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European Survey of Road users' safety Attitudes

# Distraction and fatigue

ESRA thematic report no. 3

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# Distraction and fatigue

## ESRA thematic report no. 3

Authors:

José Trigoso, Alain Areal & Carlos Pires (PRP, Prevenção Rodoviária Portuguesa, Portugal)

Partners in the ESRA project:

- BRSI - Belgian Road Safety Institute, Belgium: Uta Meesmann, Katrien Torfs, Marie Trotta, Wouter Van den Berghe
- KFV - Kuratorium für Verkehrssicherheit, Austria: Gerald Furian, Christian Brandstaetter, Susanne Kaiser, Angelika Witzik
- Raadet for Sikker Trafik - The Danish Road Safety Council, Denmark: Jesper Sølund
- Liikenneturva - Finnish Road Safety Council, Finland: Juha Valtonen, Leena Pöysti
- IFSTTAR - Institut français des sciences et technologies des transports, de l'aménagement et des réseaux, France: Marie-Axelle Granié
- BASt - Bundesanstalt für Strassenwesen, Germany: Hardy Holte, Ariane Von Below
- NTUA - National Technical University of Athens, Greece: George Yannis, Alexandra Laiou, Athanasios Theofilatos
- RSA - Road Safety Authority, Ireland: Velma Burns, Sharon Heffernan
- CTL - Centro di Ricerca per il Trasporto e la Logistica, 'Sapienza' Università di Roma, Italy: Veronica Sgarra, Davide Shingo Usami
- ITS - Instytutu Transportu Samochodowego, Poland: Ilona Buttler
- PRP - Prevenção Rodoviária Portuguesa, Portugal: Alain Areal, Carlos Pires, José Trigoso
- AVP - Javna agencija Republike Slovenije za varnost prometa, Slovenia: Vesna Marinko
- DGT - Direccion General de Trafico, Spain: Fermina Sánchez
- VTI - Väg- och transportforskningsinstitut, Sweden: Anna Vadeby
- bfu - Beratungsstelle für Unfallverhütung, Switzerland: Yvonne Achermann Stürmer, Uwe Ewert
- SWOV - Stichting Wetenschappelijk Onderzoek Verkeersveiligheid, the Netherlands: Henk Stipdonk, Charles Goldenbeld
- TI - Transport Institute, University College London, United Kingdom: Nicola Christie

Task leading organization:

PRP - Prevenção Rodoviária Portuguesa, Portugal

Project coordination:

Uta Meesmann, BRSI - Belgian Road Safety Institute, Belgium

Reviewing organizations:

bfu - Swiss Council for Accident Prevention, Switzerland; KFV, Kuratorium für Verkehrssicherheit, Austria; BRSI, Belgian Road Safety Institute, Belgium

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# 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 | United states of America |

**Other abbreviations**

| | |
|---|---|
| AAAFTS | AAA Foundation for Traffic Safety |
| 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 |
| NHTSA | National Highway Traffic Safety Administration (USA Department of Transportation) |
| NSC | National Safety Council (USA) |
| RSO | Road Safety Observatory |
| SARTRE | Social Attitudes to Road Traffic Risk |
| WHO | World Health Organization |

**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 distraction and fatigue in traffic. For both topics, personal and social perceived acceptability, risk perception, attitudes towards unsafe behaviours, and self-declared behaviours are described at a European level, within each country, by gender, and by age group. The association among the self-declared behaviours, its acceptability, the risk perceptions, and socio-demographic characteristics is also studied in order to better understand the reasons why road users engage in unsafe traffic behaviours. This association is described using logistic regression models.

## Key results

### Distraction

According to 61% of the participants in the ESRA survey, distracted drivers have increased in the past two years, being considered the behaviour that has increased the most, ahead of aggressive drivers (49%) and speeding drivers (45%).

Almost half of the respondents (47%) support zero tolerance for using any type of mobile phone while driving (hand-held or hands-free).

Talking on a hand-held mobile phone and texting (type messages/emails or check/update social media) are considered acceptable by a minority of the European road users (7% and 4%, respectively). A much higher percentage of respondents think that it is acceptable talking on a hands-free mobile phone (38%). Overall, respondents believe that behaviours related to using mobile phones while driving are more acceptable by 'others', than by themselves. Acceptability rates are higher among men and decrease with age.

The majority (82%) are aware that talking on a hand-held mobile phone increases the risk of getting involved in an accident, and that decreases the attention to the traffic (74%). Fewer respondents (56%) agree that talking on a hands-free mobile phone decreases the attention to the traffic. The perception of the negative effects of talking on a mobile phone while driving increases with age and is higher among women.

A large percentage of drivers declare that they have used a mobile phone while driving at least once in the past 12 months: 38% talked on a hand-held mobile phone, 51% talked on a hands-free mobile phone, 36% read text messages or emails, and 27% sent text messages or emails. These percentages are particularly high among drivers until 34 years old (50%, 61%, 56%, and 48%, respectively). All these behaviours are more prevalent among men and decrease with age. The analysis by country, shows that self-declared use of a hand-held mobile phone is more prevalent in Finland, Sweden, Greece, and Italy, all with prevalence rates higher than 50%. On the other hand, this behaviour is less frequently reported in Belgium, France, Ireland, the Netherlands, and the United Kingdom.

It was found that the acceptability of unsafe traffic behaviours concerning all types of use of the mobile phone (talking on hand-held/hands-free or texting), increases the likelihood of its use while driving. On the other hand, the likelihood of using a mobile phone while driving decreases with the increase of the risk perception.

Among drivers who report that they have talked on a hand-held mobile phone at least once in the past 12 months, only 3.8% were fined or convicted.

About 38% of pedestrians and 29% of cyclists report that they have listened to music through headphones as road users at least once in the past 12 months. The prevalence is especially high among road users until 34 years old: 67% of pedestrians and 50% of cyclists. The ban of using headphones (or earbuds) by pedestrians and cyclists is supported by 56% of the respondents.

Fatigue

More than 80% of ESRA participants agree that driving when they are tired increases the risk of having an accident, and that they should not drive in that condition. Only 3.5% consider acceptable people driving when they are so sleepy that have trouble keeping their eyes open. Despite that, 60% declare that they have driven when too tired to drive at least once in the past 12 months. This behaviour is more prevalent among men and drivers until 34 years old. It was also found that the likelihood of driving when tired rises with an increasing acceptability and declines with an increasing risk perception.

## Key recommendations

### Policy recommendations at European level

- Define distraction related indicators and set targets at European Union level, such as the prevalence of distracted and drowsy driving, the number of controls for mobile phone use, and the number of traffic casualties attributable to distraction and fatigue.
- Make the use of rumble strips mandatory in the Trans-European Transport Network.
- Issue a European Guideline on the mandatory use of intelligent fatigue detection and warning systems in heavy vehicles (goods and passengers).

### Policy recommendations at national and regional level

- Conduct awareness-raising campaigns on the risks of distracted and drowsy driving, in combination with frequent police controls and tips of what can be done about it.
- Incorporate information on risks associated with distraction and drowsy driving in educational programmes and in driver license training.
- Increase enforcement (and enforcement perception) in relation to distraction.
- Implement rumble strips on all national motorways, and also on rural roads, where this could be appropriate in the national context.

### Specific recommendations to particular stakeholders

- *[To vehicle manufacturers, other companies and research organisations]* Develop low cost solutions to be incorporated in vehicles that can detect or prevent distracted or drowsy driving.

## 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

Distraction has an important role in road traffic accidents. It is estimated that road users' distraction contributes to about 10-30% of road accidents in the European Union (DG MOVE, 2015). The continuous increase of sources of distraction while driving, especially the increasing diffusion of electronic devices and the massive use of mobile phones, might lead to an increase of the road accidents caused by distracted road users.

Distraction can be defined as a diversion of attention away from activities critical for safe driving toward a competing activity (Lee et al., 2008). Distracted drivers are still alert but their attention is focussed on other activities than driving. Activities like talking on the mobile phone, reading/typing messages, operating a GPS, talking to a passenger, eating, and drinking are all potentially distracting activities. These activities might affect the essential aspects of driving a vehicle and increase the risk of having an accident. Distracted drivers swerve more, which indicates diminished control over the vehicle; have longer reaction times; miss information from the road environment; and make more errors while driving (SWOV, 2013a).

The use of the mobile phone while driving is one of the most important sources of road traffic distraction. Talking, dialling a number, reading or sending text messages or emails, and performing other tasks like searching on the web or social media networking have negative effects on driving behaviour and increase the risk of accident. In the US, the National Safety Council (NSC) estimates that a minimum of 27% of crashes in 2013 involved drivers talking (21%) or texting (6%) on cell phones (NSC, 2015).

Using a mobile phone while driving involves visual, auditory, manual and cognitive distraction. Drivers talking on a hand-held mobile phone are about four times more likely to have an accident while driving (WHO, 2015). Using a hands-free mobile phone has no significant advantages because it also causes cognitive distraction – the most dangerous type of distraction. Like drivers using hand-held mobile phones, drivers using hands-free devices also have a tendency to 'look at' but not 'see' objects, and are more likely to not see relevant information from the road. They tend to miss exits, go through red lights and stop signs, and miss other important information from the road. Furthermore, the reaction time, which involves attention resources and information processing, is longer during hands-free phone conversations while driving (NSC, 2012).

Reading or sending text messages or emails while driving, which also requires visual, manual, and cognitive attention from the driver, is becoming an increasing source of distraction, mainly among young drivers. In the US, the percentage of drivers until 24 years old visibly manipulating hand-held devices while driving has increased from 0.3% in 2005 to 4.8% in 2014 (from 0.2% to 2.2% among all drivers) (NHTSA, 2015). While texting, drivers spend long periods without looking to the road, which has a huge impact on the visual distraction and increases the risk of being in an accident (Olson et al., 2009).

Cyclists and pedestrians are also affected by distraction. The increasing use of portable music player devices and mobile phones has influenced the behaviours of these road users, increasing the risk of being involved in accidents (SWOV, 2013b).

Fatigue while driving is another problem that can endanger the safety of road users. It can result in both cognitive and motor function impairment, which, while driving, can lead to increased reaction times, reduce attention, poorer psychometric coordination, and less efficient information processing. This condition can compromise the drivers' ability to control their vehicle.

The amount of time spent carrying out a particular task – for example driving for long hours without interruption – is one of the most important causes of fatigue. Other causes are the lack of sleep, biorhythm, the monotony of the task, and individual characteristics like age, medical condition, or the use of medicines, alcohol, or drugs (SWOV, 2012).

This thematic ESRA report aims at describing self-declared behaviours and attitudes related to distraction and fatigue of all kind of road users in 17 European countries. Self-declared unsafe behaviours, its acceptability, risk perception, and attitudes towards those behaviours are studied at the level of Europe as a whole, and individually in each of the 17 countries participating in the study. Some of the ESRA questions have already been used in the SARTRE4 survey, allowing for an

assessment of the development in the perspective of previous years. Some others are slightly different or new and can be considered as a first benchmark for future comparison and monitoring across Europe.

# 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 (see Appendix - ESRA 2015 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 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 distraction and fatigue. An overview of the data collection method and the sample per country can be found in the Main report.

The results presented in this thematic report are divided into two main parts: the first includes the descriptive analysis of the items concerning distraction and fatigue, and in the second part – further analysis – the association between several explanatory variables and self-declared behaviours related to the use of the mobile phone while driving as well as driving when tired is explored.

In the descriptive analysis, the results of the questions related to distraction and the questions related to fatigue are presented separately into two different topics. For all the sets of questions, the global European results, the results by country, and the global European results by gender and by age group are presented.

The first set of questions, concerns the opinions about the acceptability of unsafe traffic behaviours related to the use of the mobile phone while driving (talk on a hands-free mobile phone, talk on a hand-held mobile phone, type text messages or e-mails, and check or update social media). The fatigue topic includes the respondents' opinion about driving when they're so sleepy that they have trouble keeping their eyes open. To assess these opinions, the respondents were asked 'Where you live, how acceptable would most other people say it is for a driver to….?' and 'How acceptable do you, personally, feel it is for a driver to…?'. The results from both questions are presented side by side in order to compare the personal acceptability with perceived social acceptability. In the questionnaire, these questions were presented in a Likert scale from 1 (unacceptable) to 5 (acceptable). The percentages of acceptability (answers 4 or 5) are shown in the results.

The second set of questions includes the analysis of the self-declared (unsafe) behaviours in traffic in the past 12 months: 'In the past 12 months, as a road user, how often did you…?'. The distraction topic includes the items 'listen to music through headphones as a pedestrian', 'cycle while listening to music through a headphone', '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', and 'send a text message or email while driving'. The fatigue topic assesses how often did the respondents 'realise that they were actually too tired to drive' and 'stop and take a break because they were too tired to drive'? These questions were answered on a Likert scale from 1 (never) to 5 (almost (always)). In the results, the percentages of 'at least once' (answers 2 to 5) are presented.

The last set of questions studies the agreement on attitudes towards unsafe traffic behaviours: 'To what extent do you agree with each of the following statements?'. The distraction topic analyses the items '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', and 'People talking on a hand-held mobile phone while driving have a higher risk of getting involved in an accident'. The fatigue part includes the items 'When I feel sleepy, I should not drive a car', 'Even if I feel sleepy while driving a car, I will continue to drive', and 'If I feel sleepy while driving, then the risk of being in an accident increases'. For these items, a Likert scale from 1 (disagree) to 5 (agree) was used. The results present the percentages of agreement (answers 4 or 5).

Results of items from other questions related to distraction and fatigue, which are explored in more detail in other thematic ERSA reports, are also presented in this report. In these cases, the results are shortly mentioned and linked to the respective reports.

Due to the nominal nature of the data, the Chi-square Test for Independence is used to assess if the answers depend significantly on the gender and on the age group. The association with self-declared behaviours (further analysis) is described using logistic regression models.

# 3. Results

## 3.1. Descriptive analysis

This section comprises the descriptive statistics on questions related to the topics 'distraction' and 'fatigue'. Both topics include the results of the acceptability of unsafe traffic behaviours (personal and social), self-declared (unsafe) behaviours in traffic, and attitudes towards unsafe traffic behaviours.

For each topic, the results are presented in a similar way: first the global European results, followed by the comparison by country, and then the results by gender and age group.

### 3.1.1. Distraction

#### *3.1.1.1. Acceptability of unsafe traffic behaviours related to the use of the mobile phone while driving*

To assess the level of acceptability (personal and social) of behaviours concerning the use of mobile phone while driving, the respondents were asked to answer to the questions:

- *Where you live, how acceptable would most other people say it is for a driver to…?*
- *How acceptable do you, personally, feel it is for a driver to…?*

The opinions expressed show that the respondents consider that 'the others' accept more readily the use of mobile phones while driving, than they do themselves. This applies to both the use of the hands-free system and the hand-held mobile phone, and also to sending/reading messages and/or e-mails and for intervention in social networks (Figure 1).

The acceptability of the use of the hands-free mobile phone (47% and 38%, for 'the others' and personally, respectively) is much higher than the use of hand-held mobile phone (16% and 7%).

There is a lower acceptability of using the phone to type messages/e-mails (8% and 4%) and to check/update social media (8% and 4%) than to talk on the phone while driving, even when using a hand-held mobile phone.

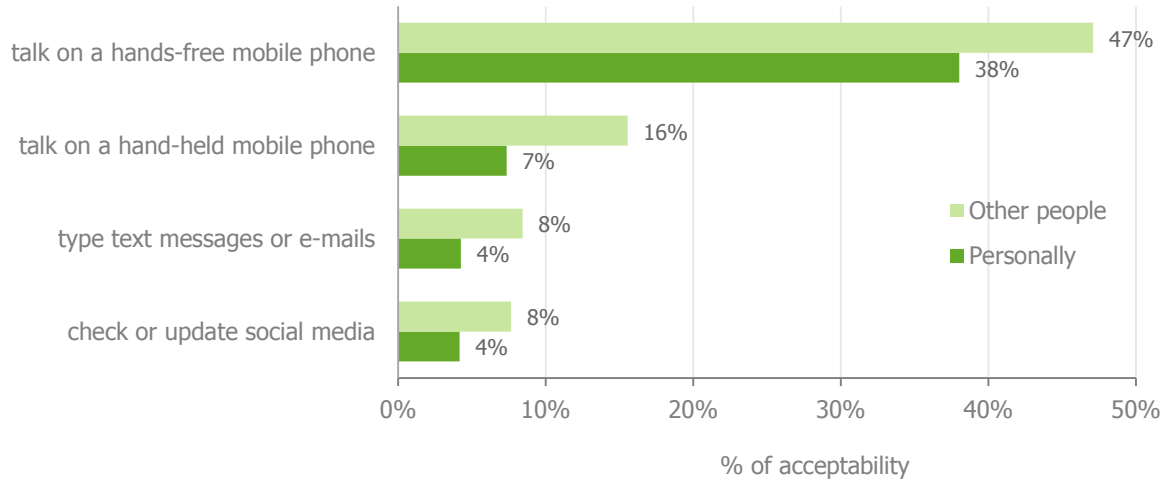


Figure 1: Acceptability of unsafe traffic behaviours related to the use of mobile phones while driving, in Europe.

*Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) European weight B / European weight C in the question 'check or update social media'.*

The opinion that the acceptability of 'others' for using a hands-free mobile phone while driving is greater than 'mine' is common to all countries, but the acceptability rates differ widely between countries – 'the others' acceptability ranges from 31% in France and the United Kingdom to 69% in Italy, and 'personally' ranges from 22% in the United Kingdom to 57% in Finland (Figure 2- left).

The 'others' acceptability rates of using a hand-held mobile phone while driving range from 6% in the Netherlands and Switzerland to 32% in Italy. The personal acceptability is the lowest in Portugal (3%) and Belgium (3%) and the highest in Poland (14%). With the exception of the Netherlands, the acceptability rates from the 'others' are higher than the personal acceptability in all the countries. The difference is particularly high in Italy and in Greece (Figure 2 - right).

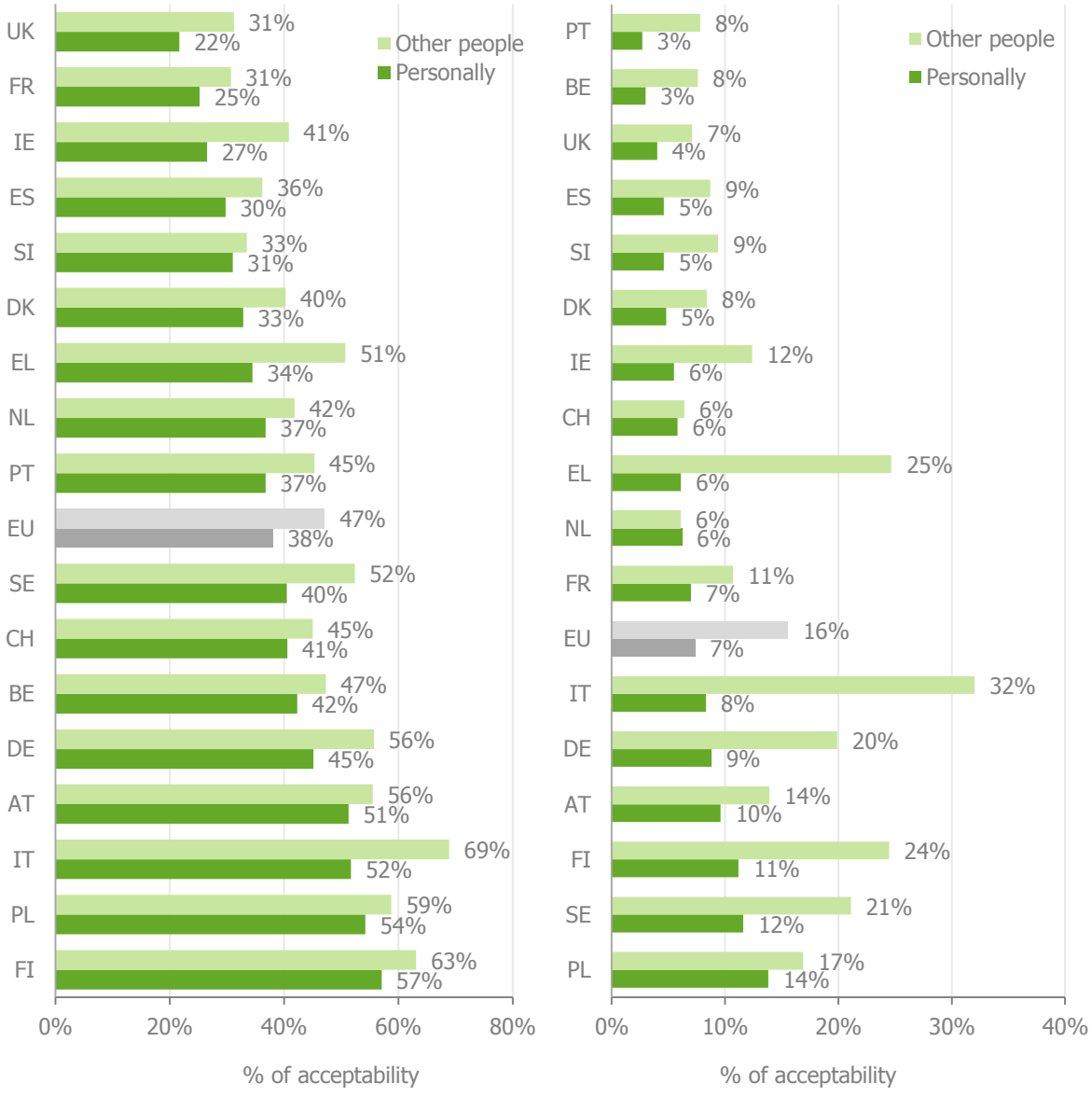


Figure 2: Acceptability of talking on a hands-free mobile phone (left) and on a hand-held mobile phone (right) while driving, by country.

*Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Countries based on individual country weight, Europe based on European weight B. (3) In Slovenia, the question 'talks on a hand-held mobile phone' refers to talking on the mobile phone while driving, without limiting it to hand-held mobile phone use only.*

The personal acceptability rates of the use of the mobile phone to type text messages or e-mails while driving are 2% or less seven countries (Denmark, Portugal, Finland, Austria, Belgium, Switzerland, and Slovenia). Poland (7%) and Italy (7%) are the countries with the highest rates. The opinion of the acceptability of the 'others' differs widely between countries, ranging from 3% in Switzerland, Austria, and Denmark, to 19% in Italy. The 'others' acceptability rates are higher than the personal rates in all the countries (Figure 3 - left).

The 'others' acceptability rates for checking or updating social media while driving, is also higher than the personal rates in all the countries. Italy and Greece are the countries where the 'others' acceptability rates are the highest (14% and 12%, respectively). On the other hand, Denmark (2%) and Switzerland (2%) have the lowest rates. Regarding the personal opinion, the percentage of respondents that consider checking or updating social media acceptable while driving ranges from 1% in Denmark, Finland and Portugal to 6% in France, Italy, and Poland.

The differences between the personal and social acceptability are also particularly high in Italy and in Greece, as it was observed for talking on a hand-held mobile phone (Figure 3 - right).

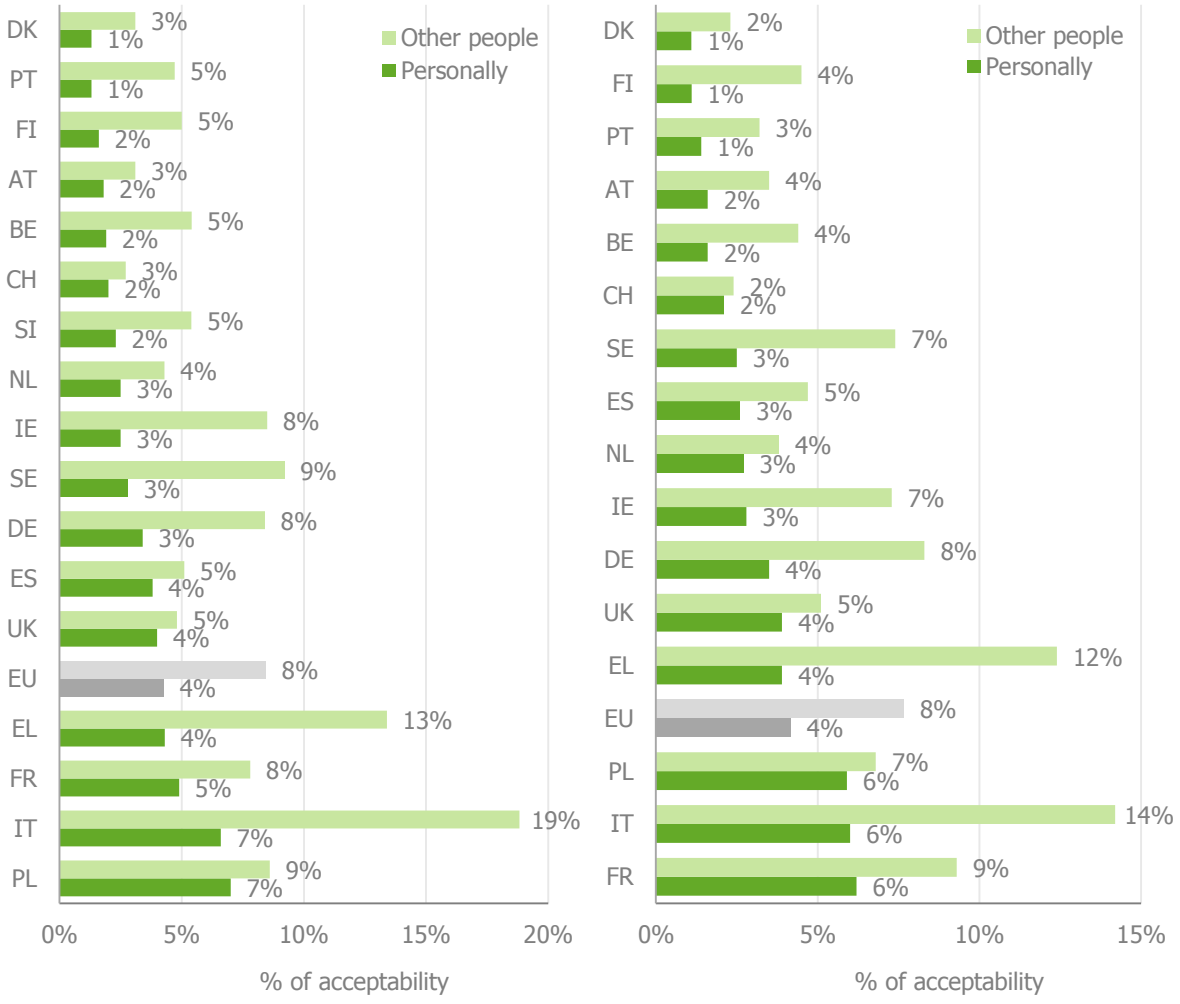


Figure 3: Acceptability of typing text messages or e-mails (left) and checking or update social media (right) while driving, by country.

*Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Countries based on individual country weight, Europe based on European weight B / European weight C for the question 'checking or update social media'.*

Regarding the comparison of the opinions by gender, the acceptability rates are lower among women, both in the personal opinion and in the opinion about the others' acceptability. This is observed in the use of the mobile phone to talk (hands-free or hand-held), to type text messages or e-mails, and to check or update social media while driving. In all the cases, the differences in the acceptability rates between women and men are significant (Chi-square test: *p<0.05*) (Figure 4).

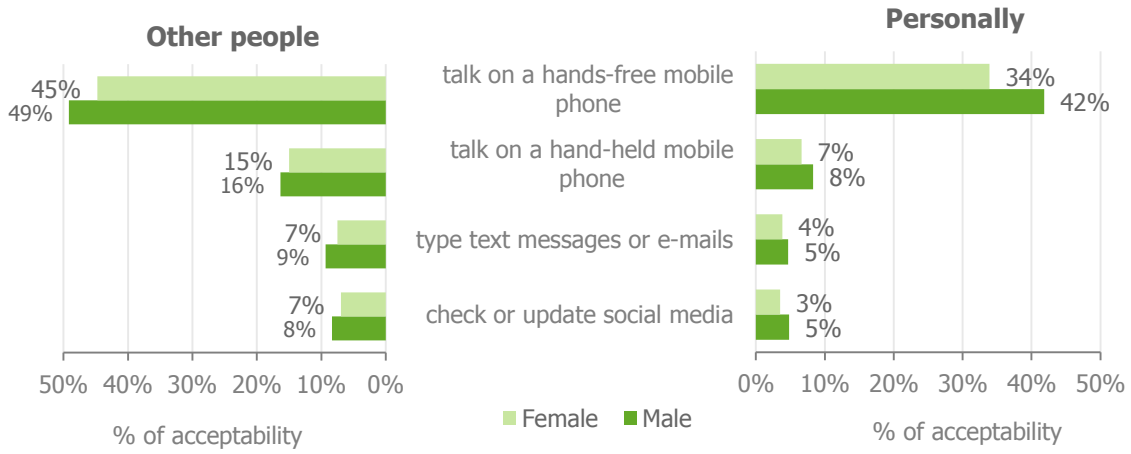


Figure 4: Acceptability of unsafe traffic behaviours related to the use of mobile phones while driving, by gender.

*Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) European weight B / European weight C in the question 'check or update social media'.*

The acceptability rates also depend significantly on the age group (Chi-square test: p<0.01). Older people show a lower acceptability of using the mobile phone to talk (hands-free or hand-held), type text messages/e-mails or check/update social media while driving, both regarding the others' opinion and personally (Figure 5).

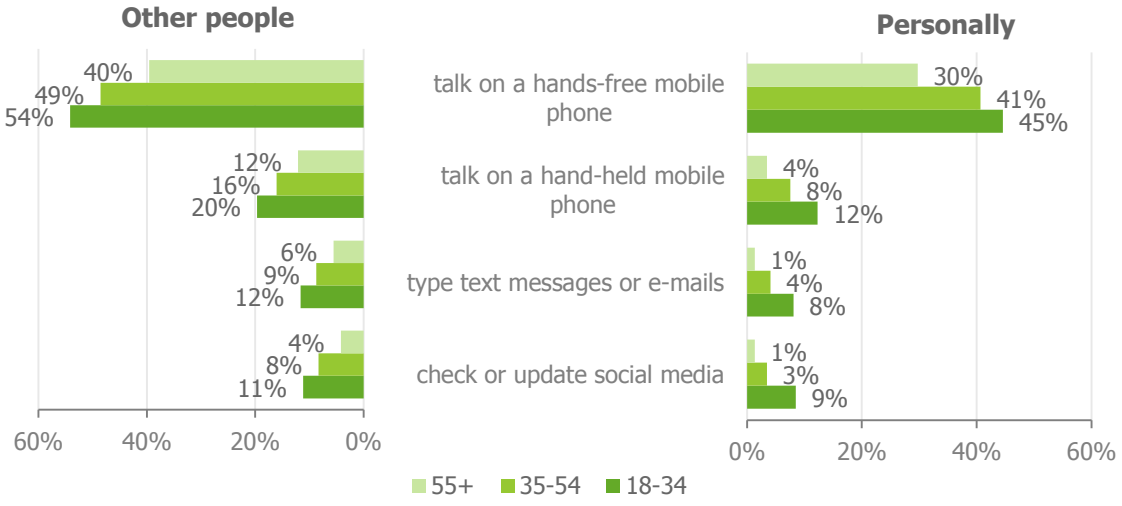


Figure 5: Acceptability of unsafe traffic behaviours related to the use of mobile phones while driving, by age group.

*Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) European weight B / European weight C in the question 'check or update social media'.*

*3.1.1.2. Self-declared (unsafe) behaviours in traffic*

To study the self-declared (unsafe) behaviours in traffic, the respondents were asked '*In the past 12 months, as a road user, how often did you…?*'. Several items concerning the use of mobile phone while driving and listening to music as pedestrians and cyclists are studied.

About half of the respondents (51%) report that they have talked on a hands-free mobile phone while driving at least once in the past 12 months. During the same period, 38% used a hand-held mobile phone. The percentage of respondents that read a text message/e-mail at least once is slightly lower (36%), but higher than the percentage of people that sent a text message/e-mail (27%). With regard to listening to music through headphones, 38% say that they have done it at least once as a pedestrian and 29% as a cyclist (Figure 6).

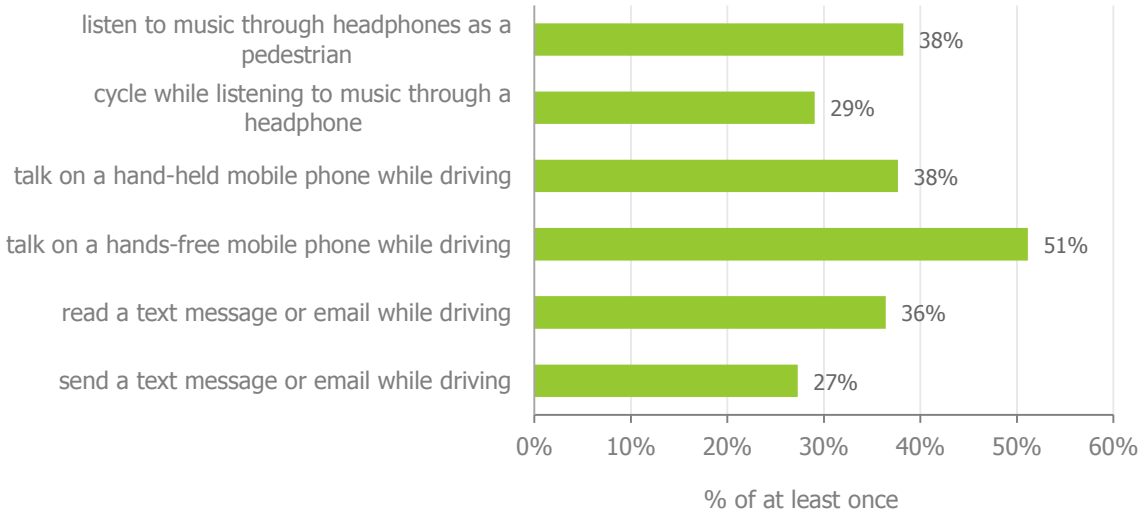


Figure 6: Self-declared (unsafe) behaviours in traffic, in Europe.
*Notes: (1) % of people that did it at least once in the past 12 months. (2) European weight B.*

The analysis by country (Table 1) shows that the United Kingdom is the country where the lowest number of people report the use of the mobile phone while driving. In fact, the United Kingdom has the lowest percentage of respondents who talked on a hand-held mobile phone (22%), read text messages/e-mails (27%), and sent text messages/e-mails (21%); and is the country with the second lowest rate of talking on a hands-free mobile phone (39%), after France (37%). In opposition, Finland is the country with the highest number of people declaring that they had talked on a hand-held mobile phone (73%), read text messages/e-mails (56%), and sent text messages/e-mails (41%). Italy is the country with the highest percentage of people reporting that they had talked with a hands-free mobile phone while driving (74%).

The rates of respondents that report listening to music through headphones as a pedestrian range from 26% in Belgium to 51% in Spain. Among the cyclists, the rate is the lowest in Austria (20%) and the highest in Greece (38%).

The analysis by gender (Figure 7) shows that all the reported behaviours depend significantly on the gender (Chi-square test: $p<0.01$). The percentage of respondents that listened to music through headphones as a pedestrian and/or when cycling, talked on a mobile phone (hands-free and/or hand-held), and read/sent text messages or e-mails at least once in the past 12 months is significantly lower among women.

The frequencies of the use of the mobile phone while driving and the use of headphones as a pedestrian and when cycling, also depend significantly on the age group (Chi-square test: $p<0.01$). In all the cases, the frequencies decrease with the increase of the age group (Figure 8).

Table 1: Self-declared (unsafe) behaviours in traffic, by country.

| | listen to music through headphones as a pedestrian | cycle while listening to music through a headphone | talk on a hand-held mobile phone | talk on a hands-free mobile phone while driving | read a text message or email | send a text message or email |
|---|---|---|---|---|---|---|
| AT | 35% | 20% | 47% | 63% | 36% | 28% |
| BE | 26% | 23% | 28% | 41% | 37% | 27% |
| CH | 37% | 25% | 35% | 50% | 36% | 29% |
| DE | 34% | 25% | 35% | 51% | 32% | 26% |
| DK | 40% | 35% | 42% | 51% | 44% | 35% |
| EL | 44% | 38% | 61% | 62% | 45% | 30% |
| ES | 51% | 35% | 35% | 56% | 36% | 26% |
| FI | 42% | 32% | 73% | 52% | 56% | 41% |
| FR | 33% | 26% | 31% | 37% | 39% | 30% |
| IE | 46% | 34% | 30% | 47% | 36% | 27% |
| IT | 41% | 36% | 55% | 74% | 49% | 33% |
| NL | 35% | 32% | 24% | 45% | 33% | 25% |
| PL | 40% | 31% | 48% | 55% | 32% | 25% |
| PT | 36% | 30% | 46% | 60% | 44% | 28% |
| SE | 45% | 34% | 62% | 50% | 45% | 32% |
| SI | 33% | 29% | 60% | 52% | 34% | 27% |
| UK | 36% | 30% | 22% | 39% | 27% | 21% |
| EU | 38% | 29% | 38% | 51% | 36% | 27% |

*Notes: (1) % of people that did it at least once in the past 12 months. (2) Countries based on individual country weight, Europe based on European weight B. (3) The two countries with lowest percentages are indicated in green, the two countries with highest percentages in yellow. (4) In Slovenia, the question 'talk on a hand-held mobile phone' refers to talking on the mobile phone while driving, without limiting it to hand-held mobile phone use only.*

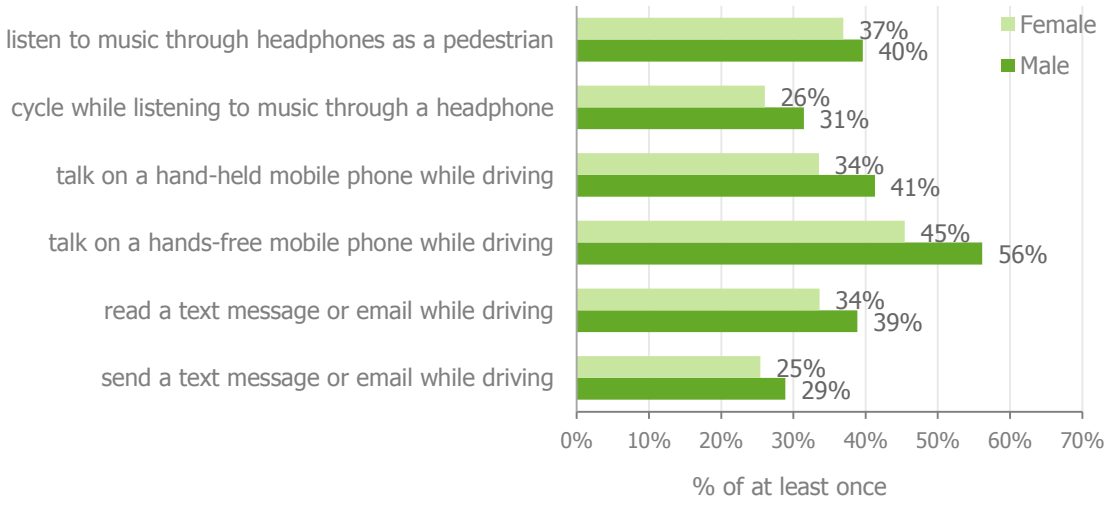


Figure 7: Self-declared (unsafe) behaviours in traffic, by gender.
*Notes: (1) % of people that did it at least once in the past 12 months. (2) European weight B.*

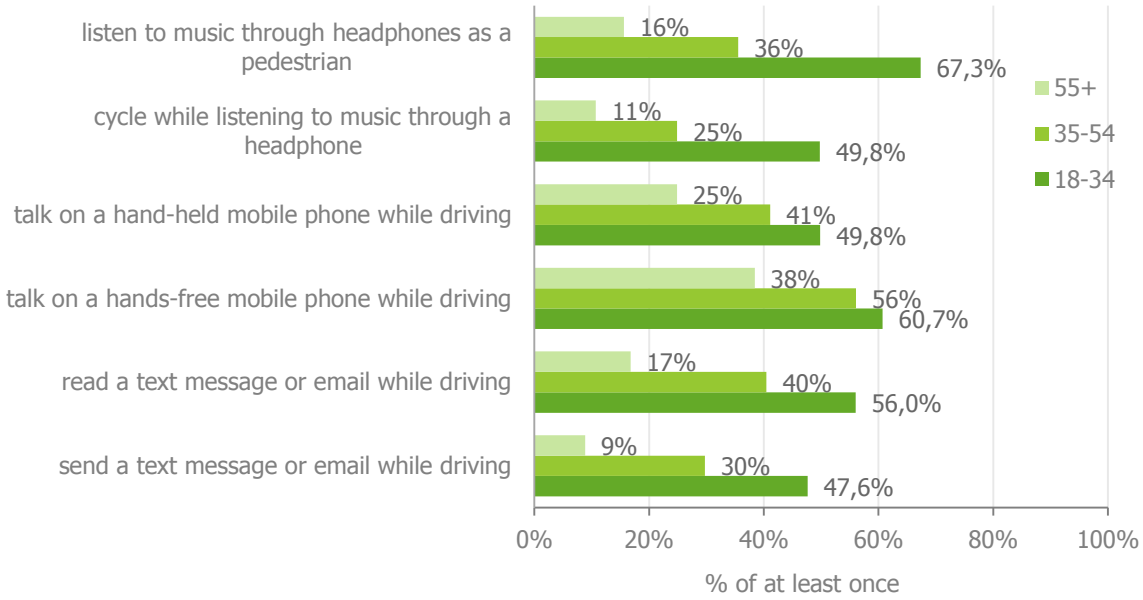


Figure 8: Self-declared (unsafe) behaviours in traffic, by age group.
*Notes: (1) % of people that did it at least once in the past 12 months. (2) European weight B.*

Despite the high number of respondents that have talked on a hand-held mobile phone while driving in the past 12 months, only 185 had a fine or conviction for doing so (7.9% of all fines/convictions). This means that only 3.6% had a fine/conviction. Talking on a hand-held mobile phone is the third reason for fines/convictions in Europe (after violating speed limits and not wearing a seat belt) (see thematic report Enforcement and support for road safety policy measures).

Almost 47% of the respondents support the measure 'zero tolerance for using any type of mobile phone while driving (hand-held or hands-free)'. The rate of support is higher than 50% in the United Kingdom (61%), Ireland (57%), Greece (55%), France (55%), and Spain (54%). Finland (28%) and Italy (30%) are the countries where the percentages of supporters are the lowest. 'The ban of using headphones (or earbuds) by pedestrians and cyclists' is supported by 56% of the respondents. The support rates range from 28% in Finland to 66% in Italy. Both support rates are higher among women and increase with the increase of the age group (see thematic report Enforcement and support for road safety policy measures).

When asked how often, as road users, the respondents are confronted with distracted drivers (drivers who are busy with something else, e.g. phone, tuning the radio, etc), the average answer was 6.4 in a scale from 0=never to 10=very often. The average answers range from 5.9 in Sweden and 6.0 in France, to 7.5 in Greece. More than half of the respondents (61%) think this behaviour has increased, when compared to two years ago. Distracted driving is the behaviour considered to have increased the most by the respondents, ahead of aggressive drivers (49%) and speeding drivers (45%). The percentage is higher among women (63%) than among men (59%), and increases with the increase of the age group. In Italy (75%) and in Austria (71%), more than 70% think that the number of distracted drivers has increased. On the other hand, Poland has the lowest percentage (40%) (see thematic report Subjective safety and risk perception).

#### *3.1.1.3. Attitudes towards unsafe traffic behaviours*

Concerning the attitudes towards unsafe traffic behaviours, the respondents were asked to give their opinion about four statements ('*To what extent do you agree with each of the following statements?*') related to the influence of talking on a mobile phone on the attention to the traffic, the risk perception, and the other car driver's behaviour.

Regarding the influence of the use of the mobile phone on the attention to the traffic, almost three quarters of the respondents agree that the attention decreases when talking on a hand-held mobile phone, and 56% when talking on a hands-free mobile phone. Furthermore, 82% believe that talking on a hand-held mobile phone increases the risk of getting involved in an accident. About half of the respondents agree that almost all car drivers occasionally talk on a hand-held mobile phone (Figure 9).

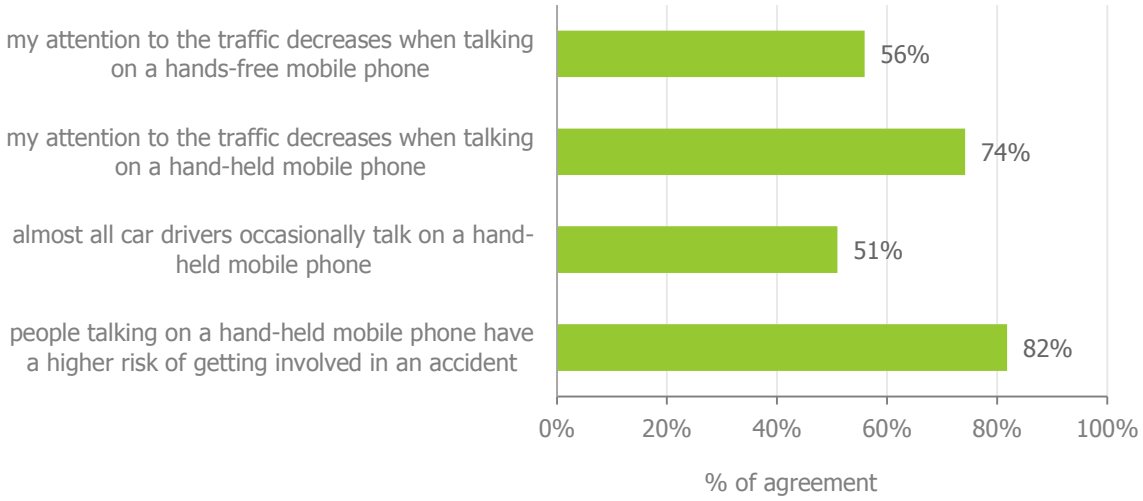


Figure 9: Attitudes towards unsafe traffic behaviours, in Europe.

*Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) European weight B.*

The comparison by country (Table 2) shows that the percentages of agreement about the influence of the hands-free mobile phone range from about 44% in Italy and Poland to 64% in Denmark. The rates of agreement regarding the influence of the hand-held mobile phone are also the lowest in Poland (65%), and 80% or higher in Greece (80%), Switzerland (80%), and Portugal (83%).

More than 90% of the Belgian respondents believe that the use of a hand-held mobile phone increases the risk of getting involved in an accident. In opposition, only 58% of the Slovenian respondents have the same opinion.

In Greece and Italy more than three quarters of the respondents agree that almost all car drivers occasionally talk on a hand-held mobile phone. The United Kingdom (28%) and the Netherlands (33%) are the countries with the lowest percentages of agreement.

The analysis by gender (Figure 10) shows that women are more aware of the influence of the mobile phone use on attention to the traffic and on the risk of having an accident. The rate of women that agree that almost all car drivers occasionally talk on a hand-held mobile phone is also higher than the rate of men. The differences are significant in all the cases (Chi-square test: $p<0.01$).

The percentages of agreement also depend significantly on the age group (Chi-square test: $p<0.01$). In fact, the perception of the influence of the use of the mobile phone (hands-free and hand-held) on the attention and on the risk of accident increases with the age. Regarding the frequency of the use of the mobile phone, the agreement rates increase slightly with the age (Figure 11).

Table 2: Attitudes towards unsafe traffic behaviours, by country (% of agreement).

| | My attention to the traffic decreases when talking on a hands-free mobile phone | My attention to the traffic decreases when talking on a hand-held mobile phone | Almost all car drivers occasionally talk on a hand-held mobile phone | People talking on a hand-held mobile phone have a higher risk of getting involved in an accident |
|---|---|---|---|---|
| AT | 55% | 78% | 58% | 83% |
| BE | 57% | 80% | 50% | 91% |
| CH | 60% | 80% | 51% | 86% |
| DE | 64% | 78% | 46% | 81% |
| DK | 60% | 79% | 46% | 85% |
| EL | 60% | 80% | 78% | 83% |
| ES | 61% | 76% | 49% | 82% |
| FI | 59% | 78% | 67% | 82% |
| FR | 58% | 68% | 49% | 75% |
| IE | 59% | 73% | 45% | 82% |
| IT | 44% | 79% | 77% | 87% |
| NL | 58% | 73% | 33% | 85% |
| PL | 44% | 65% | 58% | 82% |
| PT | 59% | 83% | 65% | 88% |
| SE | 55% | 72% | 52% | 77% |
| SI | 63% | 78% | 62% | 58% |
| UK | 57% | 68% | 28% | 81% |
| EU | 56% | 74% | 51% | 82% |

*Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) Countries based on individual country weight, Europe based on European weight B. (3) The two countries with best rates are indicated in green, the two countries with worst rates in yellow.*

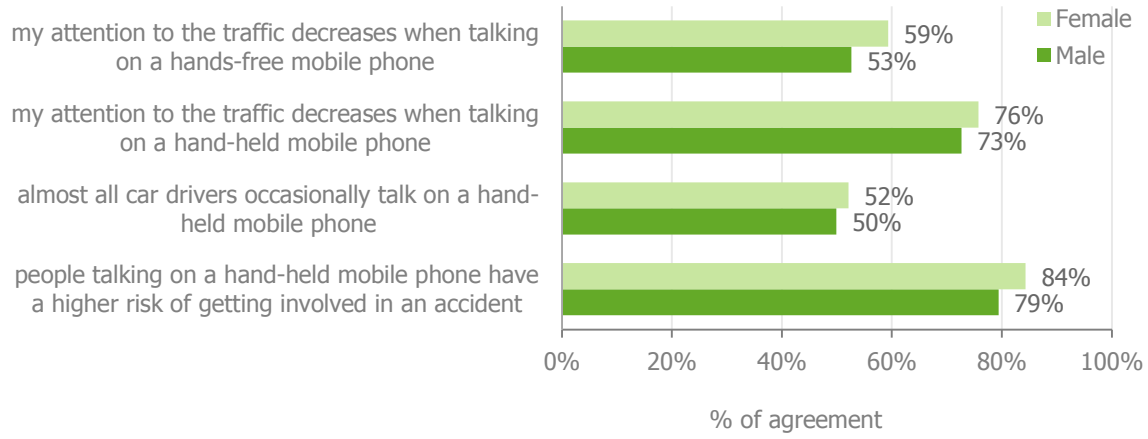


Figure 10: Attitudes towards unsafe traffic behaviours, by gender.

*Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) European weight B.*

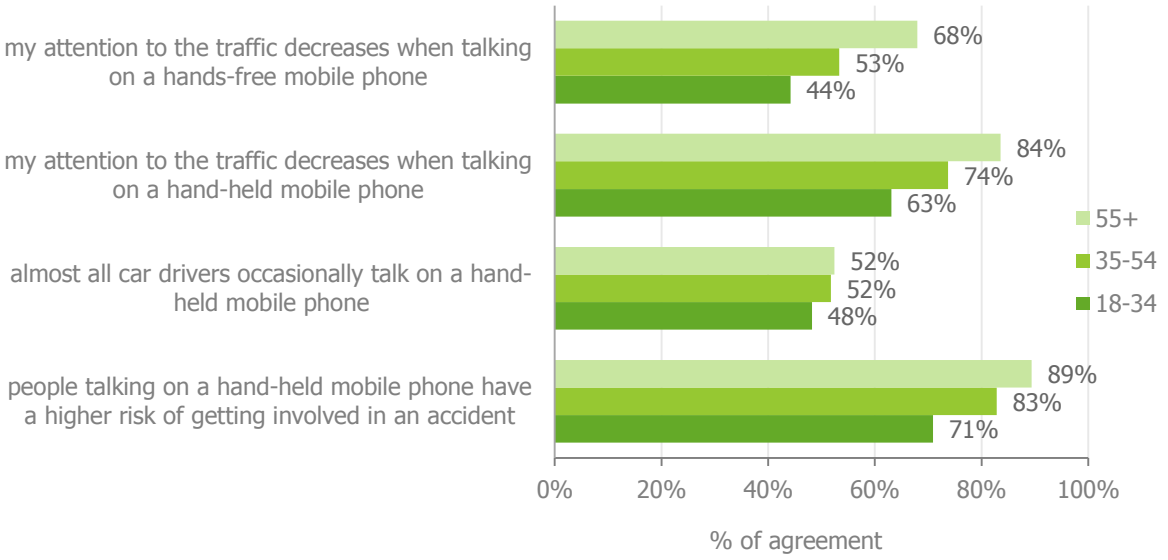


Figure 11: Attitudes towards unsafe traffic behaviours, by age group.
*Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) European weight B.*

Inattentiveness is considered to contribute to about 27% of the road traffic accidents in Europe, being the third most relevant factor, just behind driving under the influence of alcohol (33%) and driving too fast (33%). Using a mobile phone to make a call while driving (without using a hands-free device) and sending a text message while driving are considered the 6th and 7th most important factors in road traffic accidents in Europe. According to the respondents, these factors contribute to 23% and 22% of the road traffic accidents, respectively (see thematic report Subjective safety and risk perception).

### 3.1.2. Fatigue

#### *3.1.2.1. Acceptability of unsafe traffic behaviours related to driving when tired*

The personal and social acceptability of driving when tired was assessed by the answers to the questions:

- *Where you live, how acceptable would most other people say it is for a driver to…?*
- *How acceptable do you, personally, feel it is for a driver to…?*

One item was included: '...drive when they're so sleepy that they have trouble keeping their eyes open'.

Only 3.5% of the respondents consider it is acceptable that people drive when they are so sleepy that they have trouble keeping their eyes open. This percentage ranges from less than 1% in Finland (0.3%), Denmark (0.9%), and Belgium (0.9%), to about 5% in Italy (4.8%) and Poland (5.2%). The percentage of respondents that consider that the others accept driving when sleepy is higher in all the countries. The European rate is 7.3% and ranges from 2.6% in Denmark to 13.8% in Italy (Figure 12).

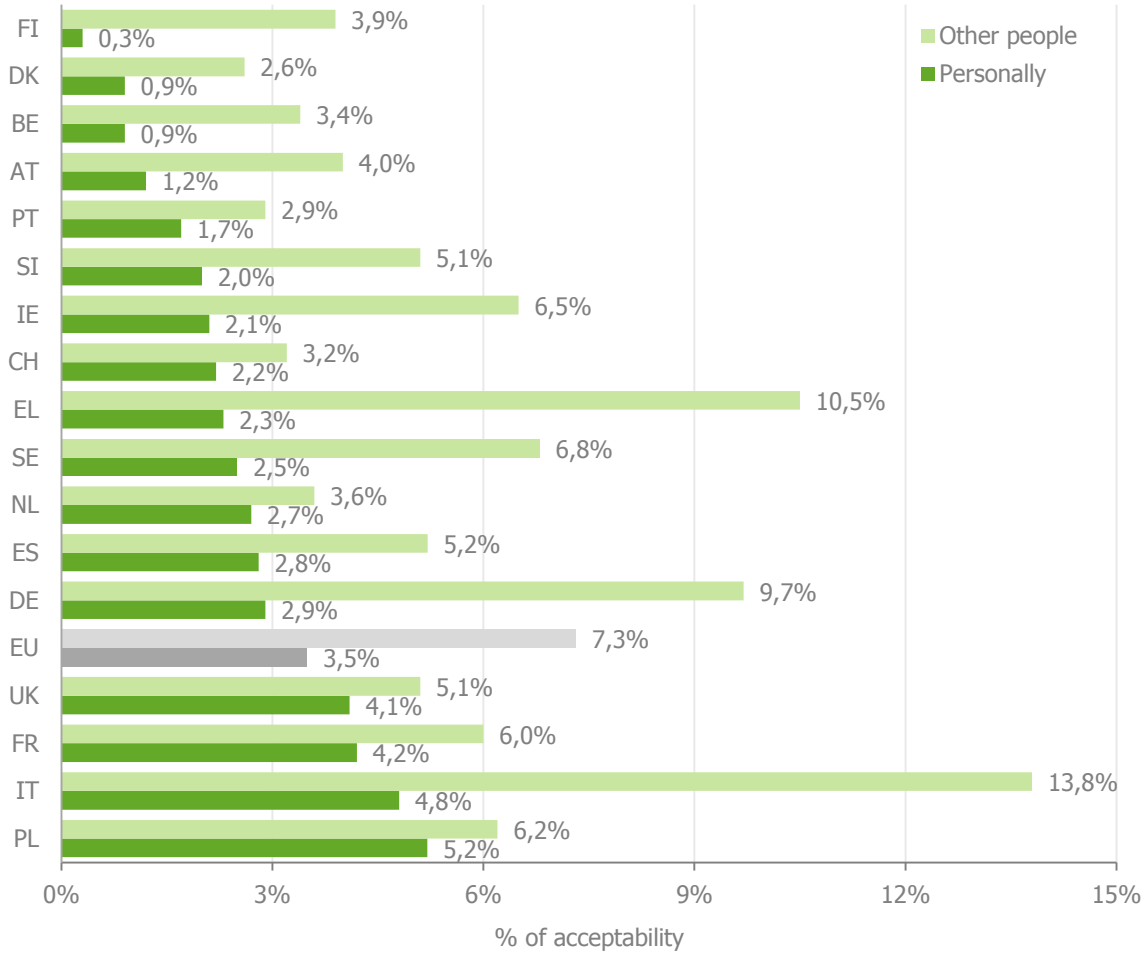


Figure 12: Acceptability of driving when people are so sleepy that they have trouble keeping their eyes open, by country.

*Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Countries based on individual country weight, Europe based on European weight B.*

The comparison by gender (Figure 13) shows that the percentages of acceptability are lower among the female respondents, both the personal acceptability and the opinion about the others' acceptability (Chi-square test: $p<0.01$).

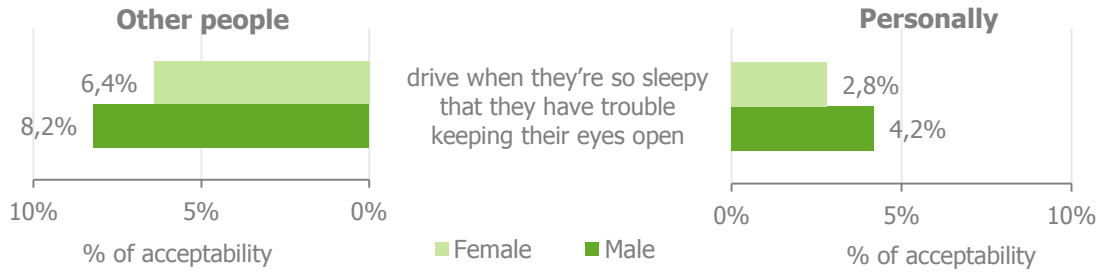


Figure 13: Acceptability of driving when people are so sleepy that they have trouble keeping their eyes open, by gender.

*Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Countries based on individual country weight, Europe based on European weight B.*

The acceptability rates also depend significantly on the age group (Chi-square test: $p<0.01$). The increase of the age group is associated with a decrease of accepting driving while tired, both regarding the others' opinion and personally (Figure 14).


Figure 14: Acceptability of driving when people are so sleepy that they have trouble keeping their eyes open, by age group.

*Notes: (1) % of acceptability: scores 4 and 5 on a 5-point scale from 1 'unacceptable' to 5 'acceptable'. (2) Countries based on individual country weight, Europe based on European weight B.*

#### *3.1.2.2. Self-declared (unsafe) behaviours in traffic*

To study the self-declared (unsafe) behaviours in traffic concerning fatigue, the respondents were asked '*In the past 12 months, as a road user, how often did you…?*' '...realise that you were actually too tired to drive' and 'stop and take a break because you were too tired to drive'.

More than half of the respondents (60%) declare that they have realised that they had been too tired to drive at least once in the past 12 months. The percentages range from 46% in the Netherlands to 76% in Slovenia (Figure 15 - left). Considering only the drivers that had felt too tired to drive, 84% stopped and took a break at least once in the same period. This behaviour is most prevalent in Slovenia, where 94% stopped and took a break, and least prevalent in Italy (68%) (Figure 15 - right).

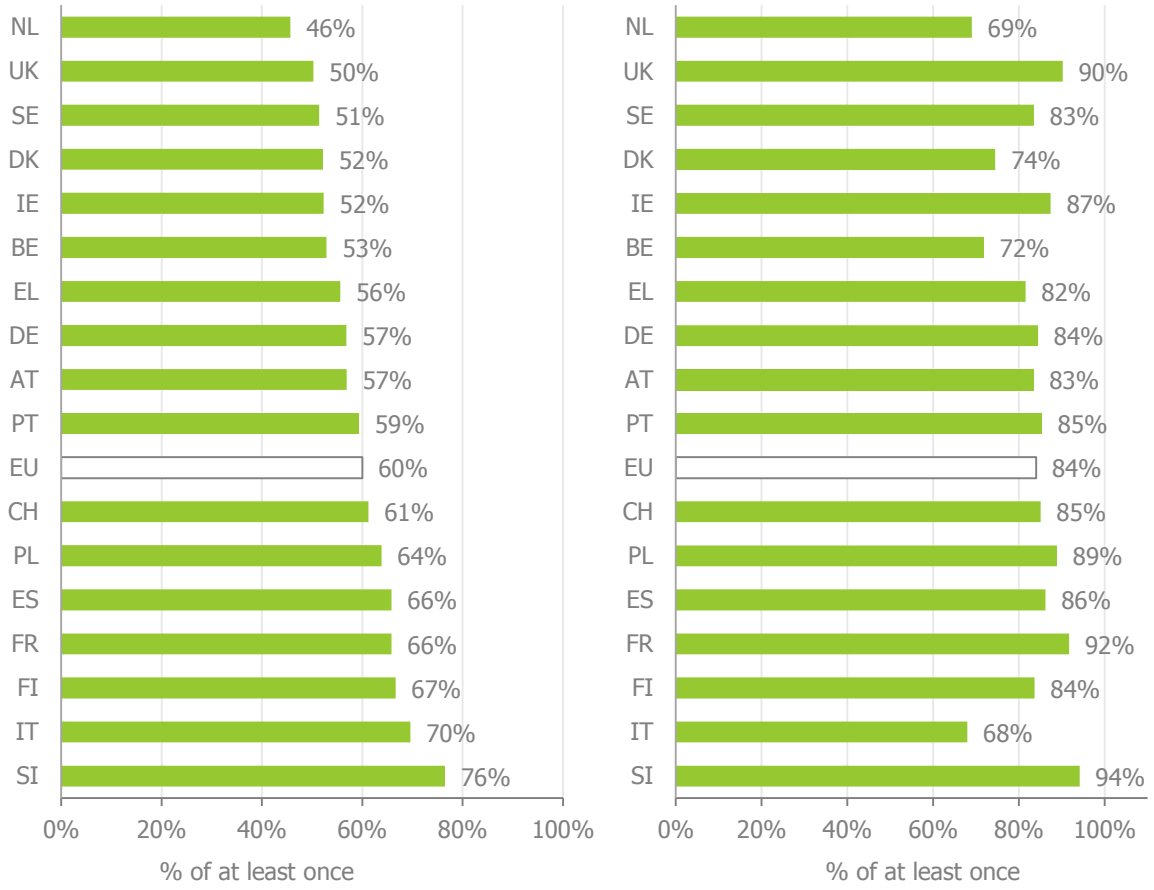


Figure 15: Self-declared (unsafe) behaviours in traffic, in Europe: 'realise that you were actually too tired to drive' (left), and 'stop and take a break because you were too tired to drive' (right).
*Notes: (1) % of people that did it at least once in the past 12 months. (2) The percentages of the respondents that stopped and took a break were calculated among those who had realised that they had been too tired to drive at least once in the past 12 months. (3) Countries based on individual country weight, Europe based on European weight B.*

The comparison by gender (Figure 16) shows that the percentage of respondents that felt too tired to drive and of those that stopped for that reason is higher among males. The differences are significant in both cases (Chi-square test: $p<0.01$).

The fatigue experienced while driving and the decision to stop and take a break depend significantly on the age group (Chi-square test: $p<0.01$). In fact, the percentage of respondents that felt too tired to drive decreases with the age. On the other hand, among those who felt too tired to drive, the percentage of respondents that stopped and took a break increases with the increase of the age group (Figure 17).

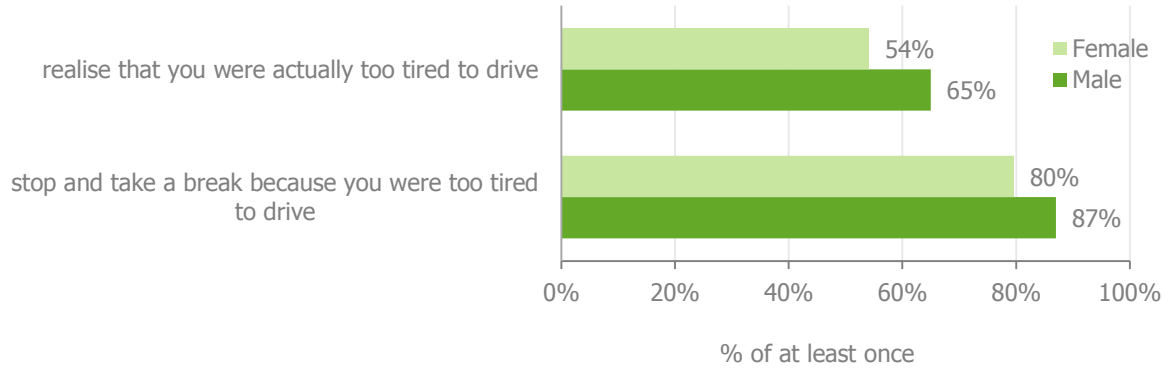


Figure 16: Self-declared (unsafe) behaviours in traffic, by gender.

*Notes: (1) % of people that did it at least once in the past 12 months. (2) The percentages of the respondents that stopped and took a break were calculated among those who had realised that they had been too tired to drive at least once in the past 12 months. (3) European weight B.*

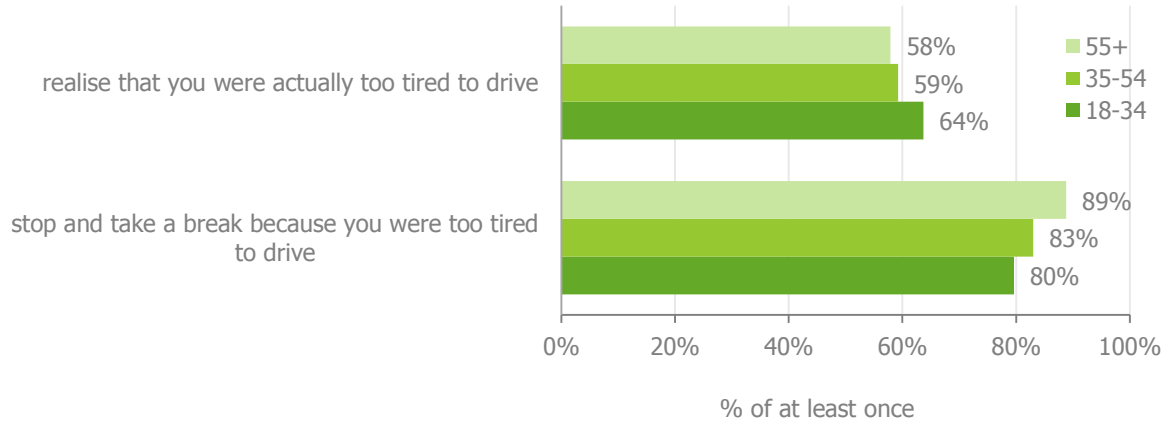


Figure 17: Self-declared (unsafe) behaviours in traffic, by age group.

*Notes: (1) % of people that did it at least once in the past 12 months. (2) The percentages of the respondents that stopped and took a break were calculated among those who had realised that they had been too tired to drive at least once in the past 12 months. (3) European weight B.*

When asked to estimate a percentage of accidents caused by tiredness behind the wheel, the average answer was 20%, which is the 9th most important factor. This percentage range from 12% in Denmark to 31% in Portugal and Greece (see thematic report Subjective safety and risk perception).

#### *3.1.2.3. Attitudes towards unsafe traffic behaviours*

Concerning the attitudes towards unsafe traffic behaviours, the respondents were asked to give their opinion about four statements (*'To what extent do you agree with each of the following statements?'*) related to driving when tired and the risk perception.

Regarding driving a car while being tired, 12% of the respondents report that they will continue to drive a car even if they feel sleepy. More than 80% agree that they should not drive a car when they feel sleepy (84%), and that the risk of accident increases if they feel sleepy while driving (85%) (Figure 18).

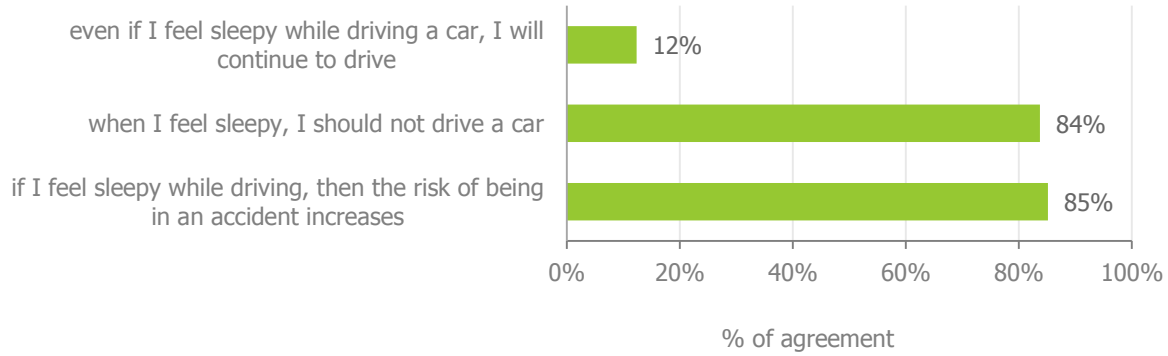


Figure 18: Attitudes towards unsafe traffic behaviours, in Europe.

*Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) European weight B.*

The percentages of agreement by country are presented in Table 3. The percentages of respondents that will still drive a car even if they feel sleepy range from 10% or less in Poland (9%), Finland (10%), and the Netherlands (10%) to 15% in France and 18% in Denmark. France and the Netherlands are the countries with the lowest percentages of people believing that they should not drive when sleepy, and that the risk of being in an accident increases if they feel sleepy while driving. The percentages of respondents that agree that one should not drive a car when sleepy are more than 90% in Italy (94%) and Portugal (91%). The awareness of the risk of driving while feeling sleepy is the highest in Finland (94%) and Portugal (93%).

Table 3: Attitudes towards unsafe traffic behaviours, by country (% of agreement).

| | Even if I feel sleepy while driving a car, I will continue to drive | When I feel sleepy, I should not drive a car | If I feel sleepy while driving, then the risk of being in an accident increases |
|---|---|---|---|
| AT | 12% | 85% | 85% |
| BE | 11% | 84% | 87% |
| CH | 12% | 87% | 87% |
| DE | 13% | 81% | 83% |
| DK | 18% | 83% | 87% |
| EL | 13% | 89% | 88% |
| ES | 11% | 85% | 87% |
| FI | 10% | 87% | 94% |
| FR | 15% | 75% | 81% |
| IE | 12% | 83% | 86% |
| IT | 12% | 94% | 91% |
| NL | 10% | 78% | 81% |
| PL | 9% | 87% | 86% |
| PT | 12% | 91% | 93% |
| SE | 12% | 82% | 82% |
| SI | 14% | 82% | 87% |
| UK | 13% | 82% | 83% |
| EU | 12% | 84% | 85% |

*Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) Countries based on individual country weight, Europe based on European weight B. (3) The two countries with best rates are indicated in green, the two countries with worst rates in yellow.*

The percentage of men that will still drive a car when sleepy is significantly higher than the percentage of women (Chi-square test: p<0.01). The percentage of men that agree that one should not drive when sleepy, and that are aware that driving when feeling sleepy increases the risk of having an accident is significantly lower than the percentage of women (Chi-square test: p<0.01) (Figure 19).

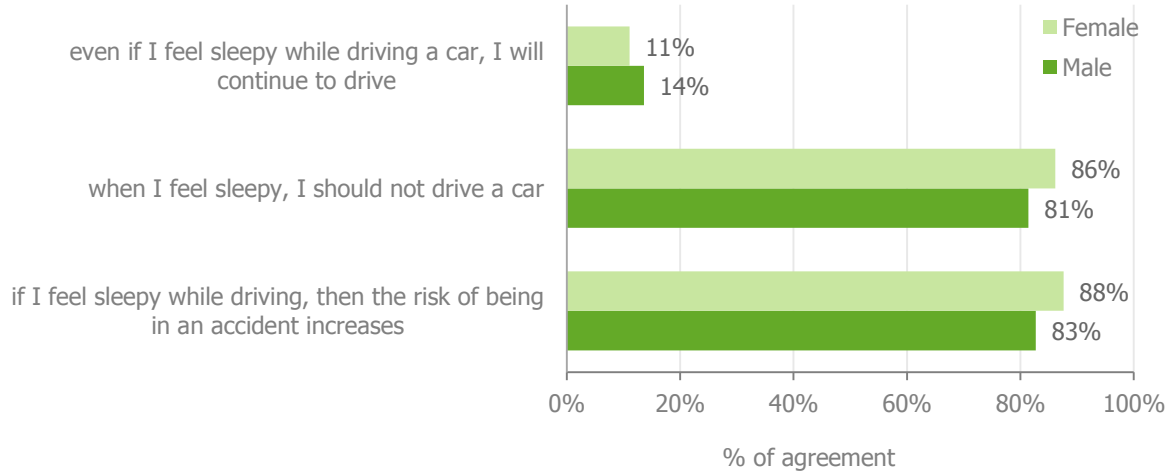


Figure 19: Attitudes towards unsafe traffic behaviours, by gender.

*Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) European weight B.*

The agreement rates also depend significantly on the age group (Chi-square test: p<0.01): the percentage of people that will continue to drive even they feel sleepy decreases with the increasing age group; and the percentage of people that agree that one should not drive a car when sleepy, and that the risk of having an accident increases if they drive when sleepy, rise with the increasing age group (Figure 20).

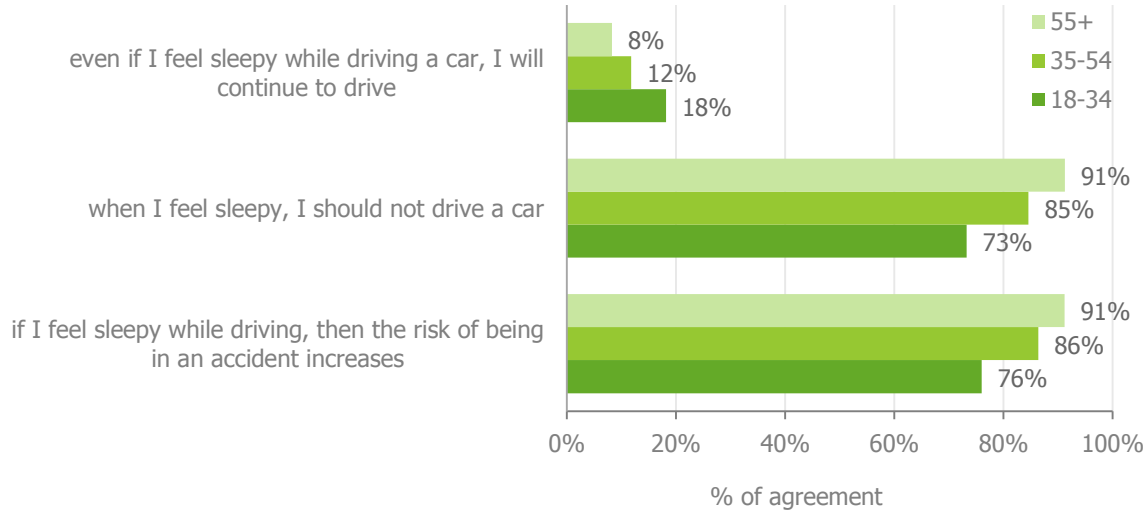


Figure 20: Attitudes towards unsafe traffic behaviours, by age group.

*Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) European weight B.*

## 3.2. Further analysis

In this section, binary logistic regression models are used to study the association between several explanatory variables and self-declared behaviours related to the use of the mobile phone while driving as well as driving when tired.

In each model, the outcome is a binary variable indicating the absence (0=never) or presence (1=at least once) of self-declared behaviours in the past 12 months concerning the use of the mobile phone while driving (talk on a hand-held/hands-free, read/send text messages) and driving when tired ('realise that you were too tired to drive').

Personal characteristics (gender, age group and educational level), frequency of driving, personal acceptability of unsafe traffic behaviours, attitudes towards unsafe traffic behaviours, support for road safety policy measures and risk perception are considered as independent variables. Nationality is also included in the models in order to explore differences/similarities between the countries, controlling for other factors.

Odds ratios (and the respective 95% Confidence Intervals) are used to measure the strength of association between the variables. To assess the fit of the models, the Hosmer-Lemeshow test is used (Hosmer *et al.*, 2013).

### 3.2.1. Factors that affect the use of a mobile phone while driving

Table 4 shows the results of the logistic regression models for talking on a hand-held mobile phone while driving (Model 1) and for talking on a hands-free mobile phone while driving (Model 2).

The odds of talking on a hand-held mobile phone and on a hands-free mobile phone for women, in comparison with men, decrease by 22% (OR = 0.78) and 27% (OR = 0.73), respectively, when controlling for all the other factors in the models. In other words, women are less likely to report the use of the mobile phone to talk while driving in both cases (hand-held and hands-free).

When comparing with the drivers aged 18 to 34 (reference group), the odds of talking on a hand-held mobile phone decrease by 22% (OR = 0.78) for drivers aged 35 to 54, and by 55% (OR = 0.45) for drivers older than 54. The decrease is slightly lower for talking on a hands-free mobile phone: 15% (OR = 0.85) for aged 35 to 54, and 49% (OR = 0.51) for drivers older than 54.

Comparing with drivers with primary education level or lower, the odds of talking on a hand-held mobile phone increases by 46% (OR = 1.46) for drivers with secondary level, by 68% (OR = 1.68) for drivers with a bachelor's degree or similar, and by 103% (OR = 2.03) for drivers with a master's degree or higher. In other words, the higher the educational level, the higher the probability of using a hand-held mobile phone while driving. This trend is not observed in the use of a hands-free mobile phone.

The likelihood of using the mobile phone to talk while driving increases with the frequency of driving, both for hand-held and hands-free mobile phone. In fact, when comparing with drivers who only drive a few days a year, the odds of talking on a hand-held mobile phone are 1.50, 2.17 and 3.43 for who drive a few days a month, 1 to 3 days a week, and at least 4 days a week, respectively. A similar trend is observed in the use of a hands-free mobile phone.

Drivers who find that talking on a hand-held mobile phone while driving is acceptable are 3.19 times more likely to do it, when comparing with the drivers that don´t accept it or have a neutral opinion. The association between the acceptability and the self-declared behaviour also exists with regard to the use of a hands-free mobile phone (OR = 1.94).

There also exists a significant association between the attitudes towards the use of mobile phones while driving and the self-declared behaviour. Drivers who think that attention to traffic decreases when talking on a hand-held mobile phone are 43% (OR = 0.57) less likely to do it, and drivers who agree that it increases the risk of having an accident are 64% (OR = 0.36) less likely to do it. Odds of talking on a hand-held mobile phone increase by 152% (OR = 2.52) for drivers who agree that almost all car drivers occasionally talk on a hand-held mobile phone while driving. Concerning talking on a hands-free mobile phone, drivers who agree that it decreases the attention to traffic, are 56% (OR = 0.44) less likely to do it.

Table 4: Logistic regression models for talking on a mobile phone while driving (hand-held and hands-free).

| **Factors** (reference category) | Dependent variable: self-declared (unsafe) behaviour (0=never; 1=at least once) | |
|---|---|---|
| | Model 1: Talk on a hand-held mobile phone | Model 2: Talk on a hands-free mobile phone |
| | **Odds Ratio** (CI95%) | **Odds Ratio** (CI95%) |
| **Gender** (Ref. male) | | |
| Female | **0.78**** (0.72-0.84) | **0.73**** (0.67-0.79) |
| **Age group** (Ref. 18 - 34) | | |
| 35 - 54 | **0.78**** (0.70-0.86) | **0.85**** (0.77-0.94) |
| 55+ | **0.45**** (0.40-0.50) | **0.51**** (0.46-0.56) |
| **Educational level** (Ref. Primary education or none) | | |
| Secondary education | **1.46**** (1.21-1.77) | **1.10** (0.92-1.32) |
| Bachelor's degree or similar | **1.68**** (1.38-2.05) | **1.41*** (1.17-1.70) |
| Master's degree or higher | **2.03**** (1.66-2.49) | **1.20** (0.99-1.46) |
| **Frequency of driving** (Ref. A few days a year) | | |
| A few days a month | **1.50*** (1.04-2.19) | **1.44*** (1.03-2.03) |
| 1 to 3 days a week | **2.17**** (1.57-3.07) | **2.52**** (1.88-3.43) |
| At least 4 days a week | **3.43**** (2.49-4.79) | **4.06**** (3.05-5.46) |
| **Personal acceptability** (Ref. unacceptable/neutral) | | |
| Talk on a hand-held mobile phone (acceptable) | **3.19**** (2.70-3.77) | - |
| Talk on a hands-free mobile phone (acceptable) | - | **1.94**** (1.78-2.12) |
| **Attitudes towards unsafe traffic behaviours** (Ref. disagree/neutral) | | |
| Attention to traffic decreases when talking on a hand-held mobile phone while driving (agree) | **0.57**** (0.52-0.64) | - |
| Attention to traffic decreases when talking on a hands-free mobile phone while driving (agree) | - | **0.44**** (0.41-0.48) |
| Almost all car drivers occasionally talk on a hand-held mobile phone while driving (agree) | **2.52**** (2.31-2.74) | - |
| People talking on a hand-held mobile phone while driving have a higher risk of accident (agree) | **0.36**** (0.32-0.41) | - |
| **Support for road safety measures** (Ref. oppose/ no opinion) | | |
| Zero tolerance for using any type of mobile phone while driving for all drivers (support) | **0.52**** (0.48-0.56) | **0.39**** (0.36-0.43) |
| **Risk perception -** number of accidents, out of 100, caused by talking on a hand-held mobile phone (Ref. 0-5) | | |
| 5 - 10 | **0.95** (0.85-1.07) | - |
| 10 - 30 | **1.01** (0.91-1.13) | - |
| 30 - 100 | **0.86*** (0.77-0.97) | - |

*Notes: (1) European weight B. (2) In Slovenia, the question 'talk on a hand-held mobile phone' refers to talk on the mobile phone while driving, without limiting it to hand-held mobile phone use only. (3) * p<0.05, **p<0.01. (4) Risk perception categorized based on quartiles: Q1=5, Q2=10, Q3=30.*

Drivers who support zero tolerance for using any type of mobile phone (hand-held or hands-free) while driving are less likely to talk on a hand-held mobile phone (OR = 0.52) and on a hands-free mobile phone (OR = 0.39).

The perception of the risk of having an accident caused by talking on a hand-held mobile phone decreases the odds of doing it. Drivers who think that more than 30% of road traffic accidents are caused by talking on a hand-held mobile phone, are less likely (OR = 0.86) to do it, when comparing with drivers who think that this percentage is lower than 5%.

Table 5 shows the results of the logistic regression models for reading a text message or email while driving (Model 3) and for sending a text message or email while driving (Model 4).

Women are less likely to read or send text messages/emails while driving (OR = 0.80 and OR = 0.85, respectively), when compared to men.

Age group has a strong negative effect on reading and sending text messages/emails while driving. When comparing with the drivers aged 18 to 34, the odds of reading text messages/emails decrease by 47% (OR = 0.53) for drivers aged 35 to 54, and by 82% (OR = 0.18) for drivers older than 54. The decrease is higher for sending text messages/emails: 53% (OR = 0.47) for aged 35 to 54 and 88% (OR = 0.12) for drivers older than 54. The effect of the age group on reading and sending text messages/emails while driving is stronger than the effect observed in talking on a mobile phone (hand-held and hands-free), presented in Table 4.

Table 5: Logistic regression models for using a mobile phone to read/send a text message or email while driving.

| **Factors** (reference category) | Dependent variable: self-declared (unsafe) behaviour (0=never; 1=at least once) | |
|---|---|---|
| | Model 3: Read a text message or email | Model 4: Send a text message or email |
| | **Odds Ratio** (CI95%) | **Odds Ratio** (CI95%) |
| **Gender** (Ref. male) | | |
| Female | **0.80**** (0.74-0.87) | **0.85**** (0.78-0.92) |
| **Age group** (Ref. 18 - 34) | | |
| 35 - 54 | **0.53**** (0.48-0.58) | **0.47**** (0.42-0.51) |
| 55+ | **0.18**** (0.16-0.20) | **0.12**** (0.11-0.14) |
| **Educational level** (Ref. Primary education or none) | | |
| Secondary education | **1.23*** (1.01-1.50) | **1.19** (0.96-1.49) |
| Bachelor's degree or similar | **1.54**** (1.27-1.88) | **1.36**** (1.10-1.71) |
| Master's degree or higher | **1.75**** (1.43-2.16) | **1.39**** (1.11-1.75) |
| **Frequency of driving** (Ref. A few days a year) | | |
| A few days a month | **1.75**** (1.24-2.49) | **1.88**** (1.28-2.81) |
| 1 to 3 days a week | **2.19**** (1.60-3.04) | **2.26**** (1.59-3.27) |
| At least 4 days a week | **3.79**** (2.81-5.20) | **3.62**** (2.58-5.19) |
| **Personal acceptability** (Ref. unacceptable/neutral) | | |
| Type text messages or e-mails while driving (acceptable) | **3.92**** (2.99-5.19) | **3.86**** (2.99-4.99) |
| Check or update social media while driving (acceptable) | **2.18**** (1.67-2.85) | **3.09**** (2.38-4.02) |
| **Support for road safety measures** (Ref. oppose/ no opinion) | | |
| Zero tolerance for using any type of mobile phone while driving (hand-held or hands-free) for all drivers (support) | **0.41**** (0.38-0.45) | **0.49**** (0.45-0.54) |
| **Risk perception -** number of accidents, out of 100, caused by sending a text message while driving (Ref. 0-5) | | |
| 5 - 10 | **0.94** (0.85-1.05) | **0.93** (0.83-1.05) |
| 10 - 30 | **0.95** (0.85-1.06) | **0.90** (0.80-1.01) |
| 30 - 100 | **0.98** (0.88-1.09) | **0.80**** (0.71-0.90) |

*Notes: (1) European weight B. (2) * p<0.05, **p<0.01. (3) Risk perception categorized based on quartiles: Q1=5, Q2=10, Q3=30.*

As was the case for talking on a hand-held mobile phone while driving, the likelihood of reading and sending text messages also increases with the educational level. Comparing with drivers with primary education level or lower, the odds of reading texts messages/emails increases by 23% (OR = 1.23) for drivers with secondary level, by 54% (OR = 1.54) for drivers with a bachelor's degree or similar, and by 75% (OR = 1.75) for drivers with a master's degree or higher. This pattern is not so obvious in sending text messages/emails: the odds for drivers with secondary level are 1.19, and for higher educational levels are similar (OR = 1.36 and OR = 1.39).

Frequency of driving also has a strong influence on the likelihood of using the mobile phone to read and send text messages/emails while driving. In both models, the odds ratio increases with the

frequency of driving: when comparing with the reference category (a few days a year), the odds of reading (sending) a text message/emails are 1.75 (1.88), 2.19 (2.26) and 3.79 (3.62) for who drive a few days a month, 1 to 3 days a week, and at least 4 days a week, respectively.

Drivers who find that the use of a mobile phone to type text messages or emails while driving is acceptable are more likely to read (OR = 3.92) and to send (OR = 3.86) text messages/emails. The association between the acceptability of the behaviour and the self-declared behaviour is also observed for the drivers who accept the use of a mobile phone to check or update social media while driving. These drivers are 2.18 times more likely to read and 3.09 times more likely to send text messages/emails while driving.

Drivers who support zero tolerance for using any type of mobile phone (hand-held or hands-free) while driving are less likely to read (OR = 0.41) or to send (OR = 0.49) text messages/emails while driving.

The perception of the risk of having an accident caused by sending a text message while driving, doesn't affect the use of a mobile phone to read text messages/emails significantly, but affects its use to send text messages/emails: drivers who think that more than 30% of road traffic accidents are caused by sending a text message while driving, are less likely (OR = 0.80) to do it, when comparing with drivers who think that this percentage is lower than 5%.

It was found that perceived social acceptability also increases the likelihood of using the mobile phone while driving (for talking on a hand-held/hands-free and for reading/sending text messages or emails), but due to the high correlation with personal acceptability, only the last was included in the models in order to avoid multicollinearity problems.

Table 6 shows the odds ratio of each country for the four models presented in Table 4 and Table 5. In each model, the country with frequency closer to the European average was chosen as the reference category. To identify groups of countries with similar likelihoods of self-declared behaviours, they were grouped according to the odds ratios (different colours in Table 6): 0.80 or lower (green); from 0.81 to 1.19 (white); from 1.20 to 1.99 (yellow); 2.00 or higher (orange).

Belgium, France, Ireland, the Netherlands, and the United Kingdom are the countries where it is the least likely to talk on a mobile phone (hand-held and hands-free) while driving (when comparing with the reference countries).

Regarding the use of a hand-held mobile phone to talk while driving, Greece, Finland, Italy, Sweden and Slovenia have the highest odds. Italy is also the country with highest odds for talking on a hands-free mobile phone.

Finland, Denmark, Italy and Sweden have the highest odds for both reading and sending text messages or emails (more than twice in Finland, when comparing with the reference countries). On the other hand, the United Kingdom, the Netherlands, Poland, and Ireland have the lowest odds.

Table 6: Logistic regression models for using a mobile phone while driving: effect of the countries.

| Country | Dependent variable: self-declared (unsafe) behaviour (0=never; 1=at least once) | | | |
|---|---|---|---|---|
| | Model 1: Talk on a hand-held mobile phone | Model 2: Talk on a hands-free mobile phone | Model 3: Read a text message or email | Model 4: Send a text message or email |
| | **Odds Ratio** (CI95%) | **Odds Ratio** (CI95%) | **Odds Ratio** (CI95%) | **Odds Ratio** (CI95%) |
| AT | **1.64** (1.27-2.12) | **1.69** (1.09-2.61) | **0.94** (0.65-1.37) | **1.01** (0.68-1.50) |
| BE | **0.69** (0.52-0.91) | **0.65** (0.42-0.99) | **1.04** (0.71-1.51) | **1** (Reference) |
| CH | **1.00** (0.76-1.30) | **0.97** (0.63-1.49) | **1** (Reference) | **1.10** (0.74-1.65) |
| DE | **1** (Reference) | **0.98** (0.68-1.41) | **0.84** (0.63-1.11) | **1.00** (0.75-1.35) |
| DK | **1.44** (1.00-2.06) | **1** (Reference) | **1.51** (0.96-2.36) | **1.63** (1.01-2.62) |
| EL | **3.05** (2.33-4.00) | **1.48** (1.01-2.29) | **1.43** (0.99-2.08) | **1.11** (0.74-1.66) |
| ES | **0.87** (0.76-1.02) | **1.11** (0.77-1.60) | **0.81** (0.61-1.08) | **0.81** (0.60-1.10) |
| FI | **5.94** (4.02-8.97) | **1.00** (0.60-1.66) | **2.57** (1.64-4.05) | **2.13** (1.33-3.41) |
| FR | **0.75** (0.66-0.85) | **0.50** (0.35-0.72) | **1.06** (0.80-1.41) | **1.08** (0.80-1.47) |
| IE | **0.67** (0.46-0.98) | **0.69** (0.42-1.13) | **0.82** (0.52-1.28) | **0.79** (0.48-1.28) |
| IT | **2.40** (2.09-2.76) | **2.55** (1.75-3.69) | **1.93** (1.45-2.58) | **1.42** (1.05-1.94) |
| NL | **0.52** (0.41-0.65) | **0.76** (0.51-1.13) | **0.76** (0.55-1.06) | **0.77** (0.54-1.10) |
| PL | **1.53** (1.31-1.77) | **1.05** (0.72-1.52) | **0.64** (0.48-0.87) | **0.72** (0.52-0.99) |
| PT | **1.48** (1.14-1.92) | **1.28** (0.83-1.98) | **1.39** (0.96-2.01) | **0.98** (0.66-1.46) |
| SE | **3.62** (2.72-4.85) | **0.99** (0.64-1.55) | **1.74** (1.19-2.56) | **1.46** (0.97-2.21) |
| SI | **2.83** (1.72-4.73) | **0.97** (0.53-1.77) | **0.83** (0.46-1.49) | **0.93** (0.49-1.71) |
| UK | **0.48** (0.41-0.55) | **0.58** (0.40-0.83) | **0.58** (0.44-0.77) | **0.65** (0.47-0.88) |

*Notes: (1) European weight B. (2) In Slovenia, the question 'talk on a hand-held mobile phone' refers to talk on the mobile phone while driving, without limiting it to hand-held mobile phone use only. (3) * p<0.05, **p<0.01. (4) In each model, the country with frequency closer to the 'EU' was chosen for reference category. (5) Colours according to the odds ratios: 0.80 or lower (green); from 0.81 to 1.19 (white); from 1.20 to 1.99 (yellow); 2.00 or higher (orange).*

### 3.2.2. Factors that affect the decision to drive when tired

Table 7 shows the results of the logistic regression model for driving when tired. The dependent variable is the item of the questionnaire 'In the past 12 months, as a road user, how often did you realise that you were actually too tired to drive?'. This variable was coded as 0=never and 1=at least once.

The odds of driving when tired for women, in comparison with men, decrease by 28% (OR = 0.72), when controlling for all the other factors in the model. In other words, women are less likely to report that they drive when they are too tired to drive.

When comparing with the drivers aged 18 to 34, the odds of driving when tired decrease by 17% (OR = 0.83) for drivers aged 35 to 54, and by 16% (OR = 0.84) for drivers older than 54. The similar odds ratio in the two higher age groups shows that drivers aged 35 to 54 and older than 54 have the same likelihood of driving when tired.

There is no significant difference in the odds of driving when tired for drivers with primary education level or lower, and drivers with secondary educational level. Comparing with drivers with primary education level or lower, the odds of driving when tired increase by 28% (OR = 1.28) for drivers with a bachelor's degree or similar, and by 42% (OR = 1.42) for drivers with a master's degree or higher.

When comparing with drivers who have driven less than 2,500 kilometres in the past 6 months, the odds of driver fatigue increases by 23%, 56%, 63%, and 83% for drivers who have driven from 2,500 to 5,000 km, from 5,000 to 7,500 km, from 7,500 to 10,000 km, and more than 10,000 km, respectively. This results show that driving when tired increases with the number of kilometres travelled.

Drivers who feel that it is acceptable to drive being so sleepy that they have trouble keeping the eyes open, are 4.01 times more likely to drive when tired.

The odds are also significantly higher for those who reported that they will continue to drive even if they feel sleepy (OR = 1.19). Drivers who think that feeling sleepy while driving increases the risk of having an accident, are less likely to drive when they are too tired to drive (OR = 0.74).

Table 7: Logistic regression model for driving when tired.

| **Factors** (reference category) | Dependent variable: realise that were actually too tired to drive (0=never; 1=at least once) |
|---|---|
| | **Odds Ratio** (CI95%) |
| **Gender** (Ref. male) | |
| Female | **0.72**** (0.67-0.78) |
| **Age group** (Ref. 18 - 34) | |
| 35 - 54 | **0.83**** (0.75-0.91) |
| 55+ | **0.84**** (0.77-0.93) |
| **Educational level** (Ref. Primary education or none) | |
| Secondary education | **1.06** (0.89-1.25) |
| Bachelor's degree or similar | **1.28**** (1.07-1.52) |
| Master's degree or higher | **1.42**** (1.19-1.70) |
| **Km driven in the past 6 months** (Ref. 0-2500 km) | |
| 2500-5000 | **1.23**** (1.12-1.35) |
| 5000-7500 | **1.56**** (1.37-1.77) |
| 7500-10000 | **1.63**** (1.44-1.84) |
| > 10000 | **1.83**** (1.62-2.08) |
| **Personal acceptability** (Ref. unacceptable/neutral) | |
| Drive when thay're so sleepy that have trouble keeping the eyes open (acceptable) | **4.01**** (3.01-5.45) |
| **Attitudes towards unsafe traffic behaviours** (Ref. disagree/neutral) | |
| Even if I feel sleepy while driving a car, I will continue to drive (agree) | **1.19**** (1.06-1.35) |
| If I feel sleepy while driving, then the risk of accident increases (agree) | **0.74**** (0.66-0.83) |

*Notes: (1) European weight B. (2) * p<0.05, **p<0.01.*

The analysis of the odds ratio for countries (controlling for the other variables in the model), show the existence of 6 countries where people are less likely to drive when tired, when comparing to the reference country (Portugal): the Netherlands (OR = 0.59), Denmark (OR = 0.74), Belgium (OR = 0.78), Ireland (OR = 0.75), the United Kingdom (OR = 0.75), and Sweden (OR = 0.77). Slovenia (OR = 2.23), Italy (OR = 1.60), Finland (OR = 1.39), Spain (OR = 1.28), and France (OR = 1.27) are the countries where people are more likely to drive when tired.

# 4. Discussion

## 4.1. Distraction

### 4.1.1. Use of the mobile phone while driving

It is known that using a mobile phone while driving has negative effects on driving behaviour, and leads to an increasing risk of accident (RSO, 2015; DG MOVE, 2015). The majority of the participants in the ESRA survey are aware of these effects: 74% agree that talking on a hand-held mobile phone decreases the attention to the traffic, 82% agree that it increases the risk of being in an accident, and only 7.4% think this behaviour is acceptable. Texting, which also involves handling a device, is only accepted by 4%. A higher percentage of respondents accept talking on a hands-free mobile phone and consider that it has less influence on the attention to traffic, when compared with handling a mobile phone. The risk of using a mobile phone while driving is often only associated to physical and visual distraction. Cognitive distraction, which is similar when using a hand-held or a hands-free mobile phone (WHO, 2015; NSC, 2012), is underestimated by many road users. This fact, together with being legal in all European countries, makes the use of hands-free devices more acceptable and more prevalent in all the European countries participating in the ESRA survey.

Women and older drivers are more aware of the risks of using a mobile phone while driving and accept this behaviour less. Differences among age groups are particularly strong when using the mobile phone to text messages/emails or social networking. The percentage of acceptability of these behaviours is 6 times higher in the age group until 34 years old, when compared with drivers over 55.

Despite the high perception of the risk and the low acceptability, 38% of the respondents report that they have talked on a hand-held mobile phone while driving at least once in the past 12 months. Almost the same percentage report the use of the mobile phone to read text messages or emails, and 51% declare to have talked on a hands-free system. These results show that some drivers use the mobile phone while driving even being aware of the risks. The social expectation to return calls or answer text messages immediately; professional reasons; or perceived practical, social, and psychological benefits could outweigh the risk of using the mobile phone while driving (Nurullah, 2013). Personality traits that lead drivers to take risks while driving could also be an explanation, as suggested by Zhao et al. (2013).

The prevalence of the self-reported use of the mobile phone to talk (hand-held or hands-free) or to read/send text messages while driving is higher among men and younger drivers. These results are in line with other studies that report men and younger people as more likely to engage in several risky driving behaviours, including using mobile phone (Ivers et al., 2009; Nurullah, 2013; CDC, 2013). In general, the likelihood of using a mobile phone while driving also increases with the educational level and with the frequency of driving.

Self-declared behaviours concerning the use of the mobile phone while driving are also influenced by the perception of its negative effects in terms of accident risk, by the personal acceptability, and by the perceived social acceptability. Both personal and perceived social acceptability increase the likelihood of using the mobile phone to talk (hand-held or hands-free) or to read/sent text messages, suggesting a social influence in the behaviours. In fact, drivers who agree that almost all car drivers occasionally talk on a hand-held mobile phone while driving are 2.5 times more likely to do the same. On the other hand, drivers who are more aware of the risks are less likely to use the mobile phone while driving.

The analysis by country show large differences among countries, especially concerning talking on a hand-held mobile phone while driving. Finland, Sweden, Greece, and Italy are the countries where this behaviour is more likely, with more than 50% of the respondents reporting the use of a hand-held mobile phone at least once in the past 12 months. Similar results had been found in SARTRE4 (SARTRE, 2012), where these same four countries had the highest rates, among the countries also participating in the ESRA project. Finland, Italy, Sweden, together with Denmark, are also the countries where texting while driving is more prevalent. The high number of mobile phone subscriptions in Italy, Finland, Sweden, and Denmark (ITU, 2016) may explain the high prevalence of mobile phone use while driving within these countries. Furthermore, Sweden is the only European

country where it is allowed to use a hand-held mobile phone while driving (WHO, 2015). On the contrary, the use of a mobile phone for any kind of use (talk on hand-held/hands-free or texting) is less likely in the United Kingdom, the Netherlands, and Ireland, than in the other European countries. In countries where it is less likely to talk on a hand-held mobile phone while driving it is also less likely to talk on a hands-free mobile phone (Belgium, France, Ireland, the Netherlands, and the United Kingdom).

The growing phenomenon of distracted driving, as reported by the World Health Organization (WHO, 2015), is confirmed by the European road users participating in the ESRA survey. In fact, 61% consider that the number of distracted drivers has increased in the past two years, being the behaviour that has increased most, ahead of aggressive drivers (49%) and speeding drivers (45%). The perception of the increasing use of the mobile phone while driving and its negative effects on road safety, may be the reason why almost half of the respondents support zero tolerance for using any type of mobile phone while driving (hand-held or hands-free).

Despite being a 'serious and growing threat to road safety' (WHO, 2015), the enforcement on the use of a mobile phone while driving apparently is low and/or is not effective, as only 3.6% of the drivers that report the use of a hand-held mobile phone in the past 12 months were fined or convicted.

#### 4.1.2. Listening to music through headphones as a pedestrians and as a cyclist

Listening to music through headphones is an important cause of distraction of pedestrians and cyclists. This behaviour is especially prevalent in ESRA participants until 34 years old: about two third say that they listened to music through headphones as a pedestrian and half declare that they listened to music through headphones while cycling. In SARTRE4 most pedestrians and cyclists reported that they had never used MP3/iPod/music devices. Despite the different methodologies in SARTRE4 and ESRA, these results suggest that the habit of listening to music while walking and cycling is increasing. These behaviours should be of concern as the fatalities among these two groups of road users have decreased less than among car occupants, between 2000 and 2013 (OECD/ITF, 2015).

### 4.2. Fatigue

More than 80% of the European drivers are aware of the risks of driving when they are tired and that they should not drive in that condition. Only 3.5% think it is acceptable to drive when too tired to do it. Despite that, 60% of the drivers were willing to take the risk and drove while fatigued at least once in the past 12 months. Wanting to get to the destination and the belief that the destination can be reached without falling asleep may be some of the reasons for driving when too tired to do it (DaCoTA, 2012). From those drivers, 84% stopped and took a break when they felt tired while driving, which indicates the awareness of the risks of driving while fatigued.

Men and younger drivers have a lower perception of the risks of driving when tired, have a greater propensity to accept these behaviours and, as a consequence, they are more likely to drive when too tired to do it. The likelihood of continuing driving when fatigued also increases with the educational level and with the number of kilometres travelled. Similar results were found in SARTRE 4. The strong association among the self-declared behaviour, its acceptability and the risk perception, suggests that drivers who do not perceive the risks, accept this behaviour more and are more likely to drive when tired.

# 5. Conclusions and recommendations

## 5.1. Conclusions

### 5.1.1. Conclusions on distraction

Distracted driving is considered the behaviour that has increased the most in the past two years, and it is seen as the third cause of accident (after speeding and driving under the influence of alcohol). The majority of the respondents are aware that talking on the phone while driving has negative effects on the driving behaviour and that increases the risk of being in an accident. Accordingly, only few road users find acceptable talking on a hand-held mobile phone or texting (type messages/emails or check/update social media) while driving. As a consequence, almost half of the road users support zero tolerance for using any type of mobile phone while driving.

Overall, the respondents consider that the 'others' accept using the mobile phone while driving more than themselves. This trend is observed in all countries and differences between personal and social perceived acceptability are particularly large in Greece and Italy. All acceptability rates are higher among men and decrease with the age.

Despite the low acceptability and the high risk perception, a large percentage of drivers report the use of a mobile phone while driving, mainly talking on a hands-free mobile phone, followed by hand-held phone, reading text messages or emails and sending messages or mails. These percentages are particularly high among drivers until 34 years old.

Texting while driving, which involves even more risks than talking, was found to be almost as prevalent as talking on a hand-held mobile phone. Within the age group until 34 years old, reading text messages is even more prevalent than talking on a hand-held mobile phone and sending text messages is almost as prevalent.

It was found that road users underestimate the risks of talking on a hands-free mobile phone. Furthermore, the acceptability of using a hands-free device is much higher than talking with the phone in hand, which makes talking on a hands-free mobile phone more prevalent. The fact of being legal gives the false impression that using a hands-free phone is safe, so drivers do it without being aware of the distracting effect of calling with a hands-free set.

Talking on a hand-held mobile phone while driving is more prevalent in Finland, Sweden, Greece, and Italy. In all these countries more than half of the drivers declare that they have talked at least once in the past 12 months. Finland, Sweden, and Italy are also among the countries where texting is more likely. On the other hand, talking on a hand-held mobile phone is less likely in Belgium, France, Ireland, the Netherlands, and the United Kingdom. The United Kingdom, the Netherlands, and Ireland stand out as the countries where using a mobile phone while driving for any type of use (talking or texting) is less likely.

Several factors were found to be associated with the self-declared behaviours concerning all types of use of a mobile phone while driving. Overall, the decrease of age, being a male, a high educational level, frequent driving, and a high acceptability increase the likelihood of using a mobile phone while driving. On the other hand, the higher the risk perception, the lower the likelihood of using a mobile phone while driving.

Regardless the fact that one out of three drivers declare to have talked on a hand-held mobile phone, only very few drivers report fines or convictions, which suggests that enforcement is low and/or is not effective.

Regarding distraction among vulnerable road users, the comparison with SARTRE4 suggests that the number of cyclists and pedestrians that listen to music on the road has increased, particularly among young road users. Two out of three pedestrians and half of the cyclists under the age of 34 say that they listened to music at least once in the past 12 months.

#### 5.1.2. Conclusions on fatigue

It is known that driving while being tired has a negative effect on driving behaviour and significantly increases the risk of accident. Most of the participants in the ESRA survey are aware of those risks and agree that they should not drive when tired and, accordingly, only very few respondents think that it is acceptable to drive when you are so sleepy that you have trouble keeping your eyes open. Despite that, more than half of the European drivers report that they have driven at least once when they were actually too tired to drive during the last year. From those drivers, most of them also say that they have stopped and took a break when they felt too tired to drive.

Driving when tired is more prevalent among men and younger drivers. It was also found that a high educational level, a large number of kilometres driven, and a high acceptability increase the likelihood of driving when too tired. On the other hand, the increase of the risk perception decreases the likelihood of driving when fatigued.

### 5.2. Recommendations[1]

#### 5.2.1. Policy recommendations at European level

- Define distraction related indicators and set targets at European Union level, such as the prevalence of distracted and drowsy driving, the number of controls for mobile phone use, and the number of traffic casualties attributable to distraction and fatigue.
- Facilitate and support the exchange of best practice in terms of countermeasures for distraction and fatigue across Member States.
- Develop common principles and goals for effective and efficient mobile (and smart) phone use strategies in the Member States as part of European Union directives and/or other legislative mechanisms.
- Make the use of rumble strips mandatory in the Trans-European Transport Network.
- Support more research on effective countermeasures for distraction and fatigue through developments in vehicle, road and ICT technology.
- Issue a European Guideline on the mandatory use of intelligent fatigue detection and warning systems in heavy vehicles (goods and passengers).

#### 5.2.2. Policy recommendations at national and regional level

- Conduct awareness-raising campaigns on the risks of distracted and drowsy driving, in combination with frequent police controls and tips of what can be done about it.
- Incorporate information on risks associated with distraction and drowsy driving in educational programmes and in driver license training.
- Develop specific campaigns and awareness raising activities in relation to distraction of pedestrians, cyclists and motorcyclists.
- Raise the awareness about the very high risks of texting while driving, and increase penalties.
- Encourage the acquisition of intelligent fatigue detection and warning systems by private drivers (e.g. through tax incentives).
- Increase enforcement (and enforcement perception) in relation to distraction.
- Implement rumble strips on all national motorways, and also on rural roads, where this could be appropriate in the national context.

[1] *These recommendations reflect the common view of all authors of the ESRA core group.*

### 5.2.3. Specific recommendations to particular stakeholders

- *[To Non-Governmental Organizations (NGOs)]* Contribute to education and awareness raising campaigns and events against distracted and drowsy driving.
- *[To vehicle manufacturers, other companies and research organisations]* Develop low cost solutions to be incorporated in vehicles that can detect or prevent distracted or drowsy driving.

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.

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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 kilometres[2] 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?**

[2] *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)[3] 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)
- driver 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)

[3] *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 parties[4] – 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**

[4] *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?**[5]

[5] *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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