



**Regrets after alcohol consumption following the
2008 financial crisis in Iceland: A prospective cohort
study**

Anna María Guðmundsdóttir

**Ritgerð til meistaragráðu
Háskóli Íslands
Læknadeild
Námsbraut í lýðheilsuvísindum
Heilbrigðisvísindasvið**



HÁSKÓLI ÍSLANDS

Áfengisneysla í kjölfar efnahagsþrenginganna á Íslandi

Anna María Guðmundsdóttir

Ritgerð til meistaragráðu í Lýðheilsuvísindum

Umsjónarkennari: Arna Hauksdóttir

Meistaraprófsnefnd: Dr. Arna Hauksdóttir, Ragnhildur Guðmundsdóttir (MSc) og Dr. Vilhjálmur
Rafnsson

Læknadeild

Námsbraut í Lýðheilsuvísindum

Heilbrigðisvísindasvið Háskóla Íslands

Febrúar 2013

Regrets after alcohol consumption following the 2008 financial crisis in Iceland: A prospective cohort study

Anna María Guðmundsdóttir

Thesis for the degree of Master of Public Health Sciences

Supervisor: Arna Hauksdóttir

Masters committee: Arna Hauksdóttir, Ph.D., Ragnhildur Guðmundsdóttir, MSc,

Vilhjálmur Rafnsson, Ph.D

Faculty of Medicine

Department of Public Health Sciences

School of Health Sciences

February 2013

Ritgerð þessi er til meistaragráðu í lýðheilsuvísindum og er óheimilt að afrita ritgerðina á nokkurn hátt nema með leyfi rétthafa.

© Anna María Guðmundsdóttir 2012

Prentun: Nón

Reykjavík, Ísland 2012

Abstract

Objectives: Economic recessions have been known to affect a population's health and well-being in numerous ways. Alcohol consumption patterns may change with economic fluctuations, however, the knowledge base on if and how the 2008 economic recession in Iceland affected alcohol intake is limited. The aim of our study was to investigate whether the economic recession in Iceland was associated with changes in alcohol consumption and regrets after drinking from 2007 (before recession) to 2009 (after onset of recession) and if socioeconomic status, financial difficulties, stress levels and social support affected potential changes.

Methods: A nationally representative prospective cohort of 3,432 Icelanders answered a health related questionnaire including questions on alcohol consumption and regrets after drinking in 2007 and again in 2009. Alcohol consumption (drinking five drinks or more per one occasion) and regrets after drinking were measured by two items from The Alcohol Use Disorders Identification Test (AUDIT-Scale). Binary logistic regression was used to identify potential change in alcohol consumption and regrets after drinking in 2009, using 2007 as a reference.

Results: Odds of drinking five drinks or more per one occasion remained similar between the years (overall OR=0.89; CI 0.78-1.02), the only observed subgroup difference was for the employed or otherwise active in the society. Overall regrets after drinking decreased between the years 2007 and 2009 (OR=0.85; CI 0.74-0.97). Regrets after drinking decreased for males (OR=0.82; CI 0.69-0.98), those married/cohabiting (OR=0.85; CI 0.73-0.99), for individuals with a university degree (OR=0.78; CI 0.61-0.99), the employed (OR=0.85; CI 0.73-0.98) and those active in the society (OR=0.85; CI 0.73-0.98). Those reporting high stress levels at both time points or high stress levels only in 2009 had higher risk of having regrets after drinking than those reporting low stress levels in both years (OR=2.89; CI 1.01-8.28 and OR=1.83; CI 1.07-3.12, respectively). Those who reported high social support in 2007 but low support in 2009, had increased regrets after drinking in 2009 compared to those who had high social support in both years (OR=1.52; CI 1.12-2.07 (measured by trust to others) and OR=1.49; CI 1.09-2.02 (measured by access to help from others)).

Conclusions: In a prospective Icelandic cohort, our findings indicate that regrets after drinking decreased following the economic recession in 2008; specifically for males, those who were married or cohabiting, employed or with a university education. Furthermore, higher stress levels and decreased social support between the two years were associated with increased risk of regrets after drinking. Future studies should focus on addressing the long-term effects of the economic crisis with specific focus on sub-groups such as females, the unemployed and those experiencing increased stress levels or low social support.

Ágrip

Inngangur: Efnahagsþrengingar geta haft margvíslegar afleiðingar á heilsu og líðan einstaklinga. Breytingar á efnahagi þjóðfélaga geta þannig haft áhrif á áfengisneyslu en lítið er vitað um hvort eða hvernig efnahagsþrengingarnar á Íslandi árið 2008 hafi áhrif á áfengisneyslu. Markmið þessarar rannsóknar var að kanna hvort efnahagsþrengingarnar á Íslandi árið 2008 hafi haft áhrif á breytingar á áfengisneyslu eða sektarkennd eftir áfengisdrykkju frá árinu 2007 (fyrir þrengingar) til ársins 2009 (í þrengingum) sem og hvort þjóðfélagsleg staða, fjárhagserfiðleikar, streita eða félagslegur stuðningur hefði áhrif þar á.

Efniviður og aðferðir: Rannsóknin var framsýn ferilrannsókn sem náði til 3432 Íslendinga sem svöruðu spurningalista bæði árin 2007 og 2009 um margvíslega heilsutengda þætti, þar með talið áfengisneyslu og sektarkennd eftir áfengisdrykkju. Neysla áfengis (neysla a.m.k. fimm drykkja í einu s.l. 12 mánuði) sem og sektarkenndar eftir drykkju var mæld með spurningum úr AUDIT-kvarðanum (The Alcohol Use Disorders Identification Test). Notuð var lógistísk aðhvarfsgreining með 95% öryggisbili (CI) til að kanna gagnlíkindahlutfall (OR) á mögulegri breytingu á áfengisneyslu eða sektarkennd eftir drykkju frá árinu 2007 til ársins 2009. Árið 2007 var notað sem viðmið fyrir breytingu til ársins 2009.

Niðurstöður: Mynstur þess að neyta a.m.k. fimm drykkja í einu breyttist lítið frá árinu 2007 til 2009 (OR=0,89; CI 0,78-1,02). Aðeins fannst marktækur munur á meðal þeirra sem voru í vinnu eða að öðru leyti virkir í samfélaginu. Sektarkennd eftir áfengisdrykkju minnkaði marktækt milli árána (OR=0,82; CI 0,69-0,98), sérstaklega hjá karlmönnum (OR=0,82; CI 0,69-0,98), hjá þeim sem voru giftir eða í sambúð (OR=0,85; CI 0,73-0,99), með háskólagráðu (OR=0,78; CI 0,61-0,99), í vinnu (OR=0,85; CI 0,73-0,98) og hjá þeim sem voru virkir í samfélaginu (OR=0,85; CI 0,73-0,98). Niðurstöðurnar sýndu ennfremur að þeir einstaklingar sem greindu frá því að upplifa mikla streitu bæði árin 2007 og 2009 sem og aukna streitu milli árána voru í aukinni áhættu á að finna fyrir sektarkennd eftir drykkju samanborið við þá sem greindu frá lítilli streitu bæði árin (OR=2,89; CI 1,01-8,28 og OR=1,83; CI 1,07-3,12). Þeir sem fundu fyrir minnkuðum félagslegum stuðningi (mælt sem traust til annarra) milli árána 2007 og 2009 voru í aukinni áhættu á því að upplifa sektarkennd eftir drykkju borið saman við þá sem greindu frá miklum félagslegum stuðningi bæði árin (OR=1,52; CI 1,12-2,07). Það sama átti við hjá þeim sem fundu fyrir minnkuðum félagslegum stuðningi milli árána (mælt sem það að geta auðveldlega leitað hjálpar frá öðrum) samanborið við þá sem greindu frá miklum stuðningi bæði árin (OR=1,49; CI 1,09-2,02).

Ályktanir: Niðurstöður benda til þess að sektarkennd eftir áfengisdrykkju hafi minnkað í kjölfar efnahagshrunsins á Íslandi árið 2008, sérstaklega hjá karlmönnum, þeim sem voru giftir eða í sambúð, þeim sem voru með háskólagráðu eða í vinnu. Þar að auki virðast þeir sem greina frá aukinni streitu og minni félagslegum stuðningi milli árána 2007 og 2009 vera í aukinni áhættu á að upplifa sektarkennd eftir áfengisdrykkju. Niðurstöðurnar kalla á frekari rannsóknir á langtímaáhrifum efnahagskreppunnar á Íslendinga, með sérstakri áherslu á konur, atvinnulausa einstaklinga og þá sem eru með lítinn félagslegan stuðning eða í aukinni áhættu á streitu.

Acknowledgements

First of all, I would like to thank my supervisor Arna Hauksdóttir for her endless support, guidance and advice throughout the process. Your excellent feedback and review encouraged me and kept me going when I was lost and needed motivation. I was truly inspired by your academic mentorship.

I also want to thank my co-supervisor Ragnhildur Guðmundsdóttir for her excellent comments, support and linguistic input to this thesis. Your advice on study methods and analysis were extremely helpful. Thank you Vilhjálmur Rafnsson, co-supervisor, for your important comments. Your knowledge and epidemiological input was of great assistance. Unnur Anna Valdimarsdóttir, head of the Centre of Public Health Sciences, thank you for your guidance in the beginning of the process and the introduction to the Public Health field.

I thank Örn Ólafsson (statistician at CPHS) and Christopher McClure, fellow student at CPHS, for their valuable help with statistical procedures and data analysis. I would also like to thank Stefán Hrafn Jónsson and Jón Óskar Guðlaugsson at the Directorate of Health (former Public Health Institute of Iceland) for providing access to and assistance with the valuable data collection utilized in this study.

Special thanks to all my co-workers at Stapi, Centre of Public Health Sciences in the University of Iceland. Thanks to all the doctoral students and former thesis-writers for excellent advice and tips, you truly know the process can be tough at times. Thanks to Sigrún Elva and other co-students, for mental support and understanding through the process.

Finally I thank my family and friends for believing in me and supporting me. I especially thank my partner for his patience and infinite support in every possible way. Your endless positive attitude made this process so much easier.

Table of contents

Abstract.....	3
Ágrip	4
Acknowledgements	5
Table of contents	6
Table of figures.....	8
Introduction.....	9
1 Alcohol – consumption and effects.....	9
1.1 Effects of alcohol use	9
1.1.1 Physical effects of alcohol use	9
1.1.2 Psychological and social effects of alcohol use	10
1.2 Different outcomes of alcohol related problems and definitions of terms	10
1.3 Alcohol consumption – worldwide and in Iceland	11
1.3.1 Alcohol use and availability in Iceland.....	12
1.3.2 Alcohol regulations in Iceland.....	12
1.4 Influencing factors on alcohol consumption	12
1.4.1 Employment status and alcohol consumption	13
1.4.2 Availability and pricing of alcohol.....	14
1.4.3 Psychological stress, social support and alcohol consumption.....	14
1.4.4 Negative life events and alcohol consumption	14
2 Economic hardships – effects on health and health behavior.....	16
2.1 Unemployment and effects on health	16
2.2 Physical health effects of experiencing a financial recession	16
2.3 Psychological effects of experiencing a financial recession	17
2.4 Health behavior during financial recessions	17
3 Alcohol consumption during economic hardships	19
3.1 The economic recession in Iceland	20
Aim.....	21
Article.....	22
Abstract.....	23
Introduction.....	24
Methods	25
Study design and population	25

Measures	25
Covariates.....	25
Statistical analysis	27
Results.....	29
Regrets after drinking and binge drinking.....	29
Regrets after drinking in 2009 in relation to stress levels, social support and economic factors..	29
Individual change within subgroups for regrets after drinking from 2007 to 2009.....	30
Discussion	31
Alcohol consumption and socio-demographic factors.....	31
Alcohol intake and employment status.....	31
Economic recessions, financial difficulties and alcohol consumption	32
Stress, social support and alcohol consumption	33
Strengths and limitations	33
Conclusion	35
Acknowledgements	36
References	37

Table of figures

Table 1 - Characteristics of the cohort of the "Health and Wellbeing"-study responding in 2007 and 2009 compared to group responding in 2007 only.....	43
Table 2 - Proportion of individuals in the "Health and Well-being"-study reporting regrets after drinking in 2007 and 2009 and odds ratios of change in regrets after drinking from 2007 to 2009.....	46
Table 3 - Proportion of individuals in the "Health and Well-being"-study reporting regrets after drinking compared to those reporting no regrets after drinking in 2009.....	48
Figure 1 - Individual change within subgroups in the "Health and Wellbeing"-study for regrets after drinking from 2007 to 2009	50
Appendix A - Individual change within subgroups for regrets after drinking from 2007 to 2009 in the "Health and Wellbeing"-study.....	51

Introduction

1 Alcohol – consumption and effects

Alcohol has been a part of human society throughout history all over the world. Fermented drinks were consumed for their nutrient, medical, antiseptic and analgesic purposes. Alcohol has played an important role in religion and worship and has a widely known cultural value for humans yet today. It is known as a social lubricant and has been used to promote enjoyment of life and enhance the flavor of food. Nonetheless, negative effects of excessive alcohol consumption were quickly realized [1].

1.1 Effects of alcohol use

Alcohol use can have multiple effects on the health and well-being of individuals and their families. Moderate alcohol consumption, that is less than two drinks a day, has been known to have cardio-protective effects [2] and may improve insulin sensitivity [3]. However, alcohol consumption is more known for its negative effects. In 2011, The World Health Organization (WHO) published a global status report on alcohol and health where alcohol is stated to be a causal factor for over 60 types of injuries and diseases and results in around 2.5 million deaths every year [4]. The volume and pattern of drinking are both factors associated with alcohol related diseases and injury, with frequent alcohol intoxication and heavy episodic drinking showing the most severe negative effects on health. About 4.5% of the global burden of disease and injury is stated to be attributable to alcohol, linking to both the incidence of disease and the course of disease. Alcohol has furthermore been identified as a possible causal factor for around 200 of about 68,000 components of the International Classification of Diseases, (ICD-10) codes, with over 30 codes directly including alcohol in their definition. Common alcohol attributable diseases are for example liver cirrhosis, many types of cancer, cardiovascular diseases and neuropsychiatric disorders [4].

1.1.1 Physical effects of alcohol use

In a review article of acute alcohol abuse it was found that alcohol abuse was connected to numerous acute diseases in the gastrointestinal tract such as in the liver, pancreas and stomach. It was also connected to impaired central nervous system activity, insufficient immune system responses to infections and prolonged recovery from physical trauma [5]. In an experiment of 80 university students, binge drinking (defined as at least five alcohol doses per drinking occasion) showed serious effects on brain function with massive perceptive and attention level impairments [6]. The delirious effects were not only connected to pure volume, but also to the binge drinking pattern of acute intoxications and abstinence periods. Furthermore, heavy drinking has been related to increased risk of physical injuries, injury related hospitalizations and traffic accidents. In addition, alcohol has direct toxic effects on organs and tissues, which in severe dosage may cause intoxication or alcohol psychosis [4]. Alcohol consumption may also lead to other alcohol use disorders such as alcohol dependence (alcoholism), which may lead to even more complex physical and psychological consequences due to

the fact that alcoholics often show impaired control over alcohol use and give it higher priority than other life obligations [4, 7].

1.1.2 Psychological and social effects of alcohol use

In addition to direct physical consequences, alcohol abuse of individuals affects their environment and may lead to many social, psychological and behavioral problems, such as relationship problems, financial difficulties and delinquency problems [8-11]. Negative experiences often accompanied with excessive alcohol use have been found to be increased quarrels or arguments, sexual risk-taking behavior that is regretted afterwards, getting into scuffles or fights (especially among men) and even getting into trouble with the police [12]. Numerous studies have reported alcohol abuse or misuse to increase negative and antisocial behavior such as aggressiveness and violence towards spouse or other family members [10, 13, 14]. Other negative factors associated with excessive alcohol consumption are increased risk of depression and suicide [15, 16] as well as increased risk of anxiety, functional disability and substance abuse [7]. The causal relationship of the effects of alcohol use on depression and anxiety is however controversial as both factors may also lead to increased alcohol use through the attempt to reduce negative emotions resulting from anxiety and depression [7, 15, 17, 18].

1.2 Different outcomes of alcohol related problems and definitions of terms

Alcohol problems may appear in numerous different ways. Hazardous alcohol use is defined by the WHO Lexicon as a pattern of use that increases the risk of harmful consequences of public health significance [19]. The Directorate of Health in Iceland conducted a clinical guidance manual for employees of the Icelandic health care service to diagnose and treat alcohol problems [20]. In the manual it is mentioned that alcohol-related problems are mostly manifested in four ways: (a) by several physical problems or symptoms such as cardiologic symptoms, gastrointestinal problems, several types of cancer, seizures, accidents and falls, (b) by several psychological problems such as amnesia, anxiety, depression and hallucinations, (c) by work-related problems like increased absence or reduced workload, and (d) by social-related problems such as relationship or marital problems, increased violent behavior, unsafe sex and financial difficulties. The manual recommends using The Alcohol Use Disorders Identification Test (AUDIT) questionnaire to diagnose alcohol-related problems when alcohol abuse, harmful alcohol use or alcohol dependence is suspected [20].

Alcohol dependence may develop when individuals have a severely strong desire to drink and alcohol use is given a higher priority than other behaviors that had greater value before [21]. Alcohol dependence is classified by the ICD-10 codes when individuals manifest at least three of the six symptoms listed in the diagnostic guidelines together at some time during the past 12 months. The symptoms include: (a) strong desire or compulsion to drink, (b) difficulties in controlling the use, (c) withdrawal state when the use is reduced or ceased, (d) evidence of increased tolerance to alcohol (e) neglect of interests as a result of increased time used for alcohol drinking or recovery, and (f) persistence of alcohol use despite harmful consequences [21, 22]. Alcohol abuse is listed in the

Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), published by the American Psychiatric Association as maladaptive drinking patterns that lead to significant impairment or distress [23]. Harmful alcohol use is listed in the ICD-10 codes and is further defined by a Lexicon developed by WHO as a pattern of use that causes physical or mental damage to health, often associated with adverse social consequences [19]. Indications for harmful alcohol use have been identified, like, having guilt or regrets after drinking [24] and increased feelings of shame [25] or other negative experience after alcohol drinking, such as increased depression [26].

Binge drinking is defined by WHO as a pattern of heavy drinking for an extended period of time, often intervening with periods of abstinence [19]. Heavy drinking is described as a pattern of drinking that exceeds the standard of moderate drinking, often measured as quantity per occasion (e.g. five drinks on an occasion, at least once a week) [19]. In the AUDIT questionnaire, binge drinking or heavy drinking is defined as hazardous alcohol use [24]. The pattern drinking in binges may have serious consequences on health-outcomes. In a population-based study of Canadian adults with a follow-up period of eight years (N=1,154), measuring binge drinking and cardiovascular outcomes, it was found that binge drinking (measured in this study as eight or more drinks per sitting, once or more in the past 12 months) increased the risk of coronary heart disease (hazard ratio, HR=2.26) and hypertension (HR=1.57) in men. For women, there was increased risk of coronary heart disease (HR=1.10), but not of hypertension [2]. Similarly, other studies have found serious consequences of binge drinking on health; such as increased risk of coronary heart disease, stroke, sudden cardiac death, blood clots (thrombosis), some types of cancer, impaired brain function, increased risk of injury as well as many other health conditions [6, 17].

1.3 Alcohol consumption – worldwide and in Iceland

In 2005, the worldwide per capita consumption of pure alcohol (for individuals 15 years and older) was around 6.13 liters [4]. Consumption levels in the past decades have been lowest in undeveloped countries such as Africa, parts of Asia and the Moslem states and highest in economically developed countries, especially Western-Europe and the former Soviet Union countries. It is also evident that most of the total alcohol consumption by nations is consumed by a minority of heavy drinkers, which seem to explain the majority of changing consumption levels of countries [27]. Global alcohol consumption remained relatively stable or slightly decreased from the year 1990 until 2005. However, a slight increase in alcohol consumption was evident in the South-East Asia region and some African countries from 2001 to 2005 [4].

Comparing alcohol consumption in the Nordic countries (measured by pure alcohol liters sold per inhabitant, 15 years of age and older) it is evident that Denmark and Greenland have the highest consumption. From the year 1991 to 2006, Denmark sold around 11.3 to 13.4 liters per inhabitant each year. In Greenland, however, the sale decreased from 15 liters in 1991 to 11.7 liters in 2006. Finland followed with about 8.3 to 10.1 sold alcohol liters, with increasing numbers from 2000 to 2006. Iceland, Åland Islands and Norway gradually increased their sold alcohol liters from around 4.8 to 7.2 liters per person. In Sweden and The Faroe Islands, sold alcohol liters were 5.8 to 7.0 [28].

1.3.1 Alcohol use and availability in Iceland

In the past decades Icelanders have gradually increased their alcohol purchase throughout the time period. From the year 1993 to 2007, alcohol consumption in Iceland (measured by pure liters of alcohol a year, per inhabitant 15 years and older) rose from 4.45 liters to 7.53 liters [28]. Numbers since the 2008 economic downturn show a slight decrease in alcohol sale [29], until the most recent measurement of the first eight months of 2012, where the sale rose slightly compared to the year before (personal communication, Einar Snorri Einarsson, Managing director of sales- and service department in The State Alcohol and Tobacco Company of Iceland, October 16th 2012).

The number of admissions to the main rehabilitation center for alcohol and substance abuse in Iceland (Vogur) has been relatively stable throughout the years, although a slight increase from the year 1991 to 2000 was observed. That is in consistence with sales numbers of alcoholic beverages in the time period. Majority of the admitted are men and the number of individuals younger than 20 years old rose consistently from the year 1995 to 2000 [30].

1.3.2 Alcohol regulations in Iceland

Most western countries decrease access to alcohol based on age; the legal age to buy any type of alcohol in Iceland is 20 years old. In Iceland, alcohol is only sold in specific stores that specialize in sale of alcoholic beverages, it is however not available at supermarkets or other grocery stores like in many other countries. Those specific alcohol stores are however widespread and usually within range of supermarkets. Alcohol can also be purchased at Icelandic restaurants and bars or other operations with liquor license permits, most commonly at a considerably raised price [31]. Lastly, alcohol taxation in Iceland is quite high, making alcoholic beverages very expensive, especially hard liquor and spirits [32]. Looking at different types of alcohol, sales figures of spirits have mostly decreased over the past decade in Iceland, with consumption of beer and wines increasing in return. In the years just before the onset of the economic recession in Iceland (that is from 2006 to 2008), an interesting exception to that trend was visible, with sale of spirits rising quite notably, although it decreased again in 2009 [33].

1.4 Influencing factors on alcohol consumption

Numerous factors affect alcohol related behavior and patterns; socio-economic factors play an important role. For example, data by WHO and other worldwide studies show great difference in consumption levels by gender, pointing to the same direction; that men consume far more alcohol overall than women, drink more heavily and consume more alcohol per sitting than women [11, 27, 34-36], Women also report less negative affect after drinking than men, show lower alcohol dependence scores and reveal fewer alcohol-related social and physical problems [34, 37].

Age is another factor affecting alcohol consumption volume. Several studies have shown that alcohol consumption decreases with increasing age and that younger individuals drink more drinks at one session than older individuals [11, 35, 38]. Moreover, it has been shown that frequent intoxications are more prevalent among young adults, with older individuals being more likely to

abstain from alcohol [27]. Alcohol consumption is also affected by age at onset of alcohol drinking. Starting to drink alcohol at a young age can lead to more alcohol related problems and increased binge drinking later in life [8, 39].

Similarly to results regarding age and gender, marital status affects alcohol patterns; single or divorced individuals consume more alcohol than individuals who are married or in a relationship [11, 36]. Marital status appears to affect women more than men; that is, married men less frequently show significant difference from single men in alcohol consumption levels [11, 38]. Recent divorce or split-up has shown the most effect on increased alcohol consumption [40, 41], although getting divorced has also been associated with increased abstinence, especially among men [41]. Finally, studies have shown that individuals with lower educational levels engage in more binge drinking and are in increased risk of alcohol dependence than individuals with higher educational level [11, 36], indicating possible protective effects of higher educational levels on excessive alcohol consumption.

1.4.1 Employment status and alcohol consumption

Employment status has a considerable effect on alcohol consumption. Firstly, being employed has been known to have a protective effect on alcohol consumption levels [42, 43] and unemployment has often been linked to increased alcohol consumption and alcohol abuse [36, 44, 45]. However, taking unemployment length into account, the effects of unemployment on alcohol intake become more complex. Short-term or recent unemployment may lead to decreased alcohol intake [34], although recent lay-off (involuntary unemployment) has also been connected to increased alcohol consumption and alcohol disorders [41, 46, 47]. Long-term unemployment (more than two years) increases risk of elevated and very excessive alcohol consumption [48]. Recent employment and transitions to employment, on the contrary to the before mentioned results, has been found to increase drinking among young men [38]. Being employed might therefore not merely have protective effects on alcohol consumption levels. In fact, working long hours (50 hours or more per week) in early adulthood has also shown up to 4 fold increased risk of alcohol-related problems than for those not working [49].

Thus, overall inactiveness on the labor market (being unemployed, retired or on a long-term sick leave) may affect alcohol consumption levels. Inactive individuals may have fewer demanding responsibilities and thus have more time to spend in alcohol drinking than employed individuals. However, reduced income might affect their possibilities of purchasing alcohol. The literature indicates that being retired or disabled has been associated with increased risk of alcohol abuse [50, 51], but it also been associated with increased abstinence within both groups [41]. Increased vulnerability of alcohol misuse within those less active on the labor market is therefore debatable. Lastly, being a student has also been linked to increased risk of alcohol consumption. Several studies agree that students may often engage in binge drinking and heavy drinking and are more likely to binge drink than non-students [52-54]. Majority of students are often in the younger age groups which as mentioned before have also been found to be in increased risk of heavy episodic drinking [27]. Therefore, students are a group worthy of careful consideration regarding alcohol abuse.

In sum, employment status appears to have considerable effects on alcohol consumption levels and raises the question if and then how employment status and change in employment status affect alcohol consumption patterns during a period of economic recession in a society.

1.4.2 Availability and pricing of alcohol

Other factors possibly affecting alcohol consumption levels include availability and pricing of alcohol [14]. High alcohol-pricing and high government taxation of alcohol have been shown as an effective tool on the consumption levels of alcohol, especially for spirits [46, 55]. Income is therefore a probable important determinant of alcohol consumption levels [4, 56], although high poverty levels have been connected to increased alcohol consumption on account of possible home-brewing and consumption of cheap alcohol [34].

1.4.3 Psychological stress, social support and alcohol consumption

Psychological stress is another factor commonly known to affect alcohol use and may increase the risk of alcohol use disorders [47]. Chronic stress from early in life has been connected to increased problem drinking by adolescents [57]. For adolescents, the experience of environmental stressors (e.g. violent surroundings and increased availability of drugs) has been found to be directly connected to alcohol use of adolescents in South-Africa [58]. Chronic stressors in adulthood such as being separated, divorced or unemployed have also been associated with increased risk of heavy drinking [41]. Furthermore, stressful daily hassles have been shown to predict drinking the next day [59]. In addition, the experience of stress has been associated with increased pathological reasons for drinking alcohol (i.e. drinking to cope), especially when self-esteem levels are low [60]; that is alcohol drinking is often used as a coping method to dampen experience of stress or to escape from stressful situations [60, 61]. The use of alcohol to cope with tension has been related to increased risk of hazardous drinking patterns (binge drinking) among students [62].

High social support (i.e. strong relations to family and/or friends) may however act as a buffer to this stress-induced alcohol consumption. Several studies report the buffering effect of social support to stress-induced drinking, especially among women [36, 63]. Similarly, high levels of emotional support by a spouse or partner have been found to decrease alcohol use of men [9]. Individuals reporting high social support have also shown decreased risk of heavy drinking or alcohol dependence [36, 64], indicating the importance of social support from significant others during stressful conditions such as an economic crisis period. However, frequent contact with friends has also shown opposite results as social gatherings often include alcohol drinking [11].

1.4.4 Negative life events and alcohol consumption

Experiencing an acute psychological trauma or a negative life event of some kind can have serious effects on individual's health and well-being. For example, loss of a spouse or a loved one has been known to increase risk of heavy alcohol consumption [65] and increase alcohol-related mortality [66].

In a recent study, men who had lost their wife showed increased risk of alcohol related problems in the first two years after bereavement (OR=2.78) compared to non-bereaved men [67]. Similar results have been found for widows, showing correlations between seeking relief of grief after loss and increased alcohol drinking [68]. The younger bereaved (7-25 years old) who lost their parent in an accident or to suicide, have shown increased rates of later alcohol abuse [69]. Similarly, a study of bereaved adults (19 years of age or older) who lost one or both of their parents, found that loss of a mother led to increased binge drinking among women and loss of both parents (within a five year period) increased odds of binge drinking for men [70].

Experiencing a traumatic event in youth, i.e. physical or sexual assault/abuse or having witnessed violence, has also been related to increased risk of heavy drinking and binge drinking later in life [71, 72]. In addition, recent divorce or separation has been associated with heavy drinking among both men and women [41]. Retirement is a major life changing event that has been related to adverse health outcomes such as increased alcohol drinking [50], but also to increased abstinence of alcohol drinking [41]. Other traumatic experiences, such as being a victim of a terrorist attack or bombing victims, have also been linked to increased alcohol consumptions among victims, both in the first few months after the event and months later [47, 73]. Furthermore, experiencing extremely stressful situations such as war, accompanied by diagnosis of posttraumatic stress disorder, was found to increase the risk of alcohol use and problem drinking among veterans who served in the 1991 Gulf War [74].

2. Economic hardships - effects on health and health behavior

In the past centuries the world economy has fluctuated with times of decline and rise. In the twentieth century were three major international crises, the Great Depression in 1929, the post-Communist recession in the former Soviet Union countries in the early 1990s and the East Asian financial crisis in the 1990s [75]. Each crisis brought upon major financial difficulties with increased unemployment, inflation and loss of savings. The most recent global recession, originating in 2008, is no exception with similar reports of sharp declines in international trade, collapse of financial institutions, budget constraints of governments and rising unemployment in many countries [76].

2.1 Unemployment and effects on health

During economic recession the unemployment rates often rise when firms and corporations are forced to lay off employees as a result of worsening economical conditions [75]. Increased unemployment rates have been linked to increased morbidity, suicide and other health hazards [77, 78]. Studies have also indicated that unemployment may lead to poorer psychological health of individuals [79]. However, other researchers have found opposite results with mortality rates decreasing with increasing unemployment rates [80]. In a study of economic fluctuations in the Asia-Pacific countries, it was revealed that a point increase in unemployment rates negatively influence mortality, especially mortality from cardiovascular disease, motor vehicle accidents and infant mortality [81]. In a Swedish study of middle aged men it was found that both short-term and long-term unemployment led to an increased risk of alcohol-related hospitalization 12 years later [82]. Therefore, how job loss will affect alcohol consumption during the economic recession in Iceland is difficult to forecast; the effects might also not be visible until later in life.

2.2 Physical health effects of experiencing a financial recession

Economical recessions may affect a population in many ways other than purely financially. Results of the effect of economical fluctuations on health and mortality have been mixed, with more recent studies agreeing that during economic downturns, health improves rather than worsens and mortality rates may decrease, with the exception of suicides [80, 83]. Furthermore, macro-economic studies have shown that mortality seems to decrease during economic downturns, and increase in upturns [84, 85]. However, other studies have found that mortality may also increase during a crisis period [86]. A review-article, including studies from Europe, North- and South-America, South-Korea and Africa, revealed that all-cause mortality during a period of an economic crisis was increased in seven of the eight studies investigated [87]. Moreover, the experience of financial strain which is a common factor during economic recessions has been known to have negative effects on self-rated physical health later in life [88].

2.3 Psychological effects of experiencing a financial recession

During economic downturns, mental health appears to deteriorate more than physical health [83, 89]. Numerous studies show that mental health seems to be worse in hard economic times than good economic times, with reports of increased incidents of mental disorders, anxiety and depression as a result of economic difficulties [90-92]. Perceived financial strain has shown correlations to increased distress and worse mental health [93]. A longitudinal study of psychological health during the 1997 financial crisis in Indonesia indicated that psychological distress increased during the crisis and remained elevated even after the crisis was over and the economy was stable again (three years later), indicating possible negative long-term effects of financial crisis on psychological well-being [94]. In addition, a more recent study of the current global economic recession has revealed that the mental health of English men has deteriorated following the 2008 recession, with evidence that the change is not merely a result of rising unemployment rates as a similar decline was observed for employed men [95].

Studies have shown that stress can increase during financial strain and hardship [96]. The experience of household financial strain such as not being able to make ends meet or having to cut back on food has also been related to increased risk of depressive symptoms [97]. Results from daily surveys conducted by the Gallup Organization in America, on self-reported well-being, showed that the American population reported markedly increased worries and stress shortly after the current economic crisis (autumn 2008) [98]. Another study found that those who experienced more economic strain or hardship as a result of a recession period, were significantly more stressed than those who experienced less economic strain [78]. The effect of the current economic crisis on stress levels of Icelanders (measured with Perceived Stress Scale-4) was studied in a prospective cohort study of 3,755 individuals, comparing two time points: (a) 2007 (before recession) and (b) 2009 (during recession). Gender specific measures of high stress levels, assessed with binary logistic regression of stress levels above the cut-off point at the 90th percentile level, revealed that high stress levels were significantly increased between the years for women (OR=1.37; CI 1.16-1.61) but not for men (OR=1.13; 0.92-1.39) [99]. In context, it can thus be speculated that increased psychological stress during an economic recession may consequently increase the risk of alcohol abuse. Social support has however been shown to act as a buffer to perceived stress and depression during economic hardship [96]. Having social relationships or social networks has been known to help against the negative effects of rapid macro-economic changes on mental health [100]. Therefore, low or lowered social support during an economic recession may lead to decreased mental health and moreover, increase alcohol related problems.

2.4 Health behavior during financial recessions

Previous studies have shown that increased financial problems make it more difficult to engage in a healthy lifestyle [88, 101]. As mentioned, during economic adverse situations, people often tend to increase risky behaviors such as alcohol consumption and drug use [34]. Other studies have shown different results, indicating that people increase healthy behavior during difficult economic situations

[83]. Furthermore, during economic downturns, tobacco use and obesity decreases and physical activity increases as a result of declining work hours and lifestyle changes [102]. The change was found to be most visible among the heavy smokers and the severely obese. A study of the effects of the current economic crisis on numerous health behaviors of the Icelandic population found that health-compromising behavior, such as smoking, heavy drinking and consumption of soft drinks and sweets, reduced following the crisis [103]. However, health-promoting behavior both decreased (i.e. consumption of fruits and vegetables reduced) and increased (i.e. amount of sleep and fish oil consumption elevated) compared to before the recession. The same was observed in a study specifically addressing the effects of the 2008 economic recession on smoking behavior of Icelanders. Prevalence of smoking declined following the economic recession, although gender specific results revealed that women were less likely to quit smoking (OR=0.65; CI 0.45-0.93), compared to men. Similarly, former male smokers who experienced decreased income during the economic recession showed decreased risk of relapse and for men whose income elevated the risk of relapse increased, respectively [104].

In sum, results have shown mixed results on the effect of economic collapse on health behaviors. A recent review article on health effects of economic recessions has shown that for high income countries, health-related outcomes mostly reveal decreased mortality rates and possibly increased healthy behavior during recession periods. However, certain population sub-groups who are hit hard by the recession through increased lay-offs or budget deficits, with possibly widening inequities, are more likely to suffer from the economic crisis [89]. In fact, it has been suggested that government policies should protect social-welfare expenditure during economic recessions in order to decrease income inequalities and protect population health [89, 105]. Therefore, positive and healthy behavior might justly be expected to increase during economic adverse situations, although specific sub-groups might be vulnerable to increases in some health-compromising behavior or reductions in certain health-promoting behavior.

3. Alcohol consumption during economic hardships

The research field of alcohol consumption during economic adverse situations is scarce and showing somewhat mixed results. The literature has indicated that increased poverty and long-term unemployment, both factors that become more common during an economic crisis, may lead to enhanced alcohol use and alcohol problems [34]. In the 1990s, the Finnish nation experienced an economic recession with excessively increased unemployment rates and sales numbers for alcohol decreased. However, findings from a large, nation-wide study (N=44,391) on alcohol consumption during the same period indicated overall increase in alcohol consumption among the nation. The authors' conclusion was that the mixed findings might be explained by increased alcohol amounts not recorded in sales figures, such as from home brewing, imports of alcohol from Eastern Europe and other illegal sales. Furthermore, certain population sub-groups, such as those who were unemployed, single and/or poorly educated were found to be in increased risk of being in the upper consumption level of alcohol consumption compared to employed, married or higher educated individuals, especially males [44]. In addition, it may be expected that the visible gender differences in alcohol consumption will remain during economic downturns. In a longitudinal follow-up study (from the year 1987 to 2003) of economic conditions and alcohol-related mortality in Finland, alcohol-related mortality decreased significantly for men during a recession period, while it was relatively stable during the same period for women [106]. However, a Russian study found that experiencing several kinds of economic problems was positively related to increased risk of binge drinking among men only [11]. Women were however less likely to drink when experiencing economic problems. It is therefore of great interest if and how gender differences in alcohol consumption will manifest in Iceland during the current economic recession.

However, an increasing number of macroeconomic studies have shown different results, indicating that alcohol consumption tends to decrease during economic recessions rather than rise [35, 84]. Moreover, Ruhm and Black found that the change in alcohol consumption during economic downturns was mostly explained by existing heavy drinkers, rather than recreational drinkers decreasing their drinking [35]. Chronic or heavy consumers (60 drinks or more in the past month) decreased their alcohol consumption the most whereas light drinking (1-20 drinks in past month) appeared to rise during bad economic times [35]. A Finnish study on alcohol-related mortality and economic fluctuations found a distinct difference between age and educational groups in alcohol consumption and mortality [106]. Among the older (age 45 and over) alcohol consumption and alcohol related-mortality increased during economic upturns, but not for the younger age group (45 and younger). Furthermore, alcohol-related mortality was higher in lower educational groups, for both men and women. In the lowest educational group alcohol consumption and mortality clearly followed economic cycles, with increasing consumption during upturns (unemployment decreased and earnings increased) and decreasing consumption during downturns [106].

Another factor of interest regarding alcohol use during adverse economic situations is the potential change in patterns of alcohol consumption. Hard liquor is known to be most affected by the economy; that is the intake of hard liquor decreases more than intake of lighter alcoholic beverages during economic recessions. Following economic downturns, consumers may in fact switch to cheaper

alcohol such as beer or wine as well as drinking more at home rather than on bars or restaurants. The main reason for this is concluded to be reduction of income following increased unemployment during recession times and possibly alcohol pricing [84]. The same results were evident during the economic recession in Argentina, where consumers reduced going to bars and drank at home instead. Similarly, they changed their consumption to cheaper or lower-quality alcoholic drinks [107].

3.1 The economic recession in Iceland

In October 2008, the world's economic crisis hit hard in Iceland, resulting in the collapse and nationalization of the three of the main bank institutions in Iceland, followed by a period of extreme uncertainty, along with loss of savings and funds by individuals and corporate businesses. In the following months, housing-mortgages increased, both for those who had loans in foreign currencies and for loans in the Icelandic currency due to a complete plummeting of the national currency along with heightened inflation [108]. Furthermore, unemployment rates more than doubled during the first months of the recession [109]. It is safe to say that since October 2008 the Icelandic nation has experienced extreme and manifold economic changes. It can therefore be assumed that those unforeseen events might have left the nation in a somewhat state of shock and in increased risk of worries and stress, providing an interesting avenue for extension of the prior literature on the effects of adverse economic situations like an economic downturn on alcohol intake of a nation.

Aim

Using a nationally-representative prospective cohort of Icelanders, the aim of this study was to investigate whether the economic recession in Iceland, beginning in 2008, is associated with changes in alcohol use and regrets after drinking between 2007 and 2009. Results will be analyzed in relation to different factors such as age, sex, education, income, financial difficulties, other socioeconomic status indicators, social support and stress levels.

Article

To be submitted to American Journal of Public Health

Regrets after alcohol consumption following the 2008 financial crisis in Iceland: A prospective cohort study

Anna María Guðmundsdóttir (1), Ragnhildur Guðmundsdóttir (1), Vilhjálmur Rafnsson (1), Arna Hauksdóttir (1)

1) Centre of Public Health Sciences, University of Iceland, Reykjavik, Iceland

Correspondence: Anna María Guðmundsdóttir, Centre of Public Health Sciences, University of Iceland, Stapi v/Hringbraut, 101 Reykjavík, Iceland
amg23@hi.is

Abstract:

Objectives: This study investigated potential association of the 2008 economic recession in Iceland with changes in alcohol consumption and regrets after drinking from 2007 to 2009 and if socioeconomic status, stress levels and social support affected potential changes.

Methods: A nationally representative prospective cohort of 3,432 Icelanders answered a health related questionnaire in 2007 and 2009. Alcohol consumption and regrets after drinking were measured by two items from The Alcohol Use Disorders Identification Test. Binary logistic regression was used to identify potential change in alcohol consumption and regrets after drinking in 2009, using 2007 as a reference.

Results: Alcohol consumption remained similar between the years. Overall adjusted regrets after drinking decreased between the years (OR=0.85), especially for males, those married/cohabiting, university educated individuals and the employed. High or heightened stress levels and decreased social support between the two years, was associated with increased risk of regrets after drinking compared to low stress levels or high support in both years.

Conclusions: Our findings indicate that overall regrets after drinking decreased following the economic recession in 2008, especially for males and individuals of higher socio-economic status.

Introduction

Alcohol and alcohol consumption has been a part of human societies throughout time; it has been known as a social lubricant and used to promote enjoyment of life. However, negative effects of alcohol consumption were soon observed [1] and it is now known that excessive alcohol intake can have multiple effects on health and well-being of individuals and their families. Alcohol abuse may cause numerous acute diseases in the gastrointestinal tract such as in the liver, pancreas and stomach, impaired central nervous system activity, insufficient immune system responses to infections and prolonged recovery from physical trauma [5]. In addition, alcohol abuse of individuals may lead to many social, psychological and behavioral problems, such as relationship problems, depression, anxiety, financial difficulties and delinquency problems [7, 8, 15, 16]. Regarding potential risk factors for alcohol abuse, stress has been the focus of some studies. It is known that long-term high stress levels or experiencing a crisis or trauma of some kind, e.g. loss of a loved one or divorce, can have a serious effect on individual's wellbeing and alter their alcohol consumption patterns [41, 67, 72]. Major societal changes, such as economic recessions, and their effects on alcohol intake of the population may therefore be of interest.

Stressful events, such as economic recessions, can have an important impact on the physical and psychological health. Numerous studies indicate negative effects of economic recessions on health and alcohol consumption patterns [34, 87] while others suggest the opposite [110]. Firstly, studies have shown that increased financial problems make it more difficult to engage in a healthy lifestyle [88, 101] and that people often tend to increase risky behaviors such as alcohol consumption and drug use during economic adverse situations [34]. Secondly, unemployment and acute financial difficulties, both common factors during economic recessions, have been associated with increased heavy drinking among men [41]. In addition, studies have also shown that stress may increase during financial strain and hardship [41, 96]. Social support has, however, been shown to act as a buffer to perceived stress and depression during economic hardship [96]. On the other hand, macroeconomic studies have shown opposite results regarding recessions and alcohol use, indicating that alcohol consumption tends to decrease during economic recessions rather than rise [35, 84].

In October 2008, the world's economic crisis hit hard in Iceland. Unexpectedly to the Icelandic nation, three of the main bank institutions in Iceland collapsed and were nationalized, followed by a period of extreme uncertainty, loss of savings and funds by individuals and corporate businesses, which left the nation startled and experiencing vast changes in only a number of days. The distinct shock experienced in the Icelandic population following the economic collapse provides a valuable avenue for extension of the prior literature on the effects of adverse economic situations on alcohol intake of a nation.

Methods

Study design and population

In 2007, the Public Health Institute in Iceland conducted a study to assess the health and well-being of Icelanders. A stratified, randomized sample of 9,807 Icelanders, 18-79 years old, received questionnaires by mail in October and November 2007 [111]. The population was divided into 12 strata with six age groups and two residency regions (capital area and other areas). A total of 5,909 individuals responded to the questionnaire; the final response rate of those who received the questionnaire was 60.3% [112]. In autumn 2009, those individuals who had signed an informed consent to be contacted in a follow-up study were contacted again. A total of 4,092 individuals responded (77.3% of those agreeing to participate again) [113]; of those, 3,432 answered questions on regrets after alcohol use at both time points.

Measures

Alcohol consumption was assessed by two items from The Alcohol Use Disorders Identification Test (AUDIT) by The World Health Organization (WHO) [24]. Those items were: "how often have you had five or more drinks on one occasion in the last 12 months?" with response alternatives being (a) daily or almost daily, (b) three to four times a week, (c) one to two times a week, (d) one to three times a month, (e) seven to eleven times in the past 12 months, (f) three to six times in the past 12 months, (g) once or twice in the past 12 months and (h) never in the past 12 months; and "how often during the last year have you had a feeling of guilt or remorse after drinking?" with response alternatives being (a) never, (b) monthly or less, (c) one to three times a month, (d) weekly, and (e) daily or almost daily. Hereafter these questions will be referred to as: "five drinks or more" and "regrets after drinking". The item regarding "regrets after drinking" was re-coded into those answering as having had regrets after drinking, once or more often, in the past 12 months; compared to those who reported never having had regrets in that time period. The item regarding "five drinks or more" was re-coded into those who reported consumption of five drinks or more on one occasion, once or more often in the past month, during the time period of the past 12 months; compared to those who reported drinking five drinks or more less than monthly.

The exposure of interest for our study were the vast macroeconomic changes following the 2008-crisis, therefore, the exposure variable is thus a proxy of time and corresponding waves of assessment, i.e. (0) corresponded the year 2007 and (1) the year 2009.

Covariates

Covariates included in the study were: age, sex, education, marital status, employment status, income, residency area size, number of children, capacity to manage financially and employment activeness. Also, other social and economic factors such as stress level, social support, living standards, concerns about debt, income change, mortgage increase and loss of savings were included.

Age was categorized into six age groups. Educational status was categorized into (a) basic, (b) middle, and (c) university level. Marital status was classified into (a) single or divorced, (b) committed but not cohabiting, (c) married or cohabiting and (d) widowed. Employment status was regrouped into (a) employed (employee, employer or as being ill or temporarily away from work), (b) unemployed, (c) student, (d) homemaker or on parental leave, (e) retired, and (f) disabled ($\geq 50\%$ disability). Income was measured as joint monthly household income in the Icelandic currency (Icelandic "krona") with the response alternatives (a) low ($\leq 279,000$), (b) middle (280,000 – 780,000), and (c) high ($\geq 781,000$). Size of residency area ranged from (a) city or town ($\geq 5,000$ inhabitants), (b) village (200 – 5,000 inhabitants), and (c) farming (< 200). Number of children was sorted as following: (a) 0, (b) 1, (c) 2, (d) 3, and (e) ≥ 4 children. Capacity to manage financially was estimated by the question: "how difficult or easy has it been for you and your family (if applicable) to make ends meet financially in the past 12 months (e.g. paying for food, rent and bills)", and was categorized into (a) easy, (b) neither easy nor difficult, and (c) difficult. Activity in the employment market was split into two groups: active (employed, students, on parental leave or were sick or temporarily absent from work (≤ 10 days)) and less active (full time homemakers, the unemployed, retired individuals, the disabled and those who were sick or temporarily absent from work (> 10 days)). Those who fell into both groups (active and less active) were listed as active.

Questions regarding social support were: "how easy or difficult is it for you to trust the following people for personal matters?" and "how easy or difficult is it for you to get help from the following people to solve problems?" In both questions, the question referred to (a) spouse/partner, (b) other family members, (c) friends, and (d) work-/schoolmates. Response alternatives to both questions were (a) does not apply, (b) very difficult, (c) rather difficult, (d) neither easy nor difficult, (e) rather easy, and (f) very easy. The questions were dichotomized into "difficult" (those who answered as either very difficult, rather difficult or neither easy nor difficult) and "easy" (those who answered as rather easy or very easy). Responses were then combined and categorized into five groups, depending on the number of supportive sources: (0) finds it difficult to trust or get help from all four support sources (*no social support*), (1) finds it difficult to trust or get help from three support sources (*little social support*), (2) finds it difficult to trust or get help from two of the support sources (*some support*), (3) finds it easy to trust or get help from three support sources (*much support*), and (4) finds it easy to trust or get help from all four sources of social support (*very much support*). The variables were then re-coded into four groups, (a) high social support in 2007 and high social support in 2009, (b) low in 2007 and high in 2009, (c) high in 2007 and low in 2009 and (d) low in 2007 and low in 2009.

For measurement of stress levels, the 4-item Perceived Stress Scale (PSS-4) was used. The PSS-4 scale is a four item, validated and reliable measurement for the perception of stress [114] and is designed to measure the degree to which situations in one's life are appraised as stressful. Similar to the re-coding method for the variables measuring social support, the variable for stress level was re-coded into two groups, "high" and "low", both for the years 2007 and 2009. Beforehand, responses were combined and re-coded in the same way as mentioned before for social support: (0) those who answered as never having experienced any stressful events in neither of the four questions (*no stress*), (1) answered as not having experienced any stressful events in three of the four questions

(*little stress*), (2) answered as having experienced stressful events in two of the questions (*some stress*), (3) answered as having experienced stressful events in three of the four questions (*much stress*), and (4) answered as having experienced stressful events in all of the four questions (*very much stress*). As in the case for social support, the group "low" included those who answered as having some, little or no stress, and the group "high" those who answered as having much or very much stress. Stress level was then combined and categorized into those reporting (a) low stress level in 2007 and low stress level in 2009, (b) high stress level in 2009 and low in 2007, (c) low in 2007 and high in 2009, (d) high in 2007 and high in 2009.

Regarding standard of living in 2009 compared to before the recession, the question "how is your standard of living today compared to before the banking crisis in October 2008?" was used. Response alternatives were: (a) better, (b) same, (c) worse. Concerns about debt were estimated with the question "how much or little concerns do you have about your debt?" with response alternatives being (a) none, (b) some, and (c) much. The question for change of income was: "has there been a change in your income as a result of the banking crisis in October 2008?" The change was measured as (a) raised, (b) same, and (c) lowered. Increase in mortgage was measured with the question: "have your mortgage payments increased from September 2008 until today?" It was further divided into (a) same or lowered, (b) 1-30% mortgage increase, (c) 30-60% mortgage increase and (d) over 60% increase. The question regarding loss of savings was: "how much savings, if any, did you lose as a result of the banking crisis in October 2008?" The question was in four separate parts: loss of stock shares, loss of supplementary pension savings, loss of savings in money-market funds and loss of other types of savings. All four questions were collided into only one question with two options, (a) no loss of any type of the savings mentioned above, or (b) some loss of any type of savings.

Statistical analysis

Frequency measures were used to describe background factors of the cohort answering the questionnaire in both 2007 and 2009, and those only answering in 2007 (table 1). To estimate the change of the 2008 economic recession (exposure variable) for the two main alcohol outcomes under study between the two years (i.e. 2007 and 2009), we used binary logistic regression and estimated stratified odds ratios with 95% confidence intervals (table 2). Scores in 2007 were used as a reference to scores in 2009.

The questions "five drinks or more" and "regrets after drinking" were measured with respect to numerous background factors including: age, sex, marital status, education, employment, income, residency, capacity to manage financially and employment activeness. Adjustments were made for age (in birth years), sex, education, and marital status. The model for household income was adjusted additionally for number of adults in home. Having regrets after drinking in the year 2009 was then further compared with regard to stress levels and social support in 2009 as well as specific recession related questions which were: living standards compared to before the recession, concerns about debt, income change, mortgage increase and loss of savings. In table 3 binary logistic regressions were used to measure odds ratios of having regrets after drinking in 2009 compared to having no regrets after drinking in 2009, with 95% confidence intervals. The model was adjusted for age (in birth

years), sex, education and marital status. All statistical significance measures were at the 0.05 level and two-tailed. Statistical analyses were made with PASW Statistics version 17. The study was approved by the Ethics Review Board (07-081 and 09-094) and the Data Protection Authority (S4455).

Results

Table 1 shows the characteristics of the cohort responding to the question: "regrets after drinking", in the Health and Well-being study in 2007 and 2009 (n=3,432), and the group who only responded in 2007 (n=1,676). The groups were similar in sex distribution, size of residency area and income. Compared to males, more females responded in both years, most of the respondents lived in the capital city and had an average income. The group answering only in 2007 was younger than responders of both years (mean age in 2007 was 44.5 and 51.1 for those answering 2007 and 2009 ($p<0.001$)), more likely to be single or not married ($p<0.001$) and to have basic education ($p=0.001$), than the group answering in both years. Mean score of regrets after drinking was higher for those only answering in 2007 than those answering both years ($p<0.001$).

Regrets after drinking and binge drinking

The overall adjusted odds ratio shows that regrets after drinking decreased between the two time points (OR=0.85; CI 0.74-0.97) (table 2). Gender specific analyses showed that regrets after drinking decreased significantly between the years for men (OR=0.82; CI 0.69-0.98), but not significantly for women (OR=0.88; CI 0.72-1.07). Subgroup analysis revealed that regrets after drinking had decreased for: those married or cohabiting (OR= 0.85; CI 0.73-0.99), individuals with a university degree (OR=0.78; CI 0.61-0.99), the employed (OR=0.85; CI 0.73-0.98) and those generally active in the society (OR=0.85; CI 0.73-0.98), compared to regrets after drinking in 2007. Statistically significant changes were not observed for other demographic or income groups.

Analysis for the item "five drinks or more per one occasion" showed that over-all consumption of five drinks or more was similar in the year 2009 compared to 2007 (OR= 0.89; CI 0.78-1.02) (not shown in tables, same demographic and income groups used as used in table 2). Risk of consuming five drinks or more per one occasion decreased significantly for the employed group and the group active in the society (OR=0.83; CI 0.71-0.97 and OR=0.83; CI 0.71-0.97, respectively). However, no changes were observed for other subgroups.

Regrets after drinking in 2009 in relation to stress levels, social support and economic factors

Table 3 shows analyses on regrets after drinking in 2009 with respect to (a) change in stress levels and social support between 2007 and 2009 and (b) economical related factors. Those reporting high stress levels at both time points or high stress levels only in 2009 had more regrets after drinking than those reporting low stress levels in both years (OR=2.89 (CI 1.01-8.28) and OR=1.83 (CI 1.07-3.12) respectively). When adjusting for regrets after drinking in 2007, results were however not statistically significant. Those who reported high social support (trust-item: respondents found it easy/difficult to trust others) in 2007 but low support in 2009, had increased regrets after drinking in 2009 compared to those who had high social support in both years after adjusting for age, sex, marital status and education (OR=1.52; CI 1.12-2.07). Those who had low social support (trust) in both years did, on the other hand, not have significantly more regrets after drinking than those with high social support (trust)

in both years (OR=1.24; CI 0.98-1.57). The help-item of social support showed similar results; respondents who found it difficult to seek help from others in 2007 and 2009 or only in 2009 (not in 2007), had higher risks of having regrets after drinking than those who found it easy in both years (OR=1.37; CI 1.08-1.74 and OR=1.49; CI 1.09-2.02, respectively). In addition, high concerns about debt in 2009, compared to no concerns, were related to more regrets after drinking, before adjustments (OR=1.47; CI 1.13-1.89) but not after (OR=1.13; CI 0.86-1.48). Recession related factors such as change in income, experience of change in living standards, mortgage increase and loss of savings were not linked to regrets after drinking in 2009.

Individual change within subgroups for regrets after drinking from 2007 to 2009

Individual responses to the question "regrets after drinking" in 2007 were further investigated with respect to how their responses were, to the same question, in 2009 (Figure 1). Majority of the individuals responded identically in 2007 and 2009, that is, as having no regrets in both years or as having regrets in both years. However, 39% of individuals who reported regrets after drinking in 2007 reported no regrets after drinking in 2009 and 7.4% of those who answered as not having regrets after drinking in 2007 reported having regrets in 2009. No changes were observed by demographic factors for individuals who changed their status of regrets after drinking between the two years, except for the variable employment activeness and those who were students (appendix A).

Discussion

Our findings indicate that overall regrets after drinking decreased following the 2008-economic recession in Iceland. Gender specific analyses showed that the decrease was significant for men, individuals who were employed or active in the society, highly educated and those who were married or cohabiting. When investigating magnitude of alcohol intake (five drinks or more per one occasion), no overall change was observed between 2007 or 2009. However, those employed or otherwise active in the society showed decrease in consumption of five drinks or more between the two years. Our findings furthermore indicate that increased stress levels and decreased social support following the economic recession in 2008 may be associated with increased risk of having regrets after drinking.

Alcohol consumption and socio-demographic factors

Our findings indicate that regrets after drinking decreased for men (not women) during the recession as compared to before the recession. Previously, it is known that men generally drink more heavily than women [34] and that a decrease in alcohol consumption during economic downturns is mostly explained by a decrease in consumption by existing heavy drinkers [35]. Therefore, the decrease in regrets after drinking might be connected to a more overall decrease in heavy drinking by men, resulting in a significant decrease in regrets after drinking for men but not for women.

Other background factors did mostly not show significant alterations in regrets after drinking between the two years, except regrets decreased for those who were married or cohabiting and those with a university degree as the highest level of education. Married or cohabiting individuals may have certain resiliency regarding alcohol misuse during times of crisis as they generally drink less alcohol than individuals who are not married (and show less problematic drinking behavior) [11, 36, 40]. Regarding educational level, some studies have found that individuals with low educational levels engage in more binge drinking and have increased risk of alcohol-related mortality, compared to higher educated individuals [11, 106]. However, during the recession in Finland in the 1990s, middle or highly educated females were more often in the upper consumption level of alcohol compared to less educated women [44].

Alcohol intake and employment status

Employment status appears to have a considerable effect on alcohol related outcomes. Being employed has been known to have a protective effect on alcohol consumption, with the employed drinking less alcohol than those not employed [42], which is in agreement with our study where the employed or individuals active on the labor market or in the society showed significantly decreased consumption of five drinks or more and decreased regrets after drinking from 2007 to 2009. In addition, those less active in the society showed indications of increased consumption of five drinks or more, although not significantly. Retirement and disability (both groups included in the less active group) have been shown to lead to increased alcohol use or alcohol dependency [50, 115]. Previous studies show somewhat mixed results on the effect of unemployment on alcohol consumption.

Unemployment has often been linked to increased risk of alcohol intake and alcohol abuse [36, 44, 45]. However, other studies have found that unemployment may lead to decreased alcohol intake [46], especially short-term unemployment [34].

Therefore, it can be speculated that being employed or otherwise formally active in the society may have a protective effect on alcohol consumption and alcohol related problems. In addition, individuals who are retired or disabled (in our study, a part of the "less active group") may be vulnerable to alcohol misuse.

Economic recessions, financial difficulties and alcohol consumption

Regarding effects of experiencing an economic recession on alcohol use, our findings imply that overall regrets after drinking decreased in the year 2009 (during the economic recession) compared to 2007 (before the recession). Other studies agree with those findings; that is, alcohol consumption decreasing during economic recessions [35, 84, 110]. However, some have reported increased consumptions of alcohol within certain social subgroups, such as the unemployed, single or individuals with lower socio-economic status [34, 44]. Ruhm and Black found that heavy drinking (defined as 100 drinks or more per month) decreased during an economic recession whereas light drinking (20 drinks or less per month) increased in bad economic times [35]. They also reported that reduction of alcohol intake during a recession may be due to a change in the consumption levels of existing drinkers, from heavy drinking to moderate drinking, rather than recreational drinkers reducing or discontinuing their alcohol intake. That may also be the case in our study as overall regrets after drinking and consumption of five drinks or more decreased between the years (OR=0.85 CI 0.74-0.97; OR=0.89 CI 0.78-1.02), but specific subgroups such as students, disabled individuals, those with low income and individuals who were committed but not cohabiting, showed indications of either increased binge drinking or regrets after drinking, although results were not statistically significant.

During economic downturns, financial difficulties, low income and poverty have been linked to increased risk of alcohol use [18, 34]. Jukkala et al. found that participants with several economic problems (defined as reporting two or more economic problems, such as having to refrain from purchases and/or relying on outside financial help) showed increased risk of binge drinking compared to those with fewer financial problems [11]. In our study, measurements of financial difficulties (loss of income, increase in debt or mortgage) did not affect regrets after drinking in 2009. The only indication was observed for concerns about debts in the year 2009, where those who had high concerns about their debts, showed increased regrets after drinking compared to those who had no concerns. The relationship did, however, not remain statistically significant after adjustments for potential confounding variables. The fact that no associations were observed between economic-related factors and change in regrets after drinking is of interest. One explanatory factor might be lag-time, that is, that in the fall of 2009 (one year post collapse) economic uncertainty may have had a general effect on the whole population (instead of specifically). It could therefore be that economic factors will be more predictive of increased risks of alcohol related problems as time passes.

Stress, social support and alcohol consumption

Individuals reporting high stress in both 2007 and 2009 and those who reported low stress before the recession and high stress during the recession, (increased stress levels between the two time points) showed increased regrets after drinking in 2009 after adjustments for background factors. This indicates that during an economic recession, high and heightened stress may increase the risk of alcohol abuse. Research has in fact found that stress may act as a mediator for increased alcohol consumption and alcohol-related problems [59, 60]. Acute stressful conditions, such as worsening of financial position, getting divorced or being laid off have been linked to increased heavy drinking, particularly among men. Chronic financial difficulties (long-term difficulties affording food, housing, electricity, etc.), have however been associated with more abstinence of alcohol drinking [41]. Women have been found to reveal higher stress levels than men and to be more likely to drink alcohol excessively as a coping method to negative emotions in stressful situations, but men are less likely to drink in such situations [61, 116]. Previous research on the effects of the current economic recession on Icelanders showed that stress levels increased between 2007 and 2009, particularly among women [99]. Put into perspective with our current stress results, this might explain why decrease in regrets after drinking was only observed for men, not women. Future gender-specific studies might reveal a more distinct effect of psychological stress on negative alcohol outcomes of the Icelandic population.

When investigating social support, our results showed that reduced social support between 2007 and 2009 was associated with increased regrets after drinking in 2009. Low social support, along with financial difficulties and unemployment, has previously been associated with excess risk of increased alcohol drinking [36, 64, 117]. Peirce et al. found that perceived social support decreased the risk of individuals drinking alcohol to cope with negative emotions (e.g. to forget worries) [18]. Furthermore, college students experiencing low parental attention and support have shown increased risk of alcohol-related problems and more pathological reasons for drinking through low self-esteem and increased stress levels [60]. Therefore, low social support during an economic recession may affect the risk of alcohol related problems and should also be taken into account when investigating effects of economic crisis on alcohol use.

Strengths and limitations

The strength of this study is primarily the large and prospective cohort of the Icelandic nation included in the survey; allowing prospective assessment of change in alcohol outcomes within subgroups, before and during an economic recession.

Potential limitations of the study mainly include the possible dropout of participants not answering the questionnaire in the year 2009. It is thus possible that non-participants in 2009 have different alcohol patterns which might affect our results – the most likely effect would however bias findings towards the null (given that non-responders are more likely to have increased alcohol problems). Also, some items of the original AUDIT questionnaire (a well developed measurement of alcohol intake) were missing in the questionnaire, making usage of a total AUDIT score impossible. Therefore, only two items were chosen as an outcome (drinking five drinks or more per one occasion and regrets after

drinking), that best indicated hazardous and harmful alcohol use. It should also be mentioned that self-reported measurements of alcohol intake could be subject to bias, however, studies have found the AUDIT-questions, even with self-reported measurements, as a reliable tool for identifying harmful and hazardous alcohol use [118].

Conclusion

Taken together, our findings indicate that regrets after drinking have decreased between the year 2007 and 2009, specifically for males, those who are married or cohabiting, employed or with a university education. In addition, higher stress levels and decreased social support between the two time points were associated with increased risk of regrets after drinking. The second measurement point of this study took place only one year after the economic collapse, indicating that full repercussions of the economic recession on alcohol intake may not have been visible at the time. Future studies, addressing the long-term effects of the economic crisis on alcohol intake should focus on sub-groups such as females, the unemployed and those experiencing increased stress or lowered social support.

Acknowledgements

We would like to thank the Directorate of Health (former Public Health Institute of Iceland) for providing the data. We also want to give special thanks to Örn Ólafsson, PhD, and Christopher McClure, MPH, for their statistical assistance.

References

1. Hanson, D.J. *Preventing Alcohol Abuse: Alcohol, Culture, and Control*, 1995. Westport: CT: Praeger.
2. Murray, R.P., et al. *Alcohol volume, drinking pattern, and cardiovascular disease morbidity and mortality: Is there a U-shaped function?* *American Journal of Epidemiology*, 2002. 155(3): p. 242-248.
3. Bonnet, F., et al. *Moderate alcohol consumption is associated with improved insulin sensitivity, reduced basal insulin secretion rate and lower fasting glucagon concentration in healthy women.* *Diabetologia*, 2012. 55(12): p. 3228-3237.
4. World Health Organization. *Global status report on alcohol and health*, 2011. [cited 2012 May 4th]; Available from: http://www.who.int/substance_abuse/publications/global_alcohol_report/en/.
5. Dolganiuc, A., and Szabo, G. *In vitro and in vivo models of acute alcohol exposure.* *World Journal of Gastroenterology*, 2009. 15(10): p. 1168.
6. Maurage, P., et al. *Cerebral effects of binge drinking: Respective influences of global alcohol intake and consumption pattern.* *Clinical Neurophysiology*, 2012. 123(5): p. 892-901.
7. Mewton, L., et al. *The Epidemiology of DSM-IV Alcohol Use Disorders amongst Young Adults in the Australian Population.* *Alcohol and Alcoholism*, 2011. 46(2): p. 185-191.
8. Jernigan, D.H. *Global status report: Alcohol and young people*, 2001. World Health Organization: Geneva.
9. Caldeira, V. and Woodin, E.M. *Social Support as a Moderator for Alcohol-Related Partner Aggression During the Transition to Parenthood.* *Journal of Interpersonal Violence*, 2012. 27(4): p. 685-705.
10. Reinaldo, M.A.S. and Pillon, S.C. *Alcohol effects on family relations: A case study.* *Revista Latino-Americana De Enfermagem*, 2008. 16: p. 529-534.
11. Jukkala, T., et al. *Economic strain, social relations, gender, and binge drinking in Moscow.* *Soc Sci Med*, 2008. 66(3): p. 663-74.
12. Lavikainen, H., et al. *Relationship between negative experiences and drinking experience among 15-to 16-year-old adolescents in Finland.* *European Addiction Research*, 2008. 14(3): p. 169-178.
13. Boden, J.M., Fergusson, D.M. and Horwood, L.J. *Alcohol misuse and violent behavior: Findings from a 30-year longitudinal study.* *Drug and Alcohol Dependence*, 2012. 122(1-2): p. 135-141.
14. Room, R., Babor, T. and Rehm, J. *Alcohol and public health.* *Lancet*, 2005. 365(9458): p. 519-530.
15. Archie, S., Kazemi, A.Z. and Akhtar-Danesh, N. *Concurrent binge drinking and depression among Canadian youth: prevalence, patterns, and suicidality.* *Alcohol*, 2012. 46(2): p. 165-172.
16. Pirkola, S.P., et al. *Alcohol-related problems among adolescent suicides in Finland.* *Alcohol and Alcoholism*, 1999. 34(3): p. 320-329.
17. Rehm, J., et al. *Alcohol-related morbidity and mortality.* *Alcohol Research & Health*, 2003. 27(1): p. 39-51.
18. Peirce, R.S., et al. *Relationship of Financial Strain and Psychosocial Resources to Alcohol-Use and Abuse - the Mediating Role of Negative Affect and Drinking Motives.* *Journal of Health and Social Behavior*, 1994. 35(4): p. 291-308.
19. Babor, T., et al. *Lexicon of alcohol and drug terms*, 1994. [cited 2012 June 6th]; Available from: http://www.who.int/substance_abuse/terminology/who_ladt/en/.

20. Ossurason, B., et al. *Clinical guidelines for diagnosing and treating alcohol problems in the health care system*, 2007 [cited 2012 November 11th]; Available from: <http://www.landlaeknir.is/gaedi-og-efirlit/heilbrigdisstarfsfolk/klininskar-leidbeiningar/leidbeiningar/item14963/Afengismedferd-i-heilsugaeslu>.
21. World Health Organization. *International Classification of Diseases (ICD-10)*, n.d. [cited 2012 October 10th]; Available from: <http://www.who.int/classifications/icd/en/>.
22. World Health Organization. *Dependence syndrome*, n.d. [cited 2012 November 2nd]; Available from: http://www.who.int/substance_abuse/terminology/definition1/en/.
23. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, DSM-IV. fourth ed.*, 1994. In Grant, B.F., et al. *The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence: United States, 1991-1992 and 2001-2002. [Comparative Study]*. Drug Alcohol Depend, 2004. 74(3), 223-234.
24. Babor, T.F., et al. *AUDIT - The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Care (second edition)*, 2001. Geneva: World Health Organization.
25. Dearing, R.L., Stuewig, J. and Tangney, J.P. *On the importance of distinguishing shame from guilt: relations to problematic alcohol and drug use*. Addictive Behaviors, 2005. 30(7): p. 1392-404.
26. Dennhardt, A.A. and Murphy, J.G. *Associations Between Depression, Distress Tolerance, Delay Discounting, and Alcohol-Related Problems in European American and African American College Students*. Psychology of Addictive Behaviors, 2011. 25(4): p. 595-604.
27. Babor, T., et al., *Alcohol: No ordinary commodity. A summary of the book*. Addiction, 2003. 98(10): p. 1343-1350.
28. Statistics Iceland. *Prices and consumption: Consumption of alcoholic beverages 2007*. Statistical Series, 2008. (3) Reykjavik: Statistics Iceland.
29. The State Alcohol and Tobacco Company of Iceland (ATVR). *Sales figures of alcohol*, n.d. [cited 2012 May 23rd]; Available from: http://www.vinbudin.is/desktopdefault.aspx/tabid-8/78_read-348/.
30. Steindorsdottir, T. *Alcohol and other drugs - various statistical information*, 2002. Reykjavik: Directorate of Health.
31. *Alcohol law no. 75/1998*.
32. *Alcohol taxation law no. 96/1995*.
33. The State Alcohol and Tobacco Company of Iceland (ATVR). *Annual report of ATVR in 2011*, 2011. [cited 2012 May 23rd]; Available from: http://www.vinbudin.is/desktopdefault.aspx/tabid-38/79_read-349/.
34. Khan, S., Murray, R.P. and Barnes, G.E. *A structural equation model of the effect of poverty and unemployment on alcohol abuse*. Addictive Behaviors, 2002. 27(3): p. 405-423.
35. Ruhm, C.J. and Black, W.E. *Does drinking really decrease in bad times?* J Health Econ, 2002. 21(4): p. 659-678.
36. Joutsenniemi, K., et al. *Living arrangements, heavy drinking and alcohol dependence*. Alcohol and Alcoholism, 2007. 42(5): p. 480-491.
37. Murgraff, V., et al. *Regret is what you get: The effects of manipulating anticipated affect and time perspective on risky single-occasion drinking*. Alcohol and Alcoholism, 1999. 34(4): p. 590-600.
38. Christie-Mizell, C.A. and Peralta, R.L. *The Gender Gap in Alcohol Consumption during Late Adolescence and Young Adulthood: Gendered Attitudes and Adult Roles*. Journal of Health and Social Behavior, 2009. 50(4): p. 410-426.
39. Eliassen, M., et al. *The relationship between age at drinking onset and subsequent binge drinking among women*. Eur J Public Health, 2009. 19(4): p. 378-82.

40. Power, C., Rodgers, B. and Hope, S. *Heavy alcohol consumption and marital status: disentangling the relationship in a national study of young adults*. *Addiction*, 1999. 94(10): p. 1477-1487.
41. San Jose, B., et al. *Stressors and alcohol consumption*. *Alcohol and Alcoholism*, 2000. 35(3): p. 307-312.
42. Dooley, D. and Prause, J. *Effect of favorable employment change on alcohol abuse: One- and five-year follow-ups in the National Longitudinal Survey of Youth*. *American Journal of Community Psychology*, 1997. 25(6): p. 787-807.
43. Caban-Martinez, A.J., et al. *Health indicators among unemployed and employed young adults*. *J Occup Environ Med*, 2011. 53(2): p. 196-203.
44. Luoto, R., Poikolainen, K. and Uutela, A. *Unemployment, sociodemographic background and consumption of alcohol before and during the economic recession of the 1990s in Finland*. *International Journal of Epidemiology*, 1998. 27(4): p. 623-629.
45. Deb, P., et al. *The effect of job loss on overweight and drinking*. *J Health Econ*, 2011. 30(2): p. 317-327.
46. Ettner, S.L. *Measuring the human cost of a weak economy: does unemployment lead to alcohol abuse?* *Soc Sci Med*, 1997. 44(2): p. 251-60.
47. Keyes, K.M., Hatzenbuehler, M.L. and Hasin, D.S. *Stressful life experiences, alcohol consumption, and alcohol use disorders: the epidemiologic evidence for four main types of stressors*. *Psychopharmacology (Berl)*, 2011. 218(1): p. 1-17.
48. Kriegbaum, M., et al. *Excessive drinking and history of unemployment and cohabitation in Danish men born in 1953*. *Eur J Public Health*, 2011. 21(4): p. 444-8.
49. Gibb, S.J., Fergusson, D.M. and Horwood, L.J. *Working hours and alcohol problems in early adulthood*. *Addiction*, 2012. 107(1): p. 81-88.
50. Zins, M., et al. *Effect of Retirement on Alcohol Consumption: Longitudinal Evidence from the French Gazel Cohort Study*. *Plos One*, 2011. 6(10).
51. Subramaniam, M., et al. *Prevalence and correlates of alcohol use disorders in the Singapore Mental Health Survey*. *Addiction*, 2012. 107(8): p. 1443-52.
52. Kelly-Weeder, S. *Binge drinking and disordered eating in college students*. *Journal of the American Academy of Nurse Practitioners*, 2011. 23(1): p. 33-41.
53. Mundt, M.P. and Zakletskaia, L.I. *Prevention For College Students Who Suffer Alcohol-Induced Blackouts Could Deter High-Cost Emergency Department Visits*. *Health Affairs*, 2012. 31(4): p. 863-870.
54. Velazquez, C.E., et al. *Differential prevalence of alcohol use among 2-year and 4-year college students*. *Addictive Behaviors*, 2011. 36(12): p. 1353-1356.
55. Purshouse, R.C., et al. *Estimated effect of alcohol pricing policies on health and health economic outcomes in England: an epidemiological model*. *Lancet*, 2010. 375(9723): p. 1355-64.
56. Ogwang, T. and Cho, D.I. *Economic determinants of the consumption of alcoholic beverages in Canada: a panel data analysis*. *Empirical Economics*, 2009. 37(3): p. 599-613.
57. Enoch, M.A. *The role of early life stress as a predictor for alcohol and drug dependence*. *Psychopharmacology (Berl)*, 2011. 214(1): p. 17-31.
58. Brook, D.W., et al. *Environmental stressors, low well-being, smoking, and alcohol use among South African adolescents*. *Soc Sci Med*, 2011. 72(9): p. 1447-53.
59. Ayer, L.A., et al. *Drinking and stress: An examination of sex and stressor differences using IVR-based daily data*. *Drug and Alcohol Dependence*, 2011. 115(3): p. 205-212.
60. Backer-Fulghum, L.M., et al. *The stress-response dampening hypothesis: How self-esteem and stress act as mechanisms between negative parental bonds and alcohol-related problems in emerging adulthood*. *Addictive Behaviors*, 2012. 37(4): p. 477-484.

61. Rice, K.G. and Van Arsdale, A.C. *Perfectionism, Perceived Stress, Drinking to Cope, and Alcohol-Related Problems Among College Students*. *Journal of Counseling Psychology*, 2010. 57(4): p. 439-450.
62. Tyssen, R., et al. *Use of alcohol to cope with tension, and its relation to gender, years in medical school and hazardous drinking: a study of two nation-wide Norwegian samples of medical students*. *Addiction*, 1998. 93(9): p. 1341-9.
63. Handley, E.D. and Chassin, L. *Stress-induced drinking in parents of adolescents with externalizing symptomatology: the moderating role of parent social support*. *Am J Addict*, 2008. 17(6): p. 469-77.
64. Peirce, R.S., et al. *Financial stress, social support, and alcohol involvement: a longitudinal test of the buffering hypothesis in a general population survey*. *Health Psychology*, 1996. 15(1): p. 38-47.
65. Byrne, G.J., Raphael, B. and Arnold, E. *Alcohol consumption and psychological distress in recently widowed older men*. *Aust N Z J Psychiatry*, 1999. 33(5): p. 740-7.
66. Martikainen, P. and Valkonen, T. *Mortality after the death of a spouse: rates and causes of death in a large Finnish cohort*. *American Journal of Public Health*, 1996. 86(8): p. 1087-93.
67. Pilling, J., et al. *Alcohol use in the first three years of bereavement: a national representative survey*. *Substance Abuse Treatment Prevention and Policy*, 2012. 7.
68. Grimby, A. and Johansson, A.K. *Factors related to alcohol and drug consumption in Swedish widows*. *Am J Hosp Palliat Care*, 2009. 26(1): p. 8-12.
69. Brent, D., et al. *The incidence and course of depression in bereaved youth 21 months after the loss of a parent to suicide, accident, or sudden natural death*. *Am J Psychiatry*, 2009. 166(7): p. 786-94.
70. Marks, N.F., Jun, H. and Song, J. *Death of Parents and Adult Psychological and Physical Well-Being: A Prospective U.S. National Study*. *J Fam Issues*, 2007. 28(12): p. 1611-1638.
71. Colman, I., et al. *Stress and development of depression and heavy drinking in adulthood: moderating effects of childhood trauma*. *Soc Psychiatry Psychiatr Epidemiol*, 2012.
72. Cisler, J.M., et al. *PTSD symptoms, potentially traumatic event exposure, and binge drinking: A prospective study with a national sample of adolescents*. *Journal of Anxiety Disorders*, 2011. 25(7): p. 978-987.
73. Pfefferbaum, B. and Doughty, D.E. *Increased alcohol use in a treatment sample of Oklahoma City bombing victims*. *Psychiatry*, 2001. 64(4): p. 296-303.
74. Coughlin, S.S., Kang, H.K. and Mahan, C.M. *Alcohol use and selected health conditions of 1991 Gulf War veterans: survey results, 2003-2005*. *Prev Chronic Dis*, 2011. 8(3): p. A52.
75. Stuckler, D., et al. *The health implications of financial crisis: a review of the evidence*. *Ulster Med J*, 2009. 78(3): p. 142-5.
76. OECD. *Policy responses to the economic crisis: Investing in innovation for long-term growth*, 2009. OECD.
77. Stuckler, D., et al. *The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis*. *Lancet*, 2009. 374(9686): p. 315-323.
78. Aytac, I.A. and Rankin, B.H. *Unemployment, economic strain and family distress: The impact of the 2001 economic crisis*. *New Perspectives on Turkey*, 2008(38): p. 181-203.
79. Novo, M., Hammarstrom, A. and Janlert, U. *Health hazards of unemployment--only a boom phenomenon? A study of young men and women during times of prosperity and times of recession*. *Public Health*, 2000. 114(1): p. 25-9.
80. Tapia Granados, J.A., *Recessions and mortality in Spain, 1980-1997*. *European Journal of Population*, 2005. 21: p. 393-422.
81. Lin, S.J., *Economic fluctuations and health outcome: a panel analysis of Asia-Pacific countries*. *Applied Economics*, 2009. 41(4): p. 519-530.

82. Lundin, A., Backhans, M. and Hemmingsson, T. *Unemployment and Hospitalization Owing to an Alcohol-Related Diagnosis Among Middle-Aged Men in Sweden*. *Alcoholism-Clinical and Experimental Research*, 2012. 36(4): p. 663-669.
83. Ruhm, C.J. *Are recessions good for your health?* *Quarterly Journal of Economics*, 2000. 115(2): p. 617-650.
84. Ruhm, C.J. *Economic conditions and alcohol problems*. *J Health Econ*, 1995. 14(5): p. 583-603.
85. Gerdtham, U.G. and Ruhm, C.J. *Deaths rise in good economic times: evidence from the OECD*. *Econ Hum Biol*, 2006. 4(3): p. 298-316.
86. Brenner, M.H. *Relation of Economic-Change to Swedish Health and Social Well-Being, 1950-1980*. *Social Science & Medicine*, 1987. 25(2): p. 183-195.
87. Falagas, M.E., et al. *Economic crises and mortality: a review of the literature*. *Int J Clin Pract*, 2009. 63(8): p. 1128-35.
88. Shippee, T.P., Wilkinson, L.R. and Ferraro, K.F. *Accumulated Financial Strain and Women's Health Over Three Decades*. *J Gerontol B Psychol Sci Soc Sci*, 2012. 67(5): p. 585-94.
89. Suhrcke, M. and Stuckler, D. *Will the recession be bad for our health? It depends*. *Soc Sci Med*, 2012. 74(5): p. 647-53.
90. Viinamaki, H., et al. *Mental health at population level during an economic recession in Finland*. *Nordic Journal of Psychiatry*, 2000. 54(3): p. 177-182.
91. Stein, C.H., et al. *Family ties in tough times: how young adults and their parents view the U.S. economic crisis*. *J Fam Psychol*, 2011. 25(3): p. 449-54.
92. Lee, S., et al. *Evidence for the 2008 economic crisis exacerbating depression in Hong Kong*. *Journal of Affective Disorders*, 2010. 126(1-2): p. 125-133.
93. Selenko, E. and Batinic, B. *Beyond debt. A moderator analysis of the relationship between perceived financial strain and mental health*. *Soc Sci Med*, 2011. 73(12): p. 1725-32.
94. Friedman, J. and Thomas, D. *Psychological Health Before, During, and After an Economic Crisis: Results from Indonesia, 1993-2000*. *The World Bank Economic Review*, 2008. 23(1): p. 57-76.
95. Katikireddi, S.V., Niedzwiedz, C.L. and Popham, F. *Trends in population mental health before and after the 2008 recession: a repeat cross-sectional analysis of the 1991-2010 Health Surveys of England*. *BMJ Open*, 2012. 2(5).
96. Meyer, K. and Lobao, L. *Economic hardship, religion and mental health during the midwestern farm crisis*. *Journal of Rural Studies*, 2003. 19(2): p. 139-155.
97. Okechukwu, C.A., et al. *Household food insufficiency, financial strain, work-family spillover, and depressive symptoms in the working class: the Work, Family, and Health Network study*. *American Journal of Public Health*, 2012. 102(1): p. 126-33.
98. Deaton, A. *The financial crisis and the well-being of Americans*. *Oxf Econ Pap*, 2012. 64(1): p. 1-26.
99. Hauksdottir, A., McClure, C.B., Jonsson, S.H., Olafsson, O. and Valdimarsdottir, U. *Increased stress among women following an economic collapse – a prospective cohort study*. *American Journal of Epidemiology*, in press.
100. Wahlbeck, K. and McDaid, D. *Actions to alleviate the mental health impact of the economic crisis*. *World Psychiatry*, 2012. 11(3): p. 139-45.
101. Tangcharoensathien, V., et al. *Health impacts of rapid economic changes in Thailand*. *Social Science & Medicine*, 2000. 51(6): p. 789-807.
102. Ruhm, C.J. *Healthy living in hard times*. *J Health Econ*, 2005. 24(2): p. 341-63.

103. Asgeirsdottir, T.L., Corman, H., Noonan, K., Olafsdottir, Th. and Reichman, N.E. *Are Recessions Good for Your Health Behaviors? Impacts of the Economic Crisis in Iceland*. Working Paper No. 18233, 2012 [cited 2012 November 14th]; Available from: http://www.nber.org/papers/w18233.pdf?new_window=1.
104. McClure, C.B., et al. *Economic crisis and smoking behaviour: prospective cohort study in Iceland*. *BMJ Open*, 2012. 2(5).
105. Stuckler, D., et al. *Responding to the economic crisis: a primer for public health professionals*. *Journal of Public Health*, 2010. 32(3): p. 298-306.
106. Herttua, K., Makela, P. and Martikainen, P. *Differential trends in alcohol-related mortality: a register-based follow-up study in Finland in 1987-2003*. *Alcohol Alcohol*, 2007. 42(5): p. 456-64.
107. Munne, M.I. *Alcohol and the economic crisis in Argentina: recent findings*. *Addiction*, 2005. 100(12): p. 1790-9.
108. The Central Bank of Iceland. *Price developments: 12-month inflation, 2012* [cited 2012 November 1st]; Available from: <http://www.cb.is/monetary-policy/price-developments/>.
109. Statistics Iceland. *Employment, unemployment and labour force - trend seasonally adjusted - monthly 2003-2012*, 2012 [cited 2012 October 16th]; Available from: <http://www.statice.is/Statistics/Wages,-income-and-labour-market/Labour-market>.
110. Valkonen, T., et al. *Changes in socioeconomic inequalities in mortality during an economic boom and recession among middle-aged men and women in Finland*. *Eur J Public Health*, 2000. 10(4): p. 274-280.
111. Directorate of Health. *Survey on health and well-being of Icelanders*, n.d. [cited 2012 October 2nd]; Available from: <http://www.landlaeknir.is/tolfraedi-og-rannsoknir/rannsoknir/heilsa-og-lidan-islendinga/>.
112. Jonsson, S.H., et al. *Health and well-being of Icelanders 2007: Project report*, 2011 [cited 2012 June 7th]; Available from: <http://www.landlaeknir.is/tolfraedi-og-rannsoknir/rannsoknir/heilsa-og-lidan-islendinga/>.
113. Gudlaugsson, J.O. and Jonsson, S.H. *Health and well-being of Icelanders 2009 - extended study: Project report*, 2012 [cited 2012 November 15th]; Available from: <http://www.landlaeknir.is/tolfraedi-og-rannsoknir/rannsoknir/heilsa-og-lidan-islendinga/>.
114. Cohen, S., Kamarck, T. and Mermelstein, R. *A global measure of perceived stress*. *Journal of Health and Social Behavior*, 1983. 24(4): p. 385-396.
115. Hasin, D.S., et al. *Prevalence, correlates, disability, and comorbidity of DSM-IV alcohol abuse and dependence in the United States - Results from the National Epidemiologic Survey on Alcohol and Related Conditions*. *Archives of General Psychiatry*, 2007. 64(7): p. 830-842.
116. Norberg, M.M., et al., *Social Anxiety, Reasons for Drinking, and College Students*. *Behavior Therapy*, 2010. 41(4): p. 555-566.
117. Steptoe, A., et al. *Stress, social support and health-related behavior: a study of smoking, alcohol consumption and physical exercise*. *J Psychosom Res*, 1996. 41(2): p. 171-80.
118. Skipsey, K., Burleson, J.A. and Kranzler, H.R. *Utility of the AUDIT for identification of hazardous or harmful drinking in drug-dependent patients*. *Drug and Alcohol Dependence*, 1997. 45(3): p. 157-163.

Table 1 – Characteristics of the cohort of the "Health and Wellbeing"-study responding in 2007 and 2009 compared to group responding in 2007 only

		Responders in 2007 & 2009 (n=3432)	Responders in 2007 only (n=1676)
Age	Mean ± SD	51.1 ± 15.8	44.5 ± 17.4
	Data not stated	0	19
Regrets after drinking (once or more in the last 12 months)		n=662 (19.3%)	n=508 (30.3%)
	Data not stated	0	0

Sex		n (%)	n (%)
	Male	1660 (48.4)	789 (47.7)
	Female	1772 (51.6)	864 (52.3)
	Data not stated	0	23

Age			
	18-29	370 (10.8)	405 (24.5)
	30-39	537 (15.6)	312 (18.8)
	40-49	622 (18.1)	314 (19.0)
	50-59	712 (20.7)	239 (14.4)
	60-69	689 (20.1)	188 (11.4)
	>70	502 (14.6)	198 (12.0)
	Data not stated	0	20

Marital Status			
	Single/Divorced	487 (14.3)	331 (20.0)
	Committed, not Cohabiting	132 (3.9)	138 (8.3)
	Cohabiting/Married	2663 (78.0)	1120 (67.7)
	Widowed	133 (3.9)	66 (4.0)
	Data not stated	17	21

Table 1 – continued (a)

Education		
Basic	1214 (36,3)	693 (42.9)
Middle	1327 (39.7)	609 (37.7)
University	803 (24.0)	313 (19.4)
Data not stated	88	61

Size of Residency Area		
City (>5000)	2208 (65.0)	1084 (66.0)
Village (200-5000)	888 (26.1)	426 (25.9)
Farming (<200)	300 (8.8)	132 (8.0)
Data not stated	36	34

Employment Status ¹⁾		
Employed	2992 (62.6)	1457 (59.9)
Unemployed	96 (2.0)	65 (2.7)
Student	410 (8.6)	324 (13.3)
Homemaker/Parental Leave	504 (10.5)	260 (10.7)
Disabled (\geq 50%)	237 (5.0)	131 (5.4)
Retired	539 (11.3)	194 (8.0)
Data not stated	24	19

Income		
Low	511 (15.8)	261 (17.2)
Middle	1761 (54.5)	805 (53.0)
High	543 (16.8)	246 (16.2)
Lives Alone/Doesn't Apply	416 (12.9)	208 (13.7)
Data not stated	201	156

Table 1 – continued (b)

Number of Children		
0	477 (14.0)	401 (24.3)
1	353 (10.3)	208 (12.6)
2	862 (25.2)	397 (24.0)
3	991 (29.0)	348 (21.1)
≥4	732 (21.4)	297 (18.1)
Data not stated	17	25

¹⁾ In 2009, those who were employed half-time and unemployed half-time were also listed as being employed. It should be mentioned, that the employment status variable in the questionnaire was divided in such a way that all employment status answers could be answered as either yes or no. Therefore, a person could answer as having numerous employment statuses, for example as both student and unemployed at the same time, which resulted in different total numbers for this particular variable.

Table 2 – Proportion of individuals in the "Health and Well-being"-study reporting regrets after drinking in 2007 and 2009 and odds ratios of change in regrets after drinking from 2007 to 2009

	2007 (n=3432)	2009 (n=3432)	(crude)	(adjusted)
	n (row %)	n (row %)	OR (95%) CI	OR (95%) CI ^a
Regrets After Drinking	662 (19.3)	608 (17.7)	0.90 (0.80-1.02)	0.85 (0.74-0.97)
(once or more in the last 12 months)				
Age				OR (95%) CI^a
18-29	136 (36.8)	100 (34.8)	0.92 (0.67-1.27)	0.83 (0.56-1.23)
30-39	126 (23.5)	111 (22.4)	0.94 (0.70-1.26)	0.77 (0.55-1.07)
40-49	131 (21.1)	122 (19.6)	0.92 (0.69-1.21)	0.92 (0.68-1.26)
50-59	134 (18.8)	140 (20.0)	1.08 (0.83-1.40)	1.05 (0.79-1.41)
60-69	92 (13.4)	89 (12.5)	0.93 (0.68-1.27)	0.79 (0.56-1.12)
>70	43 (8.6)	46 (7.5)	0.86 (0.56-1.33)	0.74 (0.46-1.19)
Sex				OR (95%) CI^a
Male	380 (22.9)	346 (20.8)	0.88 (0.75-1.04)	0.82 (0.69-0.98)
Female	282 (15.9)	262 (14.8)	0.92 (0.77-1.11)	0.88 (0.72-1.07)
Marital status				OR (95%) CI^a
Single/Divorced	142 (29.2)	114 (24.3)	0.78 (0.58-1.04)	0.74 (0.54-1.02)
Committed, not Cohabiting	43 (32.6)	52 (36.9)	1.21 (0.73-1.99)	1.32 (0.75-2.32)
Cohabiting/Married	463 (17.4)	420 (16.1)	0.91 (0.79-1.05)	0.85 (0.73-0.99)
Widowed	12 (9.0)	13 (8.4)	0.93 (0.41-2.11)	0.64 (0.26-1.60)
Education				OR (95%) CI^a
Basic	195 (16.1)	159 (14.3)	0.87 (0.70-1.10)	0.92 (0.72-1.16)
Middle	269 (20.3)	253 (19.3)	0.94 (0.77-1.14)	0.92 (0.75-1.12)
University	189 (19.5)	170 (20.0)	0.81 (0.64-1.03)	0.78 (0.61-0.99)
Employment				OR (95%) CI^a
Employed	621 (20.8)*	546 (19.3)*	0.90 (0.78-1.03)	0.85 (0.73-0.98)
Unemployed	16 (16.7)*	31 (19.9)*	1.24 (0.64-2.41)	0.88 (0.42-1.84)
Student	113 (27.6)	108 (32.6)	1.27 (0.93-1.75)	1.27 (0.88-1.84)
Homemaker/Parental Leave	52 (10.6)	41 (10.9)	1.03 (0.67-1.59)	0.85 (0.52-1.38)
Retired	51 (9.5)	56 (7.7)	0.80 (0.54-1.19)	0.71 (0.47-1.09)
Disabled	35 (16.4)*	26 (11.9)	0.69 (0.40-1.19)	0.67 (0.38-1.19)
Income (household-income a year)				OR (95%) CI^b
Low (<=3.4 mill. isk kr.)	86 (16.8)	76 (16.3)	0.96 (0.69-1.35)	0.78 (0.54-1.14)
Middle (3.5-9.4 mill. isk kr.)	331 (18.8)	294 (16.9)	0.88 (0.74-1.05)	0.83 (0.68-1.01)
High (=>9.5 mill. isk kr.)	136 (25.0)	132 (22.4)	0.86 (0.66-1.14)	0.93 (0.69-1.26)

Table 2 – continued

Size of Residency Area				OR (95%) CI^a	
City (=>5000)	432 (19.6)*	394 (18.0)*	0.90 (0.77-1.05)	0.86 (0.73-1.01)	
Village (5 000-200)	182 (20.5)*	158 (18.0)*	0.85 (0.67-1.08)	0.83 (0.64-1.07)	
Farming (<200)	44 (14.7)*	41 (13.9)*	0.94 (0.60-1.49)	0.64 (0.38-1.08)	
Capacity to Manage Financially				OR (95%) CI^a	
Easy	410 (19.9)*	313 (17.9)*	0.88 (0.75-1.04)	0.88 (0.73-1.05)	
Neither Easy nor Difficult	150 (17.4)*	154 (15.8)*	0.89 (0.70-1.14)	0.88 (0.67-1.14)	
Difficult	197 (21.9)*	133 (20.2)*	0.90 (0.67-1.21)	0.74 (0.54-1.01)	
Employment Activeness				OR (95%) CI^a	
Active ⁺	591 (21.5)	509 (20.0)	0.91 (0.80-1.04)	0.85 (0.73-0.98)	
Less Active ⁺⁺	57 (10.0)	82 (10.0)	1.01 (0.71-1.44)	0.89 (0.30-1.30)	

(a) Adjusted for age, sex, marital status and education.

(b) Adjusted for age, sex, marital status, education and adults in home.

(⁺) The active were: employed, students, temporarily sick (<=10 days) or on parental leave.

(⁺⁺) Less active were: unemployed, homemakers, disabled, temp. sick (>10 days) or retired.

*not significant

Table 3 - Proportion of individuals in the "Health and Well-being"-study reporting regrets after drinking compared to those reporting no regrets after drinking in 2009

REGRETS AFTER DRINKING IN 2009			
(once or more in the last 12 months)			
	n (row %)	n (row %)	OR (95% CI)
	never	=> 1 time in past	adjusted¹
	in past year	year	
Perceived stress			
Low 2007-Low 2009	2547 (82.3)	548 (17.7)	(1.0 Ref)
High 2007-Low 2009	47 (82.5)	10 (17.5)	0.89 (0.42-1.87)
Low 2007-High 2009	53 (71.6)	21 (28.4)	1.83 (1.07-3.12)
High 2007-High 2009	9 (60.0)	6 (40.0)	2.89 (1.01-8.28)
Perceived social support - Trust			
High 2007-High 2009	863 (82.9)*	178 (17.1)*	(1.0 Ref)
Low 2007-High 2009	370 (80.4)*	90 (19.6)*	1.10 (0.82-1.48)
High 2007-Low 2009	275 (76.6)*	84 (23.4)*	1.52 (1.12-2.07)
Low 2007-Low 2009	925 (81.0)*	217 (19.0)*	1.24 (0.98-1.57)
Perceived social support - Help			
High 2007-High 2009	967 (83.1)*	196 (16.9)*	(1.0 Ref)
Low 2007-High 2009	378 (78.8)*	102 (21.3)*	1.32 (1.00-1.75)
High 2007-Low 2009	287 (79.1)*	76 (20.9)*	1.49 (1.09-2.02)
Low 2007-Low 2009	803 (80.3)*	197 (19.7)*	1.37 (1.08-1.74)
Living standards compared to before recession			
Better	86 (77.5)*	25 (22.5)*	(1.0 Ref)
Same	955 (84.0)*	182 (16.0)*	1.02 (0.62-1.69)
Worse	1703 (81.1)*	396 (18.9)*	1.18 (0.72-1.94)
Concerns about debt			
None	1606 (83.4)	319 (16.6)	(1.0 Ref)
Some	748 (81.5)	170 (18.5)	0.98 (0.79-1.21)
Much	330 (77.5)	96 (22.5)	1.13 (0.86-1.48)
Income change			
Raised	78 (75.7)*	25 (24.3)*	(1.0 Ref)
Same	1441 (82.4)*	308 (17.6)*	0.96 (0.59-1.58)
Lowered	593 (82.5)*	126 (17.5)*	0.96 (0.57-1.61)

Table 3 - continued

Mortgage increase			
Same/Lowered	124 (86.7)*	19 (13.3)*	(1.0 Ref)
1-30% increase	1237 (82.5)*	263 (17.5)*	1.17 (0.69-1.98)
30-60% increase	186 (81.6)*	42 (18.4)*	1.35 (0.73-2.49)
60% increase or more	104 (83.9)*	20 (16.1)*	0.96 (0.47-1.94)

Loss of savings			
No loss	1033 (82.8)*	2115 (17.2)*	(1.0 Ref)
Loss	1370 (80.4)*	335 (19.6)*	1.11 (0.91-1.37)

(¹) Adjusted for age, sex, education and marital status.

*not significant



Figure 1 - Individual change within subgroups in the "Health and Wellbeing"-study for regrets after drinking from 2007 to 2009

The figure shows individual responses to the question "regrets after drinking" in 2007, divided into two response options: having regrets in 2007 and not having regrets in 2007 (left side of the figure). Those who responded to each category in 2007 were then further divided with respect to how their responses were, to the same question, in 2009 with the same two response options (right side of the figure).

Appendix A - Individual change within subgroups for regrets after drinking from 2007 to 2009 in the "Health and Wellbeing"-study

BACKGROUND FACTORS (in the year 2009)	No regrets in 2007 or 2009 N=2,566 (86.4%) N (row %)	Regrets in 2007 and 2009 N=404 (13.6%) N (row %)	Regrets in 2007 but no regrets in 2009 N=258 (55.8%) N (row %)	No regrets in 2007 but regrets in 2009 N=204 (44.2%) N (row %)
Sex				
Male	1178 (83.1)	240 (16.9)	143 (57.4)*	106 (42.6)*
Female	1388 (89.4)	164 (10.6)	115 (54.0)*	98 (46.0)*
Age groups				
18-29	153 (67.7)	73 (32.3)	34 (55.7)*	27 (44.3)*
30-39	329 (82.3)	71 (17.8)	56 (58.3)*	40 (41.7)*
40-49	443 (85.0)	78 (15.0)	57 (56.4)*	44 (43.6)*
50-59	513 (85.6)	86 (14.4)	47 (46.5)*	54 (53.5)*
60-69	584 (90.1)	64 (9.9)	37 (59.7)*	25 (40.3)*
70-81	544 (94.4)	32 (5.6)	27 (65.9)*	14 (34.1)*
Education				
Basic	880 (89.1)	108 (10.9)	72 (58.5)*	51 (41.5)*
Middle	973 (85.4)	167 (14.6)	88 (50.6)*	86 (49.4)*
University	589 (84.0)	112 (16.0)	91 (61.1)*	58 (38.9)*

Appendix A – continued (a)

Marital status				
Single/Divorced	310 (79.3)	81 (20.7)	46 (58.2)*	33 (41.8)*
Committed, not cohabiting	75 (67.6)	36 (32.4)	14 (46.7)*	16 (53.3)*
Cohabiting/Married	2007 (88.0)	274 (12.0)	188 (56.3)*	146 (43.7)*
Widow/-ed	134 (95.0)	7 (5.0)	7 (53.8)*	6 (46.2)*
Income				
Low	918 (88.1)	124 (11.9)	77 (57.5)*	57 (42.5)*
Middle	1274 (86.3)	202 (13.7)	141 (56.2)*	110 (43.8)*
High	255 (78.7)	69 (21.3)	32 (49.2)*	33 (50.8)*
Employment				
Employed	1790 (85.3)*	308 (14.7)*	198 (54.2)*	167 (45.8)*
Unemployed	108 (82.4)*	23 (17.6)*	17 (68.0)*	8 (32.0)*
Student	194 (71.9)	76 (28.1)	29 (47.5)	32 (52.5)
Homemaker/Parental leave	309 (92.2)	26 (7.8)	26 (63.4)*	15 (36.6)*
Retired	639 (94.2)	39 (5.8)	31 (64.6)*	17 (35.4)*
Disabled	173 (89.6)	20 (10.4)	20 (76.9)*	6 (23.1)*

Appendix A – continued (b)

Capacity to manage financially				
Easy	1319 (86.3)*	209 (13.7)*	116 (52.7)*	104 (47.3)*
Neither nor	750 (87.7)*	105 (12.3)*	71 (59.2)*	49 (40.8)*
Difficult	457 (84.3)*	85 (15.7)*	69 (59.0)*	48 (41.0)*
Employment activeness				
Active	1589 (83.7)	310 (16.3)	188 (53.1)	166 (46.9)
Less active	965 (91.1)	94 (8.9)	70 (65.4)	37 (34.6)

*not significant