ESRA

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E-Survey of Road users' Attitudes



ESRA2 methodology

ESRA2 report Nr. 1

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ESRA2 methodology

ESRA2 report Nr. 1

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List of Abbreviations

Country codes

AT	Austria
AU	Australia
BE	Belgium
CA	Canada
CH	Switzerland
CZ	Czech Republic
DE	Germany
DK	Denmark
EG	Egypt
EL	Greece
ES	Spain
FI	Finland
FR	France
HU	Hungary
IE	Ireland
IL	Israel
IN	India
IT	Italy
JP	Japan
KE	Kenya
KR	Republic of Korea
MA	Morocco
NG	Nigeria
NL	Netherlands
PL	Poland
PT	Portugal
RS	Serbia
SE	Sweden
SI	Slovenia
UK	United Kingdom
US	United States
ZA	South Africa

Other abbreviations

ESRA	E-Survey of Road Users' Attitudes
LOI	Length of the interview
Q	Question
y	Years of age

Executive summary

This report provides an overview on the ESRA methodology, in particular the fieldwork, data processing and reporting procedures. The report also presents information on the survey sample and on the quality assurance arrangements for the common ESRA outputs such as the Thematic Reports and country fact sheets.

The ESRA initiative

ESRA (E-Survey of Road users' Attitudes) is a joint initiative of road safety institutes, research centres, public services, and private sponsors from all over the world. The aim is to collect and analyse comparable data on road safety performance, in particular road safety culture and behaviour of road users. The ESRA data are used as a basis for a large set of road safety indicators. These provide scientific evidence for policy making at national and international levels.

Vias institute in Brussels (Belgium) initiated and coordinates ESRA, in cooperation with eleven core group partners (BASt (Germany), BFU (Switzerland), CTL (Italy), IATSS (Japan), IFSTTAR (France), ITS (Poland), KFV (Austria), NTUA (Greece), PRP (Portugal), SWOV (the Netherlands), TIRF (Canada)). In total 28 partners from 32 countries participated in the current edition of this ESRA survey (ESRA2_2018).

Data collection and scope of the questionnaire

ESRA data are collected through online panel surveys, using a representative sample of the national adult populations in each participating country (at least N = 1000 per country).

At the heart of this survey is a jointly developed questionnaire, which is translated into 42 national language versions in ESRA2_2018. The survey addresses several types of road users (e.g. car drivers, powered-two-wheelers, cyclists, pedestrians). The themes covered include self-declared behaviour, attitudes and opinions on unsafe traffic behaviour, enforcement experiences and support for policy measures. The survey addresses different road safety topics (e.g. driving under the influence of alcohol, drugs and medicines, speeding, distraction) and targets car occupants, powered-two-wheelers, cyclists and pedestrians.

Hard quota are used for gender and age[1] distribution during the sampling procedure (United Nations Statistics Division, 2019). The geographical spread of the sample across the country was at least monitored (soft quota). Four market research agencies (INFAS, Ipsos (formerly GfK), Punto de Fuga, and Dynata (formerly RN SSI)) organised the fieldwork under the supervision of Vias institute. The fieldwork was conducted simultaneously in all participating countries in December 2018[2].

Data processing

Vias institute predefined hard quota for gender and age distribution per country as well as a series of minimum criteria for data cleaning, which the market research agencies had to respect. The provided data files of the market research companies had to respect a specified database template. All the national data files were merged together into one file, including the answers of all respondents in 32 countries. Vias institute checked the quality of the data and carried out a second data cleaning, which included controlling for duplicate entries, removing inconsistencies with panel information, checking for the length of the interview (identifying and eliminating 'speeders' and 'turtles'), and removing straightliners (respondents who give the same answers for many questions). From the original, pre-cleaned sample provided by the market research agencies (N=35,452), 416 respondents were removed from the dataset. The final sample consists of N=35,036 respondents.

In view of facilitating dissemination of ESRA2 results, some original answer categories (mainly 5-point and 7-point scales) were dichotomized (2 answer categories; binary variables). The dichotomization process was conducted centrally by Vias institute and used in presenting all descriptive analyses of the

[1] 6 age groups: 18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y+
[2] Only in Switzerland the fieldwork extended to January 2019.

ESRA2 reports. The dichotomizations and reference categories for each question are indicated in the ESRA2 questionnaire in Appendix 1 (see information on binary variable).

A weighting of the data was applied in the descriptive analyses. This weighting took into account small corrections with respect to national representativeness of the sample based on gender and six age groups: 18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y+ (United Nations Statistics Division, 2019). For the regional means, the weighting also took into account the relative size of the population of each country within the total set of countries from this region.

The statistical packages used within the data processing were SPSS 25.0 (IMB corp, 2017) and R (R core team, 2018).

Sample characteristics

In total the ESRA2_2018 survey collected data from more than 35,000 road users across 32 countries (N=35,036). The participating countries in ESRA2_2018 were:

- Europe: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the 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 Afrika.

The samples (after applying a weighting factor) are representative for the national adult population based on interlaced quota of gender and six age groups (United Nations Statistics Division, 2019). The survey addresses several types of road users (e.g. car drivers, powered-two-wheelers, cyclists, pedestrians). Distribution of the national samples according to transport mode, gender, age groups, internet use and education level presented in this report.

Reporting and quality control

The common results of the ESRA2_2018 survey are published in a Main Report, a Methodology Report and fifteen Thematic Reports (Table 5; page 24). Furthermore, 32 country fact sheets have been produced so far, in which national key results are compared to a regional mean (benchmark) and scientific articles, national reports and many conference presentations are currently in progress. All common ESRA2 reports have been peer-reviewed within the consortium, following a pre-defined quality control procedure.

Further information on ESRA and its results

An overview of the results and news on the ESRA initiative is available on: www.esranet.eu

1 The ESRA initiative

1.1 Monitoring road safety attitudes and performance

Trends in road safety performance and the success of policy measures can be monitored using road safety performance indicators, based on accident statistics, roadside observations, or (questionnaire) surveys.

There is a broad consensus amongst road safety experts that roadside observations are the golden standard to produce road safety performance indicators since they are based on observed behaviour in traffic. But observation-based studies have also limitations. The number and nature of variables that are observable are limited. Moreover, roadside observations require a sophisticated study design and protocol. They are very time intensive and cost consuming. At present, moreover, due to methodological differences, results of such studies are often not comparable across countries.

An alternative is to use questionnaire surveys. Such surveys, when properly designed and with an adequate sampling approach, can yield very useful information on road safety performance and road safety culture as well. Moreover, when online panels are used, such surveys appear to be a relatively inexpensive way for obtaining indicators on safety practice and road users' behaviour. A further advantage of such surveys is that they allow to collect data on many additional factors as well and hence can provide insights into socio-cognitive determinants of behaviour: attitudes, perceived social norm, risk perception, or existing habits. Socio-cognitive factors can help to understand the underlying motivations of certain behaviour (e.g. Ajzen, 1991; Rosenstock, 1974; Rogers, 1975; Vanlaar and Yannis, 2006). In the current literature those factors are often closely linked with assessing road safety culture (e.g. Ward et al., 2019).

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 used, or sample population being surveyed.

Therefore, in 1991 the European Commission initiated the European project SARTRE (Social Attitudes to Road Traffic Risk in Europe; homepage: www.attitudes-roadsafety.eu/). A common questionnaire and study design were developed, and face-to-face interviews were conducted among a representative sample of the national adult population. Four editions of the SARTRE survey were completed (1991, 1996, 2002, 2010). In the first three editions of the SARTE project, surveys were directed only to car drivers. In the fourth edition, the target group was extended to powered two-wheelers, pedestrians, cyclists, and users of public transport (Cestac and Delhomme, 2012). SARTRE4 involved 19 European countries. It was the last of the SARTRE series that was funded by the European Commission.

In 2015, Vias institute (formerly the Belgian Road Safety Institute) launched the ESRA (E-Survey of Road users' Attitudes) initiative to build on the SARTRE experience and extend scope and coverage, initially with partners from a number of EU countries. In a few years, the project evolved into a global initiative.

1.2 Aim and objectives

ESRA is a joint initiative of road safety institutes, research centres, public services, and private sponsors from all over the world. The aim is to collect and analyse comparable data on road safety performance, in particular road safety culture and behaviour of road users. The ESRA data are used as a basis for a large set of road safety indicators. These provide scientific evidence for policy making at national and international levels.

The main objectives of the ESRA initiative can be summarized as follows:

- to provide scientific support for road safety policy at national and international levels;
- to make internationally comparable data available on the current road safety situation in countries all over the world;

- to develop a series of reliable, cost-effective and comparable road safety performance indicators;
- to develop time series on road safety performance.

The intention is to repeat this survey every three years and extend it to an increasing number of countries.

1.3 Consortium and evolution

The ESRA initiative was initiated by the Vias institute (Belgium) in 2015 (Torfs at al., 2016). As of the moment of the publication of this report (July 2019), the ESRA survey has already been conducted in 46 countries across six continents. The number of countries is still growing. Figure 1 gives an overview of the geographical coverage of the different ESRA surveys (2015-2018).

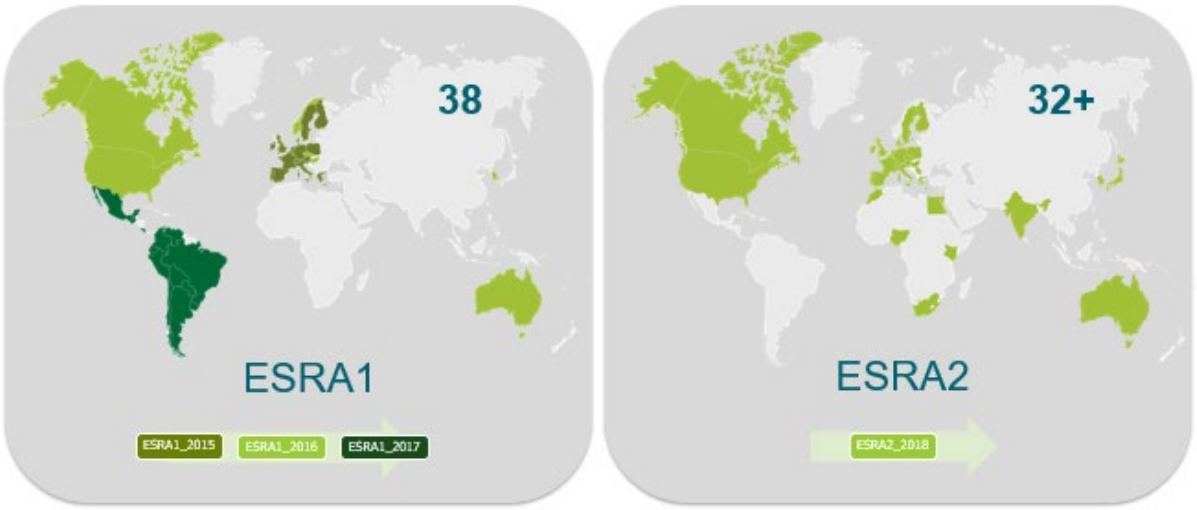


Figure 1: Evolution: Geographic coverage of the different ESRA surveys (2015-2018)

The first edition of the ESRA survey (ESRA1) was carried out in three waves in 2015, 2016 and 2017. Data were collected from almost 40,000 road users in 38 countries across 5 continents (Meesmann et al., 2018). The current report focusses on the second edition of the ESRA survey, which, in its first wave in 2018, already involved 32 countries (ESRA2_2018).

Vias institute in Brussels (Belgium) coordinated the ESRA2_2018 survey in close collaboration with eleven additional core group partners: BASt (Germany), BFU (Switzerland), CTL (Italy), IATSS (Japan), IFSTTAR (France), ITS (Poland), KFV (Austria), NTUA (Greece), PRP (Portugal), SWOV (the Netherlands), TIRF (Canada).

In each country that participates in ESRA, there is a national partner to support the initiative. They are responsible for the funding of the survey, the translation of the survey questionnaire into the national language(s) and interpretation of the findings. For the five African countries, funding was provided by the Group Renault. A list of all partners (organisations and contact persons) supporting the ESRA2 survey can be found on page 3 of this report.

1.4 Costs and resources

From the beginning onwards, the intention was to keep costs as low as possible. The main principles to achieve this are: (1) using online panel services; and (2) sharing the analysis work amongst the ESRA partner organisations.

In most countries, the cost for collecting the data was in the range between €5,000 and €10,000 (for 1000 respondents). The financial resources for the national survey costs and the staff time needed for the analyses were secured by the ESRA2 partners' own sources.

The ESRA2 questionnaire was developed by Vias institute in collaboration with the ESRA2 core group partners. National partners were responsible for the translations of the master version into their national language version(s). Furthermore, they were responsible for the validations of the national results and provided contextual information necessary for the interpretation of the results. The analyses of the common data were a joint effort of ESRA2 core group members and Vias institute, who spend over 80 person months on analysing and producing the common ESRA2 outputs.

2 Data collection and scope of questionnaire

2.1 Scope

The ESRA2 survey addresses several types of road users, i.e.:

- car drivers
- powered-two-wheelers
- cyclists
- pedestrians.

The main themes covered in the questionnaire are:

- transport modes
- road crash involvement
- self-declared behaviour in traffic
- acceptability of safe and unsafe traffic behaviour
- attitudes towards safe and unsafe traffic behaviour
- subjective safety and risk perception
- support for policy measures
- enforcement of traffic laws
- vehicle automation
- socio-demographic information

In addition, there are two bonus questions which were chosen freely by each national partner.

The survey addresses different road safety topics:

- driving under the influence of alcohol, drugs and medicines
- speeding
- protective systems (e.g. seat belt use, helmet use)
- distraction and fatigue.

Furthermore, for the interpretation of the results additional contextual information on country level were gathered via external data sources (e.g. WHO, IRTAD, CARE) and a dedicated ESRA2 expert survey (e.g. questions on current national legal regulations). Figure 2 gives an overview of the scope of the ESRA2 survey.

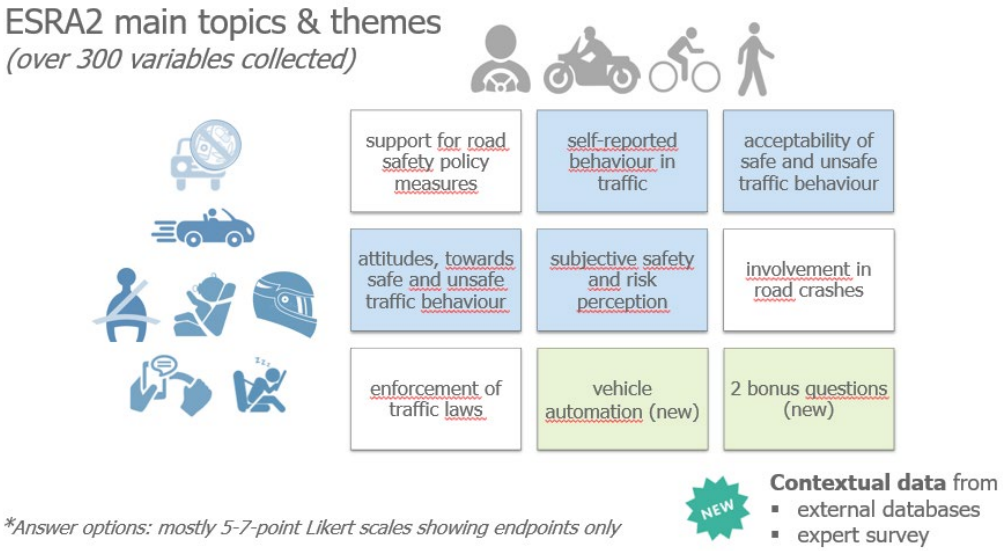


Figure 2: Scope of ESRA2 questionnaire

The median length of the interview was 20 minutes. The questionnaire was first developed in English by the ESRA core group, based on the experience with ESRA1 and subsequently translated into 42 national language versions. The survey was programmed in seven different character sets: Greek, Hebrew, Hindi, Japanese, Korean, Arabic and Latin.

2.2 Online panel survey

ESRA data is derived from an extensive online survey amongst a representative sample (at least N=1,000) of the national adult populations in each participating country. More specifically, ESRA2 is based on a web-based survey using internet panels.

This approach has some advantages compared to other survey modes, especially given the international context of the study. These advantages are:

- Self-administered web surveys are less prone to social desirability in responses compared to interviewer-administered surveys (De Leeuw, et al., 2008; Baker, Blumberg, et al. 2010; Goldenbeld and de Craen, 2013).
- The common study design provides better comparability across countries (i.e. identical criteria in sampling procedure, identical programming of questionnaire; one project management across all countries as the ESRA survey is actually 'one' survey which is only linked to different national translations).
- Reduction of time (fieldwork in most countries ca. 2 weeks; efficient data processing), workload (e.g. less time for fieldwork and data processing) and costs (national survey costs typically between €5,000 – €10,000 (excl. VAT)

It should be recognized, however, that internet penetration varies between countries. Consequently, coverage and sampling may be sub-optimal. Besides, also internet skills vary across countries (see also section 4.2).

2.3 Sample and fieldwork

The survey targets all types of road users. The aim is to cover a representative sample of the national adult population of at least 1000 respondents in each country. Hard quotas were used for gender and age[3] distribution during the sampling procedure (United Nations Statistics Division, 2019). The geographical spread of the sample across the country was monitored (soft quota). Four market research agencies (INFAS, Ipsos (formerly GfK), Punto de Fuga, and Dynata (formally RN SSI)) organised the fieldwork under the supervision of Vias institute. The fieldwork was conducted simultaneously in all countries in December 2018[4].

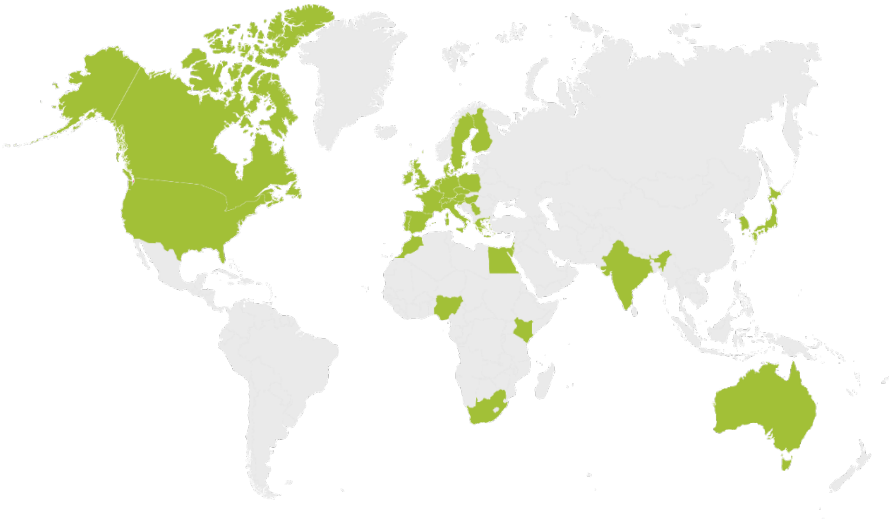


Figure 3: Geographical coverage of the ESRA2_2018 survey.

In total the ESRA2_2018 survey collected data from more than 35,000 road users across 32 countries. Figure 3 shows the geographical coverage of the survey. Details on the sample can be found in chapter 4 and a summary of the fieldwork per country in Appendix 2.

[3] 6 age groups: 18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y+
[4] Only in Switzerland the fieldwork expended to January 2019.

3 Data processing

3.1 Data preparation

The market research companies that had been selected for collecting the data had to respect minimum criteria for data cleaning which had been defined by Vias institute and provide the data in a custom made database template, The cleaned data files provided by the market research companies were merged together into one database which include all the answers of all respondents in 32 countries. The statistical packages used in the further processing of the data were SPSS 25.0 (IBM corp, 2017) and R (R core team, 2018).

After receiving the cleaned data file from the market research agencies, Vias institute conducted the following steps of quality control before data cleaning:

1. check received data from panel providers against predefined ESRA2 codebook;
2. check programming consistency (i.e., compare predefined filters in the questionnaire with the expected number of missing variables for which filters had to be used);
3. check whether the requested quota per country had been respected (national representativity of the sample based on gender and age (United Nations Statistics Division, 2019); a deviation of 5% of quota value was tolerated).

In step 1-2 only minor mistakes were identified and corrected in in the final database, without any further implications on the quality of the data. Concerning step 3, it should be mentioned that in the subcontract with the market research agency we defined, that a small deviation from the original quota of less than 5% was tolerated (to be corrected with small weighting factors). The data show, that for 75% of the ESRA2 countries the requested quota for national representativity were entirely respected even without having to use small weighting factors. In eight countries, deviations larger than 5% of the predefined quota were present (United Nations Statistics Division, 2019). Those countries were: Greece, India, Republic of Korea, Morocco, Nigeria, Serbia, Slovenia, and Spain. The main problems were an underrepresentation in the sample of woman 65y+ (and to a lesser extent men 65y+) and an overrepresentation in the sample of men 35-44y (and to a lesser extent women 35-44y). For these groups we decided to accept larger weighting factors (min. 0.54 max. 23.62; mean: 1.00; standard deviation: 0.47) to correct for national representativity.

3.2 Data cleaning

As mentioned before, Vias institute predefined criteria for data cleaning of the market research agencies before delivering the database. The following text describes the double check of Vias institute if these predefined criteria had been respected. Furthermore, some amendments were done related to step 3. Figure 4 provides on overview of the ESRA2 data cleaning process. From the original sample provided by the market research agencies (N=35,452), 416 respondents were removed in the additional data cleaning of Vias institute. The final sample consist of N=35,036 respondents.

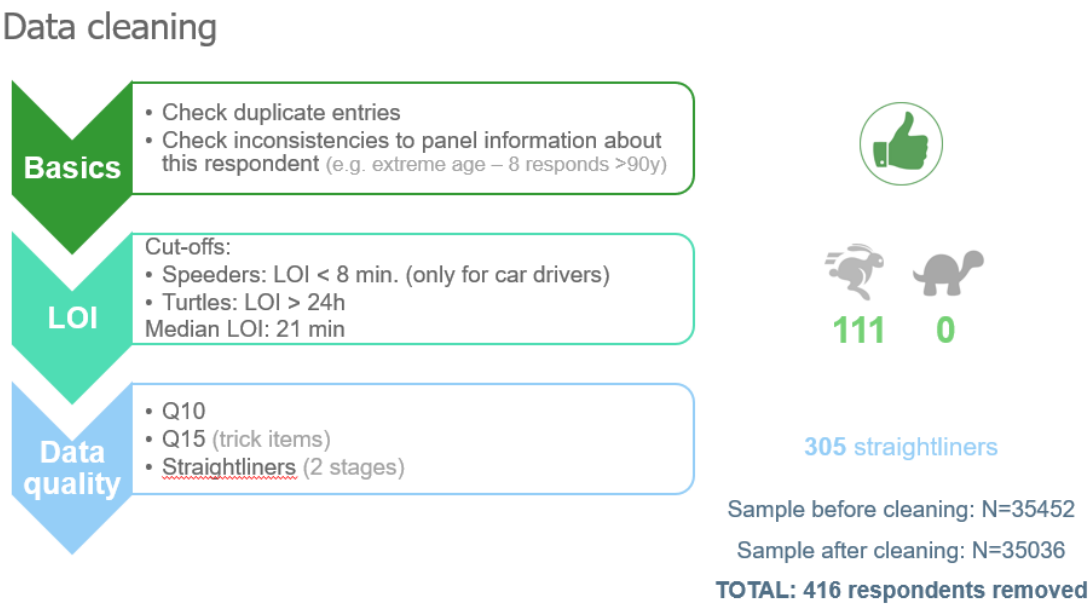


Figure 4: Overview of ESRA2_2018 data cleaning

Step1 – Duplicate entries and inconsistencies

Duplicate entries (mostly based on age, gender, country but also on IP address) had to be removed. For some outliers, the consistency of the socio-demographic info (gender, age, etc) with the information which the provider has of this respondent was checked (e.g. outliers based on age: eight respondents were older than 90y). All this information was correct, and no additional respondents had to be removed from the sample.

Step 2 – Length of the interview (LOI)

The ESRA2 questionnaire aimed at a median LOI of 20 minutes. The original criteria to clean out for 'speeders' (those, who fill out the questionnaire too fast) and 'turtles' (those who fill out the questionnaire too slow) was defined as two standard deviations of the median LOI. Because several market research agencies stated that some of their respondents do not fill in such questionnaires anymore in one go (e.g. take a break or have difficulties with internet connection). In such cases the timer of the interview keeps on running. Therefore, Vias institute decided to omit the criterion of 'turtles' during the fieldwork.

Within the ESRA2 core group a pragmatic consensus was found and the cut-offs for 'speeders' and 'turtles' were redefined as follows: 'Speeders' were defined as car drivers (based on filter of Q10 (use of transport mode)) who filled in the questionnaire in less than 8 minutes. Other road user types were excluded from this criterion as they had to fill in less questions. We identified 111 'speeders' in the sample. Those respondents were equally spread over different countries and age groups (excluding an 'agency bias'). 'Turtles' were defined as those respondents who needed more than 24 hours to fill in the questionnaire (independent of road user type). Though we loosened our initial criterion, we opted to exclude interruptions of more than one day which might increase the effect on answering patterns. We identified no 'turtles' in the sample.

Step 3 – Data quality checks

On two questions data quality checks were integrated in the ESRA2 survey:

(1) Respondents who answered on Q10 items (use of transport mode) always 'never' or on the first block of Q10 (use of transport mode: pedestrians, cyclists and powered-two-wheelers) always 'at least 4 days/week' had to be removed as those replies do not make sense.
(2) In Q15 (attitudes and opinions) we included two 'trick items' (e.g. indicate number1 on the answer scale). Respondents who answered twice incorrectly had to be removed from the sample (indication that respondent is not reading the items properly).

These data quality checks were performed by the agencies, and there was no need to remove any additional respondents based on these criteria.

Step 4 – Straightlining (2-step approach)

So-called straightlining is a response strategy where respondents fill in the same response on a scale on all items of a question. This type of answer patterns was double checked by Vias institute after the check by the agencies (who also check for other systematic response patterns). This additional check was done in 2 steps:

Round 1: 'Straightliners'

Here, a 'straightliners' is defined as a person who answered on all items (100%) of a particular question the same answer; exception Q15 (attitudes and opinions +/-90%). This included the following matrix questions:

- Q12_1b (self-declared behaviour as a car driver; expect for answering 'never' which is plausible);
- Q13_1 (Perceived acceptability of unsafe traffic behaviour of car drivers);
- Q14_1 (personal acceptability of unsafe traffic behaviour of car drivers);
- Q15 (attitudes and opinions; here straightlining defined as same response on 24 out of 27 items, so not including 2 trick items);
- Q17 (risk perception);
- Q18 (support for measures).

If a respondent is indicated as straightlining on at least four of these six questions, the respondent was removed from the sample.

Round 2: 'Almost straightliners'

Here, a 'almost straightliners' is defined as a person who answering on +/- 75% of items of a particular question the same answer. This included the following matrix questions:

- Q12_1b (self-declared behaviour as a car driver; expect for answering 'never' which is plausible; same response on 11 items out of 14);
- Q13_1 (Perceived acceptability of unsafe traffic behaviour of car drivers; same response on 5 out of 7 items);
- Q14_1 (personal acceptability of unsafe traffic behaviour of car drivers; same response on 9 out of 12 items);
- Q15 (attitudes and opinions; same response on 20 out of 27 items, so not including 2 trick items);
- Q18 (support for measures; same response on 11 out of 15 items)

If a respondent is indicated as 'almost straightlining' on all five questions, the respondent is removed from the sample

In total 305 respondents were identified as 'almost straightliners' or 'straightliners' in this step and removed from the sample.

3.3 Dichotomisation of the data

In view of facilitating dissemination of ESRA2 results, some original answer categories (mainly 5-point and 7-point scales) were dichotomized (2 answer categories; binary variables). The dichotomization process was conducted centrally by Vias institute and used in presenting all descriptive analyses of the ESRA2 reports. The dichotomizations and reference categories for each question are indicated in the ESRA2 questionnaire in Appendix 1 (see information on binary variable).

3.4 Regional groups

Four groups were defined in order to compare the results on regional level:

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

3.5 Weighting of the data

The following weights were used to calculate representative means on national and regional level (Table 1). They are based on UN population statistics (United Nations Statistics Division, 2019). The weighting took into account small corrections with respect to national representativeness of the sample based on gender and six age groups (18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y+). For the regions, the weighting also took into account the population size of each country in the total set of countries from this region.

Table 1: Overview of weights applied in ESRA2 analyses

Weight	Description
Individual country weight	Individual country weight is a weighting factor based on the gender*6 age groups (18-24y, 25-34y, 35-44y, 45-54y, 55-64y, 65y+) distribution in a country as retrieved from the UN population statistics.
Europe20 weight	European weighting factor based on all 20 European countries participating in ESRA2_2018, considering individual country weight and population size of the country as retrieved from the UN population statistics.
NorthAmerica2 weight	North American weighting factor based on all 2 North American countries participating in ESRA2_2018, considering individual country weight and population size of the country as retrieved from the UN population statistics.
AsiaOceania5 weight	Asian and Oceanian weighting factor based on all 5 Asian and Oceanian countries participating in ESRA2_2018, considering individual country weight and population size of the country as retrieved from the UN population statistics.
Africa5 weight	African weighting factor based on all 5 African countries participating in ESRA2_2018, considering individual country weight and population size of the country as retrieved from the UN population statistics.

4 Sample characteristics

In total the ESRA2_2018 survey collected data from 35,036 road users across 32 countries. The geographical coverage of the survey can be seen in Figure 3 (page 13).

In the following sections we will highlight sample size, gender and age distribution in the sample, as well as educational level, internet use and the most frequently used transport modes. Additional sociodemographic information of the respondents is also available in the data (e.g. professional occupation or level of urbanisation). These additional characteristics allow for more in-depth comparisons and provides possibilities for advanced data analyses.

4.1 Sample size, gender and age distribution

Table 2 shows the distribution of sample size, gender and age for the different countries and regions. In most countries the ESRA2_2018 survey aimed at a sample size of 1000 respondents per country (total N=35,036). In Austria and Belgium, the national partner decided to increase the samples size to 2000 respondents, as this enables further analyse on regional level. The gender distribution in the total sample is 49% men and 50% women (0.3% other). Figure 5 shows the age description by region (weighted means), which is in line with the demographic characteristics of the regional samples (e.g. younger population in the African region compared to the European or North American region; United Nations Statistics Division, 2019)[5].

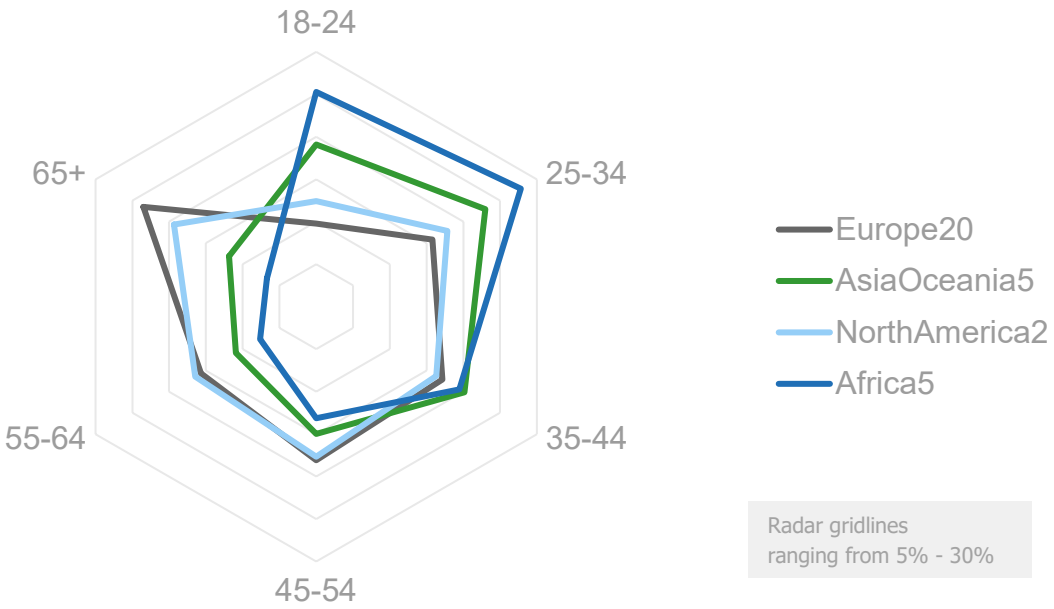


Figure 5: Age describing by region (weighted means)

The youngest respondents were, as defined in the study design, 18 years old and the oldest respondent 98 years old. The average age was 45 years with a standard deviation of 16.5 years.

It should be noted that the share of the oldest age group 65y+ varies strongly by country. This is to some extent the result of their real share in the population (United Nations Statistics Division, 2019), but in some cases it is also due to underrepresentation of this age group within the sample (i.e. Greece, India, Republic of Korea, Morocco, Nigeria, Serbia, Slovenia, and Spain).

[5] Note, that the regional weighted mean in AsiaOceania5 is strongly dominated by India.

Table 2: Sample size, gender and age distribution by country (unweighted) and region (weighed means)

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%	13%	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%

Note. (1) Reference population: all road users. (2) Unweighted sample except for regional weighed means.

4.2 Educational level and internet penetration

In ESRA2 we asked the respondents to indicate the highest qualification or educational certificate that they had obtained. Figure 6 shows the educational level of the respondents by region (weighted means). Table 3 provides an overview of the educational level of the respondents by country and region and the internet use by country. In most countries the largest group was the one with secondary education diplomas followed by the group with a bachelor's degree. The educational level of respondents in most Asian and African countries was higher. Here, most of the respondents had a bachelor's degree. As this might differ from the actual distribution of educational levels in the national populations, this variable should be considered in further analyse and the interpretation of the results.

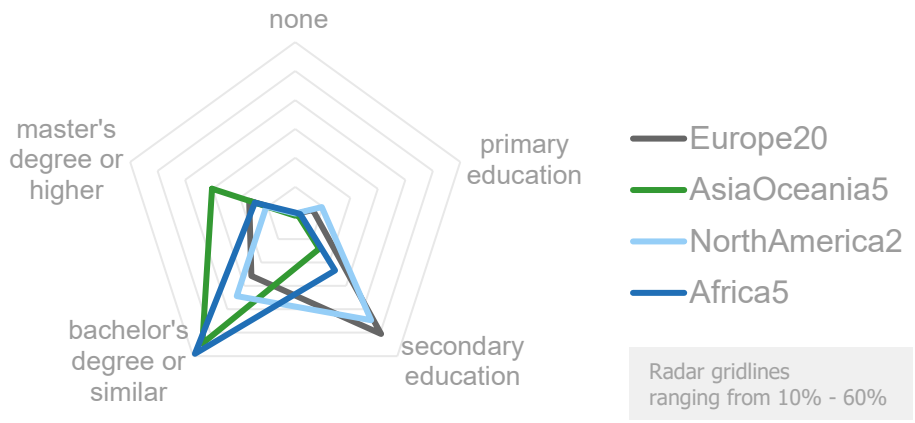


Figure 6: Age describing by region (weighted means)

Within the framework of the ESRA2 project contextual data was collected including the internet penetration in the participating countries (World Bank 2017). The internet penetration is used in the ESRA2_2018 survey as an indicator for the representativity of an online panel sample for the national population. As Table 3 shows, the number of internet-users (per 100 people[6]) is in most participating countries very high (in average 76%). It is above 60% in all countries, except for South Africa (56%), Egypt (45%), India (34%), Nigeria (28%) and Kenya (18%), which indicates a limitation of the representativity of the online panel sample, as actually only a minority of the population uses the internet. This contextual information should be considered in further analyses and interpretation of the results.

[6] includes people younger than 18y.

Table 3: Internet penetration and highest qualification of the respondents by country and region (weighted means)

Country	Internet-users (per 100 people)	none	primary education	secondary education	bachelor's degree or similar	master's degree or higher
Australia	87	0%	1%	51%	38%	9%
Austria	88	0%	7%	68%	10%	15%
Belgium	88	1%	4%	46%	32%	16%
Canada	93	0%	3%	42%	43%	11%
Czech Republic	79	0%	5%	70%	8%	18%
Denmark	97	1%	16%	44%	29%	11%
Egypt	45	1%	1%	16%	68%	13%
Finland	87	0%	13%	54%	19%	14%
France	81	1%	6%	44%	32%	17%
Germany	84	0%	15%	57%	12%	15%
Greece	70	0%	1%	32%	49%	18%
Hungary	77	0%	3%	58%	24%	14%
India	34	0%	1%	9%	55%	36%
Ireland	85	0%	1%	46%	40%	12%
Israel	82	1%	1%	38%	46%	14%
Italy	61	0%	6%	58%	13%	23%
Japan	91	0%	3%	42%	51%	4%
Kenya	18	0%	0%	14%	78%	7%
Morocco	62	2%	4%	20%	51%	23%
Netherlands	93	1%	3%	55%	32%	10%
Nigeria	28	0%	0%	14%	72%	14%
Poland	76	0%	2%	49%	14%	35%
Portugal	74	0%	2%	45%	42%	11%
Republic of Korea	95	0%	1%	23%	66%	9%
Serbia	70	0%	1%	41%	34%	25%
Slovenia	79	0%	3%	52%	39%	5%
South Africa	56	0%	1%	51%	44%	4%
Spain	85	0%	4%	36%	46%	14%
Sweden	96	0%	10%	48%	33%	9%
Switzerland	94	0%	20%	43%	25%	12%
United Kingdom	95	1%	1%	53%	36%	9%
United States	75	1%	10%	45%	33%	10%
Europe20	61-97	1%	6%	51%	26%	17%
AsiaOceania5	34-95	0%	1%	14%	55%	30%
NorthAmerica2	75-93	1%	10%	45%	34%	11%
Africa5	18-62	1%	2%	23%	59%	15%

Note. (1) Reference population: all road users. (2) weighted sample. (3) source internet use per country: World Bank (2017).

4.3 Frequent use of transport modes

In ESRA2 we asked the respondents how often they used the following transport modes in the last 12 months. Table 4 presents an overview of percentage of respondents who answered that they use a certain mode of transport at least a few days a month (in our study defined as 'frequent use of transport modes'). Figure 7 presents these results per region (weighted means).

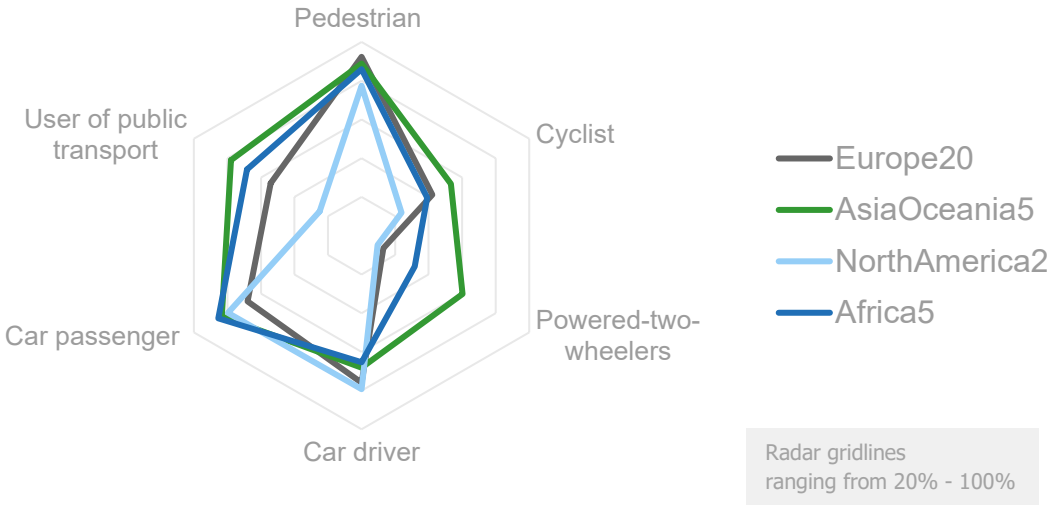


Figure 7: Frequent use of transport modes by region (weighted means)

The most striking differences between the regions are the frequent use of powered-two-wheelers, which is in the Asian Oceanian region clearly higher than in all other regions, and the frequent use of public transport and cycling, which is in North America clearly lower than in all other regions. In most countries walking, car driving and being a passenger in the car are the most frequent transport modes. Riding a powered-two-wheeler is in all countries, except for the India (71%) and Nigeria (48%) the least frequently used transport mode.

Table 4: Frequent use of transport modes by country and region (weighted means)

Country	Pedestrian	Cyclist	Powered-two-wheelers	Car driver	Car passenger	User of public transport
			A few day per month			
Australia	98%	49%	12%	49%	37%	33%
Austria	90%	40%	11%	77%	63%	42%
Belgium	89%	21%	8%	80%	72%	46%
Canada	83%	28%	9%	77%	71%	38%
Czech Republic	93%	35%	11%	61%	66%	64%
Denmark	95%	57%	8%	74%	79%	50%
Egypt	84%	42%	35%	60%	83%	77%
Finland	96%	49%	7%	71%	71%	48%
France	90%	27%	9%	78%	68%	45%
Germany	94%	50%	10%	76%	60%	49%
Greece	94%	33%	22%	80%	82%	67%
Hungary	97%	58%	16%	71%	79%	70%
India	91%	57%	71%	68%	87%	82%
Ireland	90%	30%	9%	77%	77%	51%
Israel	90%	14%	5%	84%	78%	53%
Italy	93%	48%	23%	88%	69%	56%
Japan	76%	42%	11%	64%	61%	54%
Kenya	95%	46%	38%	61%	94%	87%
Morocco	85%	40%	33%	61%	84%	69%
Netherlands	91%	74%	14%	72%	58%	40%
Nigeria	91%	45%	48%	69%	94%	88%
Poland	93%	61%	12%	74%	72%	65%
Portugal	90%	24%	13%	87%	71%	47%
Republic of Korea	89%	39%	11%	71%	81%	90%
Serbia	96%	51%	14%	70%	90%	68%
Slovenia	96%	55%	15%	83%	72%	34%
South Africa	86%	27%	15%	83%	86%	35%
Spain	94%	38%	19%	80%	69%	67%
Sweden	95%	47%	12%	69%	74%	58%
Switzerland	97%	41%	13%	77%	66%	65%
United Kingdom	88%	24%	7%	67%	73%	55%
United States	77%	23%	10%	80%	81%	24%
Europe20	92%	42%	13%	76%	68%	54%
AsiaOceania5	89%	53%	60%	68%	83%	78%
NorthAmerica2	77%	24%	10%	79%	80%	25%
Africa5	86%	39%	32%	65%	85%	68%

Note. (1) Reference population: all road users. (2) weighted sample.

5 Reporting and quality control

5.1 ESRA2 outputs

The key results of the ESRA2_2018 survey will be published through a series of reports including a Main Report (Meesmann et al. 2020), this Methodology Report (Meesmann & Torfs, 2019), 15 Thematic Reports on different topics (speeding, distraction (mobile phone use), fatigue, seat belt, child restraint systems, unsafety feeling & risk perception, enforcement, vehicle automation, pedestrians, cyclists, moped drivers and motorcyclists, young road users, elderly road users, and gender aspects; see Table 5) and 32 country fact sheets, in which national key results are compared to a regional mean (benchmark).

Table 5: ESRA2 Thematic Reports

Driving under influence	Child restraint systems	Cyclists
Speeding	Unsafety feeling & risk perception	Moped drivers & motorcyclists
Distraction (mobile phone use)	Enforcement	Young road users
Fatigue	Vehicle automation	Elderly road users
Seat belt	Pedestrians	Gender aspects

The first wave off outputs has been presented at the '2nd ESRA Symposium' in Brussels, Belgium (18/06/2019) and the final results of ESRA2 at the 'ESRA conference' in Paris, France (30/03 – 01/04/2018). An overview of the results and news on the ESRA initiative is available on: www.esranet.eu

5.2 Quality control

For all common ESRA2 outputs produced by the core group partners, the consortium defined and implemented a peer-review procedure. All SPSS and R scripts related to the data processing were peer reviewed by PRP (Portugal). All Thematic Reports were peer reviewed by an independent core group member who was not involved in the writing but an expert in the field. This review procedure was coordinated by SWOV (the Netherlands). Each country fact sheet was peer reviewed by the national ESRA2 partner. Vias institute coordinated this feedback process. Current aim is to conduct for the Main Report an external peer review, by an independent person who has not directly been involved in the ESRA initiative.

5.3 Closing remarks

The initial aim of ESRA was to develop a system for gathering reliable and comparable 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. ESRA has become a global initiative which already conducted surveys in 46 countries across six continents. The outputs of the ESRA project have become building blocks of national and international road safety monitoring systems.

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Appendix 1: ESRA2 Questionnaire

Introduction

In this questionnaire, we ask you some questions about your experience with, and your attitudes towards traffic and road safety. When responding to a question, please answer in relation to the traffic and road safety situation in [COUNTRY]. There are no right or wrong answers; what matters is your own experience and perception. Thank you for your contribution!

Socio-demographic information

Q1) In which country do you live? _____

Q2) Are you ... male – female – other (only in country who officially recognizes another gender)

Q3a) In which year were you born? Dropdown menu

Q3b) In which month were you born? Dropdown menu

Q4_1) What is the highest qualification or educational certificate that you have obtained? none - primary education - secondary education - bachelor's degree or similar - master's degree or higher

Q4_2) What is the highest qualification or educational certificate that your mother has obtained? none - primary education - secondary education - bachelor's degree or similar - master's degree or higher - I don't know

Q5a) Which of the following terms best describes your current professional occupation? white collar or office worker (excluding executive)/employee (public or private sector) →Q5b - blue collar or manual worker/worker →Q5b - executive →Q5b - self-employed/independent professional →Q5b - currently no professional occupation →Q5c

Q5b) Do you have to drive or ride a vehicle for work? (Please indicate the job category that is most appropriate for you) yes, I work as a taxi, bus, truck driver, … - yes, I work as a courier, mailman, visiting patients, food delivery, salesperson, … - no

Q5c) You stated that you currently have no professional occupation. Which of the following terms best describes your current situation? I am … a student - unemployed, looking for a job – retired - not fit to work - a stay-at-home spouse or parent - other

Q6) What is the postal code of the municipality in which you live? _____

Q7) In which region do you live? Drop down menu

Q8a) How far do you live from the nearest bus stop, light rail stop, or metro/underground station? less than 500 metres → Q8b - between 500 metres and 1 kilometre → Q8b - more than 1 kilometre → skip Q8b

Q8b) What is the frequency of your nearest bus stop, light rail stop, or metro/underground station? at least 3 times per hour - 1 or 2 times per hour - less than 1 time per hour

Mobility & exposure

Q9) Do you have a car driving licence or permit (including learner's permit)? yes - no

Q10) During the past 12 months, how often did you use each of the following transport modes in [country]? How often did you ...? at least 4 days a week - 1 to 3 days a week - a few days a month - a few days a year - never
Items (random): walk minimum 100m (pedestrian; including jogging, inline skate, skateboard, …) - cycle (non-electric) - cycle on an electric bicycle/e-bike/pedelec - drive a moped (≤ 50 cc or ≤ 4 kW; non-electric - drive a motorcycle (> 50 cc and > 4 kW non-electric) - drive an electric moped (≤ 4 kW) - drive an electric motorcycle (> 4 kW) - drive a powered personal transport device such as an electric step, hoverboard, solowheel,… - drive a car (non-electric or non-hybrid) - drive a taxi - drive a bus as a driver - drive a truck/lorry - drive a hybrid or electric car - take a taxi or use a ride-hail service (e.g. Uber, Lyft) - take the train - take the bus - take the tram/streetcar - take the subway - take the aeroplane - take a ship/boat or ferry - be a passenger in a car - use another transport mode

Q11) Over the last 30 days, have you transported a child (<18 years of age) in a car? yes - no
Items: below 150cm - above 150cm

Self-declared safe and unsafe behaviour in traffic

Q12_1a) Over the last 12 months, how often did you as a CAR DRIVER …?
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.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- drive after drinking alcohol
- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)
- read a text message or email while driving

Q12_1b) Over the last 30 days, how often did you as a CAR DRIVER …?
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.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- drive when you may have been over the legal limit for drinking and driving
- drive after drinking alcohol
- drive 1 hour after using drugs (other than medication)
- drive after taking medication that carries a warning that it may influence your driving ability
- drive faster than the speed limit inside built-up areas
- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)
- drive faster than the speed limit on motorways/freeways
- drive without wearing your seatbelt
- transport children under 150cm without using child restraint systems (e.g. child safety seat, cushion)
- transport children over 150cm without wearing their seatbelts
- talk on a hand-held mobile phone while driving
- talk on a hands-free mobile phone while driving
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while driving
- drive when you were so sleepy that you had trouble keeping your eyes open

Q12_2) Over the last 30 days, how often did you as a CAR PASSENGER …? 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.
Binary variable for all items: at least once (2-5) - never (1)
Item:

- travel without wearing your seatbelt in the back seat

Q12_3) Over the last 30 days, how often did you as a MOPED DRIVER OR MOTORCYCLIST …? 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.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- ride when you may have been over the legal limit for drinking and driving
- ride faster than the speed limit outside built-up areas (but not on motorways/freeways)
- ride a moped or motorcycle without a helmet
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while riding a moped or motorcycle

Q12_4) Over the last 30 days, how often did you as a CYCLIST …? 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.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- cycle when you think you may have had too much to drink
- cycle without a helmet
- cycle while listening to music through headphones
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while cycling
- cycle on the road next to the cycle lane

Q12_5) Over the last 30 days, how often did you as a PEDESTRIAN …? 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.
Binary variable for all items: at least once (2-5) - never (1)
Items (random):

- listen to music through headphones as a pedestrian while walking in the streets
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while walking in the streets
- cross the road when a pedestrian light is red
- cross the road at places other than at a nearby (distance less than 30m) pedestrian crossing

Acceptability of safe and unsafe traffic behaviour

Q13_1) Where you live, how acceptable would most other people say it is for a CAR 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/neutral (1-3)
Items (random):

- 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 outside built-up areas (but not on motorways/freeways)
- not wear a seatbelt while driving
- transport children in the car without securing them (child's car seat, seatbelt, etc.)
- talk on a hand-held mobile phone while driving
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while driving

Q14_1) How acceptable do you, personally, feel it is for a CAR 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/neutral (1-3)
Items (random)

- drive when he/she may be over the legal limit for drinking and driving
- drive 1 hour after using drugs (other than medication)
- drive after taking a medication that may influence the ability to drive
- drive faster than the speed limit inside built-up areas
- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)
- drive faster than the speed limit on motorways/freeways
- not wear a seatbelt while driving
- transport children in the car without securing them (child's car seat, seatbelt, etc.)
- talk on a hand-held mobile phone while driving
- talk on a hand-free mobile phone while driving
- read a text message/email or check social media (e.g. Facebook, twitter, etc.) while driving
- drive when they're so sleepy that they have trouble keeping their eyes open

Attitudes towards safe and unsafe behaviour in traffic

Q15) 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/neutral (1-3)
Items (random):
Normative believes & subjective norms (including injunctive norms from Q13)

- Most of my friends would drive after having drunk alcohol.
- Most of my friends would drive 20 km/h over the speed limit in a residential area.

Behaviour believe & attitudes

- For short trips, one can risk driving under the influence of alcohol.
- I have to drive fast; otherwise, I have the impression of losing time.
- Respecting speed limits is boring or dull.
- For short trips, it is not really necessary to use the appropriate child restraint.
- I use a mobile phone while driving, because I always want to be available.
- To save time, I often use a mobile phone while driving.

Perceived behaviour control (here: self-efficacy)

- I trust myself to drive after having a glass of alcohol.
- I have the ability to drive when I am a little drunk after a party
- I am able to drive after drinking a large amount of alcohol (e.g. half a liter of wine).

- I trust myself when I drive significantly faster than the speed limit.
- I am able to drive fast through a sharp curve.
- I trust myself when I check my messages on the mobile phone while driving.
- I have the ability to write a message on the mobile phone while driving.
- I am able to talk on a hand-held mobile phone while driving.

Habits

- I often drive after drinking alcohol.
- Even when I am a little drunk after a party, I drive.
- It sometimes happens that I drive after consuming a large amount of alcohol (e.g. a liter of beer or half a liter of wine).
- I often drive faster than the speed limit.
- I like to drive in a sporty fast manner through a sharp curve.
- It happens sometimes that I write a message on the mobile phone while driving.
- I often talk on a hand-held mobile phone while driving.
- I often check my messages on the mobile phone while driving.

Intentions

- I will do my best not to drive after drinking alcohol in the next 30 days.
- I will do my best to respect speed limits in the next 30 days.
- I will do my best not to use my mobile phone while driving in the next 30 days.

Quality control items

- Indicate number 1 on the answering scale.
- Indicate number 4 on the answering scale.

Subjective safety & risk perception

Q16) How safe or unsafe 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) = Items indicated by the respondent in Q10 are displayed.

Q17) How often do you think each of the following factors is the cause of a road crash involving a car? You can indicate your answer on a scale from 1 to 6, where 1 is "never" and 6 is "(almost) always". The numbers in between can be used to refine your response.
Binary variable: often/frequently (4-6) - not that often/not frequently (1-3)
Items (random)

- 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
- using a hands-free mobile phone while driving
- inattentiveness or day-dreaming while driving
- driving while tired

Support for policy measures

Q18) Do you oppose or support a legal obligation to …? You can indicate your answer on a scale from 1 to 5, where 1 is "oppose" and 5 is "support". The numbers in between can be used to refine your response.
Binary variable: support (4-5) – oppose/neutral (1-3)
Items (random)

- install an alcohol "interlock" for drivers who have been caught drunk driving on more than one occasion (technology that won't let the car start if the driver's alcohol level is over the legal limit)
- have zero tolerance for alcohol (0,0 ‰) for novice drivers (licence obtained less than 2 years)
- have zero tolerance for alcohol (0,0 ‰) for all drivers
- install Intelligent Speed Assistance (ISA) in new cars (which automatically limits the maximum speed of the vehicle and can be turned off manually)
- install Dynamic Speed Warning signs (traffic control devices that are programmed to provide a message to drivers exceeding a certain speed threshold)
- have a seatbelt reminder system for the front and back seats in new cars
- require all cyclists to wear a helmet
- require cyclists under the age of 12 to wear a helmet
- require all moped drivers and motorcyclists to wear a helmet
- require pedestrians to wear reflective material when walking in the streets in the dark
- require cyclists to wear reflective material when cycling in the dark
- require moped drivers and motorcyclists to wear reflective material when driving in the dark

- have zero tolerance for using any type of mobile phone while driving (hand-held or hands-free) for all drivers
- not using headphones (or earbuds) while walking in the streets
- not using headphones (or earbuds) while riding a bicycle

Q19_1) What do you think about the current traffic rules and penalties in your country for driving or riding under the influence of alcohol? agree – disagree
Items:

- The traffic rules should be stricter.
- The traffic rules are not being checked sufficiently.
- The penalties are too severe.

Q19_2) What do you think about the current traffic rules and penalties in your country for driving or riding faster than the speed limit? agree – disagree
Items: Q19_1

Q19_3) What do you think about the current traffic rules and penalties in your country for using a mobile phone while driving or riding? agree – disagree
Items: Q19_1

Enforcement

Q20_1) On a typical journey, how likely is it that you (as a CAR DRIVER) will be checked by the police for… You can indicate your answer on a scale from 1 to 7, where 1 is "very unlikely" and 7 is "very likely". The numbers in between can be used to refine your response.
Binary variable: likely (5-7) – unlikely/neutral (1-4)
Items (random)

- … alcohol, in other words, being subjected to a Breathalyser test
- … the use of illegal drugs
- … respecting the speed limits (including checks by a police car with a camera, fixed cameras, mobile cameras, and section control systems)
- … wearing your seatbelt
- … the use of hand-held mobile phone to talk or text while driving

Q21_1) In the past 12 months, how many times have you been checked by the police for using alcohol while DRIVING A CAR (i.e., being subjected to a Breathalyser test)? never – 1 time – at least 2 times - I prefer not to respond to this question
Binary variable: at least once - never (removing "I prefer not to respond to this Q)

Q22_1) In the past 12 months, how many times have you been checked by the police for the use of drugs (other than medication) while DRIVING A CAR? never – 1 time – at least 2 times - I prefer not to respond to this question
Binary variable: at least once - never (removing "I prefer not to respond to this Q)

Involvement in road crashes

Introduction: The following questions focus on road crashes. With road crashes, we mean any collision involving at least one road vehicle (e.g., car, motorcycle, or bicycle) in motion on a public or private road to which the public has right of access. Furthermore, these crashes result in material damage, injury, or death. Collisions include those between road vehicles, road vehicles and pedestrians, road vehicles and animals or fixed obstacles, road and rail vehicles, and one road vehicle alone.

Q23_1a) In the past 12 months, how many times have you personally been involved in road crashes in which you or somebody else had to be taken to the hospital? ___ times (number; max. 10) if 0 → Q23_2a; if >0 → Q23_1b → Q23_2a
Binary variable: at least once - never

Q23_1b) Please indicate the transport modes you were using at the time of these crashes.
Items indicated by the respondent in Q10 are displayed; Threshold = 'at least a few days a year'.
Number to be indicated after each transport mode; note the sum should be equal to the number indicated in Q23_1a

Q23_2a) In the past 12 months, how many times have you personally been involved in road crashes with only minor injuries (no need for hospitalisation) for you or other people? ___ times (number; max. 10) if 0 → Q23_3a; if >0 → Q23_2b → Q23_3a
Binary variable: at least once - never

Q23_2b) = Q23_1b

Q23_3a) In the past 12 months, how many times have you personally been involved in road crashes with only material damage?
___ times (number; max. number 10) if 0 → skip Q23_3b; if >0 → Q23_3b → next Q
Binary variable: at least once - never

Q23_3b) = Q23_1b

Vehicle automation

I2) Introduction: The following questions focus on your opinion about automated passenger cars. We talk about two different levels of vehicle automation:
Semi-automated passenger cars: Drivers can choose to have the vehicle control all critical driving functions, including monitoring the road, steering, and accelerating or braking in certain traffic and environmental conditions. These vehicles will monitor roadways and prompt drivers when they need to resume control of the vehicle.
Fully-automated passenger cars: The vehicle controls all critical driving functions and monitoring all traffic situations. Drivers do not take control of the vehicle at any time.

Q24) How interested would you be in using the following types of automated passenger car? You can indicate your answer on a scale from 1 to 7, where 1 is "not at all interested" and 7 is "very interested". The numbers in between can be used to refine your response.
Binary variable: interested (5-7) - not interested/neutral (1-4)
Items:

- semi-automated passenger car
- fully-automated passenger car

Q25_1) How likely do you think it is that the following benefits will occur if everyone would use a semi-automated passenger car? You can indicate your answer on a scale from 1 to 7, where 1 is "very unlikely" and 7 is "very likely". The numbers in between can be used to refine your response.
Binary variable: likely (5-7) – unlikely/neutral (1-4)
Items (random):

- fewer crashes
- reduced severity of crash
- less traffic congestion
- shorter travel time
- lower vehicle emissions
- better fuel economy
- time for functional activities, not related to driving (e.g. working)
- time for recreative activities, not related to driving (e.g. reading, sleeping, eating)

Q25_2) How likely do you think it is that the following benefits will occur if everyone would use a fully-automated passenger car? You can indicate your answer on a scale from 1 to 7, where 1 is "very unlikely" and 7 is "very likely". The numbers in between can be used to refine your response.
Items (random) = Q25_1

Bonus question to be filled in by national partner

Q26) .....? You can indicate your answer on a scale from 1 to 5, where 1 is "…." and 5 is "….". The numbers in between can be used to refine your response.
Items (random; 4 items)

Q27) .....? You can indicate your answer on a scale from 1 to 5, where 1 is "…." and 5 is "….". The numbers in between can be used to refine your response.
Items (random; 4 items)

Social desirability scale

Introduction: The survey is almost finished. The following questions have nothing to do with road safety, but they are important background information. There are no good or bad answers.

Q28) To what extent are the following statements true? You can indicate your answer on a scale from 1 to 5, where 1 is "very untrue" and 5 is "very true". The numbers in between can be used to refine your response.
Items (random):

- I always respect the highway code, even if the risk of getting caught is very low.
- I would still respect speed limits at all times, even if there were no police checks.
- I have never driven through a traffic light that had just turned red.
- I do not care what other drivers think about me.
- I always remain calm and rational in traffic. (if needed pop-up: rational = non-emotional)
- I am always confident of how to react in traffic situations.

Appendix 2: Summary of ESRA2_2018 fieldwork per country

Country	Panel provider	National subcontractor	National langue versions	Sample size	Median LOI (minutes)	Start date field (yyyy-mm-dd)	End date field (yyyy-mm-dd)
Australia	RN SSI	RN SSI	English_AU	968	18.44	2018-12-14	2018-12-29
Austria	Punto de Fuga	CINT	German_AT	1999	18.57	2018-12-04	2018-12-18
Belgium	RN SSI	RN SSI	Dutch_BE; French_BE	1985	18.90	2018-12-14	2018-12-31
Canada	RN SSI	RN SSI	English_CA; French_CA	980	19.50	2018-12-19	2018-12-31
Czech Republic	RN SSI	RN SSI	Tscheck_CR	989	20.81	2018-12-14	2018-12-30
Denmark	RN SSI	RN SSI	Denish_DK	984	20.31	2018-12-14	2018-12-31
Egypt	Punto de Fuga	CINT	Arabic_EG: English_EG*	996	21.92	2018-12-04	2018-12-24
Finland	RN SSI	RN SSI	Finish_FI	994	20.04	2018-12-14	2018-12-27
France	RN SSI	RN SSI	French_FR	994	19.02	2018-12-14	2018-12-30
Germany	RN SSI	RN SSI	German_DE	1989	18.67	2018-12-14	2018-12-29
Greece	Ipsos (GfK)	Toluna	Greece_EL	1015	23.52	2018-12-05	2018-12-19
Hungary	Punto de Fuga	CINT	Hungarian_HU	1014	21.89	2018-12-04	2018-12-12
India	Punto de Fuga	CINT	Hindi_IN; English_IN	1035	24.12	2018-12-04	2018-12-12
Ireland	Ipsos (GfK)	Toluna	English_IE	1031	21.00	2018-12-05	2018-12-24
Israel	RN SSI	Panel4All	Hebrew_IL. English_IL	984	20.02	2018-12-17	2018-12-29
Italy	RN SSI	RN SSI	Italien_IT	980	20.04	2018-12-14	2018-12-24
Japan	RN SSI	RN SSI	Japanese_JP	980	17.37	2018-12-14	2018-12-25
Kenya	Punto de Fuga	CINT	Swahili_KE; English_KE*	1000	30.55	2018-12-04	2018-12-13
Morocco	Punto de Fuga	CINT	Arabic_MA; French_MA*	1047	27.05	2018-12-05	2018-12-23
Netherlands	RN SSI	RN SSI	Dutch_NL	983	19.19	2018-12-17	2018-12-27
Nigeria	Punto de Fuga	CINT	English_NG*	1000	34.08	2018-12-04	2018-12-21
Poland	RN SSI	RN SSI	Polisch_PL	993	22.04	2018-12-17	2018-12-31
Portugal	Punto de Fuga	CINT	Portugese_PT	998	21.34	2018-12-04	2018-12-17
Republic of Korea	Ipsos (GfK)	Toluna	Serbian_RS	1043	18.62	2018-12-05	2018-12-18
Serbia	Ipsos (GfK)	CINT	Slovenian_SI	1041	24.00	2018-12-05	2018-12-18
Slovenia	Ipsos (GfK)	CINT	Afrikaans_ZA; English_ZA*	1035	23.58	2018-12-05	2018-12-15
South Africa	Ipsos (GfK)	Toluna	Korean_KR	1013	28.28	2018-12-05	2018-12-19
Spain	RN SSI	RN SSI	Spanich_ES	980	20.61	2018-12-14	2018-12-28
Sweden	RN SSI	RN SSI	Swedisch_SE	987	19.53	2018-12-17	2018-12-30
Switzerland	INFAS	Lightspeed	German_CH. French_CH. Italien_CH	1020	19.79	2019-01-04	2019-01-22
United Kingdom	RN SSI	RN SSI	English_UK	963	16.91	2018-12-14	2018-12-26
USA	Punto de Fuga	CINT	English_US	1016	16.93	2018-12-04	2018-12-11
32	**4**	**5**	**42**	**35036**	**20.82**	**2018-12-04**	**2019-01-22**



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