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Car drivers' road safety performance: A benchmark across 32 countries

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Abstract

The road safety performance of a country and the success of policy measures can be measured and monitored in different ways. In addition to the traditional road safety indicators based on the number of fatalities or injured people in road traffic crashes, complementary road safety performance indicators can be used in relation to vehicles, infrastructure, or road users' behaviour. The last-mentioned can be based on data from roadside surveys or from questionnaire surveys. However, results of such surveys are seldom comparable across countries due to differences in aims, scope, or methodology.

This paper is based on the second edition of the E-Survey of Road Users' Attitudes (ESRA), an online survey carried out in 2018, and includes data from more than 35,000 road users across 32 countries. The objective is to present the main results of the ESRA survey regarding the four most important risky driving behaviours in traffic: driving under the influence (alcohol/drugs), speeding, mobile phone use while driving, and fatigued driving. The paper explores several aspects related to these behaviours as car driver, such as the self-declared behaviours, acceptability and risk perception, support for policy measures, and opinions on traffic rules and penalties.

Results show that despite the high perception of risk and low acceptability of all the risky driving behaviours analysed, there is still a high percentage of car drivers who engage in risky behaviours in traffic in all the regions analysed. Speeding and the use of a mobile phone while driving were the most frequent self-declared behaviours. On the other hand, driving under the influence of alcohol or drugs was the least declared behaviour. Most respondents support policy measures to restrict risky behaviour in traffic and believe that traffic rules are not being checked regularly enough, and should be stricter.

The ESRA survey proved to be a valuable source of information to understand the causes underlying road traffic crashes. It offers a unique database and provides policy makers and researchers with valuable insights into public perception of road safety.

Key words: ESRA; road safety; safety performance indicators; behaviour in traffic.

1. Introduction

1.1. Road safety performance indicators

The analysis of road safety performance and the success of policy measures are usually focused on the number of crashes, injuries, and fatalities. Although these figures are important to monitor the level of road safety, they do not provide adequate information to understand the causes underlying road traffic crashes and do not indicate the interventions a country should focus on [1]. For this reason, data of crashes and victims must be supplemented by other indicators that give a more complete picture of the level of traffic safety and a better understanding of the process that leads to crashes [2].

Such indicators – safety performance indicators (SPIs) – were defined by the European Transport Safety Council (ETSC) as "any measurement that is causally related to crashes or injuries, used in addition to a count of crashes or injuries in order to indicate safety performance or understand the process that leads to accidents" [2]. SPIs should reflect the current safety conditions of a road traffic system, measure the influence of various safety interventions, and allow comparison between different road traffic systems (e.g., country/region-specific). The importance of an SPI can be assessed in terms of the strength of its connection with road crashes and their severity, whether it makes a major contribution to crashes and if it can be influenced by road safety measures or programs. SPIs are very useful tools to assess the conditions of a road traffic system, make comparisons, monitor the progress, and measure impacts of safety interventions. They can be used to give directions and to support policy decisions [3].

Over the past 20 years, several road safety performance indicators have been developed and collected at international, national, and regional levels. For example, within the scope of the project SafetyNet [4], several SPIs were developed for infrastructure, vehicles, trauma management, and road users' behaviour – the last-mentioned was collected mainly through roadside observations. Between 2004 and 2007, data were collected in 29 European countries, often based on roadside surveys [5]. However, due to the complexity of study design and protocol, the time needed for data collection, and the high costs involved, the collection of these indicators was discontinued over time in most of the countries. Thus, two of the most important goals of SPIs have not been achieved: monitoring the progress of road safety and measuring the impacts of safety interventions.

An alternative to using roadside observations for collecting data on road users' behaviour is to use questionnaire surveys. Such surveys, when properly designed and with an adequate sampling approach, can yield valuable information on road safety performance and road safety culture. Moreover, if conducted online, they are a relatively fast and inexpensive way to obtain indicators on safety culture and road users' behaviour. Furthermore, these surveys allow data collection on many additional factors as well and, therefore, can provide insights into socio-cognitive determinants of behaviour: attitudes, perceived social norms, risk perception, or existing habits. Socio-cognitive factors can help to understand the underlying motivations of certain behaviours [6-9], a valuable information to understand the process that leads to road crashes. In the current literature, those factors are often closely linked to assessing road safety culture [10]. Hence, it is tempting to use road safety indicators based on surveys for benchmarking purposes. However, the results of national surveys are seldom comparable across countries because of differences in aims, scope, methodology, questions asked, or the sample population being surveyed.

The first project using the same questionnaire and methodology in a large number of countries was the project SARTRE (Social Attitudes to Road Traffic Risk in Europe), initiated

in 1991 and carried out in 15 European countries. The project aimed to survey, with a uniform methodology, the attitudes, opinions, self-reported behaviour, and experiences of European road users. A common questionnaire and study design were developed, and face-to-face interviews were conducted among a representative sample of the national adult population of European countries. Four editions of the SARTRE survey were launched (1991, 1996, 2002, and 2010) [11].

In 2015, Vias institute (Belgium) launched the ESRA survey (E-Survey of Road users' Attitudes; website: www.esranet.eu) to fill the gap that emerged after SARTRE, in order to create a solid foundation to compare road safety performance indicators at an international level.

1.2. The ESRA initiative

The ESRA initiative is a joint initiative of road safety institutes, research centres, public services, and private sponsors from all over the world. The aims of the project are: (1) to collect and provide internationally comparable data on the current road safety situation in countries across the world, (2) to provide scientific support for road safety policy at national and international levels, (3) to develop a series of reliable, cost-effective, and comparable road safety performance indicators, and (4) to develop time series on road safety performance [12]. Thus, the ESRA data can be used as a benchmark of a large set of road safety performance indicators based on opinions, self-reported behaviour, and attitudes with respect to road safety and related transport issues.

The first edition of the ESRA survey (ESRA1) was conducted in 2015 in 17 European countries (first wave). The initiative raised a lot of interest in the international road safety community. Subsequently, 21 additional countries, mostly non-European, joined ESRA in two additional waves conducted in 2016 and 2017. In total, the first edition of ESRA covered almost 40,000 respondents from 38 countries across the world.

At the heart of the project was an online survey, using representative samples (at least 1000 road users) of the national adult population of each of the participating countries. A common questionnaire was developed and translated into 33 different languages. The subjects of the survey included the attitudes towards unsafe traffic behaviour, self-declared (unsafe) behaviour in traffic, and support for road safety policy measures [13-14].

The second edition of the ESRA survey (ESRA2) was launched in 2018 (first wave) in 32 countries across five continents. The survey followed the same methodology as the previous version, but the questionnaire was reviewed, and new topics were added (e.g., vehicle automation). A second wave has been carried out in 2019 and 2020 with data collection from 16 additional countries.

1.3. Objectives

The current article focuses on data from the first wave of the second edition of the ESRA survey, covering 32 countries. It aims at presenting an overview of the ESRA2 survey methodology and the main results concerning four road safety topics: driving under the influence of alcohol and drugs, speeding, mobile phone use while driving, and fatigued driving. The paper includes the analysis of several aspects related to these risky behaviours in traffic concerning car drivers: self-declared behaviour, acceptability and risk perception of unsafe traffic behaviour, support for policy measures, and opinions on traffic rules and penalties.

2. Methods

This section provides an overview of the ESRA2 survey methodology, the questions analysed in this article and the description of the statistical analysis carried out. Further details concerning the methodology, the data processing, and the questionnaire are available in the ESRA2 methodology report [12].

2.1. Questionnaire

The ESRA2 survey was developed based on the first edition of the ESRA questionnaire (ESRA1), which was carried out in three waves, between 2015 and 2017, in 38 countries across 5 continents [13-14]. The questionnaire was first developed in English by the ESRA core group members and subsequently translated into 42 national languages. In its first wave, it was applied in 32 countries across the world. The full English version of the questionnaire is included in the ESRA2 methodology report [12].

The questionnaire was based on other road safety surveys that have been conducted in the past. Most of the questions of the ESRA survey were based on validated questionnaires from Belgium (BIVV/IBSR Three-yearly Road Safety Attitude Survey [15]), other European countries (SARTRE – Social Attitudes to Road Traffic Risk in Europe [11]), and the US (Traffic Safety Culture Index [16]). Besides the themes covered in these surveys, such as self-declared behaviours, attitudes and opinions on unsafe traffic behaviour, subjective safety and risk perception, support for policy measures, enforcement of traffic laws, and crash involvement, the ESRA2 questionnaire also included a section on vehicle automation. The road safety topics (driving under the influence of alcohol, drugs and medicines; speeding; distraction; fatigue; and protective systems) and the targeted road users (car occupants and passengers, powered-two-wheelers, cyclists and pedestrians) covered in the survey reflect common topics related to road users behaviour, referred by the WHO as priorities in road safety [17] and by the European Commission as suggested road safety performance indicators [18]. The complete list of themes, road safety topics, and targeted road users is presented in Table 1.

Table 1. ESRA2 survey themes, road safety topics, and targeted road users.

Themes	Road safety topics	Road users
▪ self-declared behaviours ▪ attitudes and opinions on unsafe traffic behaviour ▪ subjective safety and risk perception ▪ support for policy measures ▪ enforcement of traffic laws ▪ crash involvement ▪ vehicle automation ▪ transport modes ▪ socio-demographic information	▪ driving under the influence of alcohol, drugs, and medicines ▪ speeding ▪ distraction ▪ fatigue ▪ protective systems	▪ car drivers ▪ car passengers ▪ powered two-wheelers ▪ cyclists ▪ pedestrians

2.2. Sampling and data collection

Data were collected through online panel surveys, using a representative sample of the national adult population in each of the 32 participating countries from Europe (Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, United Kingdom), North America (Canada, USA), Asia and Oceania (Australia, India, Israel, Japan, Republic of Korea), and Africa (Egypt, Kenya, Morocco, Nigeria, South Africa) (Figure 1). The approach adopted has some advantages compared to other survey modes, especially

given the international context of the study: (1) self-administered web surveys are less prone to social desirability in responses compared to interviewer-administered surveys, and (2) they also have practical advantages such as the length of the survey, timing, and costs [19-21]. However, despite the advantages of online surveys, the representativeness of the surveyed populations may be a problem, mainly for countries with low rates of internet use (lower than 30% in Kenya and Nigeria, and lower than 50% in India and Egypt).

Data collection was carried out by four contracted market research agencies (INFAS, Ipsos, Punto de Fuga, and Dynata) members of ESOMAR, an association that has defined the standards for recruiting online panels to minimize selection bias. The agencies had to respect predefined criteria for sampling and data quality, and provide the data in a custom-made database template. In this way, it was possible to ensure the same methodology for sampling and data collection in all the countries.

The research agencies selected have online probability-based research panels, designed to be representative of national populations. During the sampling procedure, a software selected potential respondents that meet the predefined criteria: representativeness of the country adult population and interlaced hard quota of gender and age group (6 age groups: 18-24, 25-34, 35-44, 45-54, 55-64, 65y+) based on population data from the United Nations [18]. Then, the sample pool was randomly sorted, and the questionnaire was sent by email to potential respondents. Once the target quotas were achieved, the survey was closed for respondents within that target group. The geographical spread of the sample across the country was monitored (soft quota) by agencies during the sampling procedure to achieve national representativeness.

The fieldwork was conducted simultaneously in all countries in December 2018 (only in Switzerland the fieldwork extended to January 2019). In total, the ESRA2 survey collected data from more than 35,000 road users across 32 countries (at least 1000 per country).

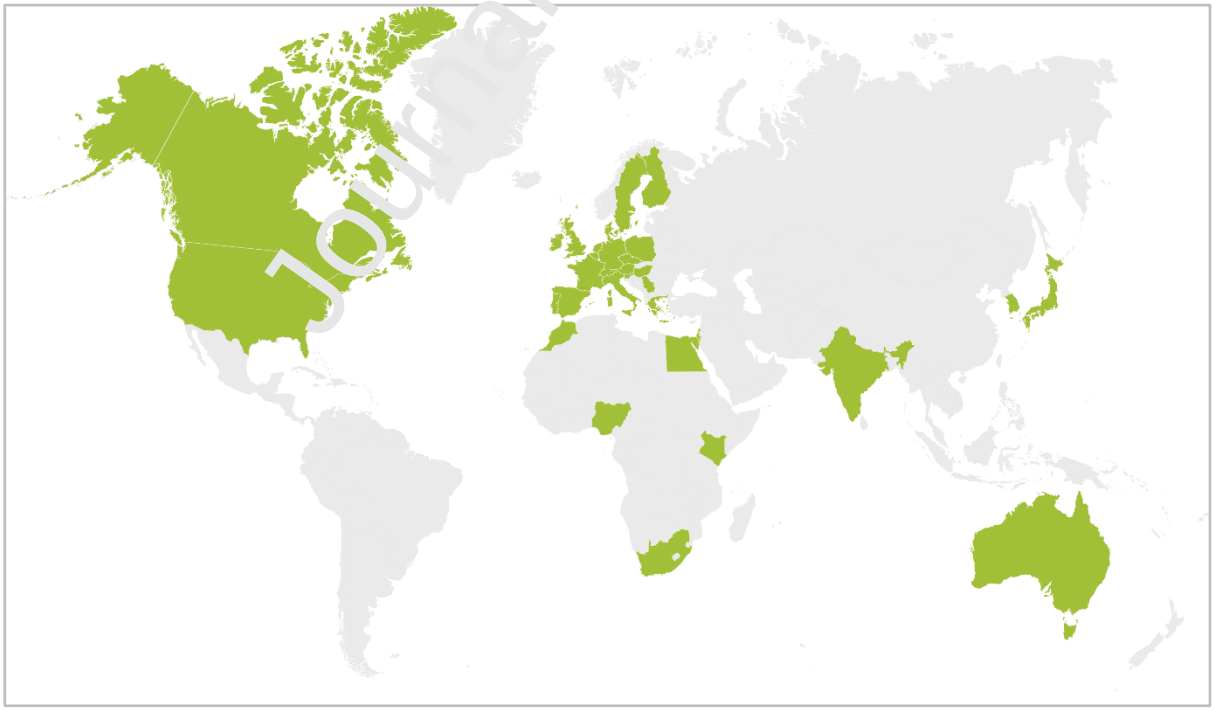

Figure 1. Geographical coverage of the ESRA2 survey in 2018 – Europe (Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, United Kingdom), America (Canada, USA), Asia and Oceania (Australia, India, Israel, Japan, Republic of Korea), Africa (Egypt, Kenya, Morocco, Nigeria, South Africa).

2.3. Quality control and data cleaning

Data received from the agencies were subjected to a thorough quality control analysis and cleaning.

It was initially checked whether the data were in accordance with the predefined codebook; the programming consistency was verified (i.e., compare predefined filters in the questionnaire with the expected number of missing variables for which filters had to be used); next, it was checked whether the requested quota per country had been fulfilled (national representativity of the sample based on gender and age group – a deviation of 5% of quota value was tolerated).

The data cleaning process included controlling for duplicate entries, removing inconsistencies with panel information, removing inconsistent answers, checking for the length of the interview (identifying and eliminating respondents who filled out the questionnaire too fast or too slow), and removing straightliners (respondents who gave the same answer to many questions).

From the original pre-cleaned sample provided by the market research agencies (N = 35,452), 416 (1.17%) respondents were removed from the dataset. The final sample consisted of 35,036 respondents (of which 25,535 are frequent car drivers). The sample size, the gender and age distribution by country and region are presented in Appendix – Table A.1.

2.4. Data analysis

Results of the ESRA2 survey are presented by country and by region. Each region refers to the group of countries of a continent and is named as:

- Africa5 – Egypt, Kenya, Morocco, Nigeria, and South Africa;
- AsiaOceania5 – Australia, Israel, India, Japan, and Republic of Korea;
- Europe20 – Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Serbia, Slovenia, Spain, Sweden, Switzerland, and United Kingdom;
- NorthAmerica2 – Canada and USA.

Weighting of the data was used to calculate representative means at national and regional levels. The weights are based on UN population data [18] and were used for small corrections with respect to national representativeness of the sample based on gender * age group (six age groups: 18-24, 25-34, 35-44, 45-54, 55-64, 65y+). For the regions, the weighting also took into account the population size of each country in the total set of countries from the region.

Most of the questions of the survey were presented on Likert scales (mainly 5-point scales), which were dichotomized for the analysis. Table 2 shows the questions of ESRA2 survey analysed in this article and the corresponding answer scales and dichotomizations. These questions are a small set of the questions included in the ESRA2 survey. This article focuses on car drivers, however, the ESRA2 survey also includes questions pertaining to cyclists, motorcyclists, and pedestrians. Analysis and discussion of other questions and on other road users can be found on thematic reports available on the ESRA website (www.esranet.eu) and in the other articles of this Special Issue of IATSS Research on ESRA.

Table 2. Subjects, topics, questions, and answer scales

	Driving under the influence	Speeding	Mobile phone use	Fatigue
Risk perception "How often do you think each of the following factors is the cause of a road crash involving a car?" *6-point scale from 1 "never" to 6 "(almost) always" – results of often/frequently (4-6) are presented.*	▪ driving after drinking alcohol ▪ driving after taking drugs (other than medication)	▪ driving faster than the speed limit	▪ using a hand-held mobile phone while driving	▪ driving while tired
Personal acceptability "How acceptable do you, personally, feel it is for a car driver to…?" **Others' acceptability** "Where you live, how acceptable would most other people say it is for a car driver to….?" *5-point scale from 1 "unacceptable" to 5 "acceptable"– results of acceptability (4-5) are presented.*	▪ drive when he/she may be over the legal limit for drinking and driving ▪ drive 1 hour after using drugs (other than medication)	▪ drive faster than the speed limit inside built-up areas ▪ drive faster than the speed limit outside built-up areas (not on motorways/freeways) ▪ drive faster than the speed limit on motorways/freeways	▪ talk on a hand-held mobile phone while driving ▪ read a text message/email or check social media while driving	▪ drive when they're so sleepy that they have trouble keeping their eyes open
Self-declared behaviour as a car driver "Over the last 30 days, how often did you as a car driver …?" *5-point scale from 1 "never" to 5 "(almost) always" – results of at least once (2-5) are presented.*	▪ drive when you may have been over the legal limit for drinking and driving ▪ drive 1 hour after using drugs (other than medication)	▪ drive faster than the speed limit inside built-up areas ▪ drive faster than the speed limit outside built-up areas (except motorways/freeways) ▪ drive faster than the speed limit on motorways/freeways	▪ talk on hand-held mobile phone while driving ▪ read text message/email or check social media while driving	▪ drive when you were so sleepy that you had trouble keeping your eyes open
Opinions on traffic rules and penalties "What do you think about the current traffic rules and penalties in your country for…" *Dichotomous variable: disagree/ agree – results of agreement are presented.*	▪ driving or riding under the influence of alcohol? ▪ traffic rules should be stricter ▪ traffic rules are not being checked sufficiently ▪ penalties are too severe	▪ driving or riding faster than the speed limit?	▪ using a mobile phone while driving or riding?	-
Support for policy measures "Do you oppose or support a legal obligation to …?" *5-point scale from 1 "oppose" to 5 "support"– results of support (4-5) are presented.*	▪ install an alcohol interlock for recidivist drivers ▪ zero tolerance for alcohol (0,0 ‰) for novice drivers ▪ zero tolerance for alcohol (0,0 ‰) for all drivers	▪ install Intelligent Speed Assistance (ISA) in new cars ▪ install Dynamic Speed Warning signs in new cars	▪ zero tolerance for using any type of mobile phone while driving for all drivers	-

Due to the nominal nature of the data, the Chi-square Test for Independence was used to assess if the answers depend significantly on the region. Pairwise comparisons were used to identify the pairs of regions that differ significantly, at a significance level of 1%. The strength of the association was assessed through the Cramer's V coefficient. The following thresholds were considered to classify the strength of associations [23]: small=0.06, medium=0.17, large=0.29. Adjusted standardized residuals were used to identify countries with percentage significantly higher than mean, significantly lower than the mean, and with no significant differences from the mean, at a significance level of 1%.

SPSS 25.0 [24] and R [25] were used for the data processing and data analysis.

3. Results

3.1. Perception of the relative importance of causes of road crashes

The risk perception of the traffic behaviours was assessed by asking "How often do you think each of the following factors is the cause of a road crash involving a car?" The scale of answers ranged from 1 "never" to 6 "(almost) always." The percentages of "often/frequently" (answers 4 to 6) are shown in the results (Figure 2 and Table 3).

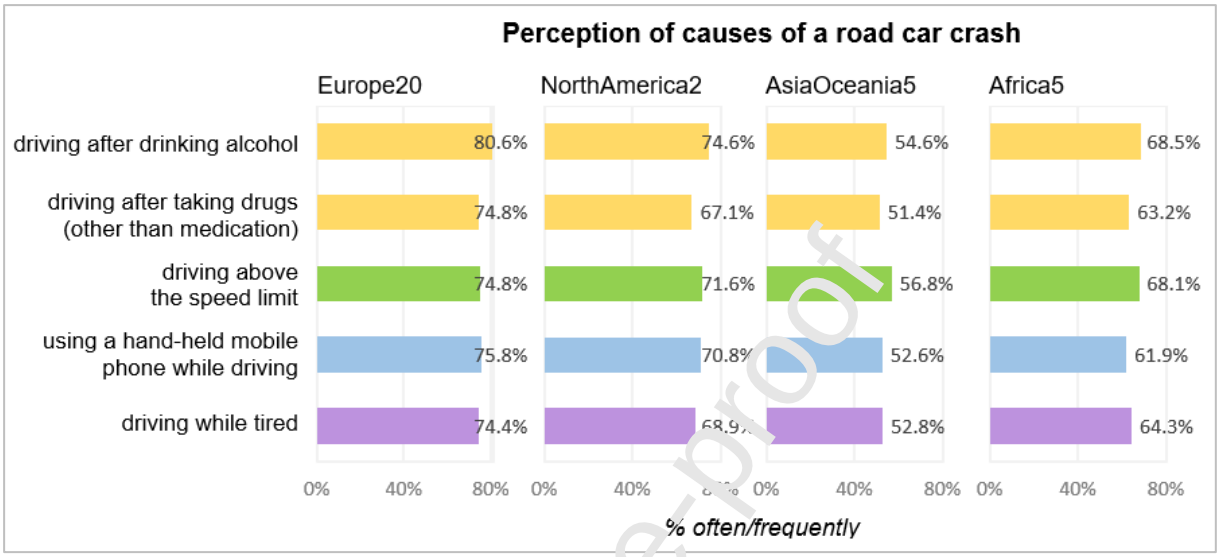

Figure 2. Perceived importance of causal factors in road crashes, by region ("*How often do you think each of the following factors is the cause of a road crash involving a car?*" - % often/frequently – scores 4 to 6 on a 6-point scale from 1 "never" to 6 "[almost] always").

Results from Figure 2 show that most respondents from all regions believe that unsafe traffic behaviours are often or frequently a cause of road crashes involving a car. The risk perception of the unsafe traffic behaviours was the highest in Europe20, with rates ranging from 74.4% for fatigued driving to 80.6% for driving after drinking alcohol. On the other hand, the rates were the lowest in AsiaOceania5, ranging from 51.4% (driving after taking drugs [other than for medication]) to 56.8% (driving above the speed limit). In NorthAmerica2, the percentages ranged from 67.1% (driving after taking drugs) to 74.6% (driving after drinking alcohol) and in Africa5 from 61.9% (using a hand-held mobile phone while driving) to 68.5% (driving after drinking alcohol). The percentages were significantly different between all pairs or regions (p-value < 0.01).

The results on the perceived importance of causal factors in road crashes, by country are presented in Table 3.

Table 3. Perceived importance of causal factors in road crashes ("*How often do you think each of the following factors is the cause of a road crash involving a car*" - % often/frequently – scores 4 to 6 on a 6-point scale from 1 "never" to 6 "[almost] always")

	Driving under the influence		Speeding	Distraction	Fatigue
Country	driving after drinking alcohol	driving after taking drugs (other than medication)	driving above the speed limit	using a hand-held mobile phone while driving	driving while tired
Australia	83.5% (+)	77.4% (+)	80.1% (+)	78.8% (+)	81.7% (+)
Austria	82.4% (+)	69.3%	73.4%	74.1% (+)	76.0% (+)
Belgium	80.0% (+)	71.8%	71.2%	76.3% (+)	72.7%
Canada	79.6%	70.4%	73.5%	76.2% (+)	72.7%
Czech Rep.	88.5% (+)	86.5% (+)	79.7% (+)	78.6% (+)	84.5% (+)
Denmark	80.8% (+)	64.1% (-)	76.7% (+)	74.0%	68.6%
Egypt	64.1% (-)	61.0% (-)	65.6% (-)	56.8% (-)	61.3% (-)
Finland	91.2% (+)	87.5% (+)	76.0% (+)	72.8%	81.3% (+)
France	77.9%	76.0% (+)	66.8% (-)	73.0%	71.0%
Germany	82.6% (+)	70.7%	76.7% (+)	77.0% (+)	75.9% (+)
Greece	76.7%	70.2%	72.8%	71.6%	70.6%
Hungary	84.8% (+)	74.2% (+)	81.5% (+)	76.2% (+)	80.7% (+)
India	57.5% (-)	54.9% (-)	59.4% (-)	55.6% (-)	54.7% (-)
Ireland	69.1% (-)	60.4% (-)	66.5% (-)	63.6% (-)	62.1% (-)
Israel	84.9% (+)	73.3% (+)	66.0% (-)	84.8% (+)	81.5% (+)
Italy	73.8%	73.9% (+)	69.3%	74.7% (+)	70.2%
Japan	35.9% (-)	30.4% (-)	42.0% (-)	33.6% (-)	40.5% (-)
Kenya	89.1% (+)	81.2% (+)	87.3% (+)	78.0% (+)	83.3% (+)
Morocco	63.1% (-)	57.5% (-)	62.8% (-)	58.5% (-)	58.5% (-)
Netherlands	80.5% (+)	65.6% (-)	73.8%	79.9% (+)	71.2%
Nigeria	82.4% (+)	75.9% (+)	82.4% (+)	76.8% (+)	76.3% (+)
Poland	82.6% (+)	79.6% (+)	80.8% (+)	73.5%	76.7% (+)
Portugal	85.1% (+)	78.6% (+)	81.4% (+)	80.0% (+)	80.4% (+)
Rep. of Korea	33.4% (-)	25.6% (-)	34.1% (-)	31.5% (-)	33.3% (-)
Serbia	82.1% (+)	79.4% (+)	78.2% (+)	74.3%	80.9% (+)
Slovenia	82.7% (+)	72.9%	73.5%	71.4%	73.1%
South Africa	74.0%	66.3%	70.0%	66.1% (-)	69.2%
Spain	83.1% (+)	80.6% (+)	79.3% (+)	79.9% (+)	75.0%
Sweden	80.1%	73.9% (+)	73.3%	64.7% (-)	76.7% (+)
Switzerland	79.0%	70.6%	70.4%	72.4%	72.8%
United Kingdom	82.2% (+)	75.4% (+)	78.2% (+)	78.5% (+)	75.6% (+)
United States	74.0%	66.6%	71.4%	70.2%	68.4%
Europe20	80.6% a	74.8% a	74.8% a	75.8% a	74.4% a
AsiaOceania5	54.6% b	51.4% b	56.8% b	52.6% b	52.8% b
NorthAmerica2	74.6% c	67.1% c	71.6% c	70.8% c	68.9% c
Africa5	68.5% d	63.2% d	68.1% d	61.9% d	64.3% d
p-value (1)	<0.001	<0.001	<0.001	<0.001	<0.001
Cramer's V	0.218	0.188	0.143	0.192	0.171

(+) countries with percentage significantly higher than the mean, (-) countries with percentage significantly lower than the mean, countries with no superscript do not differ significantly from the mean – at the 0.01 level.
(1) p-value of Chi-Square Test of Independence for comparison among regions; each superscript letter denotes a region whose proportions do not differ significantly from each other at the 0.01 level.

3.2. Acceptability of unsafe behaviour in traffic

Results on personal acceptability ("How acceptable do you, personally, feel it is for a car driver to…?") and social acceptability ("Where you live, how acceptable would most other people say it is for a car driver to…?") of unsafe traffic behaviour are presented in Figure 3 (by region) and in Table 4 (by country – only personal acceptability). Results show the percentage of acceptability – scores 4 and 5 on a 5-points scale from 1 "unacceptable" to 5 "acceptable."

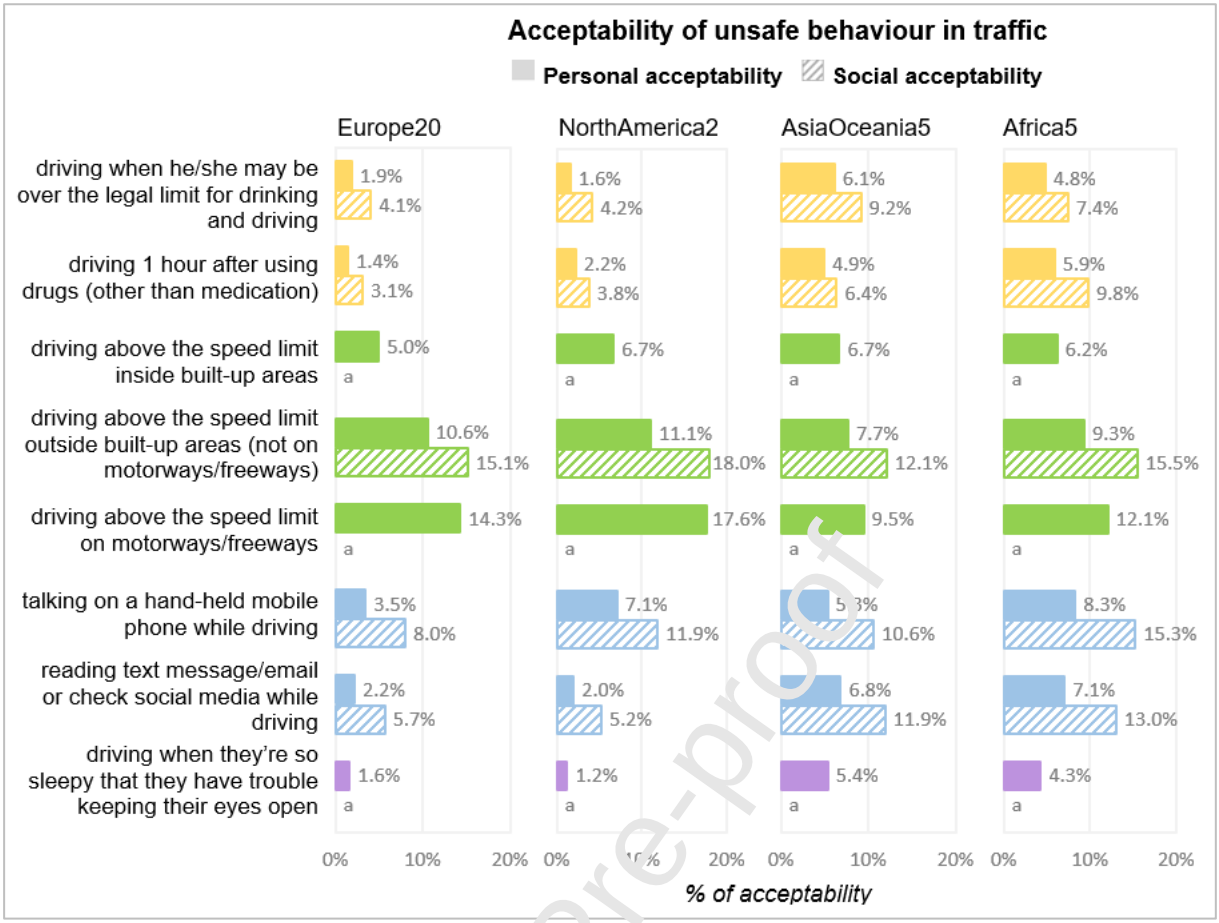

Figure 3. Personal and social acceptability of unsafe behaviour in traffic, by region (% of acceptability – scores 4 and 5 on a 5-point scale from 1 "unacceptable" to 5 "acceptable").
"a" – no data available for social acceptability.

Results from Figure 3 show low levels of personal acceptability of the different behaviours considered. These rates were particularly low in Europe20 and NorthAmerica2 for driving under the influence of alcohol or drugs, texting while driving, and fatigued driving. The acceptability of these behaviours was significantly higher in AsiaOceania5 and Africa5 (p-value < 0.01).

On the other hand, driving above the speed limits on motorways/freeways – the behaviour with the highest rates of acceptability in all regions – was considered more acceptable in NorthAmerica2 and Europe20 than in Africa5 and AsiaOceania5 (significant differences between all pairs or regions: p-value < 0.01). Driving above the speed limit outside built-up areas was significantly lower in AsiaOceania5 (p-value < 0.01) and driving above the speed limit inside built-up areas was significantly lower in Europe20 (p-value < 0.01). Driving above the speed limits inside built-up areas was considered less acceptable than outside built-up areas in all regions.

Results also indicate that the respondents consider that "others" accept the unsafe traffic behaviours more readily, than they do themselves. This pattern is observed in all the regions for all the risky behaviours analysed.

Table 4 shows the results of personal acceptability by country.

Table 4. Personal acceptability of unsafe behaviour in traffic, by country (% of acceptability – scores 4 and 5 on a 5-point scale from 1 "unacceptable" to 5 "acceptable").

Country	Driving under the influence		Speeding			Distraction		Fatigue
	driving when he/she may be over the legal limit for drinking and driving	driving 1 hour after using drugs (other than medication)	driving above the speed limit inside built-up areas	driving above the speed limit outside built-up areas	driving above the speed limit on motorways /freeways	talking on a hand-held mobile phone while driving	reading text message/e mail or check social media while driving	driving when they're so sleepy that they have trouble keeping their eyes open
Australia	1.8%	2.2%	3.1% (-)	6.1% (-)	7.0% (-)	2.8%	1.7%	2.1%
Austria	2.6%	2.1%	10.5% (+)	22.1% (+)	29.0% (+)	7.4% (+)	3.1%	2.7%
Belgium	3.1% (+)	1.8%	6.0%	11.7%	18.0% (+)	1.9% (-)	1.7% (-)	1.3%
Canada	3.0%	4.2% (+)	7.2% (+)	11.8%	19.4% (+)	4.8%	3.0%	2.9%
Czech Rep.	1.1%	0.6% (-)	3.1% (-)	9.1%	11.0% (-)	3.6%	0.7% (-)	1.0%
Denmark	0.9% (-)	1.0%	2.5% (-)	10.8%	15.7%	2.0% (-)	1.2% (-)	0.8%
Egypt	5.2% (+)	8.6% (+)	7.6% (+)	13.8% (+)	15.7%	11.9% (+)	9.8% (+)	5.9% (+)
Finland	0.2% (-)	0.7% (-)	7.4% (+)	15.9% (+)	21.0% (+)	7.2% (+)	2.5%	1.0%
France	2.3%	1.2%	6.7%	12.6%	17.3% (+)	3.4%	1.5%	1.0%
Germany	2.2%	1.9%	6.6%	15.0% (+)	18.0% (+)	4.9%	2.3%	2.0%
Greece	1.2%	1.3%	2.7% (-)	7.8% (-)	8.6% (-)	1.9% (-)	4.8% (+)	1.8%
Hungary	0.5% (-)	0.7% (-)	2.4% (-)	6.9% (-)	8.6% (-)	1.6% (-)	1.0% (-)	0.4% (-)
India	7.2% (+)	5.5% (+)	7.1% (+)	7.8% (-)	9.5% (-)	5.8% (+)	7.8% (+)	6.1% (+)
Ireland	1.6%	1.5%	2.5% (-)	5.8% (-)	8.9% (-)	3.0%	1.1% (-)	1.8%
Israel	0.7% (-)	1.5%	6.5%	12.4%	18.1% (+)	2.3% (-)	1.9%	1.6%
Italy	1.4%	0.6% (-)	2.6% (-)	7.1% (-)	8.7% (-)	1.4% (-)	1.6%	0.9%
Japan	1.2%	3.2%	4.2%	6.6% (-)	8.6% (-)	3.0%	2.1%	1.8%
Kenya	3.9% (+)	2.1%	4.0%	6.4% (-)	8.3% (-)	4.0%	2.5%	1.3%
Morocco	6.4% (+)	6.2% (+)	7.4% (+)	8.0%	13.1%	8.3% (+)	8.8% (+)	5.1% (+)
Netherlands	1.1%	1.3%	3.2% (-)	7.8% (-)	14.3%	1.6% (-)	1.3% (-)	1.5%
Nigeria	3.0%	4.7% (+)	2.7% (-)	5.6% (-)	5.7% (-)	4.3%	3.3%	2.2%
Poland	2.1%	1.7%	8.2% (+)	11.0% (+)	18.2% (+)	5.6%	3.4%	2.3%
Portugal	0.9% (-)	1.1%	3.3%	7.2% (-)	15.7%	1.6% (-)	1.1% (-)	0.7% (-)
Rep. of Korea	0.8% (-)	0.5% (-)	5.7%	7.0% (-)	10.2% (-)	4.6%	3.5%	2.2%
Serbia	1.0% (-)	0.5% (-)	2.9% (-)	4.8% (-)	7.2% (-)	1.4% (-)	0.7% (-)	0.3% (-)
Slovenia	0.6% (-)	0.7% (-)	1.3% (-)	8.0%	13.3%	1.3% (-)	0.9% (-)	0.2% (-)
South Africa	2.2%	1.8%	3.4%	6.0% (-)	7.4% (-)	4.4%	1.8%	1.7%
Spain	1.4%	1.0%	4.0%	6.6% (-)	10.2% (-)	3.5%	3.9%	2.3%
Sweden	1.5%	0.9% (-)	3.8%	18.5% (+)	23.9% (+)	4.6%	1.6%	1.1%
Switzerland	1.2%	1.4%	2.3% (-)	12.3%	21.9% (+)	4.4%	1.3% (-)	0.7% (-)
United Kingdom	2.8%	2.6%	4.3%	6.7% (-)	10.3% (-)	3.3%	2.2%	2.5%
United States	1.5%	2.0%	6.6%	11.0%	17.4% (+)	7.4% (+)	1.9%	1.0%
Europe20	1.9% [a]	1.4%	5.0% [a]	10.6% [a]	14.3% [a]	3.5% [a]	2.2% [a]	1.6% [a]
AsiaOceania5	6.1% [b]	4.9% [b]	6.7% [b]	7.7% [b]	9.5% [b]	5.3% [b]	6.8% [b]	5.4% [b]
NorthAmerica2	1.6% [a]	2.2% [a]	6.7% [b]	11.1% [a]	17.6% [c]	7.1% [c]	2.0% [a]	1.2% [a]
Africa5	4.8% [a]	5.9% [b]	6.2% [b]	9.3% [a]	12.1% [d]	8.3% [c]	7.1% [b]	4.3% [b]
p-value (1)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cramer's V	0.101	0.113	0.032	0.036	0.061	0.087	0.118	0.096

(+) countries with percentage significantly higher than the mean, (-) countries with percentage significantly lower than the mean, countries with no superscript do not differ significantly from the mean – at the 0.01 level.
(1) p-value of Chi-Square Test of Independence for comparison among regions; each superscript letter denotes a region whose proportions do not differ significantly from each other at the 0.01 level.

3.3. Self-declared unsafe behaviour in traffic

To assess the extent of unsafe behaviour in traffic, car drivers were asked to report on the frequency of that behaviour in the past 30 days on a 5-point scale from 1 "never" to 5 "(almost) always." The percentages of respondents stating "at least once" (answers 2 to 5) are presented in Figure 4 and Table 5.

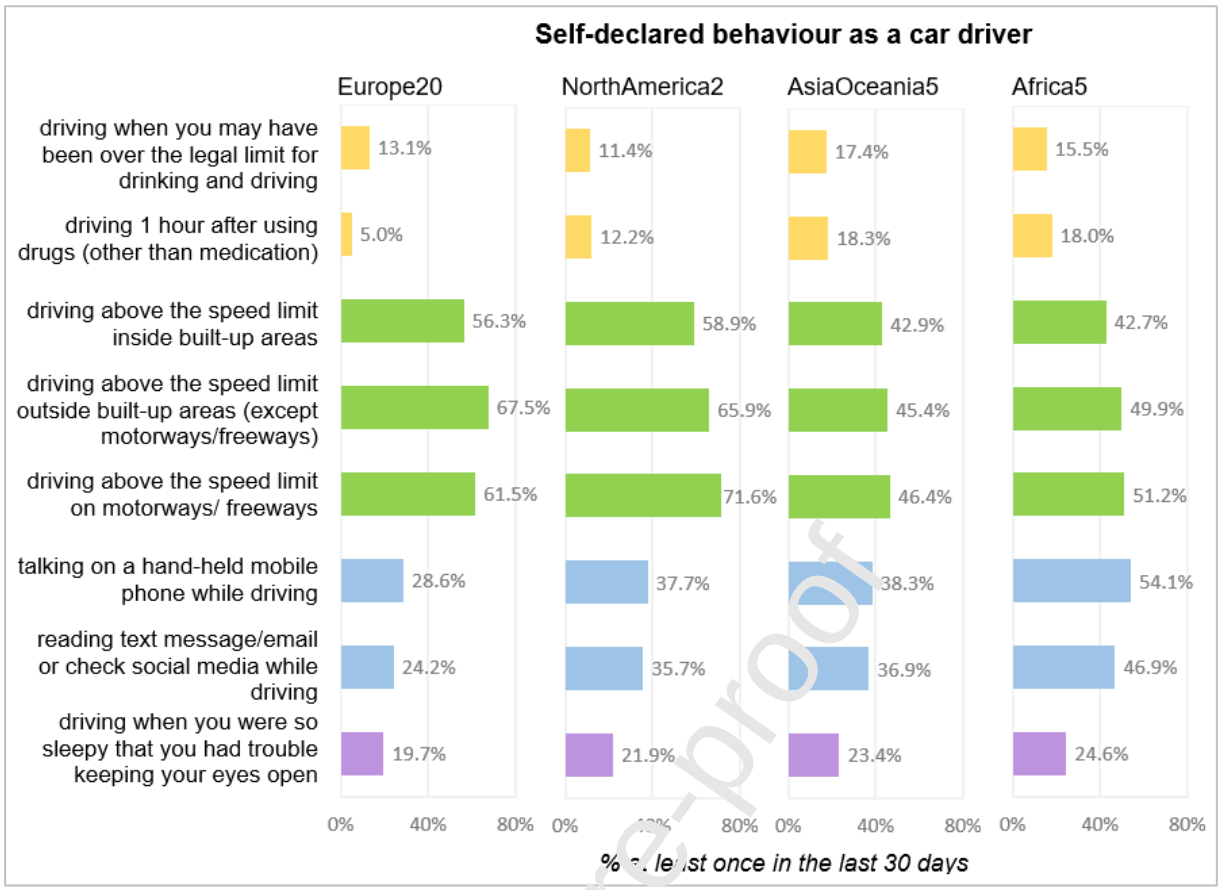

Figure 4. Self-declared behaviour as a car driver, by region (% at least once in the past 30 days – scores 2 to 5 on a 5-point scale from 1 "never" to 5 "[almost] always").

Region-wise results (Figure 4) show that driving under the influence of alcohol or drugs was the least frequently declared unsafe behaviour in all regions. However, while in Europe20 a higher percentage of car drivers declared drinking and driving (13.3%) than driving after using drugs (5.0%), the opposite was observed in the other 3 regions. The comparison among the regions shows higher prevalence of driving under the influence of alcohol or drugs in AsiaOceania5 and Africa5 than in Europe20 and NorthAmerica2 (p-value < 0.01).

On the other hand, the self-declared speeding rates were higher in Europe20 and NorthAmerica2 than in AsiaOceania5 and Africa5 (p-value < 0.01). Out of the 4 risky behaviours analysed, driving above the speed limits was the most frequently declared in all regions, except in Africa5. In Europe20 and NorthAmerica2, more than half the car drivers declared driving above the speed limit inside built-up areas (56% and 58.9%, respectively), outside built-up areas (67.5% and 65.9%), and on motorways/freeways (61.5% and 71.6%). These percentages were less than, or close to, 50% in the other regions.

The self-declared use of the mobile phone while driving was more prevalent in Africa5 (54.1% declared talking on the phone and 46.9% declared texting) than in Europe20 (p-value < 0.01) with a difference of about half the percentage figures (28.6% and 24.2%, respectively). While NorthAmerica2 and AsiaOceania5 reported similar figures (p-value > 0.01), ranging from 35.7% to 38.8% – significantly higher than in Europe20 (p-value < 0.01) and significantly lower than in Africa5 (p-value < 0.01)

Self-declared fatigued driving was significantly lower in Europe20 (19.7%) than in the other regions (p-value < 0.01): 23.4% in AsiaOceania5, 21.9% in NorthAmerica2, and 24.6% in Africa5.

Overall, the results on self-declared behaviour (Figure 4) and personal acceptability (Figure 3) are consistent when compared by region: regions with higher acceptability tend to have higher rates of the corresponding self-declared behaviour. Furthermore, the behaviours considered to be more acceptable tend to occur more frequently.

However, there are some inconsistencies when comparing personal acceptability and self-declared behaviours. For example, the personal acceptability of fatigued driving is lower than driving under the influence of alcohol in all regions, while the percentage of drivers who declared driving while fatigued were much higher than those who declared drinking and driving. Concerning speeding, in Europe20 the percentage of respondents who consider it acceptable to drive beyond the speed limit inside built-up areas (5.0%) is about half of those who consider the same behaviour acceptable outside built-up areas (10.6%), while the corresponding rates of self-declared behaviours were closer (56.3% and 67.5%). In NorthAmerica2, texting while driving was considered acceptable by 2.0% and talking on a hand-held mobile phone by 7.1%, while rates of the corresponding self-declared behaviours were similar (35.7% and 37.7%).

Table 5 shows the results of self-declared behaviour by country.

Table 5. Self-declared behaviour as a car driver, by country (% at least once in the past 30 days – scores 2 to 5 on a 5-point scale from 1 "never" to 5 "[almost] always").

Country	Driving under the influence		Speeding			Distraction		Fatigue
	driving when you may have been over the legal limit for drinking and driving	driving 1 hour after using drugs (other than medication)	driving above the speed limit inside built-up areas	driving above the speed limit outside built-up areas	drive above the speed limit on motorways / freeways	talking on a hand-held mobile phone while driving	reading text message/email or check social media while driving	driving when you were so sleepy that you had trouble keeping your eyes open
Australia	8.9% (-)	5.9%	44.6% (-)	50.6% (-)	49.3% (-)	12.5% (-)	19.0% (-)	17.0% (-)
Austria	14.8%	7.3%	71.4% (+)	82.5% (+)	77.0% (+)	36.5%	34.2% (+)	31.8% (+)
Belgium	24.2% (+)	7.1%	61.7% (+)	72.1% (+)	68.3% (+)	22.2% (-)	28.1%	24.4%
Canada	14.5%	12.8% (+)	66.4% (+)	75.1% (+)	78.6% (+)	21.4% (-)	26.0%	22.0%
Czech Rep.	11.9%	2.7% (-)	68.3% (+)	78.3% (+)	71.1% (+)	33.7%	26.8%	21.9%
Denmark	11.6%	4.2% (-)	61.8% (+)	81.8% (+)	74.1% (+)	24.4% (-)	29.0%	24.1%
Egypt	13.1%	20.3% (+)	37.3% (-)	46.8% (-)	49.3% (-)	62.9% (+)	51.6% (+)	31.3% (+)
Finland	4.1% (-)	1.7% (-)	72.8% (+)	78.9% (+)	77.8% (+)	49.5% (+)	35.9% (+)	28.8% (+)
France	22.3% (+)	6.3%	63.0% (+)	74.6% (+)	67.3%	25.8% (-)	28.1%	18.5% (-)
Germany	9.0% (-)	3.7% (-)	66.6% (+)	75.0% (+)	64.8%	40.1% (+)	22.8% (-)	23.5%
Greece	19.3% (+)	7.2%	42.9% (-)	60.6% (-)	64.1%	45.3% (+)	31.9%	25.6%
Hungary	3.9% (-)	2.2% (-)	55.2%	66.8%	56.6% (-)	29.1% (-)	17.1% (-)	20.3%
India	19.9% (+)	20.4% (+)	39.1% (-)	41.8% (-)	44.7% (-)	41.6% (+)	38.7% (+)	21.9%
Ireland	10.7%	6.9%	45.1% (-)	59.9% (-)	60.5%	22.1% (-)	26.3%	23.9%
Israel	7.6% (-)	3.4% (-)	58.3%	66.4%	71.2% (+)	24.6% (-)	29.8%	26.5% (+)
Italy	13.6%	4.3% (-)	40.5% (-)	55.1% (-)	49.1% (-)	26.6% (-)	24.0% (-)	14.2% (-)
Japan	5.0% (-)	12.5% (+)	64.5% (+)	65.0%	53.3% (-)	17.8% (-)	25.7%	33.2% (+)
Kenya	16.8% (+)	16.7% (+)	43.5% (-)	54.9% (-)	52.6% (-)	60.1% (+)	48.9% (+)	17.8% (-)
Morocco	14.2%	18.0% (+)	41.2% (-)	44.1% (-)	46.7% (-)	48.3% (+)	47.9% (+)	22.4%
Netherlands	9.0% (-)	5.1% (-)	58.5%	69.2%	77.9% (+)	11.6% (-)	18.0% (-)	21.6%
Nigeria	11.9%	24.1% (+)	40.8% (-)	46.4% (-)	45.6% (-)	57.6% (+)	36.7% (+)	17.7% (-)
Poland	6.4% (-)	2.9% (-)	64.8% (+)	73.5% (+)	55.7% (-)	42.1% (+)	26.7%	19.6%
Portugal	14.1%	4.4% (-)	66.8% (+)	79.4% (+)	70.6% (+)	37.4%	36.6% (+)	20.2%
Rep. of Korea	8.0% (-)	3.5% (-)	57.0%	57.9% (-)	53.8% (-)	42.6% (+)	41.7% (+)	29.9% (+)
Serbia	11.0%	3.8% (-)	53.0%	64.6%	44.5% (-)	47.7% (+)	36.0% (+)	13.9% (-)
Slovenia	16.6% (+)	3.5% (-)	60.8% (+)	79.7% (+)	75.3% (+)	44.5% (+)	30.4%	20.8%
South Africa	21.4% (+)	12.6% (+)	52.7%	62.1% (-)	61.8%	47.2% (+)	42.5% (+)	22.5%
Spain	17.1% (+)	5.9%	49.7% (-)	58.8% (-)	61.4%	21.7% (-)	22.8% (-)	20.7%
Sweden	6.9% (-)	4.7% (-)	53.3%	78.5% (+)	80.5% (+)	31.1%	24.8% (-)	24.3%
Switzerland	21.5% (+)	4.3% (-)	51.4%	75.1% (+)	75.6% (+)	24.7% (-)	24.8% (-)	19.0%
United Kingdom	8.8% (-)	7.4%	50.1% (-)	58.4% (-)	56.1% (-)	9.6% (-)	14.5% (-)	15.3% (-)
United States	11.1%	12.1% (+)	58.0%	64.9%	70.8% (+)	39.6% (+)	36.9% (+)	21.9%
Europe20	13.1% [a]	5.0% [a]	56.3% [a]	67.5% [a]	61.5% [a]	28.6% [a]	24.2% [a]	19.7% [a]
AsiaOceania5	17.4% [b]	18.3% [b]	42.9% [b]	45.4% [b]	46.4% [b]	38.3% [b]	36.9% [b]	23.4% [b]
NorthAmerica2	11.4%	12.2% [c]	58.9% [a]	65.9% [a]	71.6% [c]	37.7% [b]	35.7% [b]	21.9% [b]
Africa5	15.5% [b]	13.0% [d]	42.7% [b]	49.9% [c]	51.2% [d]	54.1% [c]	46.9% [c]	24.6% [b]
p-value (1)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cramer's V	0.050	0.204	0.125	0.185	0.138	0.187	0.184	0.048

(+) countries with percentage significantly higher than the mean, (-) countries with percentage significantly lower than the mean, countries with no superscript do not differ significantly from the mean – at the 0.01 level.
(1) p-value of Chi-Square Test of Independence for comparison among regions; each superscript letter denotes a region whose proportions do not differ significantly from each other at the 0.01 level.

3.4. Opinions on traffic rules and penalties

Opinions on traffic rules and penalties on driving under the influence of alcohol, driving above the speed limit and using a mobile phone while driving, were assessed by asking the respondents if they could agree or not agree with three statements: “traffic rule/penalties should be stricter,” “traffic rules/penalties are too severe,” and “traffic rules are not being checked sufficiently.” A dichotomous variable “disagree/agree” was used – the percentages of agreement are presented in Figure 5 and Table 6.

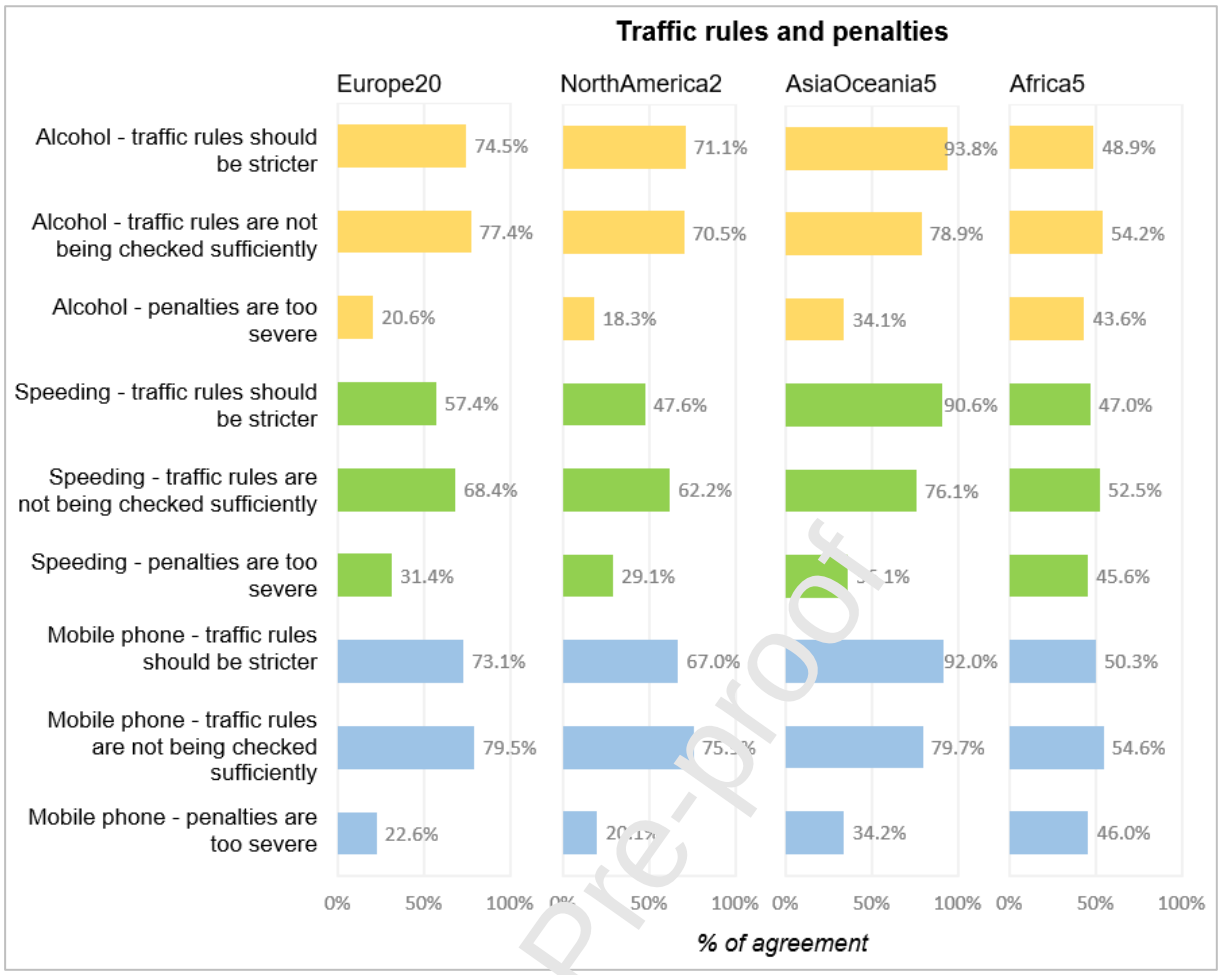

Figure 5. Opinions on traffic rules and penalties, by region (% of "agree" – dichotomous variable: disagree/agree).

Most respondents from Europe20, NorthAmerica2, and AsiaOceania5 agree that traffic rules concerning driving under the influence of alcohol should be stricter and are not being checked sufficiently: 74.5% and 77.4%, respectively, in Europe20; 71.1% and 70.5% in NorthAmerica2; and 93.8% and 78.9% in AsiaOceania5. On the other hand, a minority agrees that penalties are too severe: 20.6% in Europe20; 18.3% in NorthAmerica2; and 34.1% in AsiaOceania5. The figures on the use of mobile phone while driving are similar to these in the three regions. A lower percentage of respondents from Europe20 and NorthAmerica2 believe that traffic rules concerning speeding should be stricter (57.4% and 47.6%, respectively) and that they are not being checked enough (68.4% and 62.2%).

In Africa5, the percentage of respondents who agree that the traffic rules should be stricter and are not being checked sufficiently is significantly lower than in other regions (p-value < 0.01, except for speeding – no differences with NorthAmerica2: p-value > 0.01), and the percentage of those who agree that traffic rules/penalties are too severe is significantly higher than in other regions (p-value < 0.01).

Results on the opinions on traffic rules and penalties by country are presented in Table 6.

Table 6. Opinions on traffic rules and penalties, by country (% of "agree" – dichotomous variable: disagree/agree).

Country	Driving or riding under the influence of alcohol			Driving or riding faster than the speed limit			Using a mobile phone while driving or riding		
	traffic rules should be stricter	traffic rules are not being checked sufficiently	penalties are too severe	traffic rules should be stricter	traffic rules are not being checked sufficientl y	penalties are too severe	traffic rules should be stricter	traffic rules are not being checked sufficientl y	penalties are too severe
Australia	65.9% (-)	59.5% (-)	20.1%	51.4% (-)	54.2% (-)	31.5%	66.7% (-)	68.3% (-)	23.3%
Austria	63.5% (-)	68.4% (-)	16.1% (-)	37.4% (-)	54.2% (-)	30.7%	60.1% (-)	74.1% (-)	20.1% (-)
Belgium	69.9% (-)	73.4%	24.9% (+)	51.1% (-)	65.0%	37.4% (+)	71.9%	80.1% (+)	25.8%
Canada	74.0%	72.8%	16.5% (-)	59.7%	66.7%	23.7% (-)	73.3%	77.3%	18.6% (-)
Czech Rep.	75.2%	75.8%	16.3% (-)	59.3%	71.6% (+)	24.9% (-)	71.4%	79.6%	20.8% (-)
Denmark	65.4% (-)	68.9% (-)	9.2% (-)	44.0% (-)	63.1% (-)	19.4% (-)	64.9% (-)	74.1% (-)	11.6% (-)
Egypt	14.4% (-)	27.7% (-)	63.4% (+)	17.9% (-)	28.2% (-)	62.6% (+)	19.6% (-)	27.5% (-)	66.6% (+)
Finland	81.8% (+)	79.0% (+)	10.6% (-)	50.7% (-)	65.6%	29.3%	65.0% (-)	76.7%	20.1% (-)
France	64.5% (-)	69.1% (-)	35.8% (+)	42.3% (-)	53.0% (-)	51.0% (+)	61.2% (-)	67.1% (-)	38.5% (+)
Germany	70.9% (-)	75.2%	16.6% (-)	52.3% (-)	64.5% (-)	24.1% (-)	69.7%	77.6%	16.7% (-)
Greece	85.0% (+)	94.8% (+)	23.0%	78.5% (+)	94.9% (+)	30.7%	80.4% (+)	96.4% (+)	29.6% (+)
Hungary	75.5%	71.6%	26.1% (+)	57.3%	61.4% (-)	44.3% (+)	74.8%	77.5%	29.8% (+)
India	94.9% (+)	78.3%	38.7% (+)	94.2% (+)	76.5% (+)	38.5% (+)	93.5% (+)	78.6%	37.4% (+)
Ireland	71.4%	76.2%	23.9%	61.8%	72.5% (+)	32.3%	76.0% (+)	84.1% (+)	26.0%
Israel	84.1% (+)	82.4% (+)	10.9% (-)	61.4%	71.8% (+)	22.1% (-)	68.4%	76.8%	20.9% (-)
Italy	81.3% (+)	85.8% (+)	17.6% (-)	68.6% (+)	80.3% (+)	27.4% (-)	83.8% (+)	87.6% (+)	17.6% (-)
Japan	89.7% (+)	83.9% (+)	15.6% (-)	74.2% (+)	75.3% (+)	28.9%	87.4% (+)	85.6% (+)	23.5%
Kenya	91.7% (+)	83.9% (+)	17.5% (-)	89.2% (+)	82.4% (+)	20.9% (-)	89.7% (+)	86.4% (+)	19.9% (-)
Morocco	48.4% (-)	49.7% (-)	45.5% (+)	44.9% (-)	47.9% (-)	47.7% (+)	48.4% (-)	48.5% (-)	47.3% (+)
Netherlands	78.7% (+)	80.4% (+)	13.2% (-)	52.8% (-)	66.8%	30.2%	71.2%	82.1% (+)	16.9% (-)
Nigeria	93.0% (+)	89.7% (+)	16.5% (-)	89.2% (+)	83.9% (+)	16.2% (-)	89.3% (+)	87.7% (+)	15.5% (-)
Poland	73.6%	81.4% (+)	16.8% (-)	60.7%	73.8% (+)	25.9% (-)	70.0%	80.1%	21.5% (-)
Portugal	67.6% (-)	74.6%	26.8% (+)	52.4% (-)	70.4%	42.0% (+)	65.7% (-)	79.8%	31.9% (+)
Rep. of Korea	97.1% (+)	85.3% (+)	6.7% (-)	82.2% (+)	78.8% (+)	11.4% (-)	89.8% (+)	89.4% (+)	8.8% (-)
Serbia	80.5% (+)	81.4% (+)	23.8%	68.4% (+)	77.2% (+)	33.9%	76.8% (+)	82.4% (+)	30.9% (+)
Slovenia	71.8%	78.4% (+)	33.7% (+)	56.5% (-)	64.4%	55.9% (+)	69.7%	77.9%	39.1% (+)
South Africa	82.2% (+)	87.6% (+)	22.9%	74.0% (+)	81.2% (+)	30.4%	81.9% (+)	92.3% (+)	26.2%
Spain	81.0% (+)	78.9% (+)	27.8% (+)	69.8% (+)	73.3% (+)	36.3% (+)	81.9% (+)	79.9%	28.8% (+)
Sweden	82.8% (+)	85.0% (+)	9.3% (-)	62.2%	75.2% (+)	17.3% (-)	73.4%	82.8% (+)	11.9% (-)
Switzerland	54.1% (-)	56.3% (-)	30.4% (+)	38.2% (-)	46.0% (-)	41.4% (+)	60.8% (-)	63.1% (-)	31.1% (+)
United Kingdom	79.8% (+)	78.5% (+)	12.6% (-)	61.1%	69.9%	23.3% (-)	79.2% (+)	84.6% (+)	13.4% (-)
United States	70.9%	70.2% (-)	13.5% (-)	46.3% (-)	61.7% (-)	29.7%	66.2% (-)	75.8%	20.3% (-)
Europe20	74.5% [a]	77.4%	20.6% [a]	57.4% [a]	68.4% [a]	31.4% [a]	73.1% [a]	79.5% [a]	22.6% [a]
AsiaOceania5	93.8% [b]	78.9% [a]	34.1% [b]	90.6% [b]	76.1% [b]	36.1% [b]	92.0% [b]	79.7% [a]	34.2% [b]
NorthAmerica2	71.1% [c]	70.5% [b]	18.3% [a]	47.6% [c]	62.2% [c]	29.1% [a]	67.0% [c]	75.9% [b]	20.1% [a]
Africa5	48.9% [d]	54.2% [c]	43.6% [c]	47.0% [c]	52.5% [d]	45.6% [c]	50.3% [d]	54.6% [c]	46.0% [c]
p-value (1)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cramer's V	0.285	0.193	0.204	0.279	0.148	0.110	0.263	0.209	0.198

(+) countries with percentage significantly higher than the mean, (-) countries with percentage significantly lower than the mean, countries with no superscript do not differ significantly from the mean – at the 0.01 level.
(1) p-value of Chi-Square Test of Independence for comparison among regions; each superscript letter denotes a region whose proportions do not differ significantly from each other at the 0.01 level.

3.5. Support for policy measures

To assess the level of support for policy measures concerning driving under the influence of alcohol, speeding and using the mobile phone while driving, a 5-point scale from 1 = “oppose” to 5 = “support” was used. The percentages of support (answers 4 to 5) are presented in Figure 6 and Table 7.

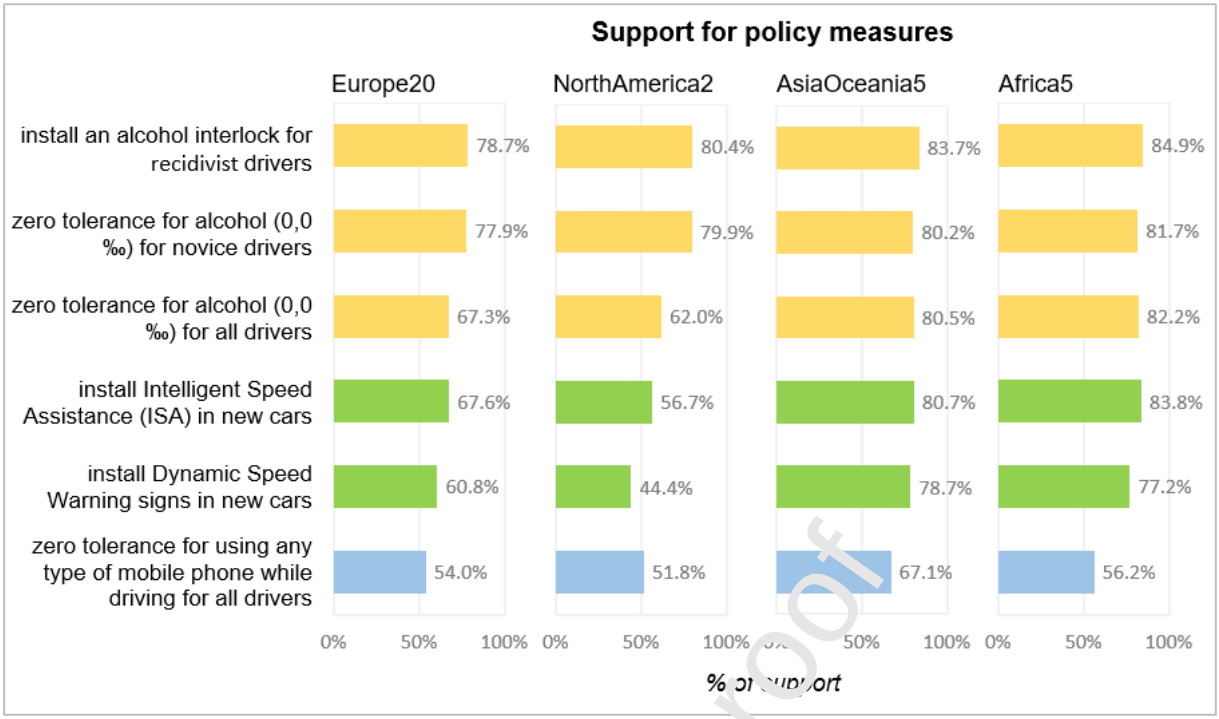

Figure 6. Support for policy measures, by region (% of support – scores 4 and 5 on a 5-point scale from 1 "oppose" to 5 "support").

The installation of an alcohol interlock for recidivist drivers (drivers who have been caught for drunk driving on more than one occasion) and zero tolerance for alcohol for novice drivers were supported by more than three quarters of the respondents of all regions (percentages ranging from 78% to 85%). A lower percentage of European and American respondents support zero tolerance for alcohol for all drivers (67.3% and 62.0%, respectively). Surprisingly, the support rate for this measure was significantly higher (p-value < 0.01) in AsiaOceania5 (80.5%) and in Africa5 (82.2%) – regions with the highest rates of self-declared drinking and driving.

Measures for tackling speeding – installation of Intelligent Speed Assistance (ISA) and Dynamic Speed Warning signs in new cars – received more support in AsiaOceania5 and Africa5 regions (percentages from 79% to 84%) than in Europe20 and NorthAmerica2 (percentages ranging from 44.4% to 67.7%). The percentages were significantly higher in AsiaOceania5 and Africa5 than in Europe20 and NorthAmerica2 (p-value < 0.01).

The support for zero tolerance for using any type of mobile phone while driving was the strongest in AsiaOceania5 (67.1%) and the lowest in Europe 20 (54.0%) and in NorthAmerica2 (51.8%). This received less support in Europe20, AsiaOceania5, and Africa5, than the measures to tackle drinking and driving, and speeding.

The six policy measures analysed are part of the fifteen included in ESRA2 survey. An extensive discussion of all measures can be found in Van den Berghe *et al*. [26].

The results on the support for policy measures by country are presented in Table 7.

Table 7. Support for policy measures, by country (% of support – scores 4 and 5 on a 5- point scale from 1 "oppose" to 5 "support").

Country	Driving under the influence of alcohol			Speeding		Distraction
	install an alcohol interlock for recidivist drivers	zero tolerance for alcohol (0,0 ‰) for novice drivers	zero tolerance for alcohol (0,0 ‰) for all drivers	install Intelligent Speed Assistance (ISA) in new cars	install Dynamic Speed Warning signs in new cars	zero tolerance for using any type of mobile phone while driving
Australia	84.7%	85.4% (+)	50.6% (-)	65.8% (-)	57.5% (-)	57.6% (+)
Austria	71.6% (-)	83.2%	51.2% (-)	54.3% (-)	43.5% (-)	36.8% (-)
Belgium	76.1% (-)	78.1% (-)	57.6% (-)	64.8% (-)	57.9% (-)	47.5% (-)
Canada	85.0% (+)	85.6% (+)	59.1% (-)	61.8% (-)	49.0% (-)	62.7% (+)
Czech Rep.	78.3% (-)	86.1% (+)	73.7% (+)	67.0% (-)	56.1% (-)	43.4% (-)
Denmark	84.5%	69.1% (-)	52.4% (-)	63.6% (-)	55.7% (-)	56.5%
Egypt	85.4% (+)	83.9%	87.8% (+)	84.5% (+)	78.6% (+)	52.8%
Finland	88.6% (+)	69.4% (-)	60.1% (-)	64.6% (-)	52.1% (-)	34.1% (-)
France	73.1% (-)	74.2% (-)	53.3% (-)	61.9% (-)	59.7%	50.6%
Germany	69.0% (-)	84.1% (+)	62.3% (-)	61.0% (-)	48.1% (-)	48.8% (-)
Greece	85.1% (+)	83.9%	67.4%	82.8% (+)	79.9% (+)	66.3% (+)
Hungary	82.5%	87.5% (+)	83.2% (+)	74.7% (-)	70.1% (+)	47.8% (-)
India	83.8%	80.5%	82.0% (+)	83.8% (+)	82.0% (+)	70.6% (+)
Ireland	83.8%	82.6%	74.0% (+)	76.9% (-)	64.4%	60.4% (+)
Israel	82.7%	88.5% (+)	77.3% (+)	70.4% (-)	63.1%	48.1% (-)
Italy	79.7%	53.7% (-)	77.7% (+)	70.8% (-)	71.9% (+)	51.1%
Japan	82.2%	78.9%	78.3% (+)	54.9% (-)	63.8%	51.0%
Kenya	93.9% (+)	88.4% (+)	88.8% (+)	95.2% (+)	86.2% (+)	77.5% (+)
Morocco	80.3%	77.6% (-)	77.1% (+)	81.3% (+)	75.5% (+)	50.6%
Netherlands	79.7%	82.4%	64.9% (-)	52.1% (-)	47.5% (-)	55.5%
Nigeria	91.7% (+)	90.7% (+)	90.8% (+)	92.0% (+)	86.1% (+)	70.2% (+)
Poland	87.2% (+)	79.4%	67.2%	74.4% (+)	63.9%	45.0% (-)
Portugal	82.8%	79.0%	66.1%	81.7% (+)	65.1%	50.7%
Rep. of Korea	86.3% (+)	75.4% (-)	72.5% (-)	73.3%	67.5% (+)	51.1%
Serbia	88.4% (+)	91.9% (+)	75.7% (+)	85.9% (+)	79.5% (+)	61.4% (+)
Slovenia	85.8% (+)	92.2% (+)	72.2%	79.8% (+)	69.4% (+)	54.0%
South Africa	86.3% (+)	79.1%	75.1% (+)	79.0% (+)	70.9% (+)	59.9% (+)
Spain	87.2% (+)	89.4% (+)	80.8% (+)	79.7% (+)	76.4% (+)	68.2% (+)
Sweden	86.1% (+)	80.4%	71.5%	62.8% (-)	54.5% (-)	47.5% (-)
Switzerland	65.6% (-)	73.9% (-)	48.8% (-)	60.0% (-)	56.1% (-)	42.8% (-)
United Kingdom	80.5%	80.8%	70.7%	65.1% (-)	55.9% (-)	68.6% (+)
United States	79.8%	79.2%	62.3% (-)	56.1% (-)	43.8% (-)	50.5%
Europe20	78.7% [a]	79.1% [a]	67.3% [a]	67.6% [a]	60.8% [a]	54.0% [a]
AsiaOceania5	83.7% [b]	86.2% [b]	80.5% [b]	80.7% [b]	78.7% [b]	67.1% [b]
NorthAmerica2	80.4% [a]	79.9% [b]	62.0% [c]	56.7% [c]	44.4% [c]	51.8% [a]
Africa5	84.9% [b]	81.7% [b]	82.2% [b]	83.8% [d]	77.2% [b]	56.2% [c]
p-value [(1)]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cramer's V	0.036	0.036	0.152	0.172	0.199	0.097

(+) countries with percentage significantly higher than the mean, (-) countries with percentage significantly lower than the mean, countries with no superscript do not differ significantly from the mean – at the 0.01 level.
(1) p-value of Chi-Square Test of Independence for comparison among regions; each superscript letter denotes a region whose proportions do not differ significantly from each other at the 0.01 level.

4. Discussion

Results from the ESRA2 survey presented in this article show that most road users are aware of the negative road safety effects of risky traffic behaviours. Overall, the majority of respondents consider that all the behaviours mentioned – driving under the influence of alcohol and drugs, speeding, mobile phone use while driving, and fatigued driving – frequently cause road crashes. Furthermore, the percentage of road users who find all behaviours personally acceptable is quite low. Notwithstanding the high risk perception and the low acceptability of risky driving behaviours, there is still a high percentage of car drivers who engage in these risky behaviours in traffic. This finding may partly be explained by the (unrealistic) "optimism" bias in many drivers, making them believe that road crashes (as other negative events) happen to others, but not to themselves [27].

An interesting finding was the belief that risky behaviours in traffic are more acceptable by "others" than the respondents themselves. This pattern was consistent with the results of ESRA1 and was observed for all the risky behaviours in all the regions and countries. These results suggest the externalization of responsibilities and the belief of a moral superiority over others, which, according to Tappin and McKay [28], comprises a substantial irrational component.

Overall, driving beyond the speed limit was the most frequently self-declared risky behaviour. The percentage of drivers declaring to have been speeding at least once in the past 30 days was particularly high in Europe and North America, higher than 55% inside built-up areas and higher than 60% outside built-up areas and on motorways or freeways. Car drivers apparently underestimate the risks of speeding (mainly outside built-up areas), a key risk factor in road traffic, strongly associated with both the number of crashes and their severity [29].

Conversely, driving under the influence of alcohol or drugs (other than medication) appears to be the least prevalent behaviour in all the regions. Nevertheless, the rates of drinking and driving, and drug driving were quite substantial, mainly in AsiaOceania5 and Africa5 regions – 15.5% to 18.3% of respondents declared these behaviours at least once in the past 30 days. Differences among regions concerning these behaviours may be explained by different attitudes towards the use of alcohol and drugs in the general population, differences in legislation, and variable perceptions of the probability to be checked by the police [30].

The World Health Organization (WHO) considers the use of the mobile phone while driving one of the most serious and growing threats to road safety [31]. The results from the ESRA2 survey confirmed the dimension of the problem globally, particularly in African countries. These behaviours were less prevalent in the other regions, although the figures are still substantial: about one quarter in Europe20 and 35.7% to 38.3% in America2 and AsiaOceania5 regions. Other results from ESRA2 survey [32] show that the rates of talking on a hands-free mobile while driving a car are even higher, ranging from 47.7% in Europe20 to 66.8% in Africa5. Personality traits that predispose drivers to risky driving [33], the social expectation to return calls or to answer text messages immediately, professional reasons, or perceived practical, social, and psychological benefits are some of the reasons that may explain the high rates of mobile phone use while driving [34].

Surprisingly, the personal acceptability of fatigued driving was quite low – even lower than drinking and driving in all regions, and lower than taking drugs and driving in North American and African countries. Despite the lower acceptability (ranging from 1.2% in NorthAmerica2 to 5.4% in AsiaOceania5), fatigued driving was declared by more than 20% of the respondents (19.7% in Europe20 to 24.6% in Africa5). These results suggest that car drivers

are unable to prevent or adequately react to the problem of fatigued driving, even though they may have strong personal norms against this type of behaviour.

The concern about risky road behaviours and the need to restrict them are clear in the support for policy measures and in the opinions on traffic rules and penalties. In fact, the majority of road users support all policy measures for restricting the unsafe behaviours, and agree that traffic rules should be stricter and are not being checked enough. Far less respondents consider that the penalties are too severe. These results show that road users perceive the risky behaviours in traffic as very frequent. Thus, they believe that more should be done by making the traffic rules more restrictive, increasing enforcement, and making penalties more severe.

5. Limitations of the data

One of the limitations of the ESRA2 data is the effect of cultural differences among the various countries across the world. Road users of countries from Europe, America, Africa, Asia, or Oceania may have different cultural interpretations of the questions in the survey. Factors like social values, capabilities, personality, the role of status of a person, laws, road safety culture, and infrastructural differences vary among the different countries and may influence road users' responses.

Other limitations of self-reported data are the tendency of respondents to provide answers which present a favorable image of themselves (desirability bias), the misunderstanding of questions (e.g., questions with difficult words or long questions), or unintentional faulty answers due to memory errors (recall error). These factors may also bias the answers [35-36].

The representativeness of the surveyed populations may be a problem in certain countries and regions. Samples collected through online surveys may not be representative of the entire population, mainly in countries with low rates of internet use. This is the case with some of the countries in the ESRA2 survey where the percentage of population using the internet is low (lower than 20% in Kenya and Nigeria, and lower than 50% in India and Egypt). Furthermore, samples for some regions, particularly from Africa and Asia, are based on a limited number of countries, so the results cannot be readily generalized for the region. The number of countries will be increased in the second wave of ESRA2 survey, ensuring more representative samples.

6. Conclusions

The ESRA2 survey proved to be a valuable source of information to understand the causes underlying road traffic crashes. It offers a unique database and provides policy makers and researchers with valuable insights into the public perception of road safety. The standardized methodology and sampling procedure in all participating countries can be used as a benchmark of road safety performance indicators based on opinions, self-declared behaviours, and attitudes. The ESRA initiative will be repeated on a triennial basis, which will allow the creation of a time series of road safety performance indicators to monitor the progress of road safety in countries all over the world.

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Appendix

Country	Sample size	Gender			Age group					
		Male	Female	Other	18–24y	25–34y	35–44y	45–54y	55–64y	65y+
Australia	968	48%	52%	0%	11%	19%	18%	17%	15%	20%
Austria	1999	48%	52%	0%	10%	17%	16%	19%	16%	23%
Belgium	1985	49%	51%	0%	10%	16%	17%	18%	16%	23%
Canada	980	49%	51%	0%	11%	16%	16%	18%	18%	21%
Czech Republic	989	49%	51%	0%	8%	16%	21%	16%	15%	23%
Denmark	984	49%	51%	0%	11%	15%	15%	18%	16%	24%
Egypt	996	54%	46%	0%	20%	32%	32%	11%	2%	2%
Finland	994	49%	51%	0%	10%	16%	15%	16%	17%	26%
France	994	48%	52%	0%	10%	16%	16%	17%	16%	24%
Germany	1989	49%	51%	0%	9%	15%	14%	20%	16%	25%
Greece	1015	50%	48%	2%	9%	20%	31%	25%	13%	3%
Hungary	1014	45%	50%	5%	10%	16%	19%	16%	17%	22%
India	1035	54%	45%	1%	22%	25%	22%	16%	9%	6%
Ireland	1031	46%	54%	0%	11%	19%	24%	20%	14%	11%
Israel	984	49%	51%	0%	16%	21%	19%	15%	13%	16%
Italy	980	48%	52%	0%	8%	14%	17%	19%	16%	27%
Japan	980	48%	52%	0%	8%	13%	17%	15%	15%	31%
Kenya	1000	50%	50%	0%	27%	36%	22%	12%	3%	1%
Morocco	1047	55%	45%	0%	27%	35%	24%	9%	2%	2%
Netherlands	983	49%	51%	0%	11%	15%	15%	19%	16%	23%
Nigeria	1000	55%	45%	0%	28%	37%	21%	10%	3%	2%
Poland	993	48%	52%	0%	10%	19%	18%	15%	18%	19%
Portugal	998	49%	51%	0%	10%	15%	18%	18%	19%	21%
Republic of Korea	1043	50%	48%	1%	13%	19%	22%	21%	18%	8%
Serbia	1041	49%	50%	1%	13%	20%	22%	20%	19%	6%
Slovenia	1035	51%	49%	0%	10%	18%	18%	20%	21%	13%
South Africa	1013	46%	54%	0%	17%	30%	22%	15%	11%	5%
Spain	980	54%	46%	0%	9%	15%	22%	12%	17%	24%
Sweden	987	50%	50%	0%	11%	17%	16%	17%	15%	25%
Switzerland	1020	51%	49%	0%	10%	17%	17%	20%	16%	19%
United Kingdom	963	49%	51%	0%	11%	17%	16%	18%	15%	23%
United States	1016	47%	52%	1%	12%	18%	16%	18%	17%	20%
Europe20	23027	48%	52%	0%	10%	16%	17%	18%	16%	23%
AsiaOceania5	5010	50%	49%	1%	19%	23%	20%	15%	11%	12%
NorthAmerica2	1943	48%	51%	1%	12%	18%	16%	18%	16%	19%
Africa5	5056	49%	51%	0%	25%	28%	19%	13%	8%	7%
TOTAL	35036	49%	50%	0.3%	13%	20%	19%	17%	14%	17%

Table A.1. Sample size, gender, and age distribution by country (unweighted) and region (weighted means).

Highlights

- ESRA data useful for benchmarking road safety performance around the world
- Risky behaviour in traffic is high despite low acceptability and high risk perception
- Speeding and the use of mobile phone while driving are the most frequently declared risky behaviours
- Strong support for policy measures restricting risky behaviours in traffic