

*Exploring the lifestyle factors influencing young males driving style:
A comparative study of Danish and Icelandic sample*

Sigrun Birna Sigurdardottir
DTU Transport
Technical University of Denmark
ssi@transport.dtu.dk

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Abstract

Despite general improvements in traffic safety over the years, young drivers remain a high-risk group in traffic and pose a serious health and economical problem globally. In the light of this, several studies have emerged, identifying and scrutinizing the risk factors that may contribute to this major public health issue. Males have been identified as more risk prone than females and age is a heavily contributing factor. Research regarding lifestyle and driving behaviour has identified different lifestyle profiles, which have been classified as either high-risk or low-risk profiles.

This study was a comparative study that aimed to identify lifestyle factors underlying three different driving styles for 18-19 years old Danish and Icelandic males. The study employed a detailed questionnaire with an array of leisure time and lifestyle questions that were presumably linked to driving behaviour. The three driving styles were determined by factor analyzing several questions regarding driving. The factors that emerged were given the names Thrill, Anger and Anxiety, all corresponding to particular driving behaviour. Significant difference emerged for various demographical questions, indicating that there is some difference in the traffic and transport culture between nationalities. Using the three driving styles Thrill, Anger and Anxiety as dependent variables in a linear regression, a model for each nationality and each driving style was created. The models clearly identify certain lifestyle attributes as risk factors for both groups resulting in the specific driving behaviour stated. Lifestyle attributes were similar for Thrill and Anger for both nationalities, except for drug abuse that identified these driving behaviours for the Danish sample. Lifestyle attributes for Anxiety varied the most, but the analysis did yield one variable that was the same for both samples.

Importantly, the study should be considered an explorative step toward identifying young drivers' risk factors and suggestions for further research are presented.

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Acknowledgments

In the year 2007, I received a financial support from the Icelandic Road Administration for a comparative study of factors influencing young Icelandic and Danish males driving behaviour. The research was my final project in my cand. psych education at the University of Copenhagen. However, due to extensive data, the evaluation of both nationalities was not included in the thesis. Therefore, this paper is presented for the Icelandic Road Administration, with the comparison between the two nationalities. I express my deepest gratitude to the administration for their financial support, patience and understanding throughout the process of this study.

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Introduction

It is globally acknowledged that young drivers pose a greater risk to themselves and others in traffic than any other age group. Young drivers are greatly overrepresented drivers in crashes, accounting for about 27% of driver fatalities across the OECD countries, with young male drivers' crash fatality rates as much as three times those of young female drivers (OECD, 2006). There is a global consent that traffic accidents and injuries are a major public health problem and a serious social concern. As a major but neglected public health challenge, the subject requires determined efforts for effective and sustainable prevention (World Health Organization (WHO), 2004). The reasons why young drivers pose a greater risk in traffic than any other age groups are several, and often interconnected. There is a broad range of situational factors and a very broad and dynamic range of factors influencing the behaviour of the drivers that interact together. The interaction between the characteristics of the situation including those from the on-road environment and the drivers' situation and the drivers' behaviour affect this relationship (Williamson, 1999). Recent research regarding the behaviour of young drivers has pointed out a number of interesting aspects relevant for the behaviour of young drivers. According to Gregersen (1996), the main results indicate two broad categories of influential factors. The first category has to do with the fact that young drivers are also new drivers facing a series of difficulties caused by a lack of driving skills and lack of experience. The second category of influential factors has to do with the way the young driver chooses to drive. A large number of individual factors influence the way the young driver chooses to drive. Examples of such individual factors are gender, personality and emotional state. Recognizing the importance of individual factors, awareness of the relevance of factors related to the lifestyle and general life situation of the young driver has increased (Møller & Gregersen, 2008). Furthermore, a part of young drivers fails to manage a complex range of other risk factors, many of which are related to age and gender, and are thus involved in a further disproportionate number of fatal crashes (OECD, 2006). Age-related risk factors can be found especially among young men. In their adolescence, they behave in a different manner than girls. They are more sensation seeking, more likely to

regard themselves as invulnerable, and to impress their friends, for example with a sportive driving style (The Dutch national road safety research institute (SWOV), 2008). Lifestyle has gained attention within traffic psychology and the importance of lifestyle as a predictive variable has been supported by general statistics from young drivers' accidents. Several studies have identified correlations between aspects of lifestyle and driving behaviour leading to different high- or low-risk lifestyle profiles (Berg, 1994; Chliaoutakis, Darviri & Demakakos, 1999; Gregersen & Berg, 1994). Understanding the differences in the causes of road crashes involving young people compared to crashes for other age groups, becomes an essential starting point for policy makers and others developing safety interventions targeted at young people (Williamson, 1999). Without detailed knowledge, it is impossible to make reliable decisions about suitable measures (Gregersen & Bjurulf, 1996).

Iceland and Denmark have many similarities as nations and share a common heritage background. However, the contrasts are available as well; e.g., the public transport system in each country has fundamental differences, mainly due to population and the legislation for driving is different as well. In Iceland, individuals at the age of 16 can obtain a permit for practice driving with a supervisor other than a teacher, before taking the formal test at the age of 17 (The Icelandic Ministry of Communications, 2008). However, this is not allowed in Denmark and the age for obtaining the drivers licence is 18 years, with the first lessons allowed three months prior (Danish National Police, 2002). Theoretically, if either nation has successful intervention programs in reducing the high-risk young drivers pose, there is a basis to utilize these interventions forms in either country. Beforehand though, a thorough comparison of the target group is needed before any generalizations are made.

This study was performed with a two-folded purpose; first to identify lifestyle related variables that were linked to different driving styles in a sample of young males aged 18-19 years old in Iceland and Denmark. The second purpose was to compare these findings between nationalities with the aim to identify similar lifestyle pattern between nations in order to be able to consider the possibility of a joint intervention for this group.

Age

Age is not as susceptible to change as driving experience but data shows that novice driver crash involvement decreases as the licensing age for solo driving increases, indicating that age plays a role in causing crashes (OECD, 2006). In a Danish research by Carstensen (2002) it was clear that the younger beginners in traffic had more accidents than the older beginners did. Similar results have been found in other countries where age related factors weigh heavier in countries where a driving licence can be obtained at a young age. Dutch data from 1990-2001, indicates that those that begin to drive at an older age have a much lower initial crash rate than those who begin very young, but this difference eventually becomes less (Vlakveld, 2005). Increasingly larger segments of young people today seem to adopt risk-taking behaviours. High-risk behaviour can have adverse effects on the overall development and well-being of youth and even prevent them from future successes and development. This includes behaviour that can cause physical injury as well as behaviour with cumulative negative effects. Among teens, many of the most self-injurious behaviours are related to driving (de Guzman & Bosch, 2007). Research is consensus in that overall, risk-taking behaviours begin at an early age, increase over the adolescent years, and are more common among boys than girls (Michael & Ben-Zur, 2007).

The young driver problem is well known in both Iceland and Denmark where young drivers are disproportionately high in death and crash rates compared to other age groups. For the last three years, drivers aged 17-26 years old have made up for around 20 – 25% of traffic related fatalities in Iceland but the percentage for accidents caused by this group is much higher, or approximately 38% (The Road Traffic Directorate, 2007, 2008, 2009). In Denmark, every fourth driver who is involved in an accident is under the age of 25 years old and the risk of harming both himself and others in traffic is significantly higher for younger drivers than for any other age group. For drivers aged 18-24 years old the risk is 6 times larger than for those aging 45-54 (Amternes fællesprojekt, 2002).

Gender

A study who compared the crash adjusted involvement rates of young people in the Netherlands, Sweden, and Great Britain, adjusted for exposure (involvement in

fatal accidents per kilometre), strongly indicates that the “young male problem” might be on the increase in Europe (Twisk & Stacey, 2007). Men have more crashes than women do at any age, and the impact of gender is particularly strong among the young and exacerbates the negative effects of both age and inexperience. Across various OECD countries, 18-24 year-old males show a 3-times higher involvement in fatal road crashes than their female counterparts (OECD, 2006).

In Iceland, males were almost twice as likely to be injured or die in the traffic as their female counterparts, in the year 2007, following a trend that has been evident in Iceland for a long time. Figure 1 clearly indicates the skewed ratio of males and females when it comes to fatalities in the Icelandic traffic.

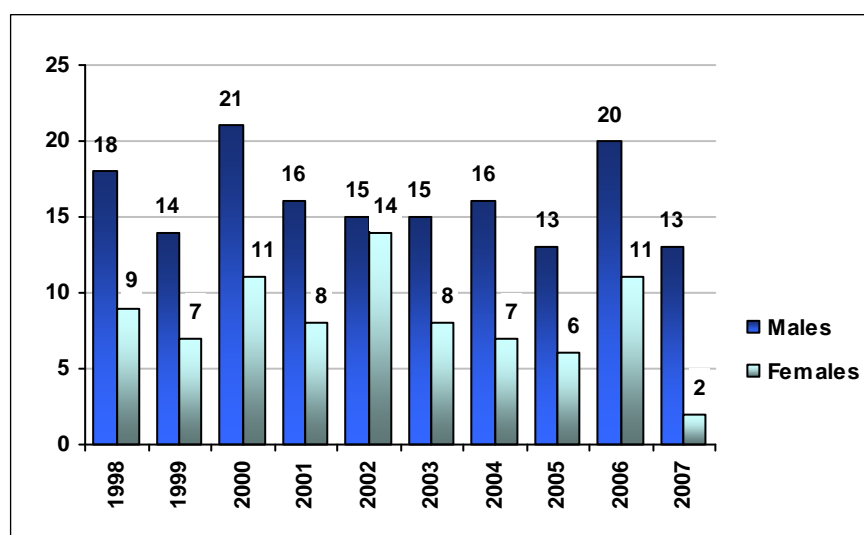


Figure 1. Deaths in traffic in Iceland based on gender (from Magnusson, 2007)

Young males in Denmark are as well considerably higher at risk to accidents in the traffic than females (Christens, 2001). In an extensive study in Denmark, 113.500 accidents were scrutinized and of them approximately 24% involved a young driver. The analysis indicated furthermore that in 82% of the accidents with the young drivers involved a male driver (Amternes fællesprojekt, 2002).

There are several reasons why males are more prone to accidents and one of the reasons is that they drive more than females do. However, in a Dutch study by Lourens, Vissers and Jessurun (1999) the effects of gender disappeared when annual mileage was accounted for. This has been observed in Iceland and Denmark as well. In Iceland the accident rate for males is approximately 2:1 compared to females, however, Icelandic males drive twice as much as Icelandic females do, therefore it is

concluded that the accident risk is equal for both genders (Briem, Thordarson & Ragnarsson, 2004). A study by Carstensen (2002) showed that despite females having far fewer accidents than males, they only drove half as much as the males did. This led to an accident risk per 1.000.000 km that was approximately the same for males and females.

Lifestyle

Lifestyle research within traffic psychology is now a on the increase due to rising awareness that driving behaviour is influenced by motivational and attitudinal factors governed by individual, cultural and situational factors outside the traffic situation (Gregersen & Bjurulf, 1996; Møller, 2004; Rothengatter, 1997). However, the smallest amount of research related to traffic behaviour has been done on social situation and lifestyle, which includes how you live, what groups you belong to, and what your interests, activities, and preferences are, etc. (Gregersen & Berg, 1994). The term lifestyle can be used to describe an individual as well as a group of people (Andreasen, 1968), it is based on the individuals need to indicate his or her social affiliation or status and is usually used in research context to describe peoples attitudes, values, value judgements, opinions, and activities (Berg, Eliasson, Palmkvist & Gregersen, 1999). Part of the young drivers' problem is indeed their age, they are in the midst of a process of freeing themselves from parents and making their own way into the adult world, a process heavily expressed with their lifestyle and youth culture, group identity, role expectations and various degree of social dependency (Gregersen, 1998). Lifestyle research has provided an important insight into the young drivers' situation in traffic in relation to their lifestyle and several studies have identified correlations between aspects of lifestyle and driving behaviour leading to different high- or low-risk lifestyle profiles (Berg, 1994; Chliaoutakis, Darviri & Demakakos, 1999; Gregersen & Berg, 1994). For example, Gregersen and Berg (1994) aimed to identify specific lifestyle profiles among young drivers and to analyse the relationship between these lifestyle profiles and accidents that young drivers had caused. They found that young drivers do not have the same accident risk. The lifestyle profile of young drivers with a high accident risk was characterised by elements such as infrequent participation in sport activities, frequent intoxication, and a generally hectic social life. Furthermore, driving with

extra motives and interest in cars were shown to be characteristic aspects of the high-risk lifestyle profiles identified. Extra motives were motives such as sensation seeking, pleasure and showing off, that is motives other than mere transportation. The most obvious advantage of their study is that it makes it possible to classify young drivers into high-, average-, or low-risk groups (Gregersen & Berg, 1994). Other studies have indicated that young male drivers seem particularly motivated to commit speeding offences by intrinsic enjoyment of fast driving (Corbett, 2003). Driving is viewed as an expressive activity by many young drivers, and is often a significant leisure activity for many (Clarke, Ward & Truman, 2005). This was well indicated in a Danish research by Møller (2002) who conducted an interview research among young Danish drivers to illustrate the relationships between lifestyle and traffic behaviour. Her results showed that besides being a means of transportation, driving has a potential psychological function extending transportation. The potential psychological function influences the self-image and identity of the young drivers. Moreover, the psychological function of driving was related to an individual sense of visibility, status, control and mobility (Møller, 2002). The differences regarding the role of driving for the youngsters was related to a difference regarding the role of driving within their peer groups. Furthermore the results indicate that the relationships between lifestyle and traffic behaviour is mediated by the subjective meaning of the traffic behaviour and hence traffic behaviour is strongly influenced by emotional and psychological motives (Møller, 2002).

One Icelandic research by Briem, Thordarson and Ragnarsson (2004) has successfully identified several psychological factors involved in young drivers' accidents in Iceland. The authors aim was to create and standardize a psychological scale for the purpose to identify high-risk drivers. Their research was divided into three phases. After each phase, the researchers changed their scale a little, to reform it and drop out unusable variables. Results originally indicated 14 psychological factors, but they were reduced down to seven in the third phase. These are; *aggression, nervousness, alertness, irresponsibility, experience seeking, excitement seeking* and *driving tediousness*. With the use of these factors, it is possible to indicate up to 20% of drivers who repeatedly break the traffic rules or cause

accidents. However, the authors point out that it would be interesting to examine what relationship lifestyle has with their factors.

The studies on the complex relationship between lifestyle and driving behaviour have contributed to a broader understanding of subgroups of drivers. Nevertheless, they have to a limited extent, been able to explain how the relationship is established (Møller & Gregersen, 2008). Therefore, lifestyle in traffic research is an important subject today in traffic psychology and various aspects of lifestyle still needs attention to conclude about the relationship to drivers' behaviour.

Comparing Iceland and Denmark

The young driver problem is well known in Iceland. The Road Accident Analysis Group (Rannsóknarnefnd umferdarslysa) (2000) has reported that young drivers in Iceland have a higher fatality rate in traffic than other age groups compared to their share in the traffic. Nevertheless, Iceland does well in comparison to other Nordic countries when comparing deaths in traffic for the year 2007. This is due to increase in accidents and decrease in deaths between the years 2006 - 2007. Countries other than Norway and Iceland see increase in deaths in traffic between the years 2006 to 2007, which is not according to the European Union objective to decrease traffic related deaths by 50% from 2000 to 2010 (Tolón-Becerra, Lastra-Bravo, & Bienvenido-Bárcena, in press). The Icelandic government has taken up similar agenda, with the purpose of decreasing deaths. Their objective is to lower traffic related deaths down to what is similar to other countries for every 100.000 habitants. The ratio has been on average around 9:100.000 for the last 10 years (The Road Traffic Directorate, 2009a). Iceland is making a progress in this battle but despite the few fatalities since 2007, it is difficult to generalize from these years alone since each accident has a proportionally greater effect in Iceland than in larger Scandinavian countries, due to the country's few inhabitants (The Road Traffic Directorate, 2008).

In Denmark, young drivers between the ages 18-24 are more likely to be involved in a car accident than any other age group in Denmark (Møller, 2004; Danmark Statistik, 2008). In fact, one of every four persons killed in traffic is under the age of 25 in Denmark (Havarikommissionen for Vejtrafikulykker (HVU), 2002). Figure 2 depicts the ratio of deaths in traffic for the Nordic countries for the years 1998 to

2007 and as can be seen, Iceland and Denmark have followed a similar path for the past years, but from 2006 there has been some difference in this ratio between the nations.

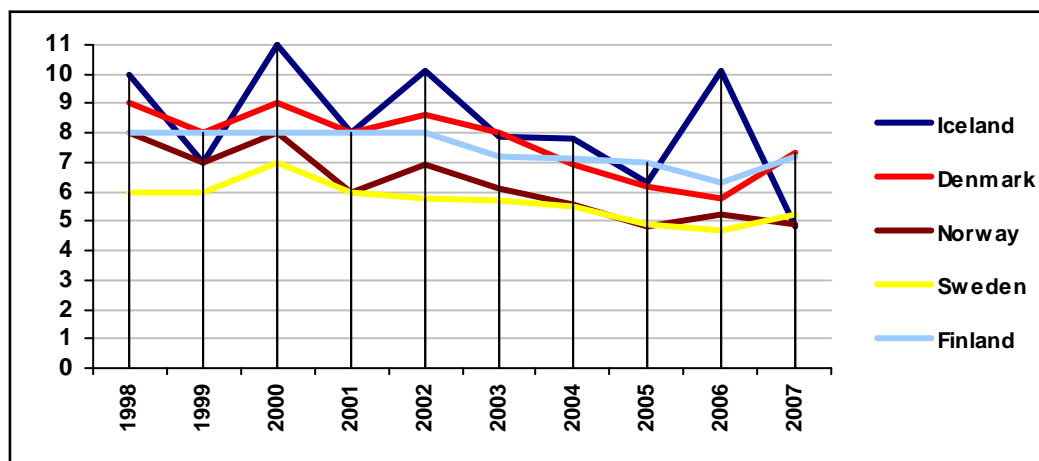


Figure 2. Deaths in traffic per 100.000 inhabitants (from Magnusson, 2007)

Research regarding lifestyle and driving style between Icelandic and Danish is be important when it comes to understanding the causes of certain driving behaviour and differences and similarities in transport and traffic culture. By making this explorative step, interventions can be improved and applied across nations.

Theoretical background

Modern research regarding driver behaviour is dominated by two schools of thought, one dealing with learning and the ability to automate behaviour, the other highlights the driver's personal and social circumstances, lifestyle etc., and studies how this affects behaviour (Engström, Gregersen, Hernetkoski, Keskinen & Nyberg, 2003). Three theories have been especially prominent in the literature and have proven extremely useful in order to understand the young driver problem. These count the *Problem Behaviour Theory* that focuses on adolescents and young adults and that while behaviour is influenced by multiple factors, behaviours viewed as problems sometimes serve a developmental purpose. The *Social Learning Theory* is based on the fact that individuals behave in ways they have learned by receiving positive reinforcement Finally the *Social Cognitive Theory* which employs a dynamic, reciprocal model in which behaviour, personal factors, and environmental influences all interact (Shope, 2006). Within the social cognition approach, models

such as the Theory of Planned Behaviour (Ajzen, 1991) has been frequently applied to study the determinants of risky driving behaviour (Ulleberg & Rundmo, 2003). Shope (2006) categorizes the multiple influences affecting young drivers' behaviour in detail. Figure 3 lists the various factors that are seen to affect youthful driving behaviour. This includes driving ability, physical, social, and behavioural development, personality, demographic factors, the perceived environment, and the driving environment (Shope, 2006).

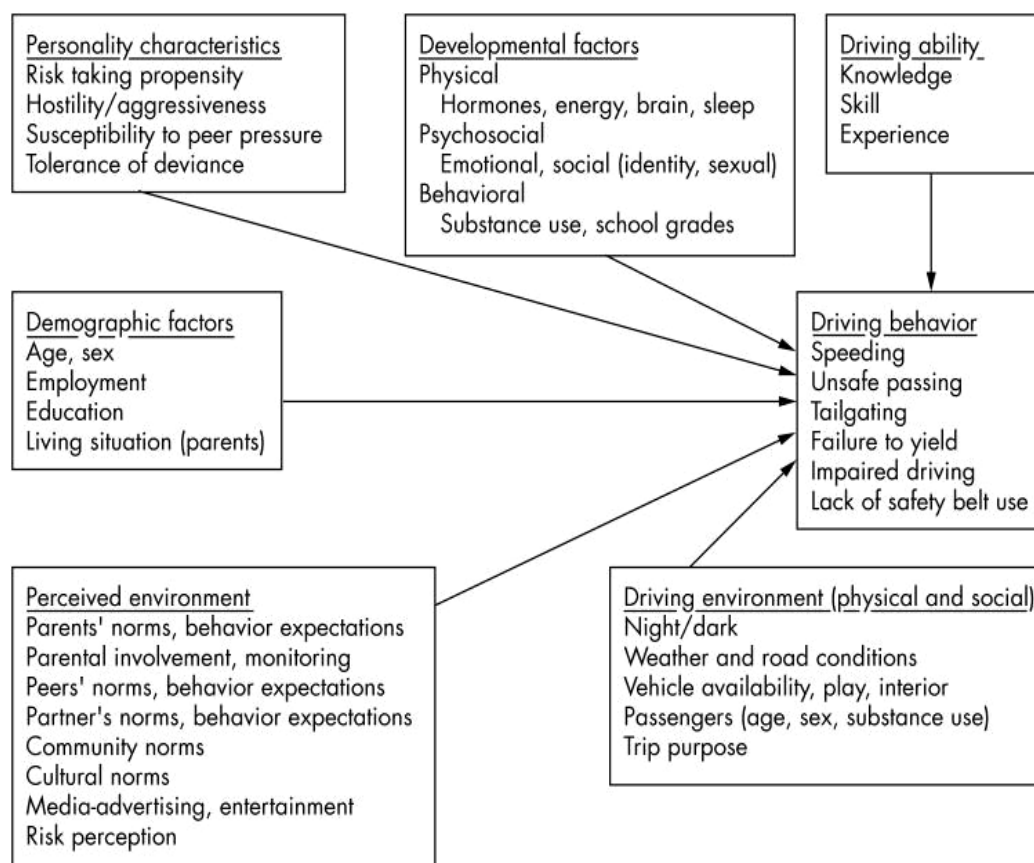


Figure 3. Influences on youthful driving behaviour (Shope, 2006)

Based on current knowledge, theories and models regarding drivers' behaviour benefit from viewing the problem from multiple angles, however, it is important to refine both the application and context of other perspectives to the particular context of novice driver behaviour (Engström, Gregersen, Hernetkoski, Keskinen & Nyberg, 2003).

This study aimed to shed a light on the relationship between young male drivers' lifestyle activities (behavioural factors) and driving behaviour, using the Theory of Problem Behaviour as theoretical foundation (Jessor 1987, 2008).

Aim of the study

This study limits itself to young males since they have on average three times greater involvement in fatal road crashes than young females, and males are as well more risk prone (OECD, 2006).

The purpose of this research was primarily to explore the relationship of lifestyle and leisure time related variables to certain driving patterns (Thrill, Anger, and Anxiety) in two groups of young male drivers, Danish and Icelandic. Secondly, to compare these variables between nationalities, in order to explore the similarities and disparities. The third objective was to scrutinize the questionnaires ability to differentiate between different types of driving behaviour and finally, to create a predictive model for each driving style using linear regression.

Method

Participants

The Danish participants were found through the Danish Driving Licence Register, a database in which all persons holding a drivers licence are registered. The sample consisted of 2000 randomly selected males, based on the following criteria: male drivers that were born between 01.08 – 31.12 1986 and got their drivers license between 01.08 – 31.12 2004. Due to the selection criteria, all drivers in the sample had their drivers licence for at least 6 months.

It was not possible to select the Icelandic sample using a Driving Licence Register database to ensure that all participants had completed their driving licence. The Icelandic sample was therefore selected by buying access to the national register (Þjóðskrá) in Iceland using the services of SKÝRR. A random sample of 2000 males from all over the country was selected, born 01.06.1988 – 30.06.1989. Since information about driving licence status was not accessible beforehand, the sample was intentionally large, but there were 2449 18 years old males at the time of the research in Iceland (Statistics Iceland, 2009). In addition, it is estimated that about 20% of the younger population and 10% of the older population do not have a driving license (H. Torp, personal communication, May 5, 2007).

In comparison to the Danish sample, there were 28.434 18 years old males in Denmark at the time of the research (Danmarks Statistik, 2009), though approximately only 9500 were born in the preferred time. The differences in ages is due to the fact that the Danish research was performed earlier than the Icelandic one, but both samples were at least 18 years old at the time of each research.

Questionnaire

The questionnaire used was an extended version of a questionnaire used in an earlier study (Møller & Gregersen, 2008). Additional questions addressing peer group activities and influence were added as well as questions regarding impaired driving. The questionnaire was a self-reported questionnaire that focused on the relationship between lifestyle and driving behaviour and contained 51 main question with a few questions divided into subcategories. With regard to lifestyle, the questionnaire included questions about leisure time activities alone and with the peer

group, interest in cars and job/education satisfaction. With regard to driving behaviour, the questionnaire included questions about driving style, offences against the Road Traffic Act, attitude towards traffic safety and beliefs about their friends driving behaviour. In addition, the questionnaire included questions about demographic issues, driving pattern, accident involvement and traffic violations.

The questionnaire was translated into Icelandic by the author and overviewed and verified by a trained Danish speaking Icelander after having being reviewed by academics who speak both Danish and Icelandic.

Data collection

The Danish data were collected using postal questionnaires. The questionnaire was sent out in June 2005 and one reminder letter was used. A stamped and addressed envelope was enclosed in all letters with the questionnaire. The total response rate was 53% (n=1055).

The Icelandic study was designed as a web survey using the service of Survey Console. The web survey was accessible through The Icelandic Road Administrations web (www.vegagerdin.is). Participants received an introduction letter the 15.06.07, with information about the research and instructions how to access the survey. Two weeks later, reminding letters was sent out to all participants prompting them that they still had time to participate and thanking them for participating. The research was open from 15.06.07 to 31.07.07 on the internet. Prizes were collected beforehand and used to encourage participation. Individuals enter their e-mail address after completing the survey to participate in the lottery. After a random selection of winners, a notification was sent to their e-mail addresses informing them about their prize, which were collectable at the Icelandic Road Administration. The total response rate in the Icelandic study was 40.35% (n=807) however the analysis excluded 133 individuals due to the selection criteria. Therefore, only 674 individuals qualified for further analysis.

Statistical analysis

The web survey collected the results for the Icelandic data in an Excel document and exported to an SPSS document from there for further analysis. The Danish data was manually coded into SPSS. The statistical analysis for both samples were performed in SPSS 17.0 for Windows, using Windows Excel to create tables

and figures. The analysis is divided up in three steps; first descriptive statistics and significance levels are presented followed by confirmatory factor analysis where the items in each driving style was determined. Lastly, linear regression is presented with the lifestyle variables that predict each of the driving style from the factor analysis. Two tailed p values were considered significant at the level of .05 or less.

Results

Descriptive data for both nationalities is presented first in this chapter, where independent samples t-test, Mann Whitney U-test and Chi square test were used as appropriate to measure significant difference between the nationalities. Secondly, the factor analysis for each nationality is depicted. Lastly, the regression analysis is described, using the factors that emerged from the factor analysis as dependent variables and selected lifestyle variables as independent variables. The main hypothesis was tested here, whether there was a fundamental difference in the variables predicting selective driving behaviour of each nationality.

Descriptive statistics

Demographical variables

The participants were 18-19 years old at the time of the study and due to their young age, most of them lived at home, or 89% of the Danish participants and 80% of the Icelandic sample. The majorities in both samples were students in gymnasium or gymnasium level schools (see Figure 4). Students with part time job were registered as students. Chi square test revealed that the groups were in fact similar, with no significant difference $\chi^2(3, N = 1705) = 6.1, p >.01$.

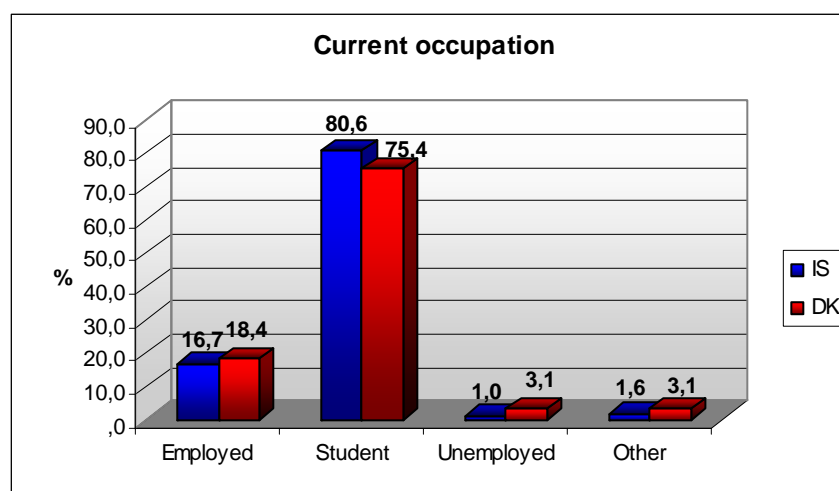


Figure 4. Participants' occupation

The samples depicted surprising results when compared on the question where they lived. The Icelandic sample seemed to be heavily drawn from the dense regions in Iceland but the Danish sample was quite well distributed around the possibilities

given as Figure 5 shows. The nationalities differed significantly on this variable, Icelanders were more likely to be from towns but the Danes were more likely to come from more rural areas; $\chi^2(3, N = 1705) = 442,03, p < .01$.

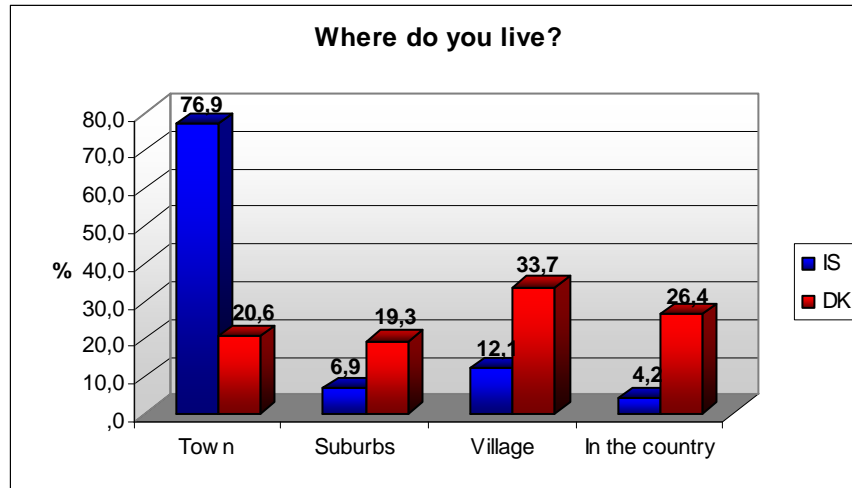


Figure 5. Geographic location of participants

When asked who was the owner of the car the young drivers mainly drove, a fundamental difference emerged for the groups. Icelandic drivers primarily have their own car, but Danish drivers mostly drive a family member's car. This was in turn significant $\chi^2(3, N = 1705) = 112,68, p < .01$. Figure 6 depicts the difference between the nationalities.

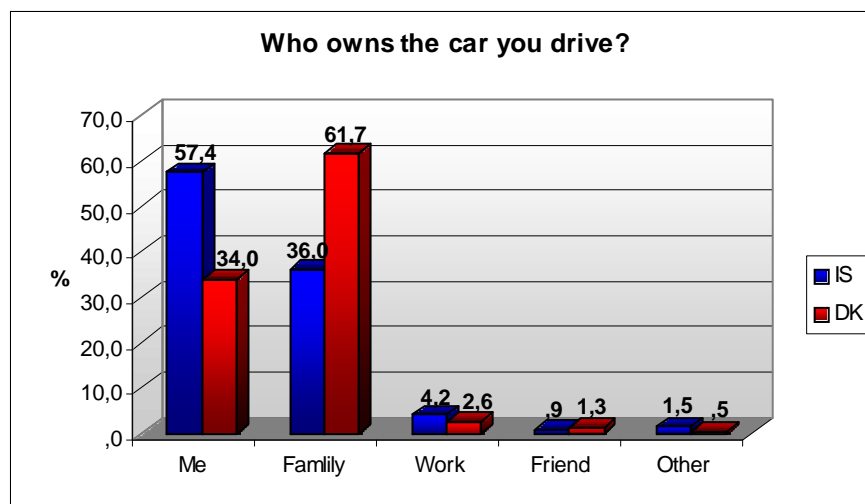


Figure 6. Ownership of car

Driving pattern

Several main questions explored the participants driving pattern. When scrutinizing the frequency of driving, the Icelandic participants used the car more often on a weekly basis, but almost 92% of the Icelandic drivers drove a car 4-7 days a week in comparison to 69% of the Danish sample (see Figure 7). Mann Whitney U-test revealed that this difference was significant; $z = -37,07, p < .01$.

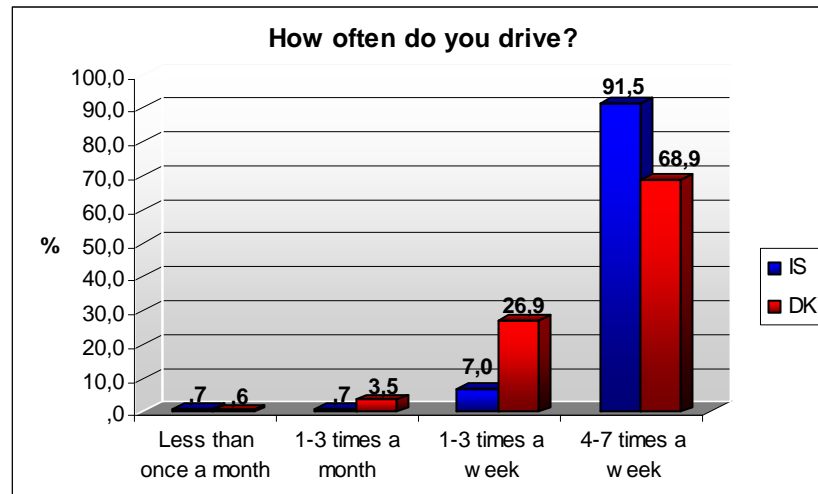


Figure 7. Frequency of driving

Participants were asked what part of the week they drove the most and the results are shown in Figure 8. The Icelandic sample used the car considerably more on weekends than the Danish sample did, which in turn drove often more evenly over the week ($\chi^2(3, N = 1705) = 33,97, p < .01$).

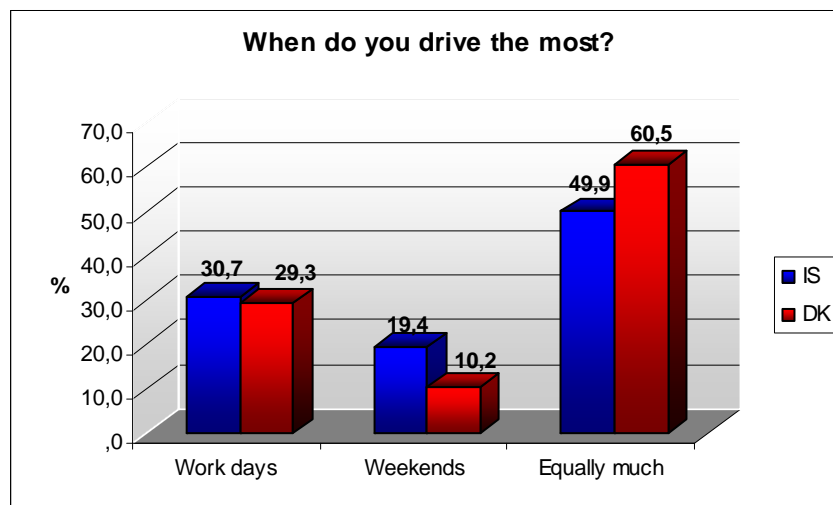


Figure 8. Driving pattern over the week

Table 1 illustrates the responses for questions regarding how often the individuals used the car for each occasion. In all instances, the Icelandic drivers had higher averages indicating that they used the car more often than the Danish drivers did.

Table 1. Driving pattern for both nationalities

	Nationality	Never (%)	Rarely (%)	Occasionally (%)	Often (%)	Very often (%)	Mean (1-5)	<i>p</i>
<i>Work/education</i>	IS	5.7	6.6	10.4	13	64.4	4,23	*
	DK	8.3	17.6	14.8	14.6	44.7	3,69	
<i>Cruising</i>	IS	7.3	21.5	29.2	24.9	17.1	3,23	*
	DK	22.9	32.4	27.0	12.5	5.3	2,45	
<i>Clubs/parties</i>	IS	10.1	33.7	34.6	13.3	8.3	2,76	*
	DK	39.3	34.8	18.4	6.3	1.2	1,95	
<i>Friends</i>	IS	1.6	6.7	22.4	42.6	26.7	3,86	
	DK	1.1	5.4	27	43	23.6	3,82	
<i>Leisure time</i>	IS	4.3	12.4	23.4	28.9	31	3,69	*
	DK	15.3	15.8	24.6	26.7	17.6	3,15	
<i>Shopping</i>	IS	6.0	27.6	29.8	20.3	16.4	3,13	*
	DK	8.3	26.2	35.1	22.1	8.2	2,96	
<i>Other</i>	IS	10.4	17.7	41.6	16.7	13.6	3,05	*
	DK	48.9	3.6	12.2	16.7	18.6	2,52	
<i>Drive for fun</i>	IS	7.6	20.7	30	26.4	15.4	3.1	*
	DK	26.4	26.8	24.2	14.4	8.3	2.5	
<i>Chauffeur for friends</i>	IS	3.4	16.4	43.8	23.4	130	3.2	*
	DK	2.6	20.7	50	20	6.8	2.5	

*Flags significant difference $p < .01$ using Independent samples *t*-test.

The last question regarded estimated mileage each week in kilometres. T-test revealed significant difference between the groups, $t(1483) = -3,9$, $p < .001$, where the Icelandic drivers drove more km each week than the Danish drivers did (see Figure 9). It is important to bear in mind that this is only an estimation of the real km driven for the drivers, not actual numbers.

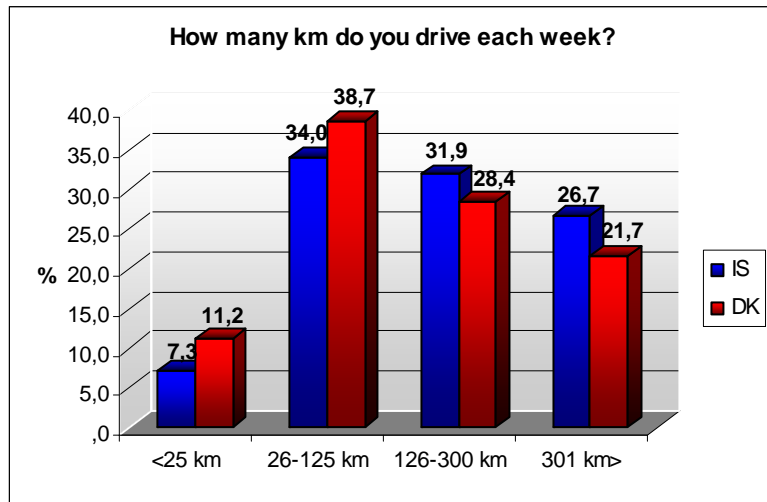


Figure 9. Kilometres driven each week

Factor analysis

The factor analysis was performed for questions regarding driving style. These items concerned individual behaviour in traffic and were divided into 14 sub-questions coded on a five point Likert scale, ranging from never to very often. These items are believed to reflect three different concepts, *Thrill*, *Anger* and *Anxiety* and therefore confirmatory factor analysis was employed in the reduction of the items (Sigurdardottir, 2008). Since the distribution of the responses was not normal for either sample, the Principal Axis Factoring method was chosen (Fabrigar, Wegener, MacCallum & Strahan, 1999) with Oblique rotation.

Danish sample

The factor analysis for the Danish sample arranged the items in the three factors after an ideal order. This solution explained approximately 40% of the shared variance. The factor loadings and the alpha value for each factor are presented in table 2.

Table 2. Factor loadings for the Danish sample

	1	2	3	Alpha
<i>a. Race with other drivers</i>	0.78			
<i>j. Drive fast for the fun of it</i>	0.76			
<i>b. Try to be the first off on a green light</i>	0.56			
<i>n. Take risky chances for the fun of it</i>	0.55			
<i>g. Drives through turns with great speed</i>	0.54			
<i>e. Drive close to the next car</i>	0.41			
<i>f. Speed up on yellow light</i>	0.40			

<i>i. Let your mood influence your driving</i>	0.30	0.24	.79
<i>d. Get angry with other drivers</i>		0.86	
<i>o. Yell at other drivers</i>		0.50	
<i>l. Get irritated if you can not pass other cars</i>	0.25	0.44	.68
<i>h. Feel insecure while driving</i>			0.75
<i>c. Loosing oversight while driving</i>			0.60
<i>k. Feel tense when passing other cars</i>			0.48 .59

Noticeable the alpha is high for factor one and two but adequate for factor three, indicating that the questionnaire defines thrilling and aggressive driving style very well, but could do better with anxious driving style. This analysis is reasonable and since all factor loadings are over .40 (apart from the question ‘do you let your mood influence your driving’) therefore it is concluded that the items do indeed successfully reflect the three concepts, Thrill, Anger and Anxiety.

Icelandic sample

The analysis for the Icelandic sample was very similar to the previous factor analysis with one exception. Item *i*) now had a higher factor loading on Anger than Thrill, however, since the question had a slightly lower cross loading on Thrill, it was decided to order the question with Thrill instead of Anger for further analysis, since this item had more conceptual value for that factor in this case. The factor analysis for the younger Icelandic sample had a combined explained variance of 53.4%. The factor loadings for the Icelandic sample and the alpha value for each factor are shown in table 3.

Table 3. Factor loadings for the Icelandic sample

	1	2	3	Alpha
<i>j. Drive fast for the fun of it</i>	0.83			
<i>n. Take risky chances for the fun of it</i>	0.80			
<i>a. Race with other drivers</i>	0.75			
<i>g. Drives through turns with great speed</i>	0.63			
<i>b. Try to be the first off on a green light</i>	0.45		-0.22	
<i>e. Drive close to the next car</i>	0.38		-0.25	
<i>f. Speed up on yellow light</i>	0.34		-0.30	
<i>i. Let your mood influence your driving</i>	0.27	-0.33		.85
<i>d. Get angry with other drivers</i>		-0.69		
<i>o. Yell at other drivers</i>		-0.60		
<i>l. Get irritated if you can not pass other cars</i>		-0.45		.63
<i>h. Feel insecure while driving</i>			0.62	
<i>k. Feel tense when passing other cars</i>			0.62	
<i>c. Loosing oversight while driving</i>			0.47	.57

This solution had high alpha for the first factor Thrill, but adequate alpha for Anger and Anxiety. The factor loadings were in most cases over .4, however item *i*) loaded on both Thrill and Anger. Nevertheless, this solution reflects the three concepts effectively.

Freidman's test revealed that the groups do not differ in their ratings on the factors and therefore further comparisons were in order. Hence, the mean scores were compared for both nationalities on the three factors Thrill, Anger and Anxiety (see table 4).

Table 4. Mean scores for both nationalities on driving styles

<i>DK</i>	Thrill	Anger	Anxiety
Mean score	2.07	2.32*	1.63
Std. deviation	0.61	0.73	0.52

<i>IS</i>	Thrill	Anger	Anxiety
Mean score	2.31*	2.18	1.78*
Std. deviation	0.72	0.78	0.59

There was a significant effect for all factors for the two nationalities. The Icelanders were significantly higher on Thrill: $t(1714) = -7,3, p < .001$, and Anxiety: $t(1714) = -5,7, p < .001$, but the Danes scored significantly higher on Anger: $t(1714) = 3,8, p < .001$.

Regression

Using the factors that emerged from the factor analysis for both samples, three new variables were created represent Thrill, Anger and Anxiety, who then served as dependent variables in linear regression. Questions limited to participants' leisure time served as dependent variables (for complete list, see Appendix 1 and 2). The Stepwise method was chosen to be able to select the best set of predictor variables into the regression model. The purpose of the regression analysis was first of all to see the possible size of effect the independent variables have on the dependent variables and secondly to evaluate if these lifestyle variables can be used to forecast about possible driving style.

Thrill

Danish sample

In total there were 14 variables in the regression model that had significant predictive value for Thrill in the Danish sample, $R^2 = .325$, $F(15) = 33.42$, $p < .01$.

The regression coefficients are depicted in table 5.

Table 5. Regression coefficients for Thrill - DK

	Unstd. Coefficients		Std. Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.281	.148		1.903	.057
Ever driven under the influence of alcohol	.291	.037	.227	7.962	.000
Cruise with friends in leisure time	.054	.014	.129	3.978	.000
Ever driven under the influence of euphoric drugs	.375	.080	.145	4.704	.000
Cruise with friends for fun	.150	.046	.103	3.273	.001
Committed a criminal conduct	.150	.049	.081	3.059	.002
Drink alcohol in leisure time	.042	.015	.079	2.861	.004
Dislike ones education or school	.067	.021	.087	3.198	.001
Goes to the movies in leisure time	.086	.025	.092	3.468	.001
Studying in leisure time	-.037	.009	-.122	-4.037	.000
Primary occupation - working	-.119	.041	-.084	-2.875	.004
How often do you drive	.072	.024	.080	2.985	.003
Drives most on workdays	-.101	.037	-.071	-2.721	.007
Spending time with family in leisure time	-.030	.012	-.064	-2.445	.015
Busy in leisure time	.095	.040	.061	2.367	.018
Smoke hash/weed in leisure time	.062	.026	.070	2.349	.019

Four items were negatively correlated to Thrill, namely studying and spending time with family in leisure time, working and driving most on workdays. This indicates that those who expose a thrilling driving style do not often carry out these two leisure time activities, nor do they have a job and do not drive the most on workdays. Having committed a criminal conduct and being under alcohol or drugs while driving seems apparent in this driving style. These individuals seem to have a busy social life and the leisure time activities involve primarily around friends, cruising, drinking and smoking hash. Lifestyle variables like going to the movies and not being content at school are significant in the model, but these are as well items that manifest youthful life and especially due to their age, going to the movies is an important function in the youngsters' social life.

Icelandic sample

For the Icelanders, 13 variables had significant prediction value in the regression model $R^2 = .318$, $F(13) = 23.61$, $p < .01$. This model explains 31% of the total variance. The regression coefficients are shown in table 6.

Table 6. Regression coefficients for Thrill - IS

	Unstd. Coefficients		Std. Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.310	.391		.792	.429
Cruise with friends in leisure time	.078	.018	.160	4.318	.000
Committed a criminal conduct	.274	.052	.182	5.280	.000
Studying in leisure time	-.056	.014	-.142	-4.095	.000
Driven under the influence of alcohol for the past 12 months	.131	.029	.157	4.550	.000
Go to the movies in leisure time	.101	.031	.107	3.224	.001
Chauffeur for friends	.077	.025	.106	3.042	.002
Reads books in leisure time	-.038	.017	-.077	-2.163	.031
Practice team sports	-.037	.012	-.105	-3.160	.002
Mainly spending time with friends: at cafés	-.171	.066	-.088	-2.595	.010
Friends interested in cars	.269	.108	.082	2.490	.013
Go to parties in leisure time	.310	.391	.094	.792	.429
How often do you drive	.078	.018	.160	4.318	.000
Play a musical instrument in leisure time	.274	.052	.182	5.280	.000

This model indicates that young Icelandic drivers that engage in thrilling driving style do not tend to spend time studying, practicing team sports or reading books in their leisure time, and they rarely go to cafés to meet with friends. Instead, these drivers seem to drive frequently, chauffeur and cruise with friends in leisure time. They go to parties, movies and play a musical instrument in leisure time. They have committed a criminal offense, driven under the influence of alcohol and have friends that are interested in cars.

Anger

Danish sample

Ten variables explained a significant proportion of variance in Anger for the Danish sample, $R^2 = .196$, $F(6) = 31.80$, $p < .01$. They significantly predicted aggressive driving behaviour, as is depicted in table 7.

Table 7. Regression coefficients for Anger - DK

	Unstd.		Std.		Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	
(Constant)	.413	.168		2.455	.014
Cruise with friends in leisure time	.061	.017	.123	3.681	.000
Ever driven under the influence of alcohol	.231	.046	.153	5.029	.000
Dislike ones education	.143	.032	.155	4.532	.000
How often do you drive	.102	.030	.096	3.369	.001
Drink alcohol in leisure time	.052	.018	.084	2.868	.004
Primary occupation – Student	-.159	.064	-.086	-2.491	.013
Driven under the influence of euphoric drugs for the past 12 months	.634	.092	.200	6.856	.000
Mainly spending time with friends: in a car	.118	.055	.070	2.139	.033

Anger is manifested with leisure time activities such as driving with friends and drinking. Interestingly, these drivers tend to use the car as a location for spending time together. They are not content with their education and having driven under the influence of alcohol or drugs is likely for these drivers.

Icelandic sample

For the Icelandic sample, seven leisure time variables explained a significant proportion of variance in aggressive driving behaviour $R^2 = .125$, $F(7) = 13.54$, $p < .01$. The model therefore explains approximately 13% of the total variance. Table 8 shows the regression coefficients for the Icelandic sample.

Table 8. Regression coefficients for Anger - IS

	Unstd.		Std.		Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta	t	
(Constant)	1.253	.271		4.624	.000
Drink alcohol in leisure time	.107	.027	.163	3.943	.000
Committed a criminal conduct	.190	.062	.118	3.050	.002
Read books in leisure time	-.058	.020	-.110	-2.953	.003
Friends interested in cars	.357	.130	.101	2.746	.006
Bored in leisure time	.301	.119	.093	2.535	.011
Play a music instrument in leisure time	-.034	.015	-.085	-2.303	.022
Driven under the influence of alcohol for the past 12 months	.078	.037	.087	2.124	.034

The activities reading books and playing an instrument have a negative relationship to Anger. The model indicates that aggressive drivers are bored in their leisure time, they are more likely to have performed a criminal act, they consume alcohol in their spare time, have friends that show interest for cars and have driven under the influence of alcohol.

Anxiety

Danish sample

The regression model for anxious driving style included 11 lifestyle variables that significantly explained 16% of the total variance, $R^2 = .163$, $F(11) = 18.48$, $p < .01$. Table 9 depicts the regression coefficients.

Table 9. Regression coefficients for Anxiety - DK

	Unstd. Coefficients		Std. Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.629	.100		6.271	.000
Ever driven under the influence of alcohol	.228	.032	.212	7.117	.000
Driven under the influence of euphoric drugs for the past 12 months	.408	.068	.181	6.031	.000
Drive the most in weekends	.191	.051	.106	3.735	.000
Goes to concerts in leisure time	.050	.023	.064	2.145	.032
Mainly spending time with friends: at a takeaway, kiosks, cafeteria or similar	.067	.038	.053	1.791	.074
Play computer games in leisure time	.022	.009	.072	2.507	.012
Active in a political or student organizations	.040	.017	.070	2.407	.016
Spending time with family in leisure time	-.029	.011	-.072	-2.511	.012
Go to the movies in leisure time	.058	.024	.073	2.429	.015
Mainly spending time with friends: in the streets	.087	.041	.062	2.104	.036
Practice strength training in leisure time	-.018	.009	-.061	-2.104	.036

Spending time with family in leisure time and practicing strength training, had a negative correlation to Anxiety. Having driven under the influence of alcohol and drugs has a strong correlation to anxious driving style however, doing drugs and drinking alcohol is not evident in the leisure time activities that these drivers

manifest. These drivers seem to drive mainly on weekends and spend most their time with friends in non-driving activities, such as meeting at the local pizzeria and hang out outside in the streets. The leisure time activities include going to concerts, playing videogames, being active in social organizations (e.g. in school) and going to the movies.

Icelandic sample

Eight leisure time variables explained a significant proportion of variance in Anxiety for the Icelandic sample, $R^2 = .108$, $F(8) = 10.03$, $p < .01$. These variables significantly predict aggressive driving behaviour as is shown in table 10.

Table 10. Regression coefficients for Anxiety - IS

	Unstd. Coefficients		Std. Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	2,288	,294		7,783	,000
Content with my leisure time	-,136	,045	-,113	-3,021	,003
Read books in leisure time	,043	,015	,107	2,814	,005
Mainly spending time with friends: in the gym	-,167	,046	-,136	-3,658	,000
Watch TV in leisure time (alone)	,037	,012	,112	3,028	,003
Mainly spending time with friends: at a takeaway, cafeteria or similar	,149	,046	,121	3,223	,001
Spending time with friends	-,064	,022	-,112	-2,909	,004
Mainly spending time with friends: at their place	,141	,062	,087	2,294	,022
How often do you drive	-,118	,057	-,079	-2,088	,037

The Icelandic drivers that manifest anxious driving style are likely to meet their friends at takeaways (or similar), read books and watch TV in their leisure time. They seem not to socialize that much with friends in their spare time and going to the gym to meet friends is not likely. Interestingly there is a negative correlation to being pleased with their leisure time.

Discussion

Despite overall improvement in roads, vehicles, law enforcement and driver training, the financial cost of traffic accidents and fatalities, estimated to be around US\$ 518 billion per year globally (WHO, 2004), is not acceptable. Young drivers are a considerable part of the problem and more interventions, money and research is needed in order to make these drivers “safe”. In isolation, public education and information campaigns do not deliver tangible, sustained reductions in road traffic deaths and serious injuries (WHO, 2004). In the GDE (Goals for Driver Education) matrix, it is stressed that an important role of driver education is to take into account factors such as lifestyle, personality, motivation, and attitude (Nyberg & Gregersen, 2007). Therefore, research that identifies the factors influencing driving style is necessary and important for policy makers who are in continuous search for successful interventions for the young drivers’ problem. This study explored several different lifestyle and leisure time variables and their relationship to three driving styles, Thrill, Anger and Aggression, for two samples of young male drivers, Icelandic and Danish. The purpose with the research was to identify variables that could explain and predict these driving styles, and to see if the two samples vary in the regression models.

Demographical variables

Shope (2006) reports that demographical variables are related to crashes. For example, those employed are more likely to report having driven after drinking, those with less education tend to show more driving problems, including driving under the influence, and those who report that they live with both parents have less risky driving than those who live with only one parent. Clearly demographical variables do matter when crash involvement and driving style is scrutinized. In this study, both samples were young at age and therefore small variance in living situation and education was expected. The majorities of the participants lived at home and were enrolled in gymnasium or other education. These variables were therefore not included in the regression analysis, but that would have produced a high correlation to driving style, without direct causal effect.

Interestingly, when asked about living surrounding there was a vast difference between the samples. There could be a geographic explanation to this difference, Denmark and Iceland are quite different geographically and Denmark is quite densely populated. On the contrary, habitation in Iceland is primarily around the capital area (with over one third of the total population) and other large towns. The question regarding suburbs is as well questionable concerning the Icelandic data, but the definition of suburbs might have been misinterpreted. Perhaps Icelandic participants that lived in the capital or large towns were more willing to participate since the majority of the rewards, given to few lucky participants for their participation, were in most part given by firms in or near the capital Reykjavik and the northern town Akureyri.

Regarding ownership of the car the young drivers used, the Danish drivers' primary drove a family member's car while the Icelandic males had their own car in approximately 57% of the cases. This difference can be traced to many things; e.g. differences in public transport systems, but Icelanders heavily depend on their own transport and the Danish have access to multiple possibilities in public transport. Taxes, insurances and other fees on cars differ, leading to a higher cost for a car owner in Denmark than in Iceland.

Driving pattern

When looking at driving pattern there was a considerable difference between the groups. The Icelandic group drove more frequently and more kilometres each week than the Danish participants. The Icelanders drove as well more frequently to several activities listed, but there was no difference in driving to meet with friends, indicating that young Icelandic and Danish males use the car in a similar magnitude for these purposes.

When asked what part of the week the drivers drove the most, both nationalities indicate that they drive the most evenly over the week, with approximately 61% of the Danish sample but 50% of the Icelandic sample. However, the Icelanders drive significantly more often in the weekends compared to the Danes. The Icelanders both cruised around in a car for fun and chauffeured for friends significantly more often than the Danes did.

Despite the Icelanders using the car more often in these before mentioned circumstances and have better access to cars, it does not mean that the nationalities do not use the car for the same social purposes. This study does not evaluate to what extent the drivers see the car as means for social interactions. It can only evaluate the difference in the usage of the car in each situation (which is influenced by access of cars), not the social function of it, but this would be an interesting subject for further research.

The factor analysis

One of the objectives of this study was to see if the questionnaire grasped different forms of driving behaviour and further more to use the emerging factors in further analysis. The questionnaire included 14 questions regarding driving behaviour that previous factor analysis had shown that divided into three factors. These factors indicated a playful driving style we named Thrill, an aggressive driving style named Aggression and the third factor indicated nervous driving style, hence the name Anxiety. A confirmatory factor analysis for these samples revealed the same structure factors for both samples with one exception. Nevertheless, the three factors used for further analysis were created using the same items for both nations. These factors were supported with good to adequate alpha values indicating fair internal consistency. The alpha values and explained variance are quite similar for the nationalities although they are somewhat higher for the Icelandic sample.

The item *i) do you let your mood influence your driving*, had cross-loadings on both Thrill and Aggression for both samples, but the highest loading was on Thrill for the Danish sample and Aggression for the Icelandic sample. This could be due to the conceptual structure of both driving styles, that this item represents in fact both driving styles, or that the individuals accept their own interpretation of the vague gesture of the question. This indicates that this question is not clear enough to be characterized completely into either category in current state, and it should be altered or cleared for further usage of this list. However, these three driving styles can be used in further analysis to identify risky drivers who need special attention and to enhance educational strategies for these drivers. The list was intentionally created short in order to give insight into the three potential driving styles but should be composed of other additional items if it is intended to be used for analytical

purposes. Nevertheless, these 14 items were useful in order to identify the three different driving styles for these young male drivers. Though further analysis only involves these three factors, the idea that there are other types of driving style interact with lifestyle variables is not excluded. Future analysis could therefore evolve around that point, by adding more items to the existing list, with more variety in order to be able to analyse the broad spectrum of driving behaviour in greater detail. The factor analysis explains a good portion of the variance for the factor Thrill for both samples, however it does not explain a high degree of the variance for Anger and Anxiety (which in turn only consisted of three items). Therefore, we can conclude that the questionnaire should be revised for further predictions regarding the correlation between lifestyle and aggressive and anxious driving style.

The regression models

Building a model to be able to predict each of the driving styles identified was the other main objective of this study. The three driving styles served as dependent variables in a Stepwise regression model and selected lifestyle and leisure time variables served as independent variables in the analysis. The results are scrutinized for each independent variable separately in the following section.

Thrill

Danish sample

The regression model for the Danes resulted with 15 independent variables that explained around 33% of the variance.

These variables indicated a busy lifestyle where the individuals spend their leisure time in low structure activities like cruising with their friends, going to the movies, consuming alcohol in their spare time and use drugs. These individuals had committed a criminal act in the past and have both driven under the influence of alcohol and euphoric substances that indicates that they do not have respect for the laws. There was a negative correlation to spending time with family, driving on workdays, studying in leisure time and working (instead of being in school or out of employment). This indicates that these drivers are primarily in school though they are not content in their pathway and do not engage in homework. They are not involved with their families in spare time and they seem to drive quite often and

then the most on weekends. No variable regarding location of leisure time was found in this model.

Icelandic sample

The regression model for the Icelandic sample yielded 13 variables, explaining in total 32% of the variance, which is extremely close to the Danish model. This model indicates that young Icelandic males that have certain disrespect for the law (have driven under the influence of alcohol and have violated the laws in the past). They engage in a social lifestyle (partying, movies, playing an instrument) with some involvement regarding cars (have friends that are interested in cars, frequently cruising in a car and driving for friends). Variables that had negative correlation to Thrill included studying, reading, practicing team sports and spending time with friends at cafés in leisure time. These variables share several similarities with the Danish model, however there was no variable regarding drug related behaviour for the Icelandic model.

Both models were statistically significant and hence possible to conclude that the variables in the model can successfully identify drivers who indulge in Thrilling driving style.

Anger

Danish sample

There were eight variables that explained around 20% of the variance in Anger. These variables indicate a driver that spends a good deal of his leisure time in relation to cars, (drives frequently, cruises with friends and uses the car as a meeting place with friends), is involved with alcohol and drugs in leisure time and has driven under the influence of either. There was a negative correlation to being a student, indicating that this driver is more likely to be employed or unemployed, but those who are students seem discontent with school.

Icelandic sample

The Icelandic model involved seven variables that in total explained nearly 13% of the total variance. This is slightly lower than for the Danes. However, these variables point to an individual that has disrespect to the laws (has performed a criminal conduct and driven under the influence of alcohol), consumes alcohol

frequently and is bored in leisure time. Playing an instrument and reading books in leisure time had negative correlation to Anger. Finally, their friends seem to show interest to cars, though being interested in cars themselves was not significant.

Both models were significant, supporting the assumption that these variables have predictive value and can explain a part of the variance in aggressive driving behaviour for both nationalities.

Anxiety

Danish sample

For the Danish sample, 11 variables illustrated the anxious driver and explained 16% of the total variance. This driver has as well driven under the influence of alcohol and drugs in the past however; his lifestyle does not seem to involve these. He drives the most in weekends, but usually spends his leisure time with friends at the streets hanging out, or at grill bars, takeaway, cafeterias or similar. Leisure time activities involve going to concerts, being active in social organizations, playing computer/videogames and going to the movies. Two variables were negative, spending time with family and practicing strength training. These variables do not indicate an individual that is used to driving, nor has he any interest for it and does not use driving as a means for “extra motives” such as sensation seeking, pleasure and showing off. He might be a nervous driver due to prior driving under the influence or just simple lack of experience. This lifestyle involves youth interests and social activities, therefore this driver might be difficult to recognize from lifestyle variables alone.

Icelandic sample

The Icelandic model for anxious driving style involved eight variables that in total explained approximately 11% of the total variance. These variables indicate an individual who seems a loner (does not spend a lot of time with friends, reads and watches TV alone in leisure time) but when he socializes, it is at friends places or at grill bars, takeaway, cafeterias or similar. He is not content with his leisure time and does not seek to socialise with other at the gym. The important thing is that this individual drives seldom, indicating lack of experience.

The models were both significant, indicating that these few variables can be useful to identify an anxious driving style for both nationalities. Interestingly there was one

variable related to location of leisure time that appeared in the model for both samples, namely spending time with friends at a grill bars, takeaway, cafeterias or similar. This could be due to the fact that these drivers do not have an easy access to cars and therefore spend time with friends in other surroundings. The model provided valuable information about what identifies the nervous driver for both nationalities but the explained variance was surprisingly high despite the fact the Anxious factor only comprised three items. Importantly the questions “*Spend time with friends - Out in the streets*” and “*Practice strength training in leisure time*” that were found significant for the factor Anxiety for the Danes were unfortunately not included in the regression analysis for the Icelandic sample due to error in the data collection. These questions need to be addressed in future research for Iceland and the questionnaire needs to be improved.

Conclusion

The study has revealed that Icelandic and Danish young male drivers are in fact comparable in many aspects concerning driving behaviour and lifestyle. However, there were fundamental differences found between the samples, differences that can for example be traced to differences in culture, transport behaviour and trends in both countries, aspects that this study does not explore. The three driving styles are affected by lifestyle variables that indicate certain lifestyle pattern and of the three driving styles, Thrill and Anger were the most comparable but Anxiety was the most dissimilar between the nations. It was interesting to see that drug related lifestyle did not emerge in Thrill and Anger for the Icelandic sample as it did for the Danish sample. Nevertheless, both samples exhibited an alcohol related lifestyle, discontentment in school and lack of respect for authority. Interestingly Icelanders that drove in an aggressive way seemed bored in their leisure time, and for the Danish, being extremely busy in leisure time was associated to Thrill.

These results are in consensus to other research regarding driving behaviour. Lifestyle and accident involvement seems to be associated, where high-risk drivers tend to exhibit higher rates of all types of problem behaviour, e.g. with apparent antisocial behaviour, low school adjustment, little family involvement, and alcohol and substance abuse (Begg, Langley & Williams, 1999; Berg, 1994; Bina, Graziano & Bonino, 2006; Smart, Sanson & Vassallo, 2005; Shope, 2006). Adolescent

problem behaviour has been shown to be a powerful prediction for later risky driving behaviour, but importantly, many risky drivers do not engage in problem behaviours during adolescence (Vassallo, Smart, Sanson, Harrison, Harris, Cockfield et al., 2007). Behavioural development is an important factor for understanding the young driver problem, but individuals that report early access to and use of tobacco, alcohol, and marijuana; have more evidence of risky driving, even drunk driving in their driving records (Shope, 2006). These findings lead to the suggestion that high-risk driving behaviour is in fact part of a broader underlying problem behaviour syndrome that needs to be addressed holistically.

Limitations

The questionnaire employed in this study was used for the first time in current form and despite several questions being used successfully in previous research; it had not undergone any psychometrical measures such as validity and reliability analysis in its current form. As a result, there are no norms to support the study's result. The study was ambitious with a large random selected sample from all over Denmark and Iceland. However, in the light of all this ambition the questionnaire was extensive, inquiring about several aspects of driving behaviour and lifestyle, which might have discouraged several participants from answering the questionnaire that presumably resulted in increased drop out rate.

The study has explored the limitations known for self-reported data (e.g. social desirability), however, this method was found to be most suitable for the data in general. Nevertheless, future studies may benefit from employing a combined approach to collect information on driving behaviour (e.g. questionnaires, direct observation and official records).

The factor analysis yielded a convincing divergence between the different driving styles, with satisfactory alpha levels for each. On the contrary, the items inquiring about location of leisure time and leisure time activities need scrutiny before being able to identify clear and reliable factors in those matters. This is matter for further research.

Despite the regression models were all found to be significant, some variables in the models might not have direct causal effect influencing the driving behaviour and are instead age specific. An example of this is going to the movies in leisure time, but

this activity is presumably popular activity for young individuals since there might not be many alternatives available. This variable identifies both playful/competitive and aggressive young drivers; nevertheless, caution should be employed when concluding of the causal effect of this variable.

Only males were included in this study's sample and the findings can therefore only apply for males, but future research should include females as well.

Utilizing the results

While profiles exist for high-risk young drivers, current knowledge does not allow particular individuals to be singled out with countermeasures before they engage in dangerous driving. This leaves policy-makers with a complex problem (Twisk & Stacy, 2007). Problem behaviour in traffic (speeding, drinking and driving, violation of rules, showing off one's presumable driving skills) may be a sign of problems with personal or social adjustment or self-control but according to the Problem behaviour theory, that kind of behaviour may be purposeful and instrumental (Jessor, 1987). Young drivers high-risk level is a product of both who they are and the environment in which they exist. Besides being a means for transportation, driving has psychological function influencing the self-image and identity of the young driver, but peers heavily influence to what extent these psychological functions are utilized (Møller, 2002). Since low school adjustment and bonding, and friendships with antisocial peers, has been shown to be consistent predictors of risky driving, substance abuse and other antisocial behaviour, it is important to keep young people connected to school and assist them to form and maintain adaptive interpersonal relationships (Vassallo et al., 2007). Interventions targeting these early factors have the potential to reduce the development of a number of problematic outcomes (Greenberg, Domitrovich & Bumbarger, 2001). Nevertheless, campaigns that consider the characteristics that identify high-risk drivers might be more effective than those that do not. For instance, it might be ineffective to use authority figures for high-risk groups since these tend to lack respect to authority. However, that might be effective with new drivers, who engage in risky driving less frequently but may account for more of the overall crash toll. Yet, a suite of strategies may be needed for maximum effectiveness (Vassallo et al., 2007). It is therefore evident that the young driver problem needs to be addressed in

a holistic way, interacting with families, schools, authority and the individuals themselves, taking both behaviour, personality and social cognitive variables into account as sources of variation in behaviour (Ulleberg & Rundmo, 2003).

The results of this study can be applied in several ways. First of all the results should be used to improve the questionnaire for future research, hopefully optimizing and clarifying the definitions of a “high-risk, medium-risk and low-risk” lifestyles and the relation it has with each specific driving behaviour. The evident differences that emerged in this study between young Icelandic and Danish males indicate that future questionnaires needs to be nation specific, since the traffic and transport culture in each country can differ, and this difference can be important when interventions are created and applied. A reliable and valid questionnaire can be employed to scrutinize the drivers that live a high-risk lifestyle but one potential strategy for improving safety among young drivers’ lies in early interaction with dangerous drivers. This study should be thought of as a step toward the goal of being able to identify risky drivers with the means of employing lifestyle and attitude questionnaires. Gregersen and Bjurulf (1996) point out that theoretically, factors such as personality, lifestyle, social background etc. may be used in such differentiating activities. By using our knowledge about how these factors correlate with driving behaviour or accident involvement, risk-prone drivers could be identified. Despite studies repeatedly finding several personality factors and some lifestyle groups to correlate with risk, it is obvious that these correlations are still relatively weak and that available instruments suffer from low sensitivity as well as low specificity with respect to their ability to predict accident involvement (Gregersen & Bjurulf, 1996). Driver behaviour is not solely a consequence of car control skill and knowledge about correct behaviour, it is also a consequence of personal and social factors such as peer groups, personality, and lifestyle that influences motivation and choices that are made in driving. This affects the drivers’ estimation of risks, self-assessment, and attitudes toward safe driving. As long as driver education is not capable of including this overall perspective, the focus will continue to be symptom treatment and not an effort to produce safe drivers through reduction of the real causes behind dangerous driving (Nyberg & Gregersen, 2007). It is a fact is that there are no single technical, legislative or behavioural means for reducing the number of accidents radically.

Improvements of safety are based on a wide net of countermeasures (Hatakka, Keskinen, Gregersen, Glad & Hernetkoski, 2002) and a grounded and thorough work creating a high quality questionnaire to identify high-risk drivers is therefore a valuable contribution to traffic safety.

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Appendix 1

Correlation table for all items in the regression for the Danish sample

Appendix 1. Correlation table for all items in the regression for the Danish sample

	Thrill	<i>p</i>	Anger	<i>p</i>	Anxiety	<i>p</i>	N
<i>How often do you drive</i>	.185	.000	.180	.000	.042	.089	1055
<i>Are you interested in cars (no/yes)</i>	.081	.004	.038	.111	-.030	.164	1055
<i>Drives the most – on weekdays</i>	-.072	.009	-.011	.361	-.009	.390	1055
<i>Drives the most – on weekends</i>	-.003	.456	-.030	.168	.111	.000	1055
<i>Drives the most –equally much</i>	.090	.002	.050	.052	-.036	.124	1055
<i>How often do you chauffeur for your friends</i>	.215	.000	.172	.000	.094	.001	1055
<i>Do you cruise with friend for fun (no/yes)</i>	.299	.000	.181	.000	.070	.011	1055
<i>Are your friends interested in cars (no/yes)</i>	.164	.000	.143	.000	.082	.004	1055
<i>Have you at any time driven a car under the influence of alcohol (no/yes)</i>	.390	.000	.286	.000	.278	.000	1055
<i>Have you for the past 12 months driven a car under the influence of alcohol (no/yes)</i>	.381	.000	.278	.000	.275	.000	1055
<i>Have you at any time driven a car under the influence of euphoric drugs (no/yes)</i>	.324	.000	.289	.000	.257	.000	1055
<i>Have you for the past 12 months driven a car under the influence of euphoric drugs (no/yes)</i>	.307	.000	.287	.000	.258	.000	1055
<i>Primary occupation - working</i>	.014	.325	.041	.094	-.047	.065	1055
<i>Primary occupation – student</i>	.052	.047	.023	.227	.048	.059	1055
<i>Primary occupation – out of employment</i>	-.040	.096	-.037	.116	-.004	.444	1055
<i>How often do you spend time with friends</i>	.167	.000	.158	.000	.039	.103	1055
<i>Spend time with friends - At my place</i>	-.036	.120	-.031	.154	-.029	.169	1055
<i>Spend time with friends - At my friends place</i>	.059	.027	.034	.138	.063	.020	1055
<i>Spend time with friends - Out in the streets</i>	.099	.001	.048	.060	.098	.001	1055
<i>Spend time with friends - In shopping malls</i>	.022	.236	-.008	.392	-.005	.433	1055
<i>Spend time with friends - At grill/burger bar or similar</i>	.071	.010	.054	.039	.086	.003	1055
<i>Spend time with friends - At a café</i>	.035	.130	.043	.082	.016	.298	1055
<i>Spend time with friends - At the pub or a disco</i>	.119	.000	.112	.000	.071	.010	1055
<i>Spend time with friends - In the gym and sport centres</i>	-.030	.162	-.034	.136	-.032	.147	1055
<i>Spend time with friends - In a car (where a few cars follow together)</i>	.237	.000	.195	.000	.086	.003	1055
<i>Play a music instrument e.g. in a band in leisure time</i>	-.049	.056	-.040	.095	.075	.007	1055
<i>Meet friends in leisure time</i>	.175	.000	.143	.000	.082	.004	1055

<i>Watch TV in leisure time</i>	.048	.058	.073	.009	.059	.027	1055
<i>Play a computer game in leisure time</i>	-.008	.397	.019	.272	.079	.005	1055
<i>Practice strength training in leisure time</i>	.068	.014	.035	.131	-.017	.290	1055
<i>Practice team sports in a club in leisure time</i>	-.010	.370	-.024	.216	-.022	.234	1055
<i>Practice individual training in a club in leisure time</i>	.029	.172	-.016	.298	.049	.057	1055
<i>Practice individual training outside a club in leisure time</i>	.007	.412	-.040	.095	.018	.284	1055
<i>Active in political society or pupil council in leisure time</i>	.004	.448	.006	.425	.093	.001	1055
<i>Go to a private fest in leisure time</i>	.172	.000	.146	.000	.106	.000	1055
<i>Go to the movies in leisure time</i>	.139	.000	.106	.000	.126	.000	1055
<i>Read books in leisure time</i>	-.100	.001	-.053	.043	.045	.071	1055
<i>Spend time with family/visit family in leisure time</i>	-.056	.034	.005	.430	-.060	.026	1055
<i>Cruise around in a car with friends in leisure time</i>	.327	.000	.246	.000	.100	.001	1055
<i>Study for school in leisure time</i>	-.120	.000	-.046	.067	.048	.060	1055
<i>Work in relation to leisure time job in leisure time</i>	.049	.055	.064	.019	.074	.008	1055
<i>Go to concerts in leisure time</i>	.084	.003	.086	.003	.130	.000	1055
<i>Use euphoric drugs in leisure time</i>	.184	.000	.179	.000	.151	.000	1055
<i>Drink alcohol in leisure time</i>	.247	.000	.193	.000	.157	.000	1055
<i>Smoke hash or pot in leisure time</i>	.233	.000	.187	.000	.154	.000	1055
<i>I like my leisure time</i>	-.039	.101	-.019	.273	-.008	.399	1055
<i>I'm bored in my leisure time</i>	.018	.275	.006	.421	.041	.090	1055
<i>I can not do everything I want to in my leisure time</i>	.088	.002	.078	.006	.027	.189	1055
<i>Feel like I am a part of a peer group with common interest</i>	-.019	.265	-.009	.380	.038	.110	1055
<i>I like my current education</i>	.109	.000	.122	.000	.087	.002	1055
<i>I have committed criminal conduct</i>	.204	.000	.151	.000	.096	.001	1055

Appendix 2

Correlation table for all items in the regression for the Icelandic sample

Appendix 2. Correlation table for all items in the regression for the Icelandic sample

	Thrill	<i>p</i>	Anger	<i>p</i>	Anxiety	<i>p</i>	N
<i>How often do you drive</i>	.185	.000	.086	.013	-.099	.005	672
<i>Are you interested in cars (no/yes)</i>	.203	.000	.082	.016	-.099	.005	672
<i>Drives the most – on weekdays</i>	-.117	.002	-.033	.398	.054	.166	672
<i>Drives the most – on weekends</i>	.062	.106	-.034	.382	.005	.906	672
<i>Drives the most –equally much</i>	.058	.130	.057	.141	-.053	.170	672
<i>How often do you chauffeur for your friends</i>	.190	.000	.053	.167	-.039	.315	672
<i>Do you cruise with friend for fun (no/yes)</i>	.293	.000	.098	.005	-.104	.003	672
<i>Are your friends interested in cars (no/yes)</i>	.163	.000	.135	.000	.037	.170	672
<i>Have you at any time driven a car under the influence of alcohol (no/yes)</i>	.265	.000	.190	.000	-.059	.064	672
<i>Have you for the past 12 months driven a car under the influence of alcohol (no/yes)</i>	.279	.000	.191	.000	-.053	.085	672
<i>Have you at any time driven a car under the influence of euphoric drugs (no/yes)</i>	.195	.000	.134	.000	-.031	.208	672
<i>Have you for the past 12 months driven a car under the influence of euphoric drugs (no/yes)</i>	-.014	.360	.032	.206	.059	.063	672
<i>Primary occupation - working</i>	.165	.000	.108	.002	-.037	.171	672
<i>Primary occupation – student</i>	-.173	.000	-.096	.006	.043	.130	672
<i>Primary occupation – out of employment</i>	.052	.090	.033	.198	-.012	.383	672
<i>How often do you spend time with friends</i>	.159	.000	.029	.224	-.121	.001	672
<i>Spend time with friends - At my place</i>	.039	.155	.009	.407	-.021	.289	672
<i>Spend time with friends - At my friends place</i>	.026	.254	-.010	.400	.076	.024	672
<i>Spend time with friends - In shopping malls</i>	.084	.015	-.003	.472	-.044	.125	672
<i>Spend time with friends - At grill/burger bar or similar</i>	.116	.001	.077	.023	.103	.004	672
<i>Spend time with friends - At a café</i>	-.046	.116	-.048	.109	-.008	.415	672
<i>Spend time with friends - At the pub or a disco</i>	.117	.001	.131	.000	-.083	.016	672
<i>Spend time with friends - In the gym and sport centres</i>	-.046	.119	-.036	.174	-.146	.000	672
<i>Spend time with friends - In a car (where a few cars follow together)</i>	.274	.000	.089	.010	-.069	.036	672
<i>Play a music instrument e.g. in a band in leisure time</i>	-.100	.005	-.087	.012	.019	.309	672

<i>Meet friends in leisure time</i>	.192	.000	.066	.043	-.088	.011	672
<i>Watch TV alone in leisure time</i>	-.009	.412	.020	.300	.123	.001	672
<i>Watch TV with family in leisure time</i>	-.057	.070	-.043	.133	.124	.001	672
<i>Play a computer game in leisure time</i>	-.091	.009	-.035	.185	.105	.003	672
<i>Practice team sports in a club in leisure time</i>	-.095	.007	.005	.447	-.108	.003	672
<i>Practice individual training in a club in leisure time</i>	.009	.413	-.053	.086	-.004	.460	672
<i>Practice individual training outside a club in leisure time</i>	-.003	.472	-.018	.321	-.058	.067	672
<i>Active in political society or pupil council in leisure time</i>	-.078	.022	-.024	.263	-.030	.219	672
<i>Go to a private fest in leisure time</i>	.264	.000	.163	.000	-.068	.038	672
<i>Go to the movies in leisure time</i>	.159	.000	.073	.029	.009	.406	672
<i>Read books in leisure time</i>	-.234	.000	-.166	.000	.153	.000	672
<i>Spend time with family/visit family in leisure time</i>	-.096	.007	-.063	.051	.090	.010	672
<i>Cruise around in a car with friends in leisure time</i>	.318	.000	.124	.001	-.105	.003	672
<i>Study for school in leisure time</i>	-.268	.000	-.157	.000	.047	.112	672
<i>Work in relation to leisure time job in leisure time</i>	-.052	.089	-.084	.015	-.055	.077	
<i>Drink alcohol in leisure time</i>	.236	.000	.239	.000	-.010	.400	672
<i>Use euphoric drugs or smoke hash or pot in leisure time</i>	.128	.000	.039	.154	-.004	.459	672
<i>I like my leisure time</i>	.007	.423	-.061	.057	-.155	.000	672
<i>I'm bored in my leisure time</i>	-.017	.332	.061	.058	.056	.074	672
<i>I can not do everything I want to in my leisure time</i>	.001	.493	.032	.201	.132	.000	672
<i>Feel like I am a part of a peer group with common interest</i>	.069	.038	.070	.034	-.081	.018	672
<i>I like my current education</i>	-.113	.002	-.044	.127	.037	.170	672
<i>I have committed criminal conduct</i>	.304	.000	.207	.000	-.041	.145	672
