



Subjective safety and risk perception

ESRA thematic report no. 5

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Table of contents

List of Abbreviations.....	4
Summary	5
1. Introduction	8
2. Methodology	9
3. Results	11
3.1. Descriptive results	11
3.1.1. Concern about road safety	11
3.1.2. Subjective safety and risk perception	14
3.1.3. Behaviour of other road users	24
3.1.4. Involvement in road crashes	29
3.2. Further analysis: Subjective safety versus road fatalities	30
3.2.1. Relation of road fatalities and the concern about road safety	30
3.2.2. Relation of feeling safe and road fatalities in different transport modes	31
4. Discussion	35
5. Conclusions and recommendations	36
5.1. Conclusions	36
5.2. Recommendations	37
5.2.1. Policy recommendations at European level	37
5.2.2. Policy recommendations at national and regional level	37
5.2.3. Specific recommendations to specific stakeholders	37
List of tables and figures	38
References	39
Appendix - ESRA 2015 Questionnaire	40

List of Abbreviations

Country codes

AT	Austria
BE	Belgium
CH	Switzerland
DE	Germany
DK	Denmark
EL	Greece
ES	Spain
FI	Finland
FR	France
IE	Ireland
IT	Italy
NL	the Netherlands
PL	Poland
PT	Portugal
SE	Sweden
SI	Slovenia
UK	United Kingdom
USA	Unites States of America

Other abbreviations

AAAFTS	AAA Foundation for Traffic Safety
BAC	Blood Alcohol Concentration
CAWI	Computer Assisted Web Interview
ESRA	European Survey of Road Users' Safety Attitudes
EU	European Union – but, in figures and tables of the present report 'EU' refers to the 17 countries participating in ESRA
SARTRE	Social Attitudes to Road Traffic Risks in Europe

ESRA weights

European weight A	European weight based on all ESRA 2015 countries except Italy
European weight B	European weight based on all ESRA 2015 countries
European weight C	European weight based on all ESRA 2015 countries except Slovenia
Individual country weight	Individual country weight based on gender and age

Summary

Objective and methodology

The ESRA project (European Survey of Road users' safety Attitudes) is a joint initiative of research organisations and road safety institutes in 17 European countries aiming at collecting comparable (inter)national data on road users' opinions, attitudes and behaviour with respect to road traffic risks. The project was funded by the partners' own resources.

The first ESRA survey was conducted online using representative samples (at least N=1,000) of the national adult populations in 17 European countries. A common questionnaire was developed and translated into 20 different country-language versions. The survey covered a range of subjects, including the attitudes towards unsafe traffic behaviour, self-declared (unsafe) behaviour in traffic and support for road safety policy measures. Data collection took place simultaneously in all countries in June/July 2015. In total, data from more than 17,000 road users (of which 11,000 frequent car drivers) were collected. Hence, the ESRA survey produced a very rich dataset. An overview of the project and the results are available on: www.esranet.eu.

This thematic report presents the results of the 2015 ESRA survey concerning subjective safety and risk perception in traffic. For both topics, general perception of issues on road safety, the feeling of (un)safety in different transport modes, risk perception of causes for accidents, confrontation with risky behaviours of other road users and self-reported involvement in road crashes are described at a European level, within each country, by gender and by age group. The association between road fatalities and subjective concern as well as between (un)safe feeling in different transport modes and fatality rates is studied in the further analysis. This association was described by putting survey data in relation to CARE accident data.

Key results

Concern about road safety

- Overall, around two thirds (68%) of all respondents are concerned about road accidents. This rating is comparable with the concern about standard of health care (70%) and unemployment (70%). However, only traffic congestions are of less concern to Europeans.
- Women are generally more concerned about all surveyed issues than men except from 'traffic congestion'. The gender gap is most obvious regarding the concern for 'road accidents'.
- Overall, Denmark is by trend the least concerned country, whereas Greece is clearly the most concerned country across all items.

Subjective safety and risk perception

- Overall, respondents feel by far safest using public transport and least safe when motorcycling and cycling.
- Generally, men tend to feel slightly safer than women.
- Older drivers feel safer than the younger age groups when driving a car and when using public means of transport.
- Driving under the influence of 'alcohol' clearly spearheads the list of risk factors followed by 'inattentiveness' and taking 'drugs' and driving. 'Tiredness' behind the wheel and taking 'psychoactive medication' while driving score lower across respondents of all countries.
- All age groups agree on driving under the influence of alcohol and driving too fast being the main causes for road accidents. They also agree on technical defects in vehicles and congestion/traffic jams to be a minor cause for road accidents.
- Women generally tend to estimate risk factors to be higher than men.

Behaviour of other road users

- Overall, respondents report to be confronted most frequently with other road users 'driving too fast', 'careless driving' and drivers who 'don't leave a safe distance'.
- Respondents report to be least frequently confronted with other road users that are 'driving too slowly'.
- The youngest age group tends to be to a lesser extent confronted with several behaviours regardless of the topic, except for driving 'too slow'.
- On the other hand, the older age group reports to be least confronted with drivers that drive 'too slow' and to be most confronted with 'speeding' drivers.
- Male respondents quote to be significantly more often confronted with drivers which drive 'too slow' than women.
- Overall, 61% of all respondents think that the occurrence of distracted drivers has increased. This was the highest value of all prompted behaviours. On the other hand, only 20% of all respondents indicated that 'driving too slow' has increased.
- There are also high values for 'aggressive drivers' (49%) and 'speeding' drivers (45%). 'Not leaving a safe distance' to the car in front (38%) and 'driving too slow' (20%) are indicated less often.

Involvement in road crashes

- The highest involvement in road traffic accidents is reported with 'cyclists on an e-bike' (9.5%) and 'mopeds' (6.3%). The lowest accident rates are on public transport (<1%). The reported severity of accidents is quite low. Most participants reported only minor incidents. Note: Figures have to be interpreted with caution bearing in mind the low case numbers.

Concern about road safety vs. fatalities per population

- There is a clear relationship between road fatalities and subjective concern: The consistency regarding both dimensions is high in most countries, especially in Greece, Portugal, France, Slovenia, Germany, Sweden, and Denmark. Four countries, Austria, Italy, Belgium and especially Poland showed a relatively low concern on road safety compared to their relatively high fatality rates.
- The change in fatalities from 2010 to 2014 developed on an especially good note in this period in Greece (-37%), Portugal (-32%), Spain (-32%), and Denmark (-29%). Nevertheless, this is not reflected in the concern on road safety which is still high in these countries except for Denmark. Thus, the concern on road safety is more influenced by the absolute number of accidents than by the change rates in the countries.

Feeling safe on different transport modes

- For car users results show that the feeling of safety has only little to do with fatalities in this mode.
- There is a weak correlation between the fatality rate of pedestrians and feeling safe as a pedestrian ($R^2=0.056$). The most striking result is the high fatality rate of pedestrians in Poland; the lowest fatality rate is found in the Netherlands. Danish pedestrians report to feel safest which is in accordance with the relatively low fatality rate.
- For cyclists we can report the strongest relationship of fatality rate and feeling unsafe of all modes ($R^2=0.5261$).
- In countries with low cycling rates like Spain, Ireland or Portugal cycling is considered as more unsafe than in countries with a high number of cyclists (e.g. the Netherlands, Denmark).
- For motorcyclists (>125cc) there is a rather high consistency of the dimensions 'fatalities' and 'feeling unsafe' as a motorcyclist' ($R^2=0.3086$). There is a group of five countries with a high number of motorcyclists on the roads and a high proportion in fatalities combined with a

rather high percentage of feeling unsafe in this mode (Italy, Switzerland, Spain, Austria, and Germany).

Key recommendations

Policy recommendations at European level

- Facilitate and support the exchange of best practice in terms of countermeasures for inadequate risk perception across Member States.
- Support more research on understanding the factors that influence the subjective safety feeling.

Policy recommendations at national and regional level

- *[In countries with insufficient acceptance that human related factors are main causes for accidents]* Spend sufficient resources on road safety education and on awareness raising (campaigns, TV-spots).
- Develop an efficient speed enforcement system that includes a careful selection of location and duration of control activities, user awareness of speed enforcement activities, systematic recording of speed controls and infringements and public communication of the results of speed enforcement activities.
- Pay within driver education programmes more attention to responsible behaviours such as leaving an adequate and safe distance to the vehicles in front.
- Monitor and enforce of keeping an adequate safety distance.
- Raise the awareness about the very high risks of texting while driving and increase penalties.

Specific recommendations to specific stakeholders

- *[To research organisations]* Provide more insight in the factors contributing to subjective safety and the perception of risks.

Conclusion

The ESRA project has demonstrated the feasibility and the added value of joint data collection on road safety attitudes and performance by partner organizations in a large number of European countries. The intention is to repeat this initiative on a biennial or triennial basis, retaining a core set of questions in every wave, allowing the development of time series of road safety performance indicators. This will become a solid foundation for a joint European (or even global) monitoring system on road safety attitudes and behaviour.

1. Introduction

The prevalence of fatalities in road traffic is the ultimate measure of road safety. And it is an objective one. However, it overall does not correspond to how safe people feel within their local traffic system. The relationship between objective and subjective traffic safety is assumed to be only minor (SWOV, 2012). At the same time, it is not agreed upon which level of subjective safety even is desirable, given that 'feeling too safe' might result in decreased caution of traffic participants and therefore in reduced traffic safety. Furthermore, awareness of the contribution of specific risk factors to crashes is a precondition for behavioural changes.

The concept of subjective safety in traffic refers to feeling safe/unsafe in traffic or the anticipation of being safe/unsafe in traffic for oneself and/or others (SWOV, 2012). This individual assessment is shaped by various internal and external factors like personal experience, observation and interpretation of traffic situations, social norms, personality traits, level of information, the built environment, infrastructure and traffic volume etc. It represents a broad concept that is similar to many others. In this thematic report it is referred to as subjective safety on a global level asking about how safe/unsafe one feels when using various transport modes and distinguished from driving anxiety as well as from feeling safe/unsafe in very specific situations (like driving in cities). Furthermore, respondents have been asked if they perceive certain risky driving behaviours increased, decreased or stagnated within the last two years.

Subjective safety has furthermore common ground with the concepts of 'risk perception' and 'concern' about traffic safety which are also operationalised to a certain extent in the ESRA survey. It is important to note that there is no agreed-upon standard definition of risk perception (Shinar, 2007). ESRA respondents were asked in this regard about their assessment of how many accidents can be accounted for a specific factor like tiredness behind the wheel or driving too fast. Risk perception must be differentiated from 'risk tolerance' and 'risk taking'. It is a complex construct like subjective safety and is very sensitive to misperception by traffic participants (De Blaeij & Van Vuuren, 2003). There is a tendency to overestimate unlikely events with catastrophic outcomes and to underestimate frequent events with less catastrophic outcomes (Slovic, 2000). In this respect a question about subjective exposure to the single risk factors was included as well. Asking about different perceived accident causes and put them in mutual relation indicates furthermore to which extent a risk factor is considered as relevant for traffic safety.

The subjective importance of road safety in the ESRA countries is assessed through asking about the level of concern people experience towards traffic safety. This is further put in relation to levels of concern towards other societal realms like crime or unemployment rates. Whereas a certain amount of concern about traffic safety issues might be beneficial for the acceptance of road safety measures, a low level of concern in combination with a high fatality rate is greatly problematic.

Some of the ESRA questions regarding subjective safety and risk perception have already been used in the SARTRE4 survey, like the level of concern regarding traffic safety. This allows an assessment of the development in a perspective of the previous years. Some others are slightly different or new and can be considered a first benchmark for future comparison and monitoring across Europe.

This thematic ESRA report aims at describing subjective safety and risk perception of all kind of road users in 17 European countries and comparing it among themselves to this effect.

2. Methodology

The ESRA project (European Survey of Road users' safety Attitudes) is a joint initiative of research organisations and road safety institutes in 17 European countries aiming at collecting comparable (inter)national data on road users' opinions, attitudes and behaviour with respect to road traffic risks. The project was funded by the partners' own resources.

The first ESRA survey was conducted online using representative samples (at least N=1,000) of the national adult populations in 17 European countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, the Netherlands, United Kingdom). A common questionnaire was developed and translated into 20 different country-language versions. The subjects covered a range of subjects, including the attitudes towards unsafe traffic behaviour, self-declared (unsafe) behaviour in traffic, and support for road safety policy measures – overall over 222 variables. The ESRA questionnaire (see Appendix - ESRA 2015 Questionnaire) was inspired by the previous European project, SARTRE, and also includes some questions of the AAAFTS-survey (USA) 'Traffic Safety Culture Index', which enables tentative comparisons with these projects. Data collection took place simultaneously in all countries in June/July 2015. A Belgian polling agency coordinated the field work to guarantee a uniform sampling procedure and methodology. In total, data from more than 17,000 road users (of which 11,000 frequent car drivers) were collected. Hence, the ESRA survey produced a very rich dataset.

Seven institutes – BRSI (BE), KfV (AT), NTUA (EL), CTL (IT), ITS (PL), PRP (PT), BFU (CH) – combined their expertise to analyse the common data and to disseminate the results. The results of the 2015 survey are published in a [Main report](#) and six thematic reports:

- [Speeding](#)
- [Driving under the influence of alcohol and drugs](#)
- [Distraction and fatigue](#)
- [Seat belt and child restraint systems](#)
- [Subjective safety and risk perception](#)
- [Enforcement and support for road safety policy measures](#)

There are also 17 country fact sheets in which the main results per country are compared with an European average. An overview of the project and the results are available on www.esranet.eu.

The present report summarizes the ESRA-results with respect to subjective safety & risk perception. An overview of the data collection method and the sample per country can be found in the Main report.

This thematic report consists of several topics. The first question in the report deals with general road safety issues:

- *How concerned are you about each of the following issues? (4-point scale / 1=very concerned to 4=not concerned at all)*

This question was also included in the SARTRE4 survey.

The following two questions deal with the topic of subjective safety and risk perception:

- *How (un)safe do you feel when using the following transport modes in your country?*

11 different transport modes were rated regarding the feeling of unsafety on a scale from 0 to 10, where 0 is 'very unsafe' and 10 is 'very safe'. The mean value of the scale is used for tables and graphs.

- *In your opinion, how many road traffic accidents are caused by each of the following factors? Estimate a percentage of accidents for each factor. In other words, how many accidents out of 100 were caused by the following factors?*

The next two questions are about the behaviour of other road users: Respondents were asked to give their estimation of probability for an accident regarding 16 items/risk situations in everyday traffic such as 'driving too fast' or 'driving under the influence of alcohol'. The mean value is the measure used for displaying results in tables and graphs.

- *Can you specify, for each of the following behaviours how often you, as a road user, are confronted with these behaviours?*

The items from the previous section on risk factors were rated on a scale from 0 to 10, where 0 is 'never' and 10 is 'very often'. Again, the mean value is used for displaying results.

- *Do you think the occurrence of the following behaviour has increased, decreased or not changed compared to 2 years ago?*

The question – including six items/behaviours - allows three categories as answers, where 1 is 'increased', 2 is 'no change' and 3 is 'decreased'.

The last question included in this chapter deals with the involvement in road crashes:

- *In the past three months have you been involved in a road traffic accident as a ...*

Respondents are asked for experiences with traffic accidents in the past three months in different transport modes: 14 categories of transport modes are included.

3. Results

3.1. Descriptive results

This chapter includes results of descriptive statistics on questions related to the topics 'subjective safety and risk perception'. Results are presented in a similar fashion for each topic. Initially, it starts with a comparison of differences between age groups, followed by a comparison by gender and finally by country with a total value for Europe.

Three different age groups have been considered: 18-34 years, 35-54 years and finally 55 years and older. Country comparisons are based on individual country weights to counter over- or underestimation. The Europe-total is based on actual data of the participating countries.

3.1.1. Concern about road safety

'How concerned are you about each of the following issues?'

Respondents were asked for their individual evaluation of how concerned they are about 'rate of crime', 'pollution', 'road accidents', 'standard of health care', 'traffic congestion' and 'unemployment'. By asking about various potential societal threats, the perceived concern about road accidents is put into perspective and indicates the subjective importance of this topic. However, when interpreting this concern about road accidents it has to be considered that it is not clear what an expressed concern exactly refers to, whether it is the threat of being in an accident or an overall concern about maybe increasing accident or fatality rates.

The level of concern was indicated on a 4-point scale (from 1 'very concerned' to 4 'not at all concerned'). For descriptive analysis these categories were dichotomised into two new categories: 'concerned' (former categories 1 and 2) and 'not concerned' (former categories 3 and 4). The subsequent analysis shows the relative frequencies of the consolidated category 'concerned'.

Overall, 68% of all respondents are concerned about road accidents to some extent. This rating is comparable with the concern about standard of health care (70%) and unemployment (70%). However, only traffic congestions are of less concern for Europeans.

It is evident that there are differences between the three age groups regarding the various sources of concern (see Figure 1). This impression is underpinned by further analysis which shows highly significant results (χ^2 , all $p < .01$) on age group comparison.

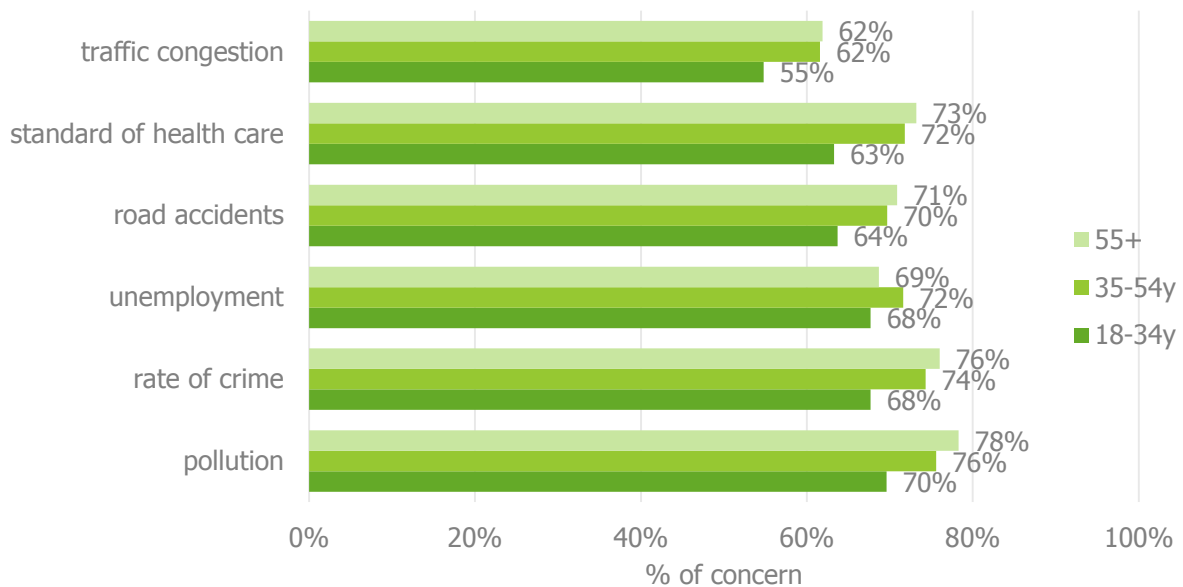


Figure 1: Concern about various issues, by age group.

Notes: (1) % of concerned participants: scores 1 and 2 on a 4-point scale from 1 'very concerned' to 4 'not at all concerned'. (2) European weight B.

The concern about road accidents increases with the respondents' age. Except for unemployment, this is also true for all other potential concerns.

In a further step the 'concerned'-answers of participants were analysed regarding their gender. As shown in Figure 1 it is obvious that there are differences between the two groups. Further analysis reveals significant results (χ^2 , all $p < .01$, except 'traffic congestion' $p = .01$) on gender comparison.

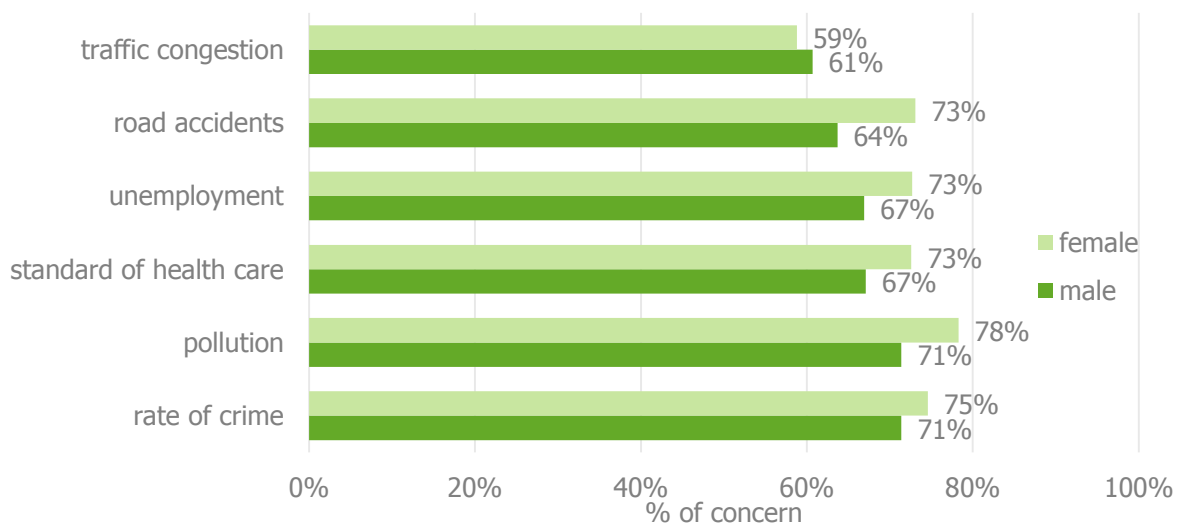


Figure 2: Concern about various issues, by gender.

Notes: (1) % of concerned participants: scores 1 and 2 on a 4-point scale from 1 'very concerned' to 4 'not at all concerned'. (2) European weight B.

Women are generally more concerned about all surveyed issues than men except from 'traffic congestion'. This gender gap is most obvious regarding the concern for 'road accidents'.

For the final part of the analysis, the responses are compared between the participating countries. Figure 3 and Figure 4 show the results of country comparison of each issue successively. Further analysis shows significant results (χ^2 , all $p < .01$).

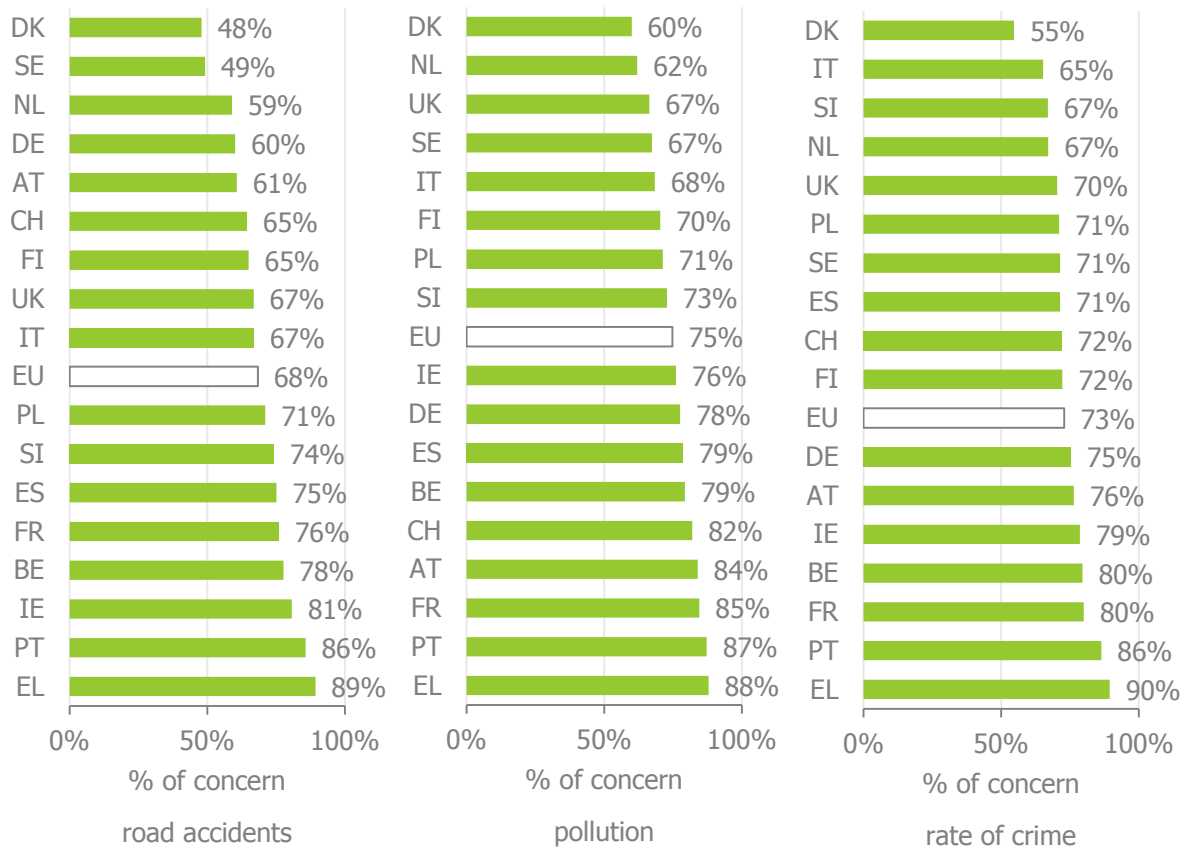


Figure 3: Concern about various issues, by country.

Notes: (1) % of concerned participants: scores 1 and 2 on a 4-point scale from 1 'very concerned' to 4 'not at all concerned'. (2) Countries based on individual country weight, Europe based on European weight B.

Figure 3 gives an overview on 'concerned'-answers compared by country referring to the issues 'road accidents', 'pollution' and 'rate of crime'. Overall, it is obvious that Denmark is by trend the least concerned country, whereas Greece is clearly the most concerned country across items.

Only looking at road accidents, respondents from Greece, Portugal and Ireland appear to be the most concerned with more than 80% approval rate, while Denmark and Sweden are the least concerned with less than the 50%. In the chapter 'further analyses' the country mean for concern regarding road accidents will be contrasted with the actual accidents per population to show to which extent this concern is related to the actual accident numbers.

3.1.2. Subjective safety and risk perception

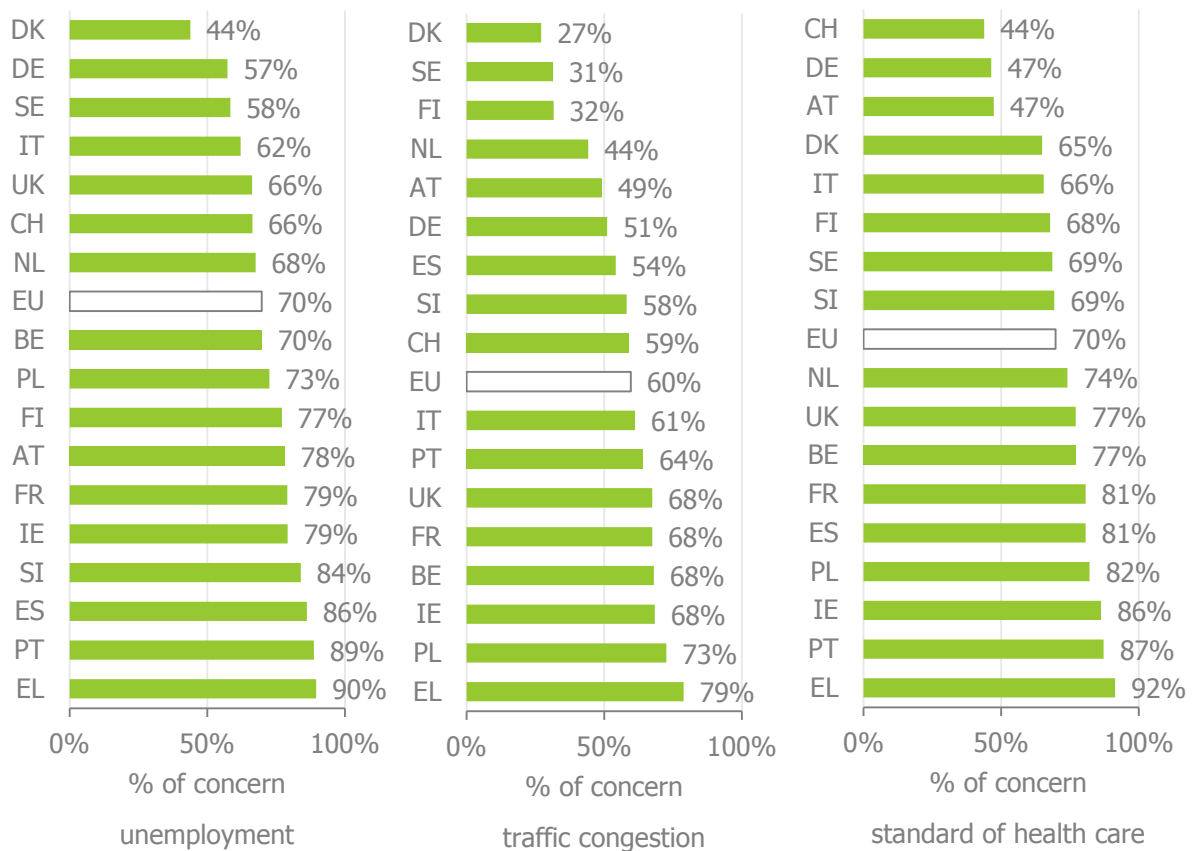


Figure 4: Concern about various issues, by country.

Notes: (1) % of concerned participants: scores 1 and 2 on a 4-point scale from 1 'very concerned' to 4 'not at all concerned'. (2) Countries based on individual country weight, Europe based on European weight B.

Figure 4 gives an overview of relative frequencies compared on a country level referring to the issues of 'unemployment', 'traffic congestion' and 'standard of health care'. Regarding 'unemployment' it is obvious that there is a great difference between the least concerned (Denmark: 44%) and the most concerned country (Greece: 90%). The European average is 70%.

For 'traffic congestion' there are the largest differences between the country with the least (Denmark: 27%) and the most concern (Greece: 79%). European average is 60%.

There are three countries with relatively low frequencies (Switzerland 44%, Germany 47%, Austria 47%) of 'concerned'-answers regarding the issue 'standard of health care' and one (Greece 92%) with an exceptionally high value. The European average lies at 70% (see Figure 4).

'How (un)safe do you feel when using the following transport modes?'

Due to the big differences in sample sizes only those transport modes with sufficient sample size are included in the analysis; threshold was a usage of a certain transport mode of at least 40% based on European-total (see Figure 5). Nevertheless, 'motorcycle as a driver' is included because of its importance for road safety. Subsequently, the following analysis focuses on six selected transport modes.

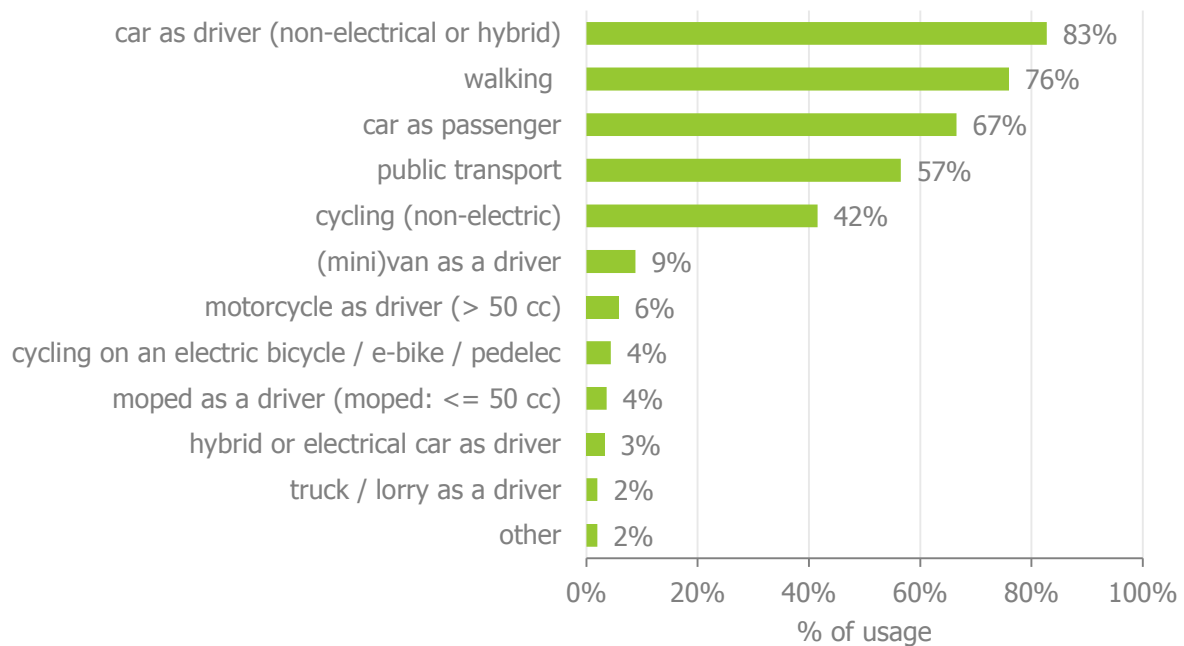


Figure 5: Frequency of transport modes, in Europe (% of usage).

Note: European weight B.

Respondents had to rate modes of transport on a 11-point scale, whereas 0 represents 'very unsafe' and 10 'very safe'. Data from Italy might be slightly overestimated as there was a scale used from 1-11. This is relevant for all charts regarding (un)safe feeling using transport modes in this section. First of all, age groups are compared for each transport mode (Figure 6 to Figure 10). There is in general a trend towards feeling safe in most of the analysed transport modes.

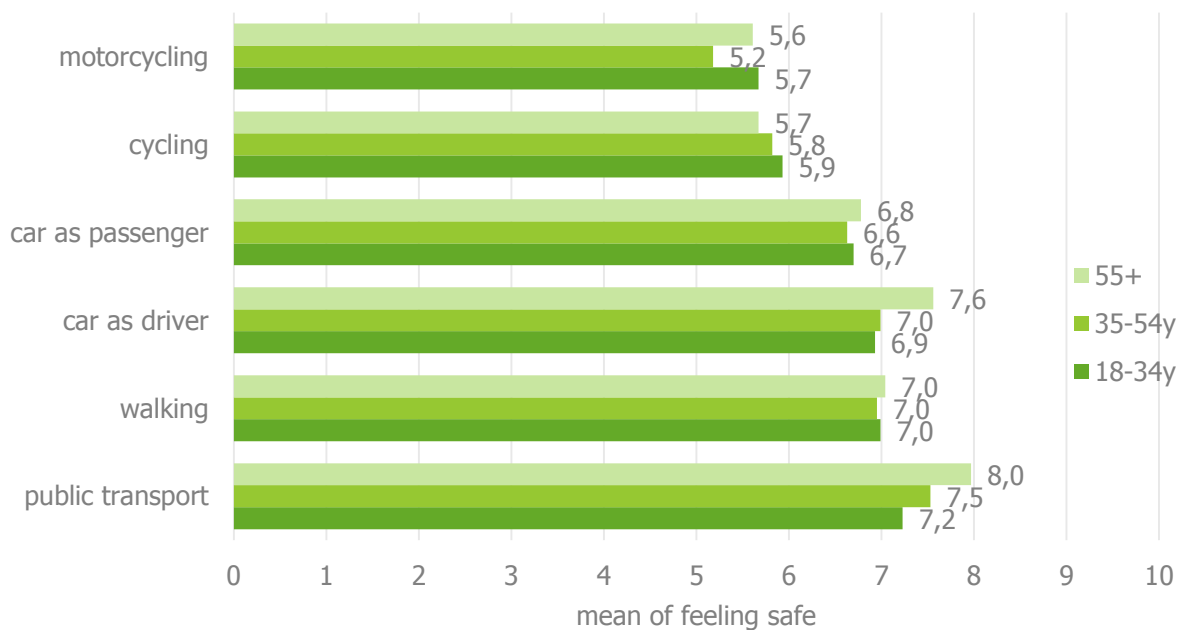


Figure 6: Feeling safe when using several different transport modes, by age group.

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) European weight B.

Overall, respondents feel by far the safest on public transport (7.6 out of 10 on average) and the least when motorcycling (5.5) and cycling (5.8).

Obviously there are differences between age groups regarding the perception of safety. While the three age categories differ the most for public transportation, the youngest respondents still feel very safe using this mode of transport compared to all other modes. However, there is no apparent common trend regarding age for all means of transport. Striking is that the oldest age group doesn't only feel much more safe than the younger ones when driving a car, but that the according mean represents the second highest value of all modes and age groups (after 55+ on public transport). With bicycles the trend is reversed. Older cyclists indicate a mean of 5.7, the mean is 5.8 for the age group 35 to 54 years and 5.9 for the youngest age group. No age differences at all have been found for the subjective safety when walking.

Further analysis has shown significant differences between the age groups for each of the so far reported transport modes (ANOVA, $p < .01$ respectively $p < .05$ for motorcycling).

Results of gender analysis are shown in Figure 7. Overall, men tend to feel slightly safer than women in most cases. The differences are highly significant for public transport and car as driver (t-test for independent samples, $p < .01$) and significant for motorcycling and car as passenger ($p < .05$). The minor gender differences for cycling and walking are not significant.

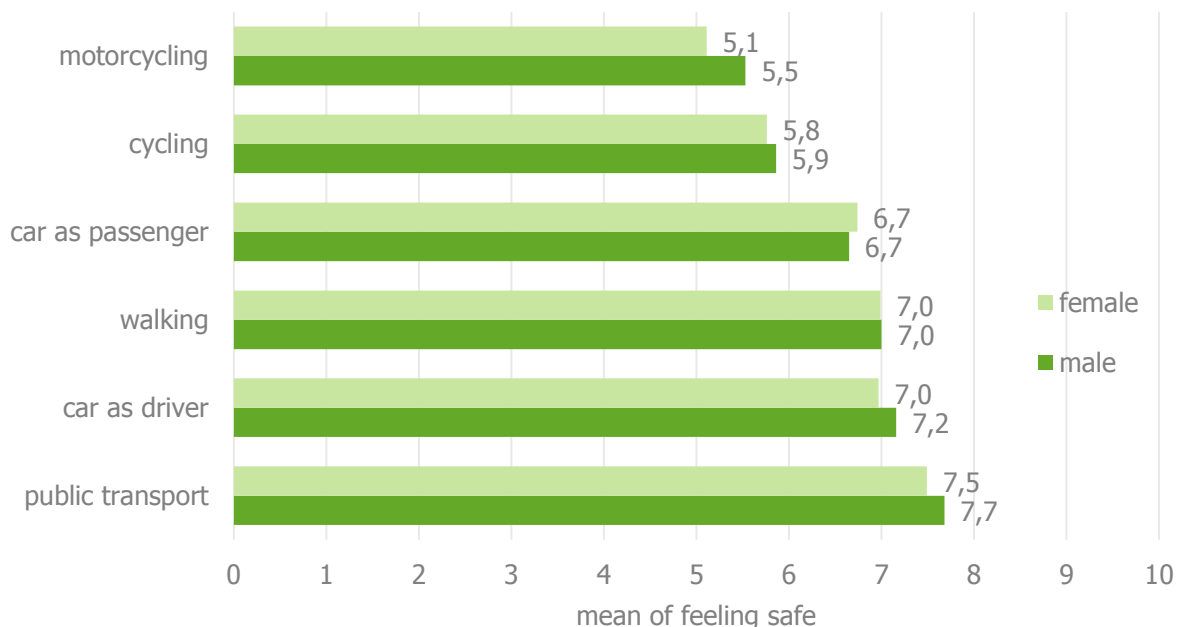


Figure 7: Feeling safe when using several different transport modes, by gender.

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) European weight B.

In Figure 8 to Figure 10, country comparison with regard to various transport modes is shown. The percentages in each row indicate the usage of the transport mode in each country as well as the European total. Further analysis indicates significant results (ANOVA, all $p < .01$).

Throughout all surveyed countries the least risk is attributed consistently to public transport. Only Swedes perceive also walking and car driving as about equally safe. In most countries motorcycling is assessed the most unsafe mode of transportation. Whereas in Spain, Ireland, Portugal, Italy and the UK it is cycling closely followed by motorcycling.



Figure 8: Feeling safe when using several different transport modes, by country.

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) Countries based on individual country weight, Europe based on European weight B.

Mean values regarding 'walking' range from 6.1 (Slovenia) to 8.3 (Denmark). Mean values in the transport mode 'cycling' have a larger range from 4.8 (Greece) to 7.4 (Denmark) (see Figure 8).



Figure 9: Feeling safe when using several different transport modes, by county.

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) Countries based on individual country weight, Europe based on European weight B.

Figure 9 shows the mean values for transport modes 'car as driver' and 'motorcycling'. The range is slightly bigger and varies from 6.3 (France) to 8.2 (Denmark) on 'car as a driver'. The range in the transport mode 'motorcycling' is larger than in all other transport modes and stretches from 3.6 (Greece) to 6.7 (the Netherlands). The European average is 7.2 for 'car as a driver' and 5.6 for 'motorcycling'. It is striking that motorcycling is the only mode Denmark's respondents don't assess safer than respondents from all other countries, with a score even below the European average.



Figure 10: Feeling safe when using several different transport modes, by country.

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) Countries based on individual country weight, Europe based on European weight B.

Results for the transport mode 'car as passenger' are depicted in Figure 10. Mean values range from 6.1 (France) to 7.7 (Denmark), the European average is 6.7. There are no big differences between the countries regarding safety feelings on public transport. The lowest mean is reported in Slovenia (7.1), the highest one in Denmark (8.4).

Overall, there is a clear trend towards feeling safe regardless of the transport mode with the exception of cycling and motorcycling. Cycling and motorcycling are the transport modes which were rated the least safe (with mean values even below 5). Respondents from Denmark showed higher mean values regarding their feeling of safety in most surveyed transport modes.

'In your opinion, how many road traffic accidents are caused by each of the following factors?'

Participants were asked to estimate the percentage of accidents reducible to various risk factors. This estimate was provided separately for each listed risk factor using a figure between 0 and 100. Thus, the total sum of all the risk factors can be higher than 100.

Overall, all groups agree on driving under the influence of alcohol and driving too fast being the main cause for road accidents. All groups also agree on technical defects in vehicles and congestion/traffic jams to be minor causes for road accidents.

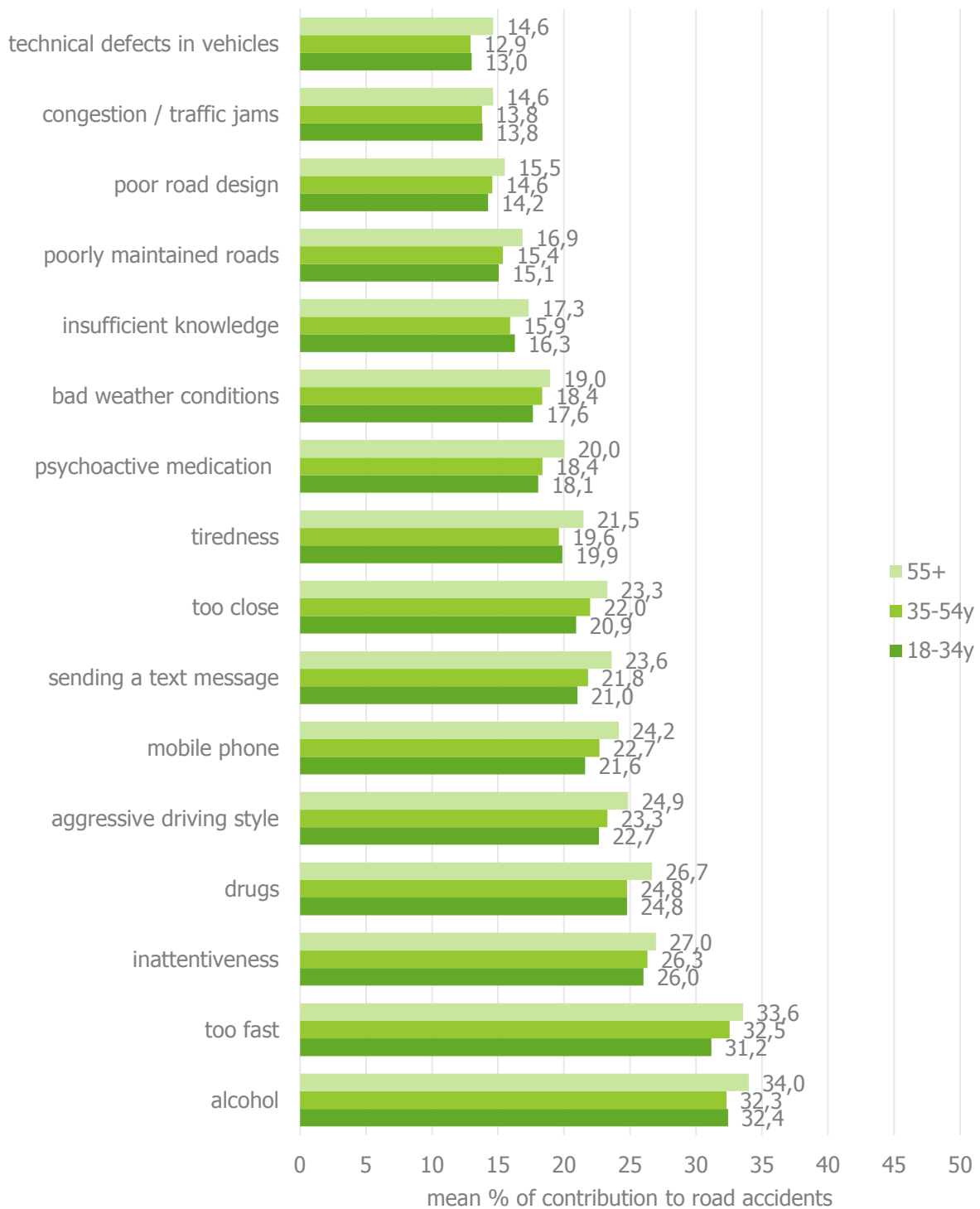


Figure 11: Contribution of risk factors to road traffic accidents, by age group.

Notes: (1) Mean of a scale range: 0% to 100%. (2) European weight B.

As shown in Figure 11, there is a tendency towards higher estimates in the age group 55+. There are no striking differences between the younger age group and the middle-aged one.

The main difference between 55+ and 18-34 concerns the use of mobile phones and sending text messages as well as following too close and driving too fast. Nearly all differences are highly

significant on a level of $p < .01$ (ANOVA), except for congestion/traffic jam ($p < .05$, ANOVA) and inattentiveness (no significant difference).

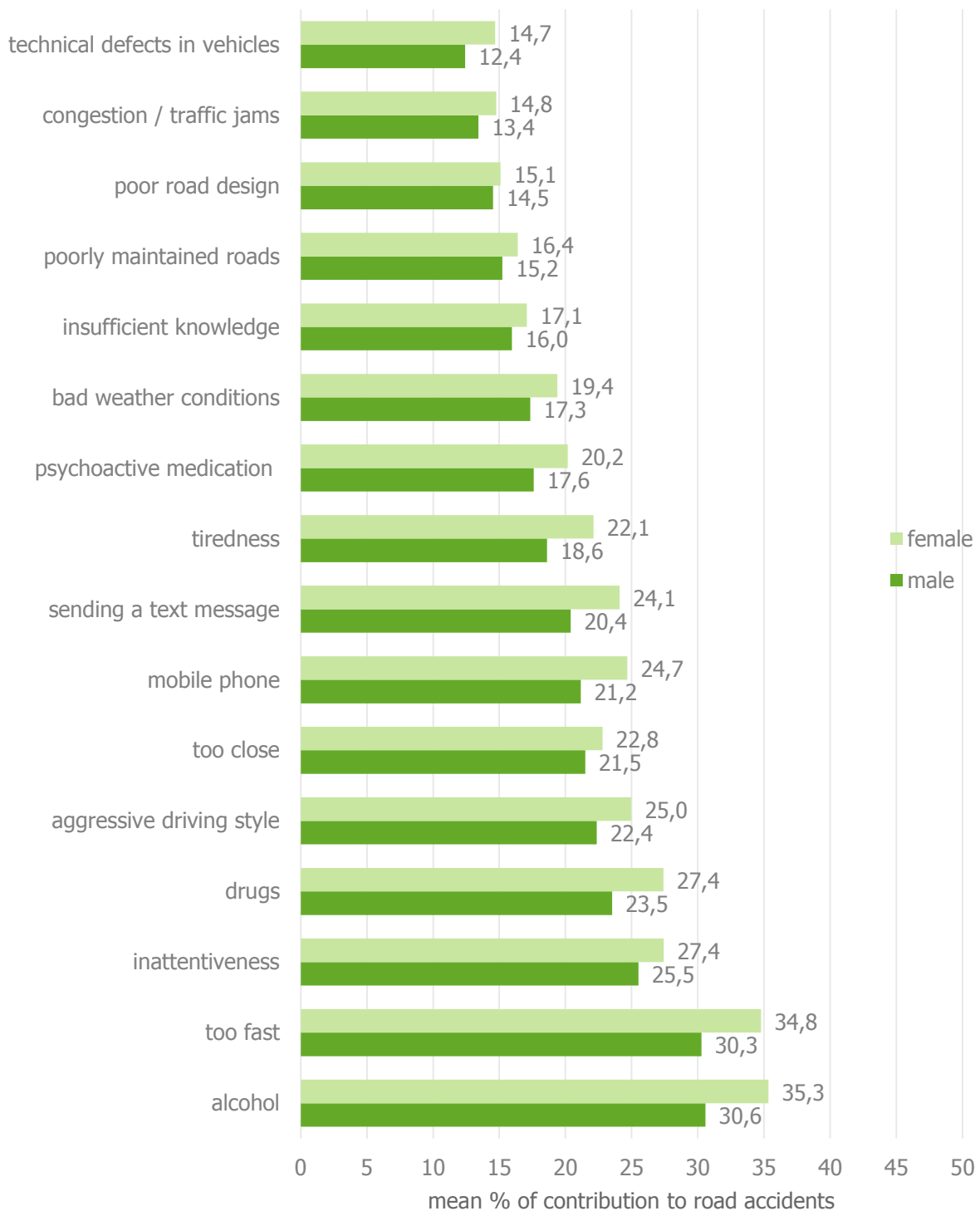


Figure 12: Contribution of risk factors to road traffic accidents, by gender.

Notes: (1) Mean of a scale range: 0% to 100%. (2) European weight B.

Figure 12 shows the comparison of risk estimation by sex. It is obvious that women generally tend to estimate risk factors to be higher than men. However, both groups agree on the factors to be causal for most accidents ('driving too fast' and 'driving under the influence of alcohol') and also the ones to be least causal ('technical defects in vehicles' and 'congestion/traffic jams'). All differences are highly significant on a level of $p < .01$ (t-test for independent samples), except for 'poor road design', where no statistical significance was found.

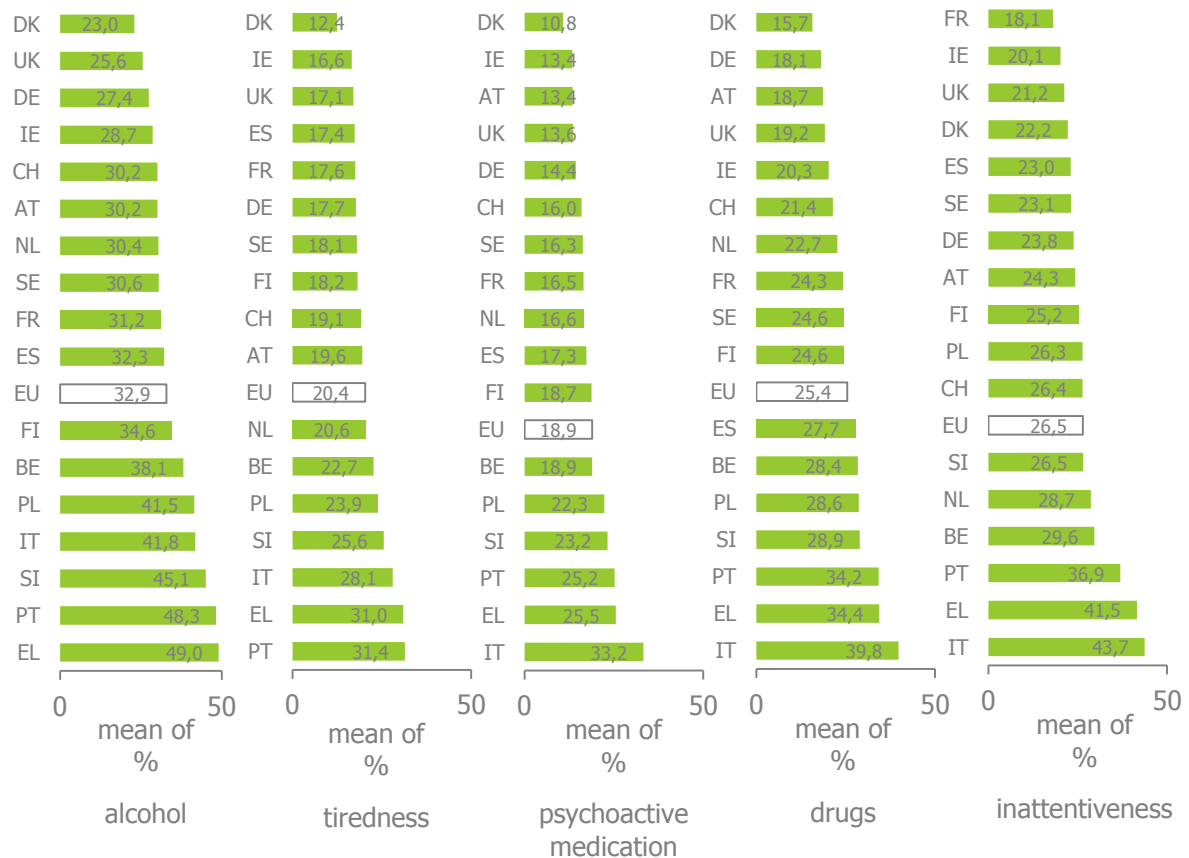


Figure 13: Contribution of human risk factors to road traffic accidents, by country - part 1.

Notes: (1) Mean of a scale range: 0% to 100%. (2) Countries based on individual country weight, Europe based on European weight B.

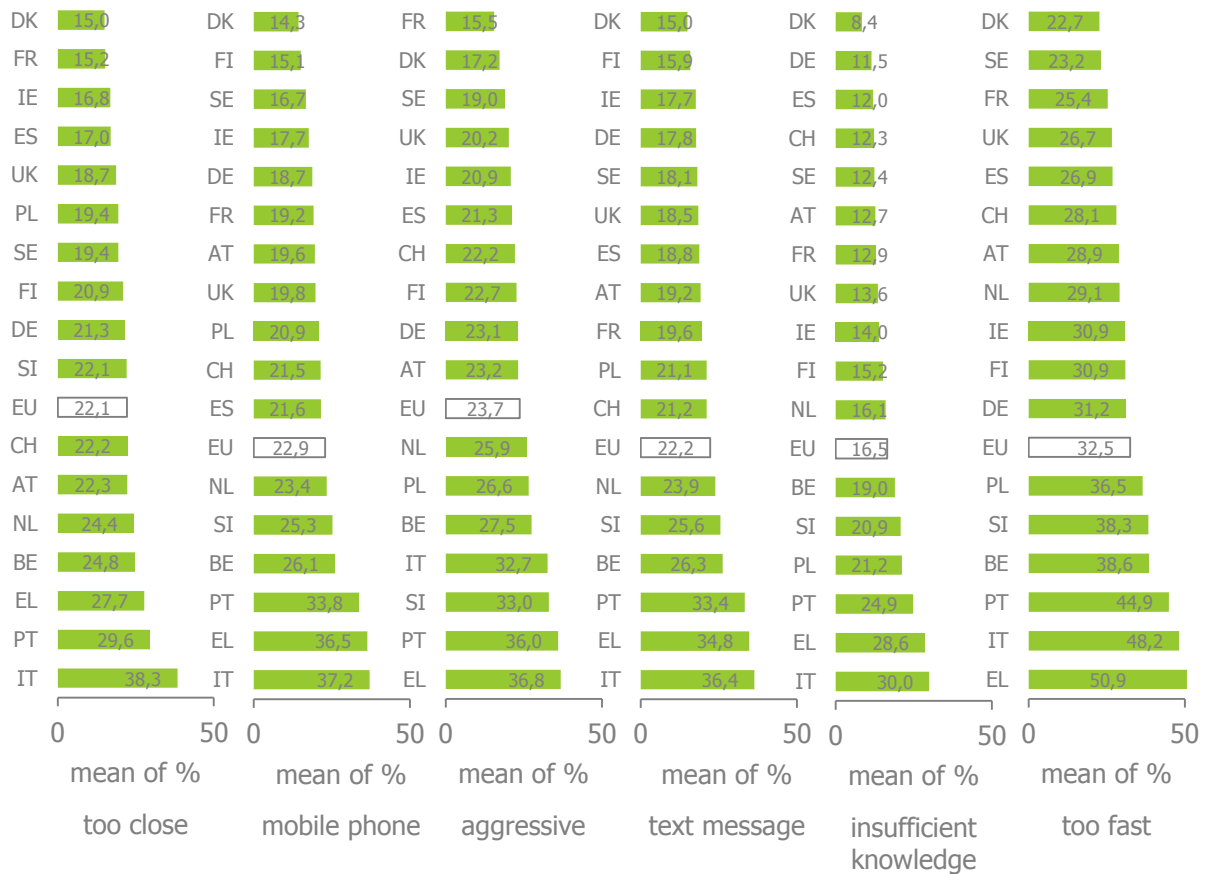


Figure 14: Contribution of human risk factors to road traffic accidents, by country - part 2.

Notes: (1) Mean of a scale range: 0% to 100%. (2) Countries based on individual country weight, Europe based on European weight B.

Figure 13 and Figure 14 present different human risk factors while driving. There are big ranges of values between countries. It is obvious, however, that overall driving under the influence of 'alcohol' clearly spearheads this list of risk factors followed by driving 'too fast', 'inattentiveness' and taking 'drugs' and driving.

Further high scoring risk factors are 'aggressive' driving style, using 'mobile phone' to make a call while driving without using a hands-free device, sending a 'text message' while driving and following 'too close' to the vehicle in front. The least important risk factor assumed to cause accidents according to the respondents' view is 'insufficient knowledge' of the traffic rules. All country differences are highly significant (ANOVA, all $p < .01$).

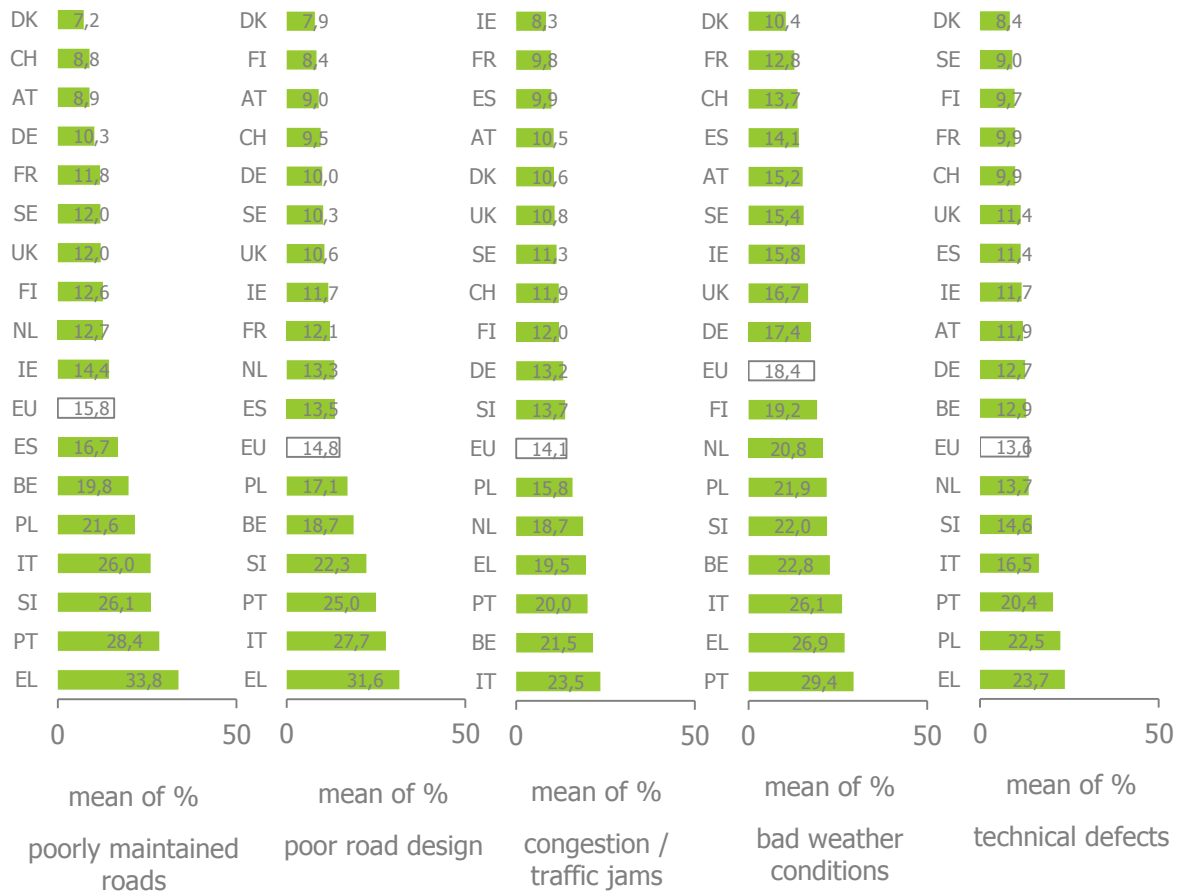


Figure 15: Contribution of external risk factors to road traffic accidents, by country.

Notes: (1) Mean of a scale range: 0% to 100%. (2) Countries based on individual country weight, Europe based on European weight B.

Figure 15 shows the results on the perception of risk factors due to external influences, independent from human behaviour. Overall, big differences between countries are displayed. According to the respondents 'bad weather conditions' is the most frequent reason for road accidents in the group. Other external risk factors are rated relatively low (see Figure 15). Further analysis shows highly significant differences (ANOVA, all $p < .01$).

All in all, it is obvious that respondents in Denmark tend to rate risk factors generally lower than those of other countries whereas respondents of Italy and Greece tend to rate them higher. There is no difference between human related risk factors and external factors.

3.1.3. Behaviour of other road users

'Can you specify, for each of the following behaviours how often, as a road user, are confronted with these behaviours?'

Respondents were asked to indicate how often they are - as a road user - confronted with several different behaviours of other traffic participants and had to score these behaviours on a 11-point scale, whereas 0 is 'never' and 10 'very often'. Overall, respondents reported to be most confronted with 'speeding' (6.8). This was followed closely by 'careless drivers' (6.7) and by 'drivers who don't leave a safe distance to the car in front' (6.6). The behaviour they were least confronted is 'driving too slowly' (4.9).

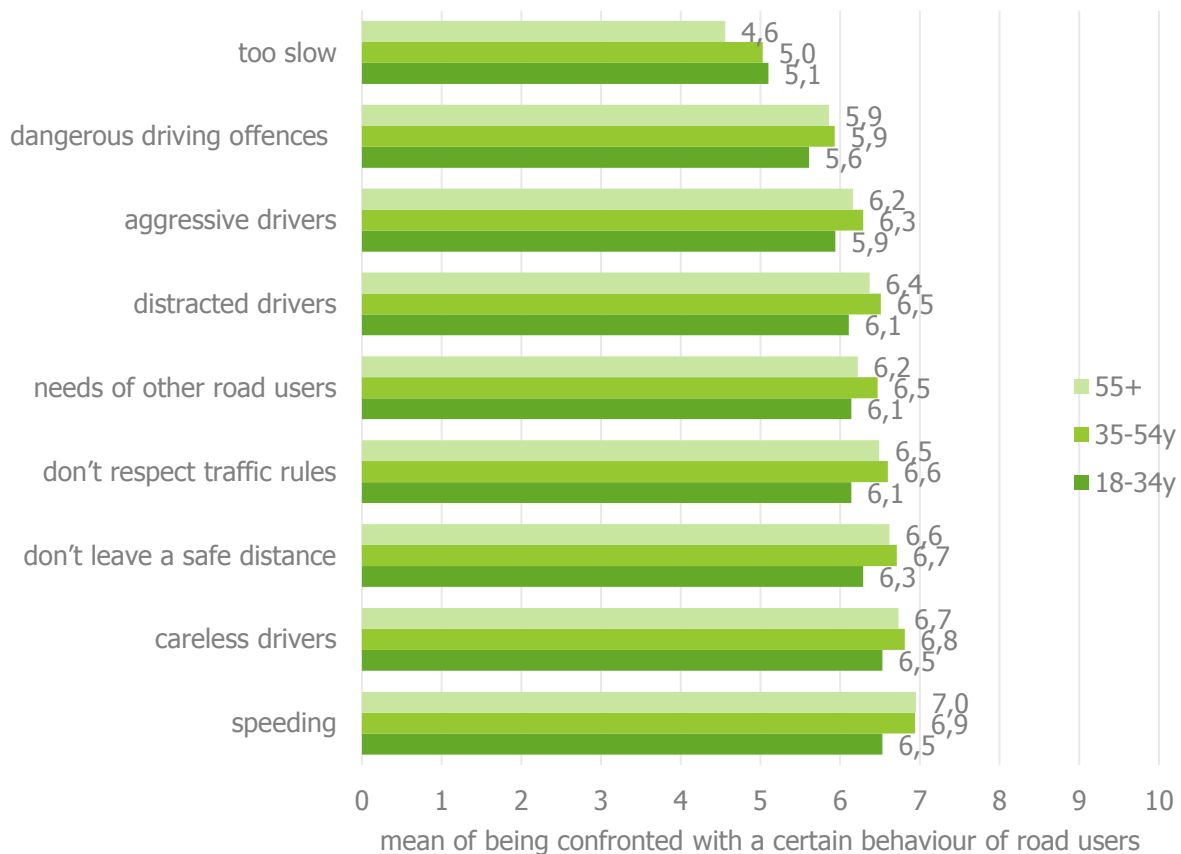


Figure 16: Being confronted with behaviours of other road users, by age group.

Notes: (1) Mean of a 11-point scale, from 0 'never' to 10 'very often'. (2) European weight A.

First of all, comparison of age groups showed significant differences regarding the occurrence of each behaviour (ANOVA, all $p < .01$). As shown in Figure 16, the younger age group tends to be to a lesser extent confronted with several behaviours regardless of the topic, except for driving 'too slow', which younger respondents quote to be most confronted with. In contrast, the middle-aged group achieves a reversed result. The latter group quotes to be most confronted with several behaviours regardless of the topic, except for 'speeding' and driving 'too slow'. The older age group reports to be the least confronted with drivers that drive 'too slow' and to be the most confronted with 'speeding' drivers.

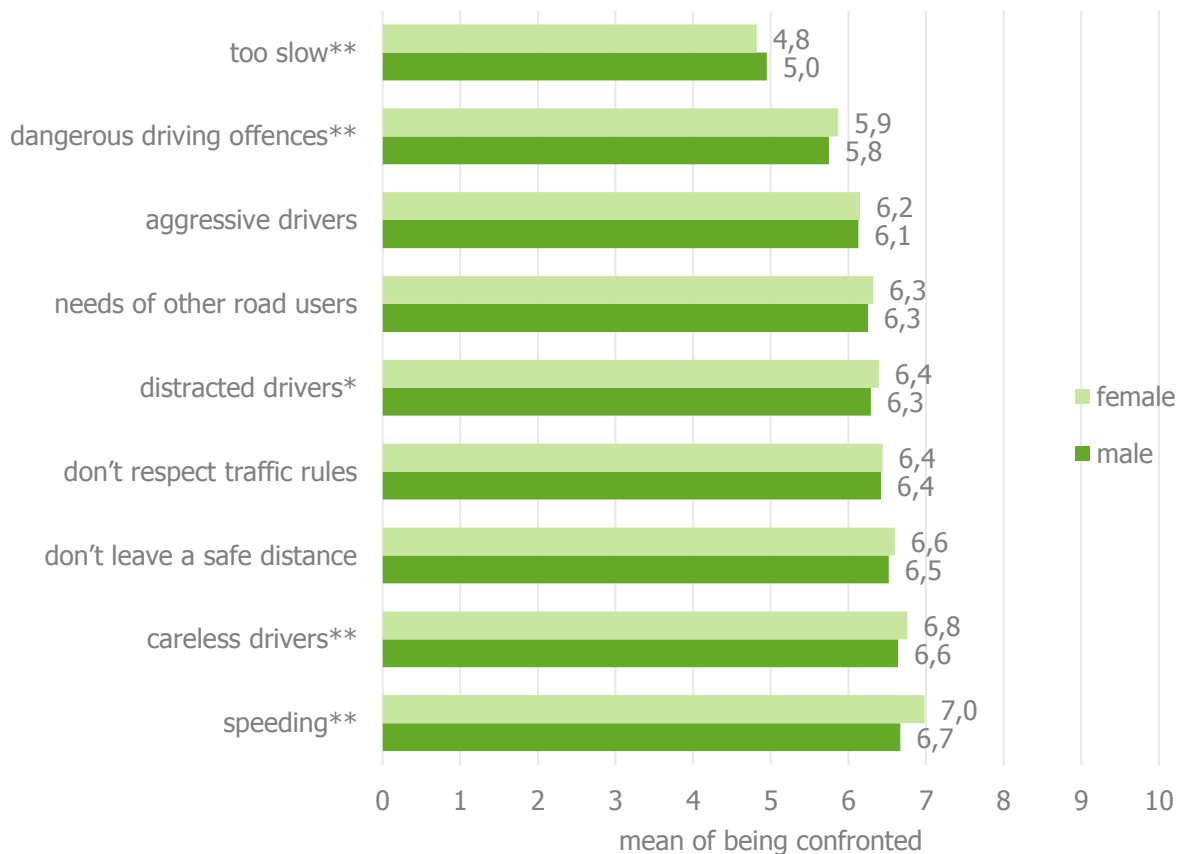


Figure 17: Being confronted with behaviours of other road users, by gender.

Notes: (1) Mean of a 11-point scale, from 0 'never' to 10 'very often'. (2) European weight A.

Differences regarding gender are rare, but nonetheless further analysis shows some significant differences (t-test for independent sample sizes; **= $p < .01$; *= $p < .05$): Male respondents quote to be significantly more confronted with drivers who drive 'too slow' than women. On the other hand, women quote to significantly face more drivers committing 'dangerous driving offences', 'distracted drivers', 'careless drivers' and 'speeding' drivers.

Subsequently, comparing mean values by country showed significant differences for all behaviours (ANOVA, all $p < .01$).



Figure 18: Being confronted with behaviours of other road users, by country.

Notes: (1) Mean of a 11-point scale, from 0 'never' to 10 'very often'. (2) Countries based on individual country weight, Europe based on European weight A.

Respondents quote an average value of 6.8 of being confronted with 'speeding' drivers. This is the highest value of reported behaviours respondents find themselves confronted with, followed by a similarly high average value for drivers who 'don't leave a safe distance' to the car in front. Respondents indicated to be not very often confronted with drivers who drive 'too slow' (see Figure 18).

Participants of the survey indicated to be confronted with 'careless drivers' on average 6.7. They stated further to be confronted with drivers who 'don't respect traffic rules' and drivers who don't take into account the 'needs of other road users' (European average of 6.4 and 6.3 respectively). Confrontation with 'dangerous driving offences' is reported at an average of 5.8 (see Figure 19).

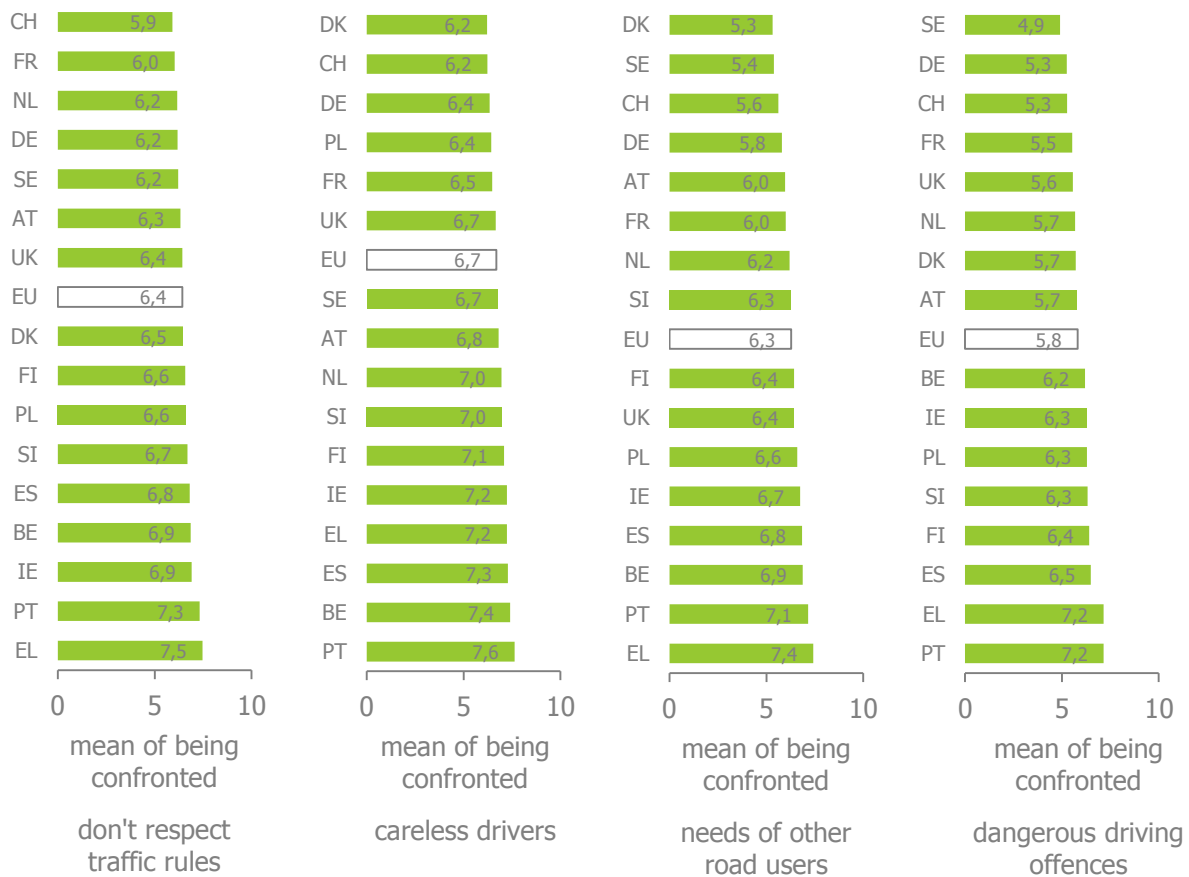


Figure 19: Being confronted with behaviours of other road users, by country.

Notes: (1) Mean of a 11-point scale, from 0 'never' to 10 'very often'. (2) Countries based on individual country weight, Europe based on European weight A.

'Do you think the occurrence of the following behaviour has increased, decreased or not changed compared to 2 years ago?'

Participants were asked to indicate the occurrence of several behaviours (see Figure 17 and Figure 18 for the list of items) and whether they think this behaviour has increased, decreased or not changed compared to 2 years ago. In the subsequent descriptive analysis the 'increased' answers are the base for comparing different groups. Overall, 61% of all respondents think that the occurrence of distracted drivers has increased. This is the highest value of all behaviours. Whereas on the other side only 20% of all respondents indicated that driving too slow has increased.

Regardless of the surveyed behaviour the older age group tends to see an 'increase' (except for driving 'too slow'), whereas younger participants definitely have lower percentages in this response category. For most of the items in question there seems to be a relation between age and perceived increase of occurrence. Except for driving 'too slow' which shows a reversed trend. Differences between age groups were highly significant for each behaviour (χ^2 , all $p < .01$).

Regarding gender differences, women clearly tend to more frequently indicate an 'increase'. This is especially the case for 'speeding' drivers (women 49%, men 41%), 'aggressive drivers' (women 52%, men 46%), drivers committing 'dangerous driving offences' (women 41%, men 36%) and 'distracted drivers' (women 63%, men 59%). Men (22%) believe to a greater extent than women (18%) that numbers of drivers who drive 'too slow' have increased in the last 2 years.

Further analysis for gender revealed highly significant differences (χ^2 , all $p < .01$), except for drivers who don't take into account the 'needs of other road users' and drivers who 'don't leave a safe distance' to the car in front (no significant differences).

Country comparison shows that most respondents think that there is an increase of distracted drivers (European average is 61%). There are also high values for 'aggressive drivers' (European average 49%), and 'speeding' drivers (European average 45%). 'Not leaving a safe distance' to the car in front (European average 38%) and driving 'too slow' (European average is 20%) are indicated less often). Further analysis shows significant results regarding all behaviours (χ^2 , all $p < .01$).

3.1.4. Involvement in road crashes

'In the past three months have you been involved in a road traffic accident as a...?'

Participants were asked about their involvement in road traffic accidents using several transport modes in the past three months and the severity of the accident(s) using the following categories: 'without material damage or any injured parties', 'with only material damage', 'with only minor injuries to myself or others' or 'in which someone had to be taken to hospital'.

Table 1 Involvement (and severity) in a road traffic accident in the past three months, in Europe (% of involvement, % of severity, respectively)

transport mode	accident involvement		severity of the accident		
	N (user)	% (user)	someone had to be taken to a hospital	only minor injuries to myself or others	only material damage
pedestrian	186	1.5%	10%	26%	64%
cyclist	129	2.0%	15%	27%	58%
cyclist on an e-bike	70	9.5%	10%	20%	70%
moped (<50 cc)	35	6.3%	18%	10%	72%
motorcyclist (50-125 cc)	39	4.0%	9%	21%	70%
motorcyclist (>125 cc)	56	5.7%	15%	46%	39%
car driver	725	5.5%	7%	15%	78%
car passenger	183	1.8%	11%	25%	64%
driver of a minivan	24	1.6%	2%	50%	48%
lorry/truck driver	10	3.4%	62%	2%	36%
on the train	61	0.7%	40%	10%	51%
on the subway	38	0.4%	5%	28%	67%
on a tram	48	0.5%	10%	24%	66%
on the bus	88	1.0%	34%	23%	43%

Note: European weight A.

As shown in Table 1 the highest involvement in road traffic accidents is reported by 'cyclists on an e-bike' (9.5%) and 'mopeds' (6.30%) (Note: Figures have to be interpreted with caution bearing in mind the low case numbers). The lowest accident rates are 'on the subway' (0.50%) and 'on a tram' (0.40%). The reported severity is included in the table for the sake of completeness, however, precaution is recommended when interpreting these figures because of the low underlying numbers.

3.2. Further analysis: Subjective safety versus road fatalities

In the further analysis a comparison between road safety outcomes and subjective safety and risk perception was conducted. As there is only a small number of reported accidents from the survey (see Figure 20) it was decided to use CARE data¹ as an external source for accident rates.

3.2.1. Relation of road fatalities and the concern about road safety

First we had a closer look at the relationship of subjective concern with the real situation of accidents in the participating countries. Thus, an analysis of CARE data was done and put in relation to the survey data.

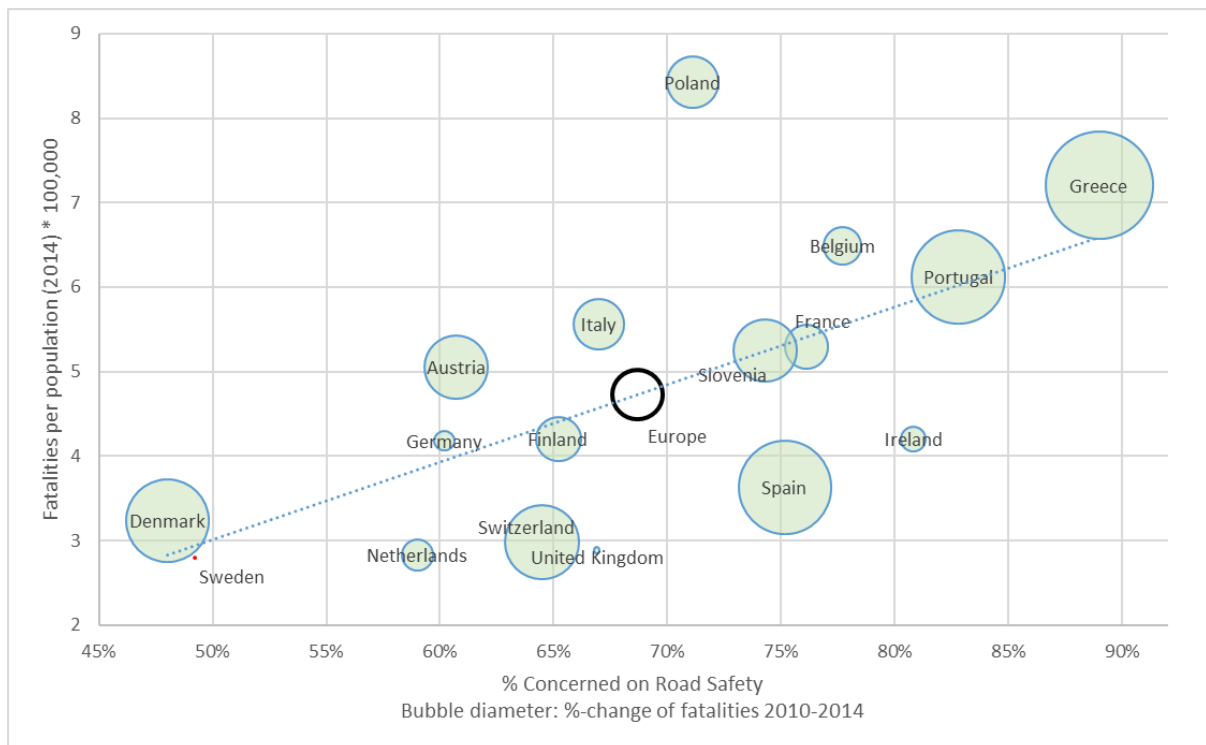


Figure 20: Road fatalities per population versus % of concern on road safety (1); bubble diameter ranges from -37% (Greece) to +2% (Sweden).

Notes: (1) Scores 1 and 2 on a 4-point scale from 1 'very concerned' to 4 'not at all concerned'. (2) Countries based on individual country weight, Europe based on European weight B.

As shown in Figure 20 there is a clear relationship between road fatalities and concern: The consistency regarding both dimensions is high in most countries, especially in Greece, Portugal, France, Slovenia, Germany, Sweden, and Denmark. Four countries, Austria, Italy, Belgium, and especially Poland, showed a relatively low concern on road safety given their relatively high fatality rates. On the other hand, the Netherlands, Switzerland, Spain, UK, and Ireland show a relatively high concern compared to their moderate to low fatality rates. Overall, the results suggest a realistic view of respondents except for Poland.

The change in fatalities from 2010 to 2014 developed on an especially good note in this period in Greece (-37%), Portugal (-32%), Spain (-32%), and Denmark (-29%). Nevertheless, this is not reflected in the concern on road safety which is still high in these countries except for Denmark. Thus, the concern on road safety is more influenced by the absolute numbers of accidents than by the change rates in the countries.

¹ CARE Database (2016), Query from March 20th, 2016;
http://ec.europa.eu/transport/road_safety/specialist/statistics/index_en.htm

3.2.2. Relation of feeling safe and road fatalities in different transport modes

In a next step, the relationship of feeling unsafe on the various transport modes with actual accident statistics was analysed. The bubbles diameter indicates the percentage of users in the respective travel mode based on results of the question on the use of different modes of transportation in this survey – serving as indicator for exposure in this mode. Results show that the feeling of safety as car driver has only little to do with fatalities in this mode ($R^2=0.0199$) (see Figure 21).

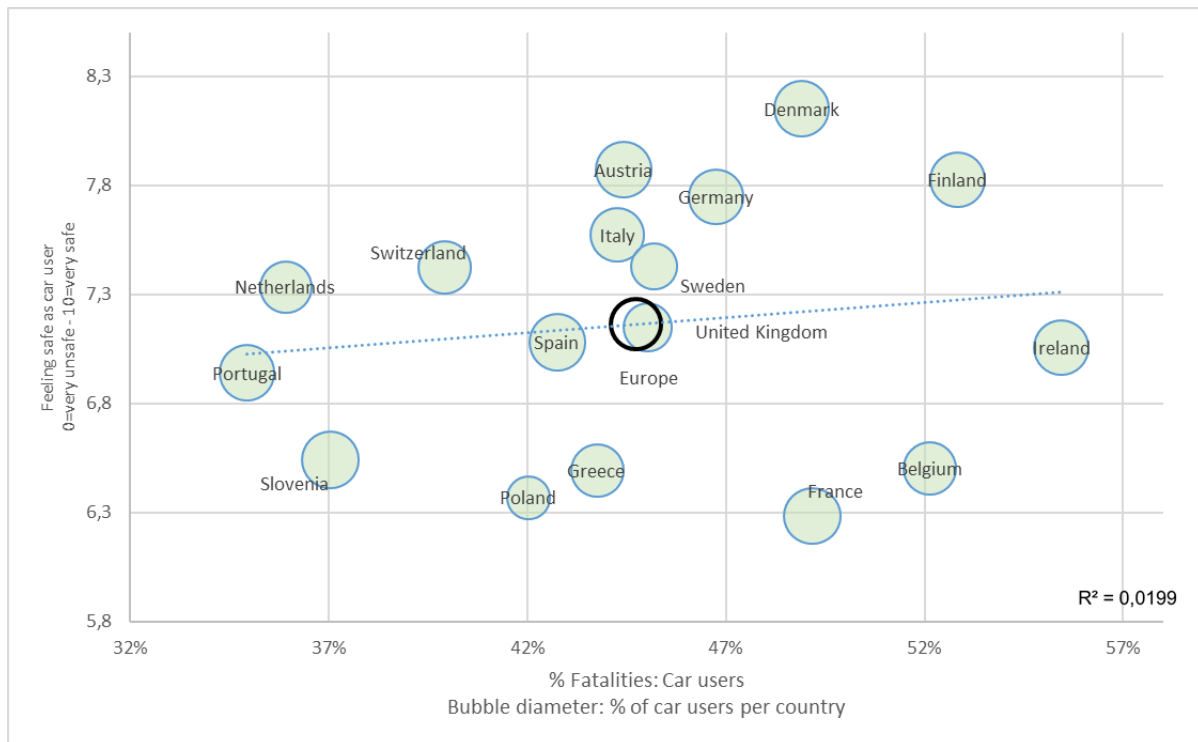


Figure 21: Mean of feeling safe as car driver versus % of road fatalities by car users (1); bubble diameter ranges 73% (Sweden) to 90% (Slovenia).

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) Countries based on individual country weight, Europe based on European weight B.

More than 50% of people killed in road accidents in Ireland, Belgium, and Finland are car drivers; drivers in the latter countries on the other hand feel relatively safe compared to their car users' fatality rate. On the positive side is Portugal with a 35% fatality rate in car users. Denmark and France show a similar fatality rate (49%) - but while French car users report to feel most unsafe as car users the results for Denmark show that car users feel the safest among the participating countries.



Figure 22: Mean of feeling safe as pedestrian versus % of road fatalities by pedestrians (1); bubble diameter ranges from 35% (Slovenia) to 96% (Finland).

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) Countries based on individual country weight, Europe based on European weight B.

There is only a weak correlation between the fatality rate of pedestrians and feeling unsafe as a pedestrian ($R^2=0.056$). The most striking result - as shown in Figure 22 - is the high fatality rate of pedestrians in Poland; the lowest fatality rate can be found in the Netherlands. Danish pedestrians report to feel safest which is in accordance with the relatively low fatality rate.

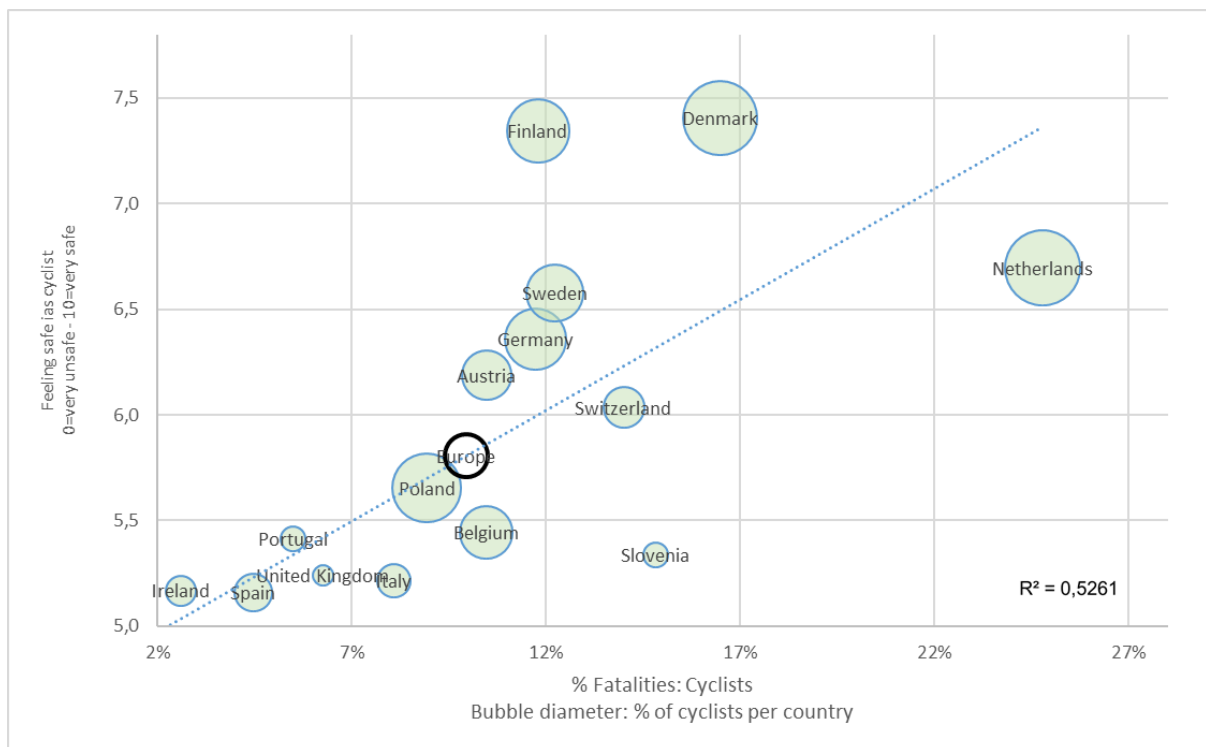


Figure 23: Mean of feeling safe as cyclist versus % of road fatalities by cyclists (1); bubble diameter ranges from 21% (UK) to 68% (Netherlands).

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) Countries based on individual country weight, Europe based on European weight B.

For cyclists the strongest relationship of fatality rate and feeling unsafe among all modes can be reported ($R^2=0.5261$). In countries with low cycling rates like Spain, Ireland or Portugal cycling is considered more unsafe than in countries with a high number of cyclists (e.g. the Netherlands, Denmark). In the latter countries cyclists feel rather safe but there is also a higher proportion in fatalities (see Figure 23).

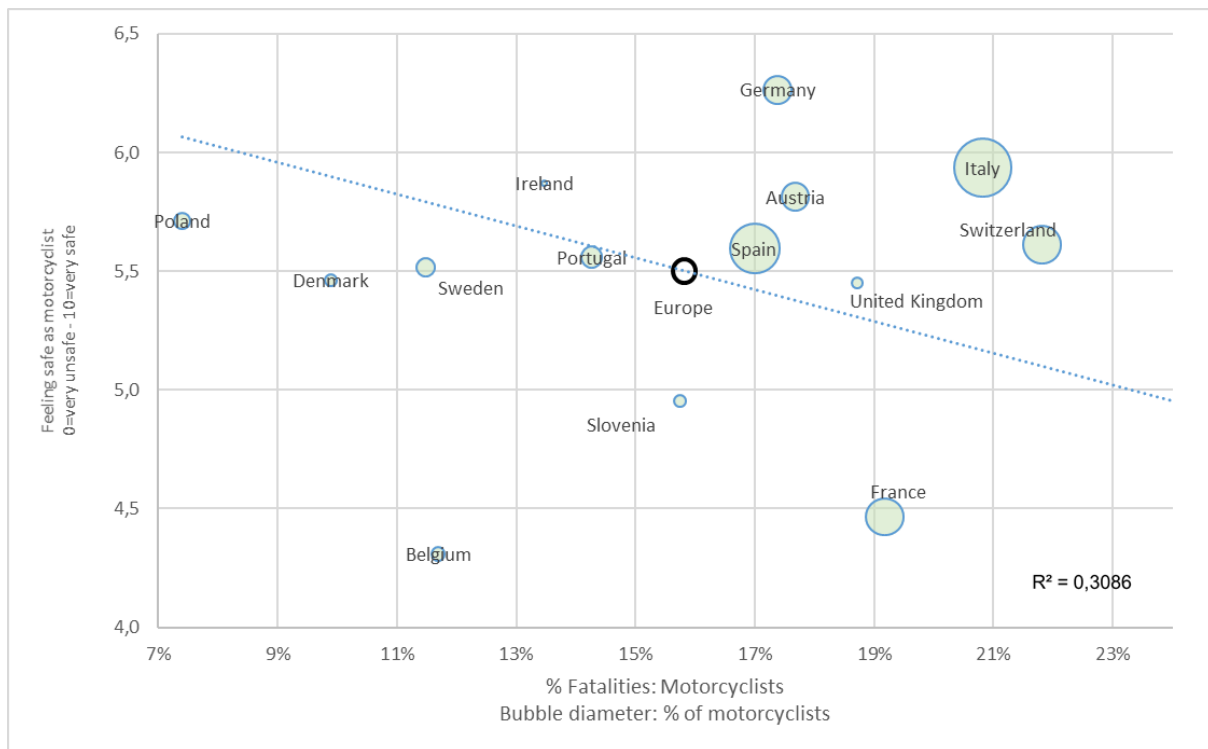


Figure 24: Mean of feeling safe as motorcyclist versus % of road fatalities by motorcyclists (1); bubble diameter ranges from 1.7% (Ireland) to 12.7% (Sweden).

Notes: (1) Mean of a 11-point scale, from 0 'very unsafe' to 10 'very safe'. (2) Countries based on individual country weight, Europe based on European weight B.

For motorcyclists (>125cc) there is a rather high consistency of motorcycle fatalities and feeling unsafe as a motorcyclist ($R^2=0.3086$). There is a group of five countries with a high number of motorcyclists on the roads and a high proportion in fatalities combined with a rather high percentage of feeling unsafe in this mode (Italy, Switzerland, Spain, Austria, and Germany). In France there is a high number of motorcyclists and a relative high fatality rate, but motorcyclists report to feel rather safe when they are riding. In the other countries motorcyclist don't play a major role in traffic (see Figure 24).

4. Discussion

Overall, around two thirds (68%) of all respondents are concerned about road accidents. Respective figures for the standard of health care (70%) and unemployment (70%) are almost the same. Only traffic congestions are of less concern to Europeans. Similar results were seen in the SARTRE4 survey (2012): Road accidents were the main concern for all the three participating groups (car drivers, motorcyclists and non-motorized road users), followed by unemployment. The least concern was similar to ESRA with traffic congestion.

Overall, Denmark is the country with the least concern, whereas Greece is clearly the most concerned country across items. This fits well with the general sentiment in these countries: The World Happiness Report 2016, which ranks 156 countries by their happiness levels, has Denmark in the lead whereas Greece is to be found at the tail end among European countries (Rank 99).

Respondents feel by far the safest on public transport (7.6 out of 10 on average) and the least when motorcycling (5.5) and cycling (5.8). This result corresponds well with European accident statistics and is also supported by SARTRE4 results where a similar question (i.e. perceived danger of transport modes) was included.

Results show that women generally tend to estimate risk factors to be higher than men. However, both groups agree on the factors to be causal for most accidents ('driving too fast' and 'driving under the influence of alcohol') and also the ones to be least causal ('technical defects in vehicles' and 'congestion/traffic jams'). However, there is an equal number of men and women producing road accidents, but men are clearly in the lead when it comes to road fatalities. One reason might be that women who feel less safe are more cautious and risk conscious in road traffic and thus avoid to a higher extent the risk taking behaviour that leads to road fatalities.

In countries with low cycling rates like Spain, Ireland or Portugal cycling is considered less safe than in countries with a high number of cyclists (e.g. the Netherlands or Denmark). This goes in line with the hypothesis of *safety in numbers* which states that a motorist is less likely to collide with a pedestrian or cyclist as the numbers of pedestrians or bicyclists increase (Brüde & Larsson, 1993).

5. Conclusions and recommendations

This section includes the main conclusions of the ESRA survey, and recommendations to raise awareness on risk perception in traffic. Policy recommendations at European and at national/regional level as well as recommendations to particular stakeholders are addressed.

5.1. Conclusions

Road accidents are a major concern for 68% of all respondents which is comparable with the degree of concern regarding the standard of health care (70%) and unemployment (70%). Women are generally more concerned about all surveyed issues than men except from 'traffic congestion'. The latter is most obvious regarding the concern for 'road accidents'.

All age groups agree on driving under the influence of alcohol and driving too fast being the main causes for road accidents. They also agree on technical defects in vehicles and congestion/traffic jams to be a minor causes for road accidents. Furthermore, high scoring risk factors are 'aggressive' driving style, using 'mobile phone' to make a call while driving without using a hands-free device, sending a 'text message' while driving and following 'too close' to the vehicle in front.

Overall, respondents report to be confronted most frequently with other road users 'driving too fast', 'careless drivers' and drivers who 'don't leave a safe distance'.

61% of all respondents think that the occurrence of distracted drivers has increased. This was the highest value of all prompted behaviours. On the other hand, only 20% of all respondents indicated that 'driving too slowly' has increased.

The highest involvement in road traffic accidents is reported with 'cyclists on an e-bike' (9.5%) and 'mopeds' (6.3%). The lowest accident rates are on public transport (<1%). The reported severity of accidents is quite low. Most participants reported only minor incidents.

There is a clear relationship between road fatalities and subjective concern: The consistency regarding both dimensions is high in most countries, especially in Greece, Portugal, France, Slovenia, Germany, Sweden, and Denmark. Four countries, Austria, Italy, Belgium and especially Poland showed a relatively low concern on road safety compared to their relatively high fatality rates.

The change in fatalities from 2010 to 2014 developed on an especially good note in this period in Greece (-37%), Portugal (-32%), Spain (-32%), and Denmark (-29%). Nevertheless, this is not reflected in the concern on road safety which is still high in these countries except for Denmark. Thus, the concern on road safety is more influenced by the absolute number of accidents than by the change rates in the countries.

For car users results show that the feeling of safety has only little to do with fatalities in this mode. Also for pedestrians we found only a weak correlation between the fatality rate of pedestrians and feeling safe as a pedestrian ($R^2=0.056$). Most striking result is the high fatality rate of pedestrians in Poland.

For cyclists we can report the strongest relationship of fatality rate and feeling unsafe of all modes ($R^2=0.5261$). In countries with low cycling rates like Spain, Ireland or Portugal cycling is considered less safe than in countries with a high number of cyclists (e.g. the Netherlands, Denmark).

For motorcyclists (>125cc) there is a rather high consistency of the dimensions 'fatalities' and 'feeling unsafe' as a motorcyclist' ($R^2=0.3086$). There is a group of five countries with a high number of motorcyclists on the roads and a high proportion in fatalities combined with a rather high percentage of feeling unsafe in this mode (Italy, Switzerland, Spain, Austria, and Germany).

5.2. Recommendations²

5.2.1. Policy recommendations at European level

- Facilitate and support the exchange of best practice in terms of countermeasures for inadequate risk perception across Member States.
- Support more research on understanding the factors that influence the subjective safety feeling.

5.2.2. Policy recommendations at national and regional level

- *[In countries with insufficient acceptance that human related factors are main causes for accidents]* Spend sufficient resources on road safety education and on awareness raising (campaigns, TV-spots).
- Develop an efficient speed enforcement system that includes a careful selection of location and duration of control activities, user awareness of speed enforcement activities, systematic recording of speed controls and infringements and public communication of the results of speed enforcement activities.
- Pay within driver education programmes more attention to responsible behaviours such as leaving an adequate and safe distance to the vehicles in front.
- Monitor and enforce of keeping an adequate safety distance.
- Raise the awareness about the very high risks of texting while driving and increase penalties.

5.2.3. Specific recommendations to specific stakeholders

- *[To research organisations]* Provide more insight in the factors contributing to subjective safety and the perception of risks.

The initial aim of ESRA was to develop a system for gathering reliable information about people's attitudes towards road safety in a number of European countries. This objective has been achieved and the initial expectations have even been exceeded. The outputs of the ESRA project can become building blocks of a road safety monitoring system in Europe that goes beyond monitoring road traffic casualties and also includes indicators for the underlying causal factors.

The ESRA project has also demonstrated the feasibility and the added value of joint data collection on road safety attitudes and performance by partner organizations in a large number of European countries. The intention is to repeat this initiative on a biennial or triennial basis, retaining a core set of questions in every wave allowing the development of time series of road safety performance indicators. This will become a solid foundation for a joint European (or even global) monitoring system on road safety attitudes and behaviour.

² These recommendations reflect the common view of all authors of the ESRA core group.

List of tables and figures

Table 1 Involvement (and severity) in a road traffic accident in the past three months, in Europe29

Figure 1: Concern about various issues, by age group.	12
Figure 2: Concern about various issues, by gender.	12
Figure 3: Concern about various issues, by country.	13
Figure 4: Concern about various issues, by country.	14
Figure 5: Frequency of transport modes, in Europe (% of usage).	15
Figure 6: Feeling safe when using several different transport modes, by age group.	15
Figure 7: Feeling safe when using several different transport modes, by gender.	16
Figure 8: Feeling safe when using several different transport modes, by country.	17
Figure 9: Feeling safe when using several different transport modes, by county.	18
Figure 10: Feeling safe when using several different transport modes, by country.	19
Figure 11: Contribution of risk factors to road traffic accidents, by age group.	20
Figure 12: Contribution of risk factors to road traffic accidents, by gender.	21
Figure 13: Contribution of human risk factors to road traffic accidents, by country - part 1.	22
Figure 14: Contribution of human risk factors to road traffic accidents, by country - part 2.	23
Figure 15: Contribution of external risk factors to road traffic accidents, by country.	24
Figure 16: Being confronted with behaviours of other road users, by age group.	25
Figure 17: Being confronted with behaviours of other road users, by gender.	26
Figure 18: Being confronted with behaviours of other road users, by country.	27
Figure 19: Being confronted with behaviours of other road users, by country.	28
Figure 20: Road fatalities per population versus % of concern on road safety (1).	30
Figure 21: Mean of feeling safe as car driver versus % of road fatalities by car users (1).	31
Figure 22: Mean of feeling safe as pedestrian versus % of road fatalities by pedestrians (1).	32
Figure 23: Mean of feeling safe as cyclist versus % of road fatalities by cyclists (1).	33
Figure 24: Mean of feeling safe as motorcyclist versus % of road fatalities by motorcyclists (1).	34

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Appendix - ESRA 2015 Questionnaire

Legend

Dichotomization of the variables has been indicated in green below the question; the reference category is indicated in italics.

Introduction

In the questionnaire, we ask about different traffic situations and your reactions to them. We would like to ask you when responding to **only be guided by your opinion on road safety in [COUNTRY]**, and to not take into account any experience with road safety abroad.

Thank you for your contribution!

Socio-demographic information (1)

Q1) Are you a... male - female

Q2a) In which year were you born?

Q2b) In which month were you born?

Mobility and exposure

Q3) Do you have a car driving licence or permit? yes – no

Q4) How often do you drive a car?

Items: At least 4 days a week – 1 to 3 days a week – A few days a month – A few days a year – Never – Don't know / no response

Q5a) During the last 12 months, which of the following transport modes have you been using in [COUNTRY]...

Items: walking (pedestrian; including jogging, inline skate, skateboard,...) - cycling on an electric bicycle / e-bike / pedelec – cycling (non-electric) – moped as a driver (moped: ≤ 50 cc) – motorcycle as driver (> 50 cc) – hybrid or electrical car as driver – car as driver (non-electrical or hybrid) – car as passenger – (mini)van as a driver – truck/lorry as a driver – public transport – other

Q5b) What were your most frequent modes of transport during the last 12 months? Start with your most frequent mode first, followed by your second most frequent, and so on.

Items: only items marked in Q5a are displayed

Q6) Did you drive a car yourself in the past 6 months? yes – no

Q7) How many kilometres³ would you estimate you have driven a car in the past 6 months? ___ km in total

Q8) Think about all the trips you undertook yesterday, so not only as a car driver but also as a pedestrian or cyclist, as a car passenger,... . How many kilometres have you travelled using each of these transport modes?

Items: only items marked in Q5a are displayed

Road safety in general

Q9) How concerned are you about each of the following issues?

³ In the UK, miles instead of kilometres are used.

You can indicate your answer on a scale from 1 to 4, where 1 is 'very concerned' and 4 is 'not at all concerned'. The numbers in between can be used to refine your response.

Binary variable: *concerned* (1-2) - not concerned (3-4)

Items: rate of crime – pollution - road accidents - standard of health care - traffic congestion – unemployment

Acceptability of unsafe traffic behaviour

Q10) Where you live, how acceptable would most other people say it is for a driver to....?

You can indicate your answer on a scale from 1 to 5, where 1 is 'unacceptable' and 5 is 'acceptable'. The numbers in between can be used to refine your response.

Binary variable: *acceptable* (4-5) – unacceptable (1-3)

Items (random)

- drive 20 km per hour over the speed limit on a freeway / motorway
- drive 20 km per hour over the speed limit on a residential street
- drive 20 km per hour over the speed limit in an urban area
- drive 20 km per hour over the speed limit in a school zone
- talk on a hand-held mobile phone while driving
- type text messages or e-mails while driving
- check or update social media (example: Facebook, twitter, etc.) while driving
- drive when they're so sleepy that they have trouble keeping their eyes open
- drive through a light that just turned red, when they could have stopped safely
- drive when they think they may have had too much to drink
- drive 1 hour after using drugs (other than medication)
- drive after using both drugs (other than medication) and alcohol
- drive with incorrect tyre pressure
- drive without insurance
- park their car where it is not allowed
- not wear a seat belt in the back of the car
- not wear a seat belt in the front of the car
- transport children in the car without securing them (child's car seat, seat belt, etc.)

Q11) How acceptable do you, personally, feel it is for a driver to...?

You can indicate your answer on a scale from 1 to 5, where 1 is 'unacceptable' and 5 is 'acceptable'. The numbers in between can be used to refine your response.

Binary variable: *acceptable* (4-5) – unacceptable (1-3)

Items (random): idem Q10

Support for road safety policy measures

Q12) Do you support each of the following measures?

Answering options: *support (pro)* – oppose (contra) – no opinion

Items (random):

- Obligatory winter tyres for cars, trucks and buses
- A licence system with penalty points for traffic violations that results in the revocation of the licence when a certain number of points are reached
- Drivers who have been caught drunk driving on more than one occasion should be required to install an 'interlock' (*) *interlock: technology that won't let the car start if the driver's alcohol level is over the legal limit*
- Zero tolerance for alcohol (0,0‰) for novice drivers (licence obtained less than 2y)
- Zero tolerance for alcohol (0,0‰) for all drivers
- Zero tolerance for using any type of mobile phone while driving (hand-held or hands-free) for all drivers
- Ban on alcohol sales in service / petrol stations along the highways / motorways
- Allowing cyclists to run red lights when permitted by specific road signs
- Having a law requiring all cyclists to wear a helmet

- Obligation for pedestrians and cyclists to wear high-visibility vests when in the dark

Q13) What do you think about the current traffic rules and penalties in your country for each of the following themes?

Answering options: *yes* – *no* – *don't know/no response*

Items (fixed order): each time for: speeding – alcohol – drugs – seat belt

- The traffic rules should be more strict
- The traffic rules are not being checked sufficiently
- The penalties are too severe

Self-declared behaviour

Q14) In the past 12 months, as a road user, how often did you...?

You can indicate your answer on a scale from 1 to 5, where 1 is 'never' and 5 is '(almost) always'. The numbers in between can be used to refine your response. (+ answering options: 'not applicable' and 'no response')

Binary variable: *never* (1) – *at least once* (2-5)

Binary variable for seat belt use: *(almost) always* (5) – *at least once not* (1-4)

Items (random; only items compatible with the road user types indicated in Q5a are shown):

- wear your seat belt as driver
- wear your seat belt as passenger in the front of the car
- wear your seat belt as passenger in the back of the car
- make children (under 150cm)⁴ travelling with you use appropriate restraint (child seat, cushion)
- make children (over 150cm) travelling with you wear a seat belt
- listen to music through headphones as a pedestrian
- cycle without a helmet
- cycle while listening to music through a headphone
- cycle on the road next to the cycle lane
- not wear a helmet on a moped or motorcycle
- drive faster than the speed limit inside built-up areas
- drive faster than the speed limit outside built-up areas (except motorways/freeways)
- drive faster than the speed limit on motorways/ freeways
- drive after drinking alcohol
- drive after using illegal drugs
- talk on a hand-held mobile phone while driving
- talk on a hands-free mobile phone while driving
- read a text message or email while driving
- send a text message or email while driving
- realise that you were actually too tired to drive
- stop and take a break because you were too tired to drive
- drive while taking medication that carries a warning to say it may influence your driving ability
- drive aggressively
- drive too slow
- drive without respecting a safe distance to the car in front
- not indicating directions when you overtake, turn left or turn right
- drive dangerously
- as a pedestrian, cross the road when a pedestrian light was red
- as a cyclist, cross the road when a traffic light was red
- as a pedestrian, cross streets at places other than at a pedestrian crossing

Q15) Over the last 30 days, how many times did you drive a car, when you may have been over the legal limit for drinking and driving? (dropdown 0 – 30 + no response)

Binary variable: *never* (0) – *at least once* (1-30)

⁴ Adapted in each country to the correct legislation (e.g. in BE 135cm)

Attitudes towards (unsafe) traffic behaviour

Q16) To what extent do you agree with each of the following statements?

You can indicate your answer on a scale from 1 to 5, where 1 is 'disagree' and 5 is 'agree'. The numbers in between can be used to refine your response.

Binary variable: *agree (4-5) – disagree (1-3)*

Items (random)

- Driving under the influence of alcohol seriously increases the risk of an accident
- Most of my acquaintances / friends think driving under the influence of alcohol is unacceptable
- If you drive under the influence of alcohol, it is difficult to react appropriately in a dangerous situation
- Driving under the influence of drugs seriously increases the risk of an accident
- Most of my acquaintances / friends think driving under the influence of drugs is unacceptable
- I know how many drugs I can take and still be safe to drive
- Driving fast is risking your own life, and the lives of others
- I have to drive fast, otherwise I have the impression of losing time
- Driving faster than the speed limit makes it harder to react appropriately in a dangerous situation
- Most of my acquaintances / friends feel one should respect the speed limits
- Speed limits are usually set at acceptable levels
- By increasing speed by 10 km/h, you have a higher risk of being involved in an accident
- It is not necessary to wear a seat belt in the back seat of the car
- I always ask my passengers to wear their seat belt
- The instructions for using the child restraints are unclear
- It is dangerous if children travelling with you do not wear a seat belt or use appropriate restraint
- For short trips, it is not really necessary to use the appropriate child restraint
- My attention to the traffic decreases when talking on a hands free mobile phone while driving
- My attention to the traffic decreases when talking on a hand-held mobile phone while driving
- Almost all car drivers occasionally talk on a hand-held mobile phone while driving
- People talking on a hand-held mobile phone while driving have a higher risk of getting involved in an accident
- When I feel sleepy, I should not drive a car
- Even if I feel sleepy while driving a car, I will continue to drive
- If I feel sleepy while driving, then the risk of being in an accident increases

Subjective safety and risk perception

Q17) How (un)safe do you feel when using the following transport modes in [country]?

You can indicate your answer on a scale from 0 to 10, where 0 is 'very unsafe' and 10 is 'very safe'. The numbers in between can be used to refine your response.

Items (random): only items marked in Q5a are displayed

Q18) In your opinion, how many road traffic accidents are caused by each of the following factors? Estimate a percentage of accidents for each factor. In other words, how many accidents out of 100 were caused by the following factors.

Provide a separate estimate for each factor. Always answer using a figure between 0 and 100 (+ option: *don't know*) The total sum of all the factors can be more than 100.

Items (random):

- Tiredness behind the wheel
- Driving under the influence of alcohol
- Driving too close to the vehicle in front

- Driving too fast
- Taking psychoactive medication and driving (*) *psychoactive medications: with side effect on the central nervous system (e.g. sedatives, antidepressants)*
- Taking drugs and driving
- Poorly maintained roads
- Poor road design
- Using a mobile phone to make a call while driving without using a hands-free device
- Congestion / traffic jams
- Bad weather conditions
- Technical defects in vehicles
- Aggressive driving style
- Inattentiveness
- Insufficient knowledge of the rules of the road
- Sending a text message while driving

Behaviour of other road users

Q19) Can you specify, for each of the following behaviours how often you, as a road user, are confronted with these behaviours?

You can indicate your opinion by means of a number from 0 to 10. '0' is 'never', and '10' is 'very often'. The numbers in between can be used to refine your answer.

Items (random):

- aggressive drivers
- distracted drivers (drivers who are busy with something else, e.g. phone, tuning the radio etc)
- road users who don't respect traffic rules
- speeding drivers / drivers who drive too fast
- drivers who drive too slow
- drivers who don't leave a safe distance to the car in front
- careless drivers (e.g., not indicating direction)
- drivers who don't take into account the needs of other road users (e.g., blocking an exit etc)
- drivers committing dangerous driving offences

Q20) Do you think the occurrence of the following behaviour has increased, decreased or not changed compared to 2 years ago?

Answering options: *increased* – no change – decreased

Items (random): idem Q19

Involvement in road crashes

Q21a) In the past three months have you been involved in a road traffic accident as a ...

(if no accident: answering option: 'none of these')

Items (multiple responses possible; only items indicated in Q5a are displayed):

Extra sub-items for

- motorcycling: motorcyclist (50-125 cc) – motorcyclist (>125 cc)
- public transport: on the train – on the subway – on a tram – on the bus

Q21b) Please indicate the severity of the accident:

Answering options (multiple responses possible per transport mode (i.e.; if a respondent had multiple accidents as pedestrian e.g.)): Without material damage or any injured parties⁵ – With only material damage – With only minor injuries to myself or others – In which someone had to be taken to hospital

Items: each transport mode indicated in Q21a

Enforcement

⁵ This option refers to an 'incident', not a crash → left out in the analysis

Q22) On a typical journey, how likely is it that you (as a driver) will be checked by the police for...

You can indicate your answer on a scale from 1 to 5, where 1 is 'very small chance' and 5 is 'very big chance'. The numbers in between can be used to refine your response. (+ option: don't know/no response)

Binary variable: *big chance (4-5) – small chance (1-3)*

Items (random):

- ... alcohol, in other words, being subjected to a Breathalyser test
- ... the use of illegal drugs
- ... seat belt wearing
- ... respecting the speed limits (including checks by police car with a camera and/or flash cameras)

Q23a) In the past 12 months, how many times have you...

Answering options: number + don't know/no response

Items:

- been stopped by the police for a check?
- had to pay a fine for a traffic violation? (except a parking fee)
- been convicted at court for a traffic violation?

Q23b) Was this a fine for

Items (multiple responses possible): violating the speed limits – driving under the influence of alcohol – driving under the influence of drugs (other than medication) – not wearing a seat belt – transporting children in the car without securing them correctly (child's car seat, seat belt, etc.) – talking on a hand-held mobile phone while driving – other reason – no response

Q23c) Was this conviction for

Items (multiple responses possible): idem Q23b

Q24) In the past 12 months, how many times were you checked by the police for alcohol while driving a car (i.e., being subjected to a Breathalyser test)?

Binary variable: *at least once - never*

Q25) In the past 12 months, how many times have you been checked by the police for the use of drugs/medication while driving?

Binary variable: *at least once - never*

Socio-demographic information (2)**Q26) What is the highest qualification or educational certificate you obtained?**

Items: None – Primary education – Secondary education – Bachelor's degree or similar – Master's degree or higher – No answer

Q27) What is the postal code of the municipality in which you live?⁶

⁶ If in a country no postal codes are in use, this question is rephrased as follows: In which county do you live?



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