



ESRA

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E-Survey of Road users' Attitudes



Speeding

ESRA2 Thematic report Nr. 2



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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
ETSC	European Transport Safety Council
EU	European Union
ICW	Individual country weight used in ESRA2
ISA	Intelligent Speed Adaptation
OECD	Organisation for Economic Co-operation and Development

Summary

Objective and methodology

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, BFU, CTL, IATSS, IFSTTAR, ITS, KfV, NTUA, PRP, SWOV, TIRF). At the heart of ESRA is a jointly developed questionnaire survey, which is translated into national language versions. 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, motorcycle and moped drivers, cyclists and pedestrians.

The present report is based on the second edition of this global survey, which was conducted in 2018 (ESRA2_2018). In total this survey collected data from more than 35.000 road users across 32 countries. An overview of the ESRA initiative and the project-results is available on: www.esranet.eu.

This thematic ESRA report on speeding describes the attitudes and opinions on speeding of road users in 32 countries from four different regions: Europe, Asia Oceania, North America and Africa. It includes comparisons among the participating countries and regions as well as descriptive results in relation to age and gender. The speeding aspects analysed in this thematic report cover the personal acceptability of speeding (individual norm) and acceptability of others (injunctive norm), self-declared speeding behaviour, attitudes and beliefs towards speeding, support for road safety policy measures and reported police checks and perceived likelihood of getting caught for speeding offences.

Key results

Among all participating countries, 4.8% (Serbia) to 22.1% (Austria) of the respondents expressed the opinion that driving faster than the speed limit outside built-up areas (but not on motorways) is acceptable. As in the first edition of ESRA, the perceived acceptability by others for driving faster than the speed limit outside built-up areas is slightly higher with 7.8% (Hungary) to 29.2% (Austria), on average.

Nevertheless, 45.4% of car drivers in the Asia Oceania region to 67.5% in the European region report to have exceeded the speed limit outside built-up areas at least once in the last 30 days. More males than females declare driving faster than the speed limit for all road areas and all four regions. However, the difference is not significant in all cases.

70.8% to 75.9% of the respondents further indicate that they will do their best to respect speed limits in the next 30 days. This intention may also be due to the finding that most road users declare they don't really trust themselves when driving significantly faster than the speed limit. The highest trust (23.0%) is expressed by respondents from Asia Oceania, whereas road users in Africa report the lowest trust in themselves when speeding (12.8%).

The perceived frequency of speeding being the cause of a road crash differs widely between countries and is highest in Kenya (87.3%), Nigeria (82.4%), followed by Hungary and Poland (81.4%, respectively). Only in Republic of Korea (34.1%) and Japan (42.0%) less than half of the respondents think that speeding frequently is the cause of a road crash. Furthermore, the percentages are higher among females than males in all four regions, with a significant difference between males (70.9%) and females (78.5%) in the European countries.

On average, more than half of the respondents tend to perceive getting checked by the police for respecting the speed limits as rather unlikely. This perceived likelihood should be enhanced to keep more people from speeding. Only in Serbia, Poland and Kenya more than 50% believe that they will be checked at least once on a typical journey.

The support for policy measures related to speeding behaviour differs widely between countries. Whereas 94.2% in India, 89.2% in Kenya and Nigeria and 88.2% in the Republic of Korea agree that the traffic rules should be stricter, only 17.8% in Egypt express this opinion, followed by Austria (37.4%) and Switzerland (38.3%).

An obligation to install dynamic speed warning signs is supported by more than 50% of the respondents in all countries, with respondents from Kenya indicating a noteworthy high support of 95.2%. The support for an installation of ISA ranges more widely from 43.5% (Austria) to 86.2% (Kenya).

By analysing the impact of various safety expectations regarding speeding, a theoretical model was developed and tested in the advanced analyses part. This model is able to explain the reported speeding behaviour as well as the habit of speeding behaviour quite well and confirms the important role of expectations on the control of speeding behaviour.

These results provide a new overview of opinions, attitudes and behaviour regarding speeding all over the world and can be used to think about new preventative measures also considering the view of the road user himself.

Key recommendations

Recommendations at European Level

- Focus on speed management outside built-up areas, since the most reported speeding behaviour was found for this area and the most road fatalities happen on rural roads.
- Intensify the agreements between and the observational learning from European countries, to adapt the quite different attitudes and opinions among countries towards safer speeding behaviour.

Recommendations at North American Level

- Point out the advantages of ISA such as estimated effects regarding lifesaving to enhance the acceptability and the support of an implementation.
- Enhance checks and monitoring to enhance the relatively low perceived likelihood of getting checked by the police for speeding on a typical journey.

Recommendations at Asia Oceanian Level

- Evaluate and revise the existing traffic rules (especially in India and Republic of Korea) to respond to the quite high percentage rate of road users thinking the traffic rules should be stricter.
- Focus on social norms when creating communicative strategies related to speeding behaviour.

Recommendations at African Level

- Particular attention must be paid to older road users (65+), for this group reports the most frequent speeding behaviour as well as the highest acceptability for this behaviour. Specific risk communication needs to be developed to reach this target group.

- The analyses show large differences between African countries concerning the support for policy measures. Possible reasons for e.g. the perceived strict rules and severe penalties in Egypt can be investigated by comparing traffic rules and laws within Africa.

The ESRA initiative has demonstrated the feasibility and the added value of joint data collection on road safety performance by partner organizations all over the world. The intention is to repeat this initiative on a triennial basis, retaining a core set of questions in every wave. In this way, ESRA produces consistent and comparable road safety performance indicators that can serve as an input for national road safety policies and for international monitoring systems on road safety performance.

1 Introduction

According to the World Health Organisation, traffic accidents are one of the eight leading causes of death all over the world (WHO, 2018). Speeding is a major cause of death and serious injuries among accidents and proper speed management offers a promising approach to reduce these road crashes. By gathering and analysing information about the attitudes, beliefs and acceptability of road users for speeding, this road safety topic shall be further investigated in the context of this report.

Driving with higher speed leads to greater risk of an occurring crash (Elvik et al. 2004; SWOV, 2012). In 2019, the European Transport Safety Council (ETSC) stated that dropping the average speed by 1 km/h on all roads across the EU would save about 2.100 lives per year. Another evocative example comes from the World Health Organisation, which publishes 10 Facts on Global Road Safety in 2018: A pedestrian who gets hit by a car with a speed of 65km/h instead of 50km/h faces more than 4 times the risk of death.

With respect to this illustration it is undisputed that speeding is one of the most important topics in road safety research. As a key risk factor in road traffic, speeding is associated with both, the number of crashes as well as the severity of crashes (OECD/ITF, 2018; SWOV, 2012). To reduce these numbers, OECD/ITF (2018) indicates that if high speed limits are planned, either stricter enforcement or an upgrade of the infrastructure is recommended additionally to compensate for the increased risk resulting from higher mean speed. The European Transport Safety Council (ETSC, 2019) states among others stricter laws, credible speed limits, education for road users and intelligent cars that help the driver to comply with the speed limits.

Speed limits, traffic rules and penalties differ between countries all over the world. Considering that higher speed is associated with a greater risk for crashes, a comparison between different countries could provide further information about the effects of implementing different laws and preventative measures that contribute to a reduction of speed on different road types. In ESRA2, data of road users in 32 countries were collected and provide an overview about attitudes and opinions on different road safety topics such as enforcement and policy measures.

According to SWOV (2016), speeding is not just driving faster than the speed limit, but it also contains not adapting the speed to the local conditions such as weather or traffic volumes. Even if you are not exceeding the prescribed maximum speed, the speed can still be too high in respect to the given conditions and thus play an important role for your safety and the safety of others. Condition based traffic information as well as speed limits differing according to weather and traffic conditions is needed to inform and create acceptability regarding road safety measures.

Exceeding the speed limit is a common behaviour. As declared by the European Commission (2015), 40% to 50% of drivers drive faster than the speed limit and 10% to 20% exceed the speed limit by more than 10 km/h. What makes all these road users drive too fast? Some characteristics of drivers exceeding the speed limit are already identified. E.g. in 2018, the National Center for Statistics and Analysis (NCSA) of the National Highway Traffic Safety Administration pointed out some driver characteristics based on the data of the Fatality Analysis Reporting System (FARS). In this analysis, low age as well as male gender was characteristic of speeding behaviour.

To take a closer look at the role of gender and age concerning changes in road traffic and preventative measures regarding speeding and to explore further factors, different constructs like self-declared speed violations, acceptability of speeding, risk perception, beliefs, attitudes and support for policy measures regarding speeding are reported in the descriptive analyses of this report and further investigated in the advanced analyses. Direct and indirect effects on the self-declared speeding behaviour as well as on the reported accidents will be explained by path analyses. In sum, this thematic ESRA2 report aims at describing the speeding behaviour and different attitudes and expectations towards speeding of road users in 32 different countries.

2 Methodology

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.

ESRA data is 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 national language versions. 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, motorcycle and moped drivers, cyclists and pedestrians. The present report is based on the second edition of this global survey, which was conducted in 2018 (ESRA2_2018). In total this survey collected data from more than 35 000 road users across 32 countries.

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.

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)). The common results of the ESRA2_2018 survey will be published in a Main Report, a Methodology Report and at least fifteen Thematic Reports (Table 1). Furthermore, 32 country fact sheets were produced, 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. An overview of the results and news on the ESRA initiative is available on: www.esranet.eu

Table 1: 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 present report summarizes the ESRA2_2018-results with respect to speeding. An overview of the data collection method and the sample per country can be found in (Meesmann & Torfs, 2019. [ESRA2 methodology](#)).

Analysed speeding aspects in this thematic report are:

a. Self-declared speeding behaviours

Answers from 1 (never) to 5 ((almost) always)

Q12_1a) *Over the last 12 months, how often did you as a CAR DRIVER...?*

- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)

Q12_1b) *Over the last 30 days, how often did you as a CAR DRIVER...?*

- 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

b. Other's acceptability (injunctive norm) and personal acceptability (individual norm) of speeding

Answers from 1 (unacceptable) to 5 (acceptable)

Q13_1) *Where you live, how acceptable would most other people say it is for a CAR DRIVER to...?*

- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)

Q14_1) *How acceptable do you, personally, feel it is for a CAR DRIVER to...?*

- 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

c. Attitudes towards speeding

Answers from 1 (disagree) to 5 (agree)

Q15) *To what extent do you agree with each of the following statements?*

Perceived Descriptive Norm:

- Most of my friends would drive 20 km/h over the speed limit in residential area.

Behaviour Beliefs and Attitudes:

- I have to drive fast; otherwise I have the impression of losing time.
- Respecting the speed limits is boring or dull.

Self-efficacy:

- I trust myself when I drive significantly faster than the speed limit.
- I am able to drive fast through a sharp curve.

Habits:

- I often drive faster than the speed limit.
- I like to drive in a sporty fast manner through a sharp curve.

Intentions:

- I will do my best to respect speed limits in the next 30 days.

d. Subjective Safety & Risk Perception

Answers from 0 (never) to 6 ((almost) always)

Q17) *How often do you think each of the following factors is the cause of a road crash involving a car?*

- driving faster than the speed limit

e. Support for policy measures related to speeding

Answers from 1 (oppose) to 5 (support)

Q18) *Do you oppose or support a legal obligation to...?*

- 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)

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?*

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

f. Enforcement and reported police checks

Answers from 1 (very unlikely) to 7 (very likely)

Q20_1) *On a typical journey, how likely is it that you (as a CAR DRIVER) will be checked by the police for...*

- respecting the speed limits (including checks by a police car with a camera, fixed cameras, mobile cameras, and section control systems)?

Chapter 3 focuses on the results of descriptive analyses (part one) and advanced analyses (part two). To assess significant differences between groups like gender or age groups, Chi-square tests were applied. The strength of the association between variables is reported with Cramer's V. According to Cohen (1988), a Cramer's $V = 0.1$ can be interpreted as a small and $V = 0.3$ as a medium effect. This aspect should be considered, when interpreting the results. In the further analyses, structural equation models (Muthén & Muthén, 2010) to explore underlying associations as well as multiple group analysis are performed.

Note that a weighting of the data was applied to 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+; based on population statistics from United Nations data (United Nations Statistics Division, 2019). For the regions, the weighting also took into account the population size of each country in the total set of countries from this region. SPSS 25.0 and R 3.6.0 was used for the descriptive results and MPlus 6.1.1 (Muthén & Muthén, 2010) for the further analyses.

3 Results & discussion

3.1 Overall results

This chapter focuses on results of descriptive statistics on survey questions related to speeding. For four regions, self-declared (reported) behaviour, the acceptability of such behaviours, norms, self-efficacy, habits and intentions towards speeding in respect of differences between gender and age groups are analysed in detail. The four regions are named after their number of participating countries (mentioned in chapter 2): Europe20, NorthAmerica2, AsiaOceania5 and Africa5.

3.1.1 Self-declared speeding behaviour

To examine the self-declared speeding behaviour as a car driver, respondents were asked to report how often they drove faster than the speed limit in different areas in the last 30 days.

Question: Over the last 30 days, how often did you as a CAR DRIVER...?

- 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

For this question, only people who reported having driven a car at least a few days a month were taken into account, which was the case for 25,535 respondents. The answering scale for the self-declared behaviour ranged from 1 (never) to 5 (almost) always). For the descriptive analyses these answers were split into never (1) and at least once (2-5).

As shown in (Figure 1), self-declared speed violations over all road types range from 42.7% in Africa5 to 71.6% in NorthAmerica2. For driving faster than the speed limit on motorways (46.4% to 71.6%), inside built-up areas (42.7% to 58.9%) and outside built-up areas (45.4% to 67.5%) the proportions of those who reported speeding behaviour at least once in the last 30 days depend significantly on the region (p -value < 0.001). In all regions, car drivers report to exceed the speed limit inside built-up areas in the last 30 days least often compared to the other road areas.

Furthermore, only in the Europe20 countries fewer people report to have driven faster than the speed limit on motorways/freeways (61.5%) than outside built-up areas (67.5%). Staying at European level, in 2017 about 8% of road fatalities occurred on motorways, 37% in urban areas and 55% on rural

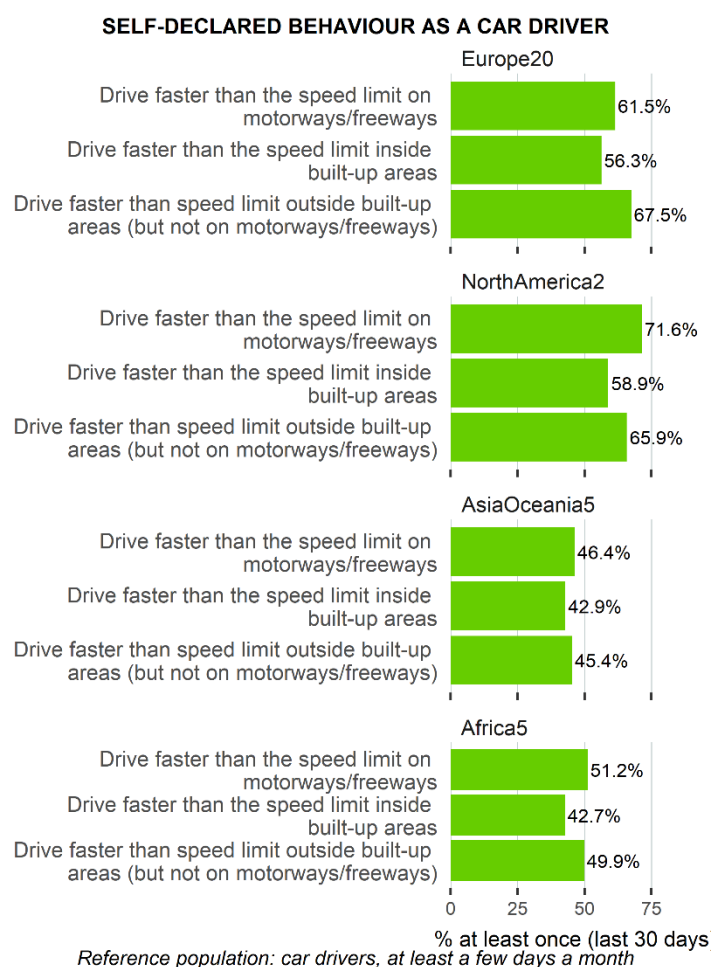


Figure 1: Self-declared behaviour on speeding, by region (% of car drivers that did it at least once in the past 30 days).

roads (European Commission, 2018). In this ESRA survey, people report the most frequent driving faster than the speed limit for driving outside built-up areas (67.5%). Taken together, these findings point out the important role of reducing speeding in Europe especially outside built-up areas.

Even though speeding behaviour is reported somewhat more frequent in the European and North American region, these results indicate that driving faster than the speed limit is widely spread over continents and differs between road areas.

When subdividing the self-declared speeding behaviour by countries (Figure 2), the percentage rates even differ within the regions. Whereas Indian respondents consistently report the lowest speed violation rates in Asia Oceania for all road areas, there is a large difference e.g. between the reported speeding in Sweden on motorways/freeways (80.5%) and inside built-up areas (53.8%).

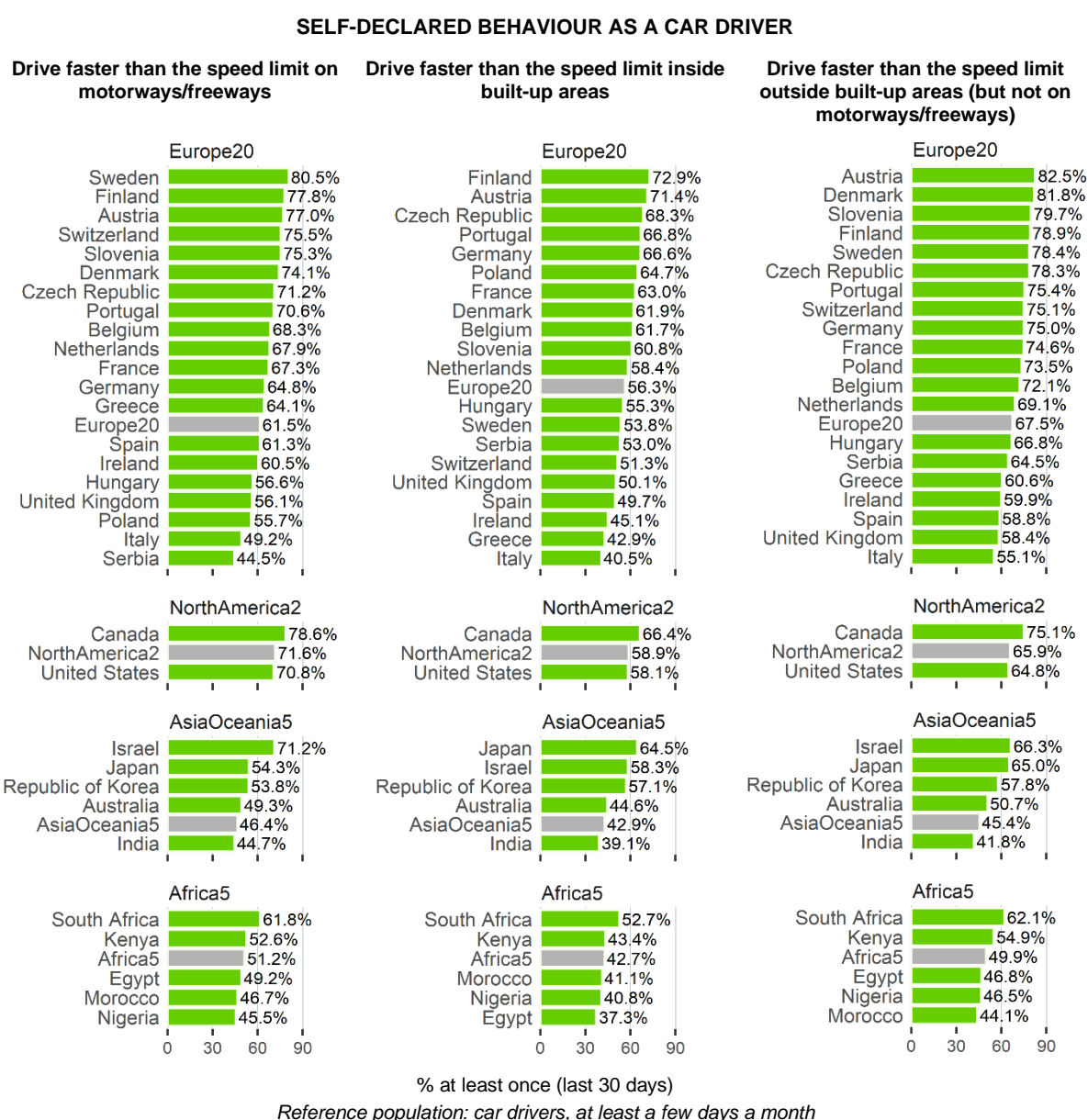


Figure 2: Self-declared behaviour on speeding, by country (% of car drivers that did it at least once in the past 30 days).

The analysis by gender shows that males report more speeding than females inside built-up areas in all regions (see Figure 3), though only for Europe20 (chi-square = 195.4; df = 1; p-value < 0.001) and Africa5 (chi-square = 23.857; df = 1; p-value < 0.001) the differences between gender reach statistical significance.

When asking for driving faster than the speed limit outside built-up areas (but not on motorways/freeways), self-declared speeding significantly depends on the gender in all regions, with males reporting more speeding than females (p-value < 0.001). The responses to driving faster than the speed limit on motorways/freeways show a similar pattern: males again report more speeding than women do, with significant gender differences in Europe20, AsiaOceania5 and Africa5 (p-value < 0.001 in each case).

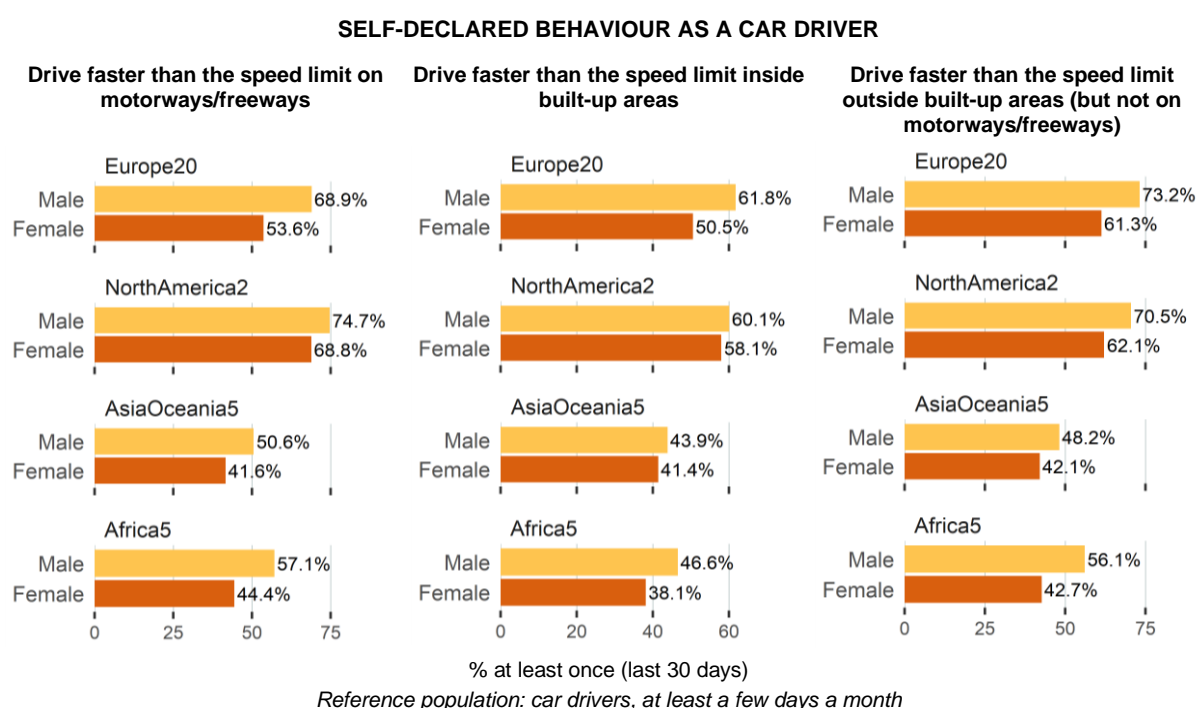
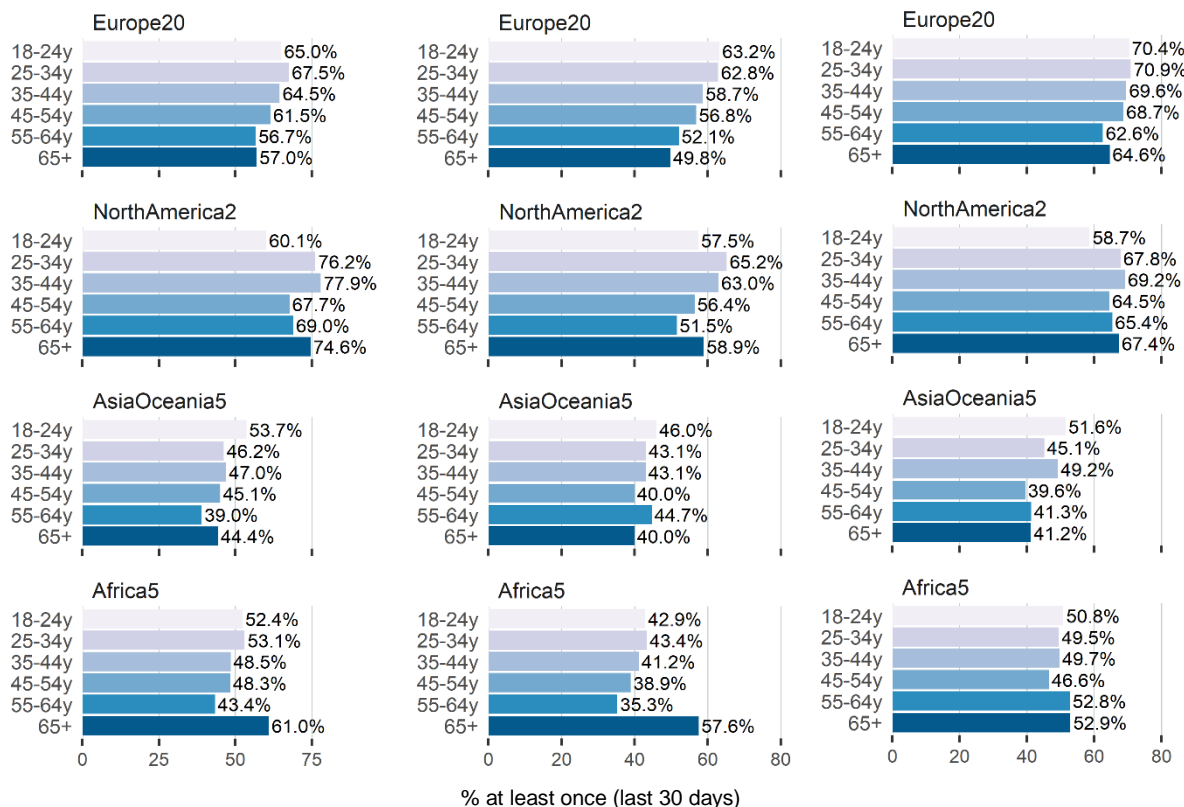


Figure 3: Self-declared behaviour on speeding, by region and gender (% of car drivers that did it at least once in the past 30 days).

As shown in Figure 4, the percentage of respondents who drove faster than the speed limit at least once in the past 30 days also varies among age groups. The proportions of those who reported speeding significantly depend on the age for all type of roads in Europe20 (p-value < 0.001). Also, in Europe20 more frequently reported speeding inside built-up areas was tendentially associated with an age decrease (chi-square = 152.475; df = 5; p-value < 0.001). The strength of the association of this self-declared behaviour and the age group was small (Cramer's V: 0.100).

SELF-DECLARED BEHAVIOUR AS A CAR DRIVER

Drive faster than the speed limit on
motorways/freewaysDrive faster than the speed limit inside
built-up areasDrive faster than the speed limit
outside built-up areas (but not on
motorways/freeways)

Reference population: car drivers, at least a few days a month

Figure 4: Self-declared behaviour on speeding, by region and age group (% of car drivers that did it at least once in the past 30 days).

Interestingly, whereas for Africa5 the speeding inside built-up areas also significantly depends on the age group (chi-square = 31.41; df = 5; p-value < 0.001), older car drivers (65+) in this region report significantly more speed violations than all other age groups (p-value < 0.01). From literature it is known that younger drivers are more likely to speed (e.g. NCSA, 2018; Stradling et. al, 2008). The contrary finding in the African regions provides cause for target-group specific measures and risk communication, especially in view of the increasing numbers of elderly persons and their mobility needs in the context of demographic change. At this point it must be noted that within the African countries the numbers of 65+ respondents who answered the ESRA2 survey were quite low (with the exception of South Africa), so that the answers of this particular age group in African countries cannot be considered to be representative.

3.1.2 Acceptability of speeding

According to theory of planned behaviour (Ajzen, 1985), the intention to show a behaviour as well as the actual behaviour is, *inter alia*, influenced by norms. To further understand why or why not people do exceed speed limits, the acceptability of this behaviour was assessed by asking about how much the respondents accept speeding behaviour and how much other people do. This perceived acceptability of other's refers to the injunctive norm, which describes people's beliefs about what most others approve or disapprove (Cialdini, Reno, & Kallren, 1990). The personal acceptability, on the other hand, can be interpreted as an individual norm.

Since this question does not refer to behaviour but to the perceived acceptability by road users, the answers of all respondents were analysed. The following two questions were asked in order to find out the level of acceptability of the behaviour 'driving faster than the speed limit' in different road areas:

Injunctive Norm

Question: Where you live, how acceptable would most other people say it is for a CAR DRIVER to...?

- drive faster than the speed limit outside built-up areas (but not on motorways/freeways)

Individual Norm

Question: How acceptable do you, personally, feel it is for a CAR DRIVER to...?

- 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

The answering scale for the acceptability of speeding ranged from 1 (unacceptable) to 5 (acceptable). For the analyses, the answers were split into acceptable (4-5) and unacceptable/neutral (1-3).

In all countries, less than one-third indicate that they do accept driving faster than the speed limit. Furthermore, respondents consider driving faster than the speed limit outside built-up areas (but not on motorways/freeways) is more acceptable by 'others' than by themselves in all countries (Figure 5).

Acceptability rates of speed violations differ widely among countries: Perceived acceptability by others ranges from 7.8% in Hungary to 29.2% in Austria. The differences between the region reach significance (chi-square = 47,954; df = 3; p-value < 0.001). The strength of the association of the social acceptability of speeding and the region was small (Cramer's V: 0.039).

When respondents were asked whether they personally accept driving faster than the speed limit outside built-up areas (but not on motorways/freeways), the proportions of those who find it acceptable significantly depend on the region again (chi-square = 41.59; df = 3; p-value < 0.001), with AsiaOceania5 countries reporting significantly less acceptability for this behaviour than the other regions on average (7.7%; p-value < 0.01). Matching this, Asia Oceania is the region with the least frequent reported speeding behaviour (see previous chapter). The strength of the association of the personal acceptability of speeding and the region was small (Cramer's V: 0.036).

Across all regions, personal acceptability ranges from 4.8% in Serbia to 22.1% in Austria. Therefore, for both personal acceptability and perceived acceptability by others, the highest as well as the lowest acceptability rates were observed in Europe20 with Austria having the highest rate in both cases.

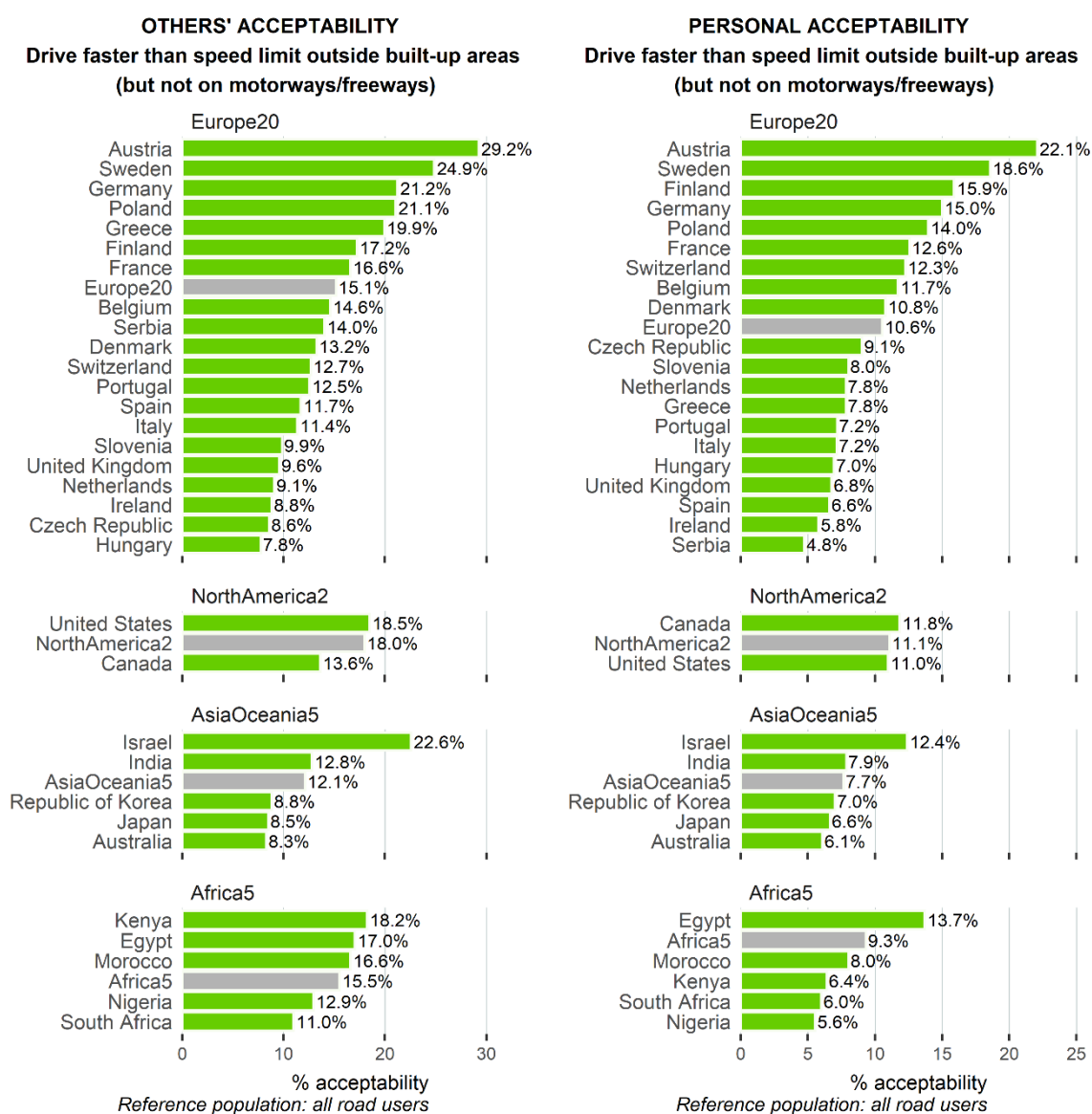


Figure 5: Acceptability of driving faster than the speed limit outside built-up areas, by region and country (% of road users who indicate driving faster than the speed limit as acceptable).

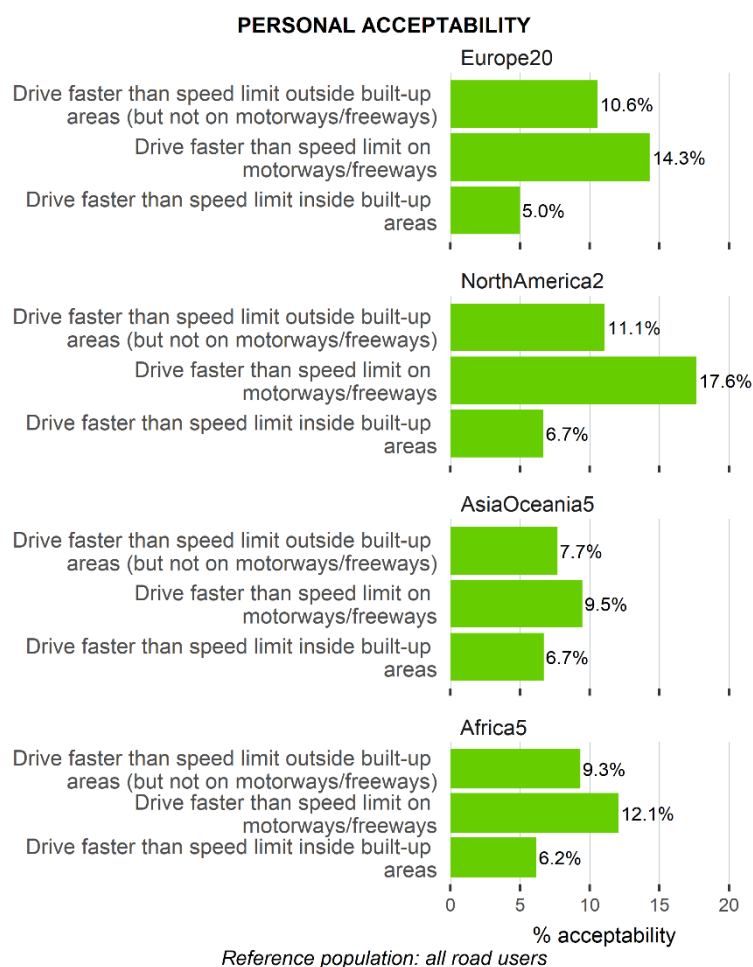


Figure 6: Personal acceptability of speeding, by region (% of road users that perceive driving faster than the speed limit as acceptable).

As shown in Figure 6, the percentage of personal acceptability of road users for speed violation is highest for the case of driving faster than the speed limit on motorways/freeways in all regions (Europe20: 14.3%, NorthAmerica2: 17.6%, AsiaOceania5: 9.5% and Africa5: 12.1%). All in all, the percentages show that most road users all over the world think speeding to be an unacceptable behaviour.

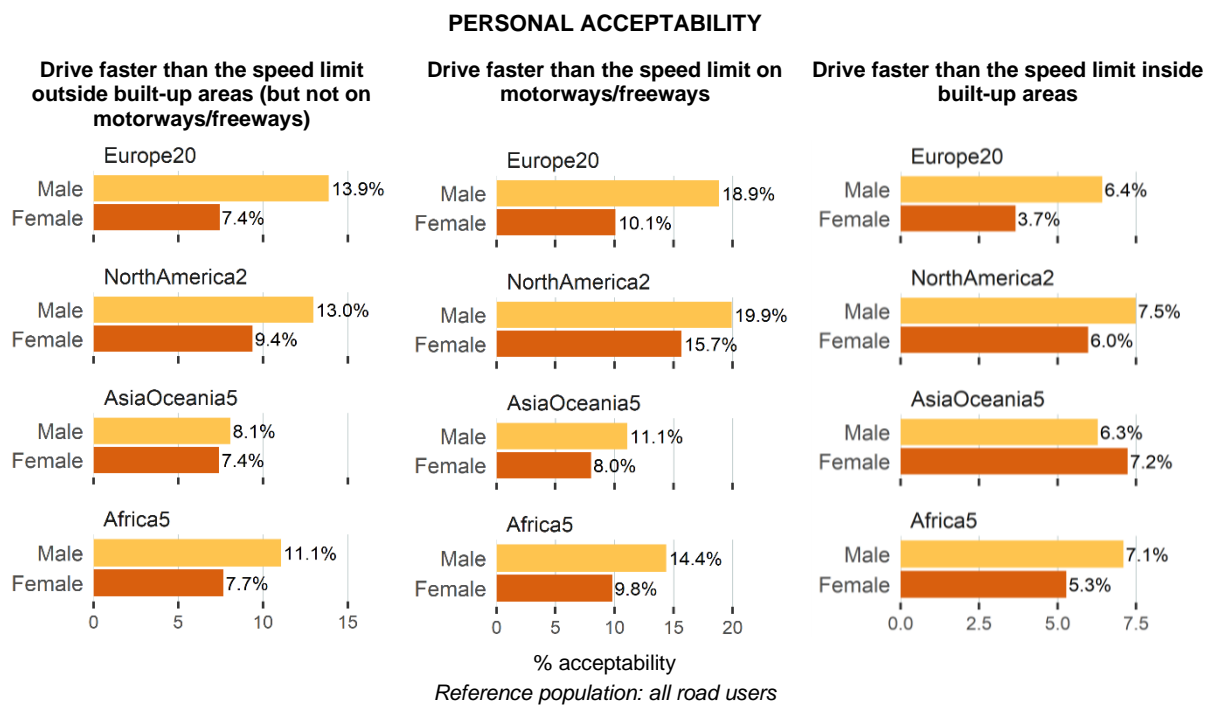


Figure 7: Personal acceptability of speeding, by region and gender (% of road users that perceive driving faster than the speed limit as acceptable).

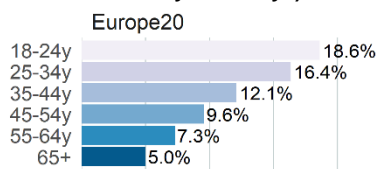
The analysis of reported acceptability of speeding behaviour by gender reveals that personal acceptability rates are lower among females for all different road areas and all regions (Figure 7), only in the AsiaOceania5 countries higher descriptive acceptability rates for driving faster than the speed limit inside built-up areas for females were observed (but not significant, p -value = 0.183). Gender-specific communication strategies could be considered to lower the acceptability among males, in order to also lower the actual speeding behaviour.

Personal acceptability rates also vary among the age of the respondents. Like the self-reported speeding behaviour, only in Africa5 countries the age group of 65+ is prominent with having the highest percentage among all three items (Figure 8). For driving faster than speed limit on motorways/freeways in the Africa5 countries, the acceptability rates for the 65+ group (17.1%) are significantly higher than the rates of the 25-34 (10.5%), 35-44 (10.3%), 45-54 (8.2%) and the 55-64 (9.3%) years of age groups (p -value < 0.01). All in all, personal acceptability depends significantly on the region (chi-square = 50.907; df = 5; p -value < 0.001) with a small effect size (Cramer's V : 0.101).

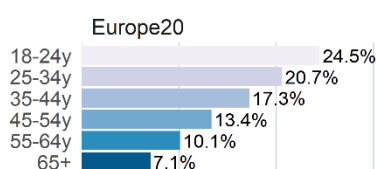
Taken together, road users believe speeding to be more acceptable by 'others' than by themselves in all countries. This pattern was already a common belief in ESRA1. Shifting this bias to a more realistic one could maybe contribute to more conscious road behaviour. Furthermore, the highest acceptability rates in both cases were found for Austria. These finding can be used to adapt communicative strategies related to speeding.

PERSONAL ACCEPTABILITY

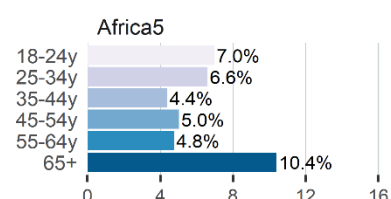
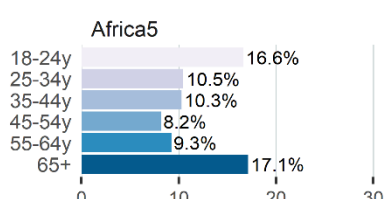
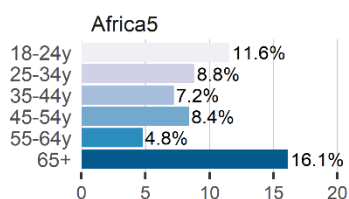
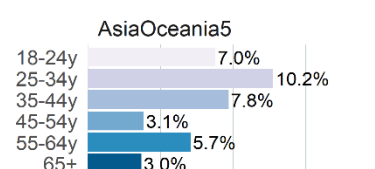
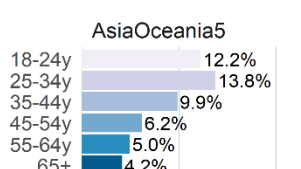
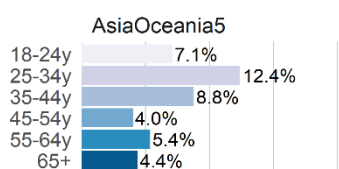
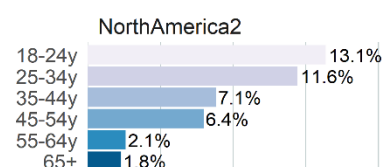
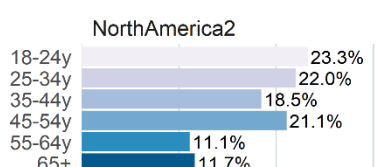
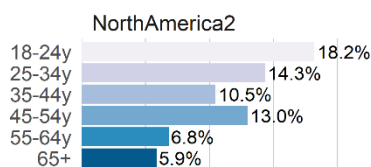
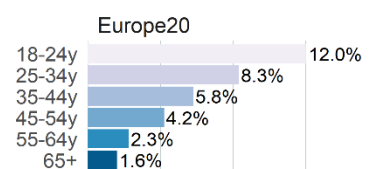
Drive faster than the speed limit
outside built-up areas (but not on
motorways/freeways)



Drive faster than the speed limit on
motorways/freeways



Drive faster than the speed limit inside
built-up areas



% acceptability

Reference population: all road users

Figure 8: Personal acceptability of speeding, by region and age group (% of road users that indicate driving faster than the speed limit as acceptable).

3.1.3 Attitudes towards speeding

In this chapter, the attitudes of all road users in the sample were assessed to investigate the cognitive aspects of speeding behaviour. Therefore, five different psychological constructs related to speeding are analysed and described.

- Perceived descriptive norm: This norm describes what a person thinks to be typical or normal and what most people would do (Cialdini et al., 1990)
- Behaviour beliefs and attitudes: What do road user think about driving faster than the speed limit? What is the reason for them speeding?
- Self-efficacy: People's beliefs about their own capabilities to do a task or activity (Bandura, 1977)
- Habits: A behaviour people show repeatedly
- Intentions: Conscious decision of a person to execute a certain behaviour

The answering scale for these five constructs ranged from 1 (disagree) to 5 (agree) and were split into agree (4-5) and disagree/neutral (1-3) for analysing.

The first construct, perceived descriptive norm, describes the perception of how other people would normally behave in a certain situation. In the ESRA2 questionnaire, an attempt is made to capture the descriptive norm by asking the following question:

Question: To what extent do you agree with each of the following statements?

- Most of my friends would drive 20 km/h over the speed limit in residential area.

The agreement for the statement 'most of my friends would drive 20 km/h over the speed limit in a residential area' depend significantly on the region (chi-square = 317.379; df = 3; p-value < 0.001). The agreement rate in the region AsiaOceania5 (24.8%) is significantly higher (p-value < 0.01) than in Europe20 (14.3%), NorthAmerica2 (17%) and Africa5 (15.4%). The strength of the association between this item and the region was small (Cramer's V: 0.100). The range greatly differs from 3.9% in Australia to 31.4% in Greece (see Figure 9).

The percentages of respondents thinking most of their friends would exceed the speed limit are slightly higher among males than females in all regions, but the rates did not differ significantly (p-value > 0.001 for all cases).

In the Europe20 region, age increase is tendentially associated with a greater rejection of the statement. Whereas 21.1% of the age group 18-24 agree with the statement, only 10.2% of the 65+ group do (p < 0.01).

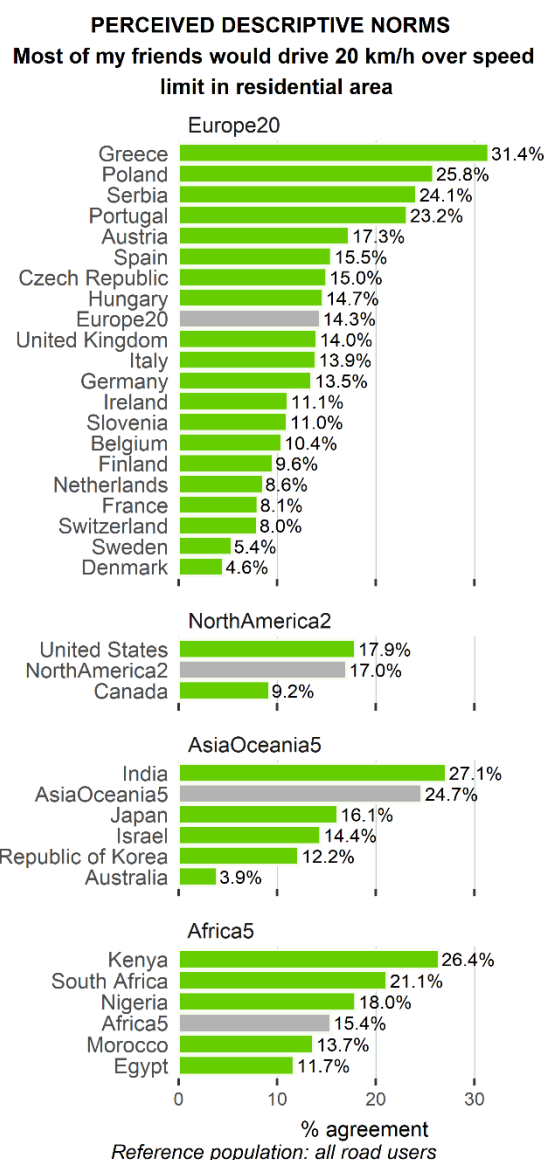


Figure 9: Perceived descriptive norms, by region and country (% of agreement).

Response rates towards the perceived descriptive norm, behaviour beliefs and attitudes, self-efficacy, habits and intentions of all participating road users are shown in Table 2. Aside for the intention related question, proportions of agreement are rather low for all questions (5.0% to 24.7%).

Except for the statement 'I am able to drive fast through a sharp curve' ($p = 0.001$), the agreement rate for all questions significantly depend on the region (p -value < 0.001 and small effect sizes in all cases).

An examination of the self-efficacy shows that 23.0% of respondents from AsiaOceania5 report trust in themselves when driving faster than the speed limit significantly more frequent than respondents in Europe20 (15.9%), NorthAmerica2 (16.3%) and Africa5 (12.8%) do (p -value < 0.01).

Furthermore, whereas in chapter 3.1.1 42.7% to 71.6% of the respondents report to have exceeded the speed limit in the last 30 days, most of the respondents in all regions (70.8% to 75.9%) report that they will do their best to respect speed limits in the next 30 days. This (descriptive) finding implies that intention may not be a sufficient predictor for speeding behaviour and that other constructs must also be taken into account. The gap between intention and actual behaviour is a well-known phenomenon in psychology (e.g. Sheeran, 2002) and has to be overcome to achieve the desired behaviour.

Table 2: Attitudes towards speeding behaviour, by region (% of agreement)

<i>To what extent do you agree with each of the following statements?</i>	Europe20	North-America2	Asia-Oceania5	Africa5
Perceived Descriptive Norms				
Most of my friends would drive 20 km/h over the speed limit in residential area.	14.3%	17.0%	24.7%*	15.4%
Behaviour beliefs & attitudes				
I have to drive fast; otherwise I have the impression of losing time.	5.6%	5.5%	8.2%	9.2%
Respecting the speed limits is boring or dull.	12.3%*	8.3%	9.7%	9.5%
Self-efficacy				
I trust myself when I drive significantly faster than the speed limit.	15.9%	16.3%	23.0%*	12.8%*
I am able to drive fast through a sharp curve.	11.3%	7.7%	10.7%	8.3%
Habits				
I often drive faster than the speed limit.	11.7%	20.8%*	11.5%	9.3%*
I like to drive in a sporty fast manner through a sharp curve.	7.4%	5.0%	6.5%	7.2%
Intentions				
I will do my best to respect speed limits in the next 30 days.	70.8%	72.8%	74.7%	75.9%

Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) Reference population: all road users. (3) The countries with the highest % are indicated in yellow, the countries with the lowest % in green. (4) *: Proportions are significantly different from all other regions (p -value < 0.01) (5) Regions based on according regional weight.

3.1.4 Risk perception

Effects of fear on attitudes, intentions, and behaviours have been found in several studies (Tannenbaum et al., 2015; Witte & Allen, 2000). These findings are also successfully used in traffic safety campaigns (e.g. Klimmt et al., 2017) by showing the risk of unsafe traffic behaviour. To assess the perceived risk related to speeding, all respondents were asked to estimate the likelihood of driving faster than the speed limit being the cause of a road crash involving a car. The scale ranged from 0 (never) to 6 (almost always) and were divided into 'often/frequently' (4-6) and 'not that often/not frequently' (1-3).

Question: How often do you think each of the following factors is the cause of a road crash involving a car?

- driving faster than the speed limit

The risk perception regarding speeding differs significantly between the regions (chi-square = 651.778; df = 3; p-value < 0.001). Proportions were significantly different between all pairs of regions (p-value < 0.01): Europe20 (74.8%), AsiaOceania5 (56.8%), NorthAmerica2 (71.6%) and Africa5 (68.1%). The strength of the association between perceived frequency of driving faster than the speed limit being the cause of a road crash and the region was small (Cramer's V: 0.143).

As shown in Figure 10, there are large ranges of values between countries. Whereas in Kenya 87.3% indicate speeding to be a frequent cause of a road crash, only 42.0% in Japan and 34.1% in the Republic of Korea are of the same opinion. There are many possible explanations for the differences between countries, e.g. the actual number of accidents attributed to speeding as well as the frequency and intensity with which the media report about it.

Females perceived speeding as a more frequent cause of road accidents than males in Europe20, AsiaOceania5 and NorthAmerica2, with a significant difference between males (70.9%) and females (78.5%) in Europe20 (chi-square = 155.164; df = 1; p-value < 0.001). The perceived frequency for driving faster than the speed limit as a cause of a road crash is with 68.1% the same for both genders in Africa5.

Despite some lower percentages in Japan and the Republic of Korea, these results indicate that road users all over the world are aware of speeding being one main cause of a road crash. Nevertheless, about 40-70% of the respondents (on an average, depending on the kind of road area and region) declare speeding in the last 30 days (see Chapter 3.1.1). This finding implies that many road users think that accidents due to speeding apply to others, but not to themselves. The feeling of being invulnerable and the belief that negative events are less likely for oneself to happen than for other

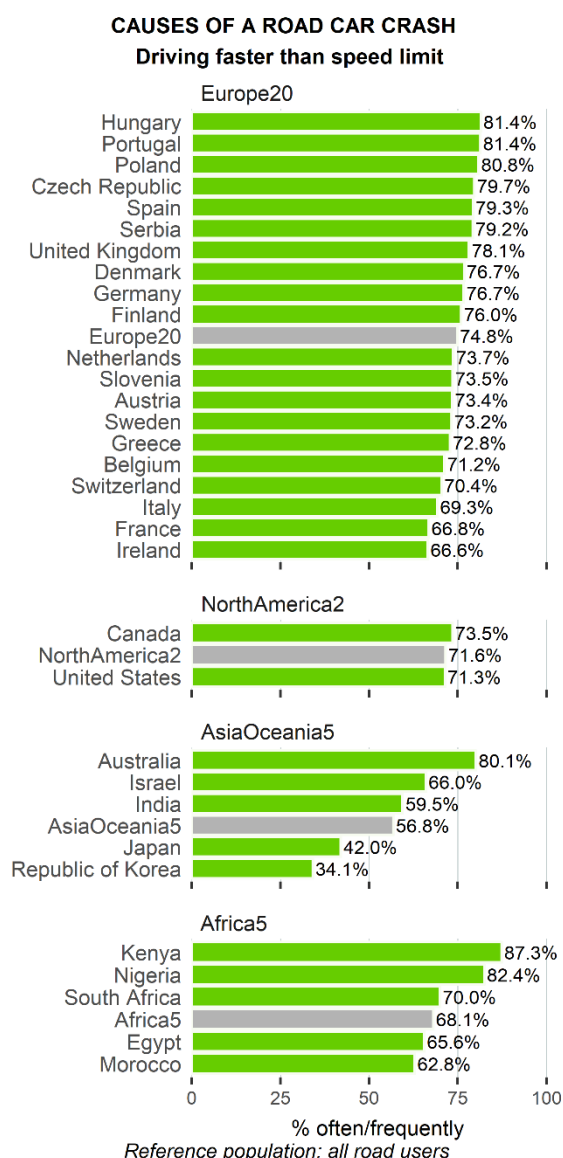


Figure 10: Driving faster than the speed limit as cause of a road crash (% perceived frequency).

people is also called 'unrealistic optimism' (Weinstein, 1980). One goal for road safety communication must be to inform people about this bias to create a more realistic risk perception regarding speeding.

3.1.5 Support for policy measures

Another topic of interest is the opinion of road users about traffic rules and penalties regarding speeding. Adequate monitoring and sanctions are important to promote or prevent specific behaviour. To assess the support of traffic rules and penalties, the following three questions were included in the survey:

Question: What do you think about the current traffic rules and penalties in your country for driving or riding faster than the speed limit?

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

All road users were asked for their opinion about the current traffic rules and penalties in their country. For all three questions, the rates of agreement depend significantly on the region (p -value < 0.001). Table 3 shows the percentages of agreement: Agreement rates of the statement 'the traffic rules (for speeding) should be stricter' range widely from 17.8% in Egypt to 94.2% in India. Even within the four regions, the rates differ widely among countries. Especially the large difference between Egypt and the other African countries is salient.

Table 3: Support for policy measures, by country (% of agreement).

What do you think about the current traffic rules and penalties in your country for driving or riding faster than the speed limit?

	The traffic rules should be stricter.	The traffic rules are not being checked sufficiently.	The penalties are too severe.
AT	37.4%	54.2%	30.7%
BE	51.1%	65.0%	37.5%
CH	38.3%	46.0%	41.3%
CZ	59.2%	71.6%	24.9%
DE	52.3%	64.5%	24.1%
DK	44.0%	63.1%	19.4%
EL	78.5%	94.8%	30.7%
ES	69.8%	73.3%	36.4%
FI	50.7%	65.6%	29.3%
FR	42.3%	53.0%	51.0%
HU	57.3%	61.4%	44.3%
IE	61.8%	72.5%	32.3%
IT	68.6%	80.3%	27.3%
NL	52.8%	66.9%	30.2%
PL	60.8%	73.8%	25.9%
PT	52.4%	70.4%	42.0%
RS	68.4%	77.3%	33.9%
SE	62.2%	75.2%	17.4%
SI	46.5%	64.4%	56.0%
UK	61.1%	69.9%	23.3%
Europe20	57.4%	68.4%	31.4%
CA	59.7%	66.7%	23.7%
US	46.2%	61.7%	29.7%
NorthAmerica2	47.6%	62.2%	29.1%
AU	51.4%	54.2%	31.5%
IL	61.4%	71.8%	22.0%
IN	94.2%	76.6%	38.7%
JP	74.2%	75.3%	28.9%
KR	88.2%	78.8%	11.4%
AsiaOceania5	90.6%	76.1%	36.1%
EG	17.8%	28.2%	62.5%
KE	89.2%	82.4%	20.9%
MA	44.9%	47.9%	47.7%
NG	89.2%	88.9%	16.2%
ZA	74.0%	81.2%	30.4%
Africa5	47.0%	52.5%	45.6%

Notes: (1) % of agreement: scores 4 and 5 on a 5-point scale from 1 'disagree' to 5 'agree'. (2) The countries with the highest % are indicated in yellow, the countries with the lowest % in green. (3) Countries based on individual country weight; regions based on according regional weight.

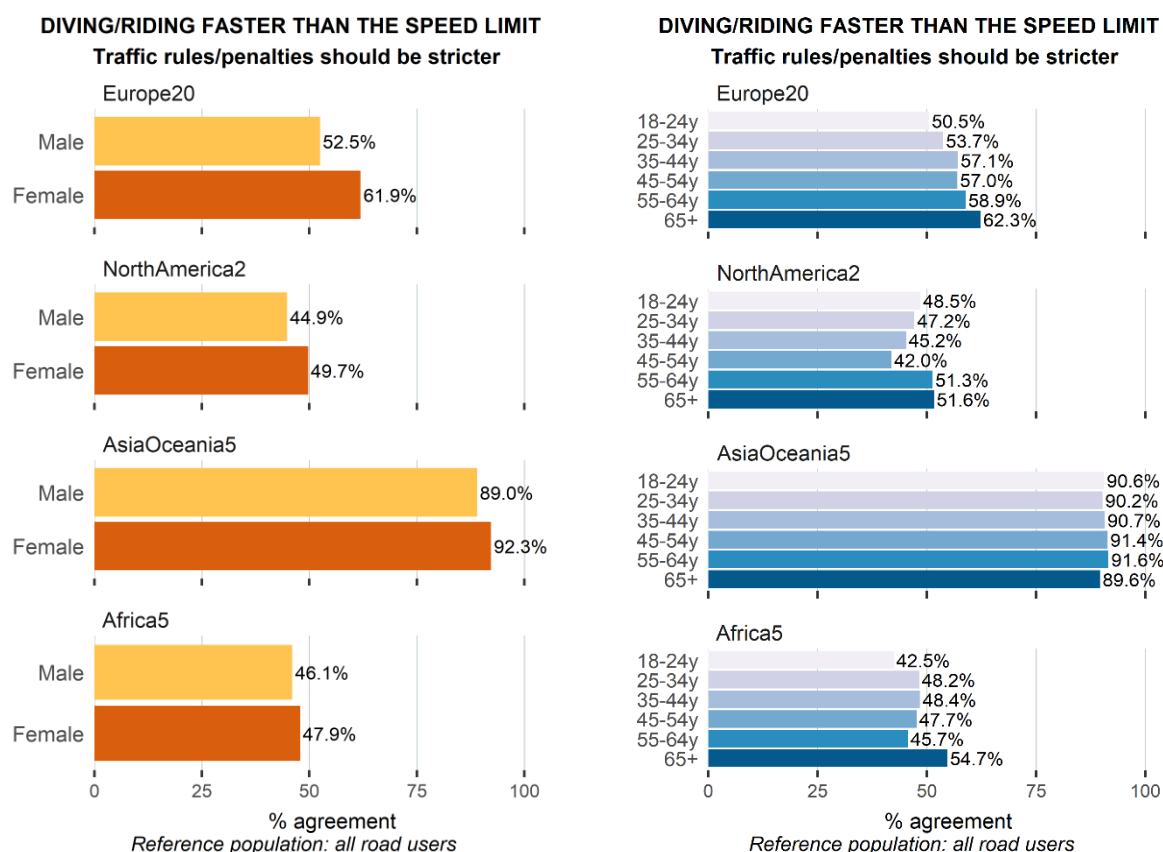


Figure 11: Support for stricter traffic rules/penalties, by region, gender and age group (% of agreement).

Females are generally more supportive of stricter traffic rules (Figure 11), with a significant gender difference in Europe20 and AsiaOceania5 countries (p -value < 0.001). The analysis by age group shows that in Europe20 countries the percentages of agreement also depend significantly on the age group (p -value < 0.001). In this region, respondents older than 65 tend to agree to stricter traffic rules more frequent (62.3%) than the 18-24-year-old age group with 50.5% (p -value < 0.01).

Regarding the insufficient check of traffic rules, Egypt again has the lowest percentages (28.2%) compared to 88.9% in Nigeria or 94.8% in Greece (see Table 3). Agreement rates of the statement 'the traffic rules are not being checked sufficiently' significantly depend on the gender in Europe20 (chi-square = 46.358; df = 1; p -value < 0.001) and Africa5 (chi-square = 13.692; df = 1; p -value < 0.001) with more females agreeing than males (Figure 12). In Europe20 the oldest age group has again the highest percentages (76.2%) in contrast to the lowest in age group 18-24 (58.6%). A similar pattern was found for NorthAmerica2 with 71.4% for the oldest and 60.1% for the youngest age group. The differences in agreement rates are statistically significant for both regions (p -value < 0.01).

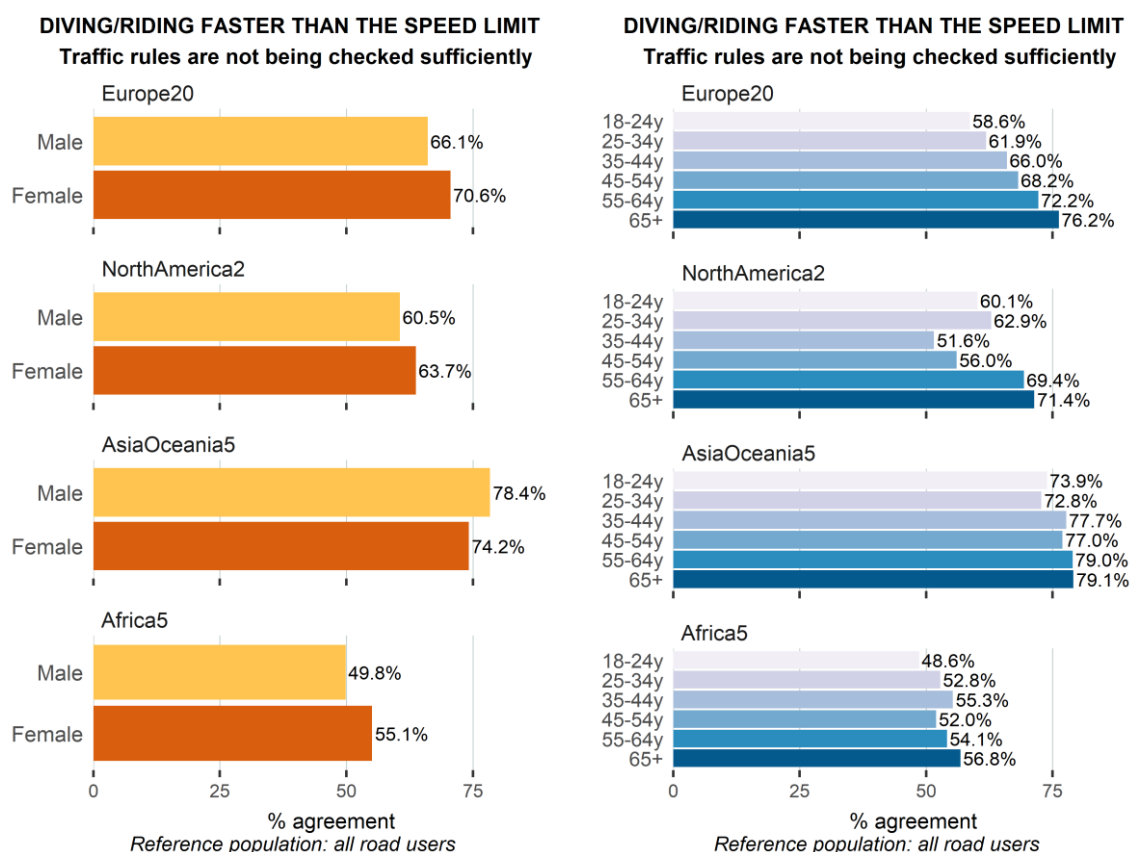


Figure 12: Sufficient check of traffic rules, by region, gender and age group (% of agreement).

As shown in Table 3, 62.5% in Egypt and 56.0% in Slovenia feel that the penalties in their country are too severe, whereas only 16.2% in Nigeria and 17.4% in Sweden share this opinion. In all four regions, males tend to agree to this statement rather than females (Figure 13), with significant differences in Europe20 and NorthAmerica2 (p -value < 0.001 in both cases). The proportions of those thinking the traffic rules/penalties in their country are too severe also depend significantly on the age group in Europe20, NorthAmerica2 and AsiaOceania5 (p -value < 0.001 in all cases). In all three regions, significantly less respondents of age group 65+ agree to the statement than respondents aged 18-24 (p -value < 0.01). Again, in Africa5, the age group 65+ reports the highest agreement, suggesting that half of this group thinks the traffic rules and penalties are too severe.

Taken together the results of the three questions regarding current traffic rules and penalties for driving or riding faster than the speed limit, females seem to tend to stricter and more monitored traffic rules than males do. Furthermore, males are more likely to believe that penalties are too severe than females are. These results fit well with the more frequent self-declared speeding for males in chapter 3.1.1. Possible reasons for these findings can only be assumed. May be males are more confronted with speed limit checks because they show speeding behaviour more frequent than females do. Thus, traffic rules and penalties are more relevant for the male driving behaviour and do more affect male's opinion regarding current policy measures.

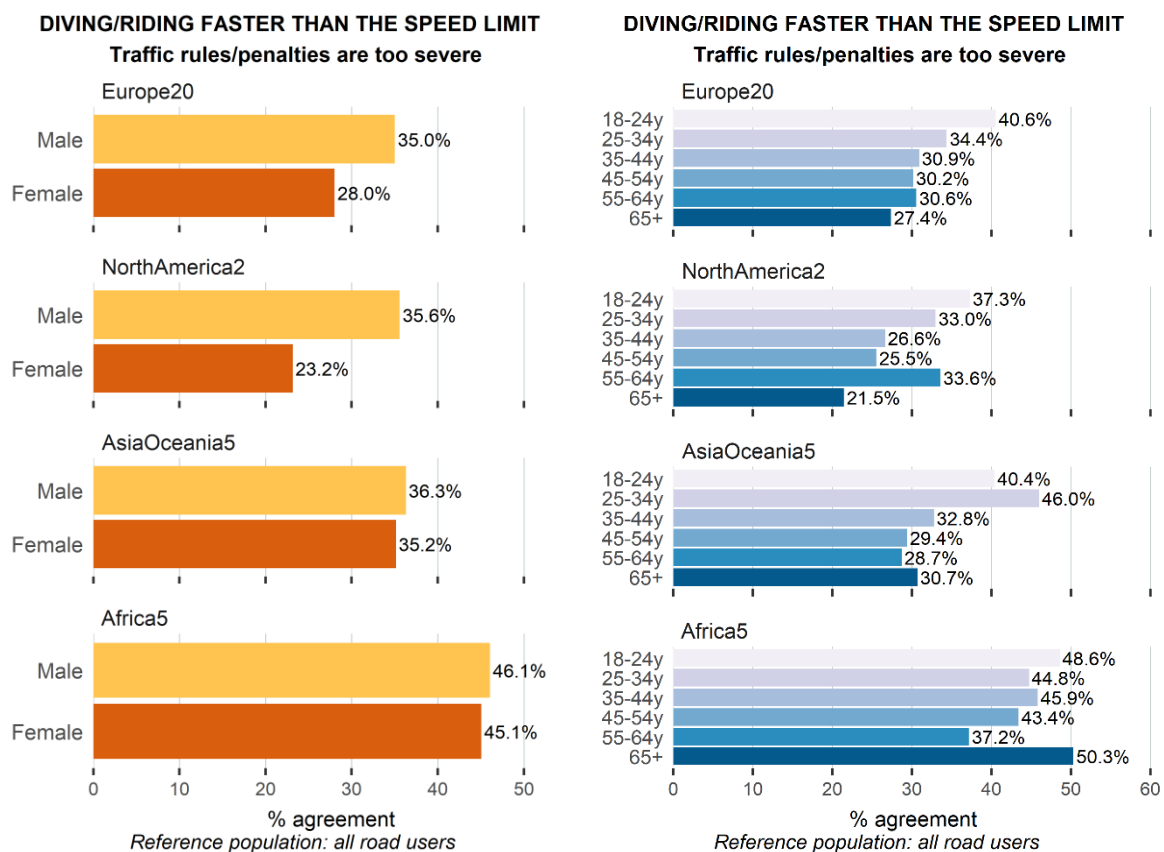


Figure 13: Severity of traffic rules/penalties, by region, gender and age group (% of agreement).

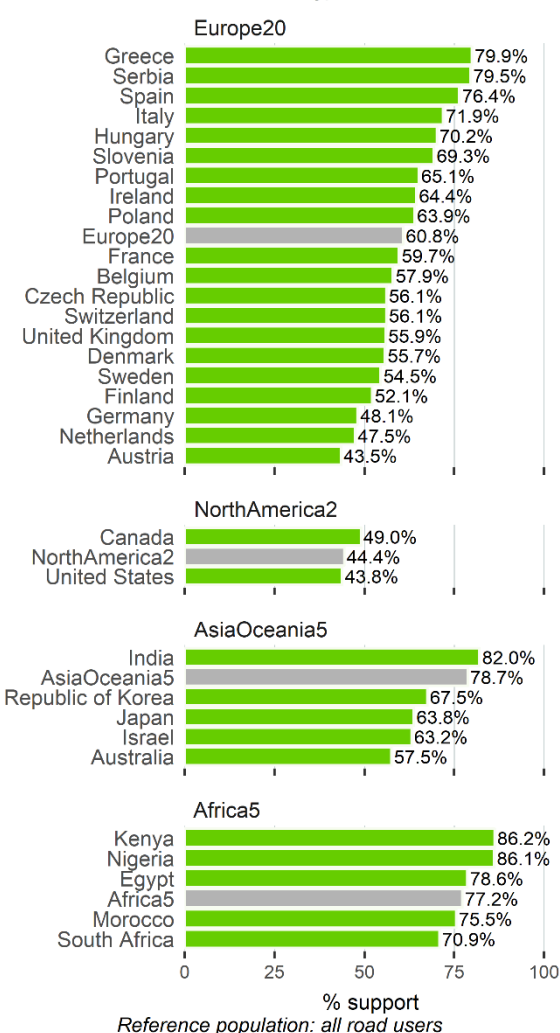
Interesting results were also found for Egypt, which has by far the lowest agreement rates for stricter traffic rules and the insufficient check of those as well as the highest approval rate regarding traffic rules being too severe. These proportions are even salient among the other African countries. Clear explanations for this finding are not discerned from the collected data. In 2017, the Egyptian Cabinet passed a new traffic law, which contains a new points-based system for traffic violations (Sadek, 2017). Maybe the perception of strict traffic rules is especially salient due to the relatively new change in the Egyptian traffic law.

Additionally, the support for two specific measures which should reduce the number of road users exceeding the speed limit was measured with a 5-points scale with the endpoints 'oppose' and 'support'. For the analyses a binary variable was used with the two values oppose/neutral (1-3) and support (4-5).

Question: Do you oppose or support a legal obligation to...?

- 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)

SUPPORT FOR POLICY MEASURES
Install Intelligent Speed Assistance (ISA) in new cars
(automatically limits max speed, can be turned off manually)



SUPPORT FOR POLICY MEASURES
Install Dynamic Speed Warning signs (devices warn drivers exceeding speed threshold)

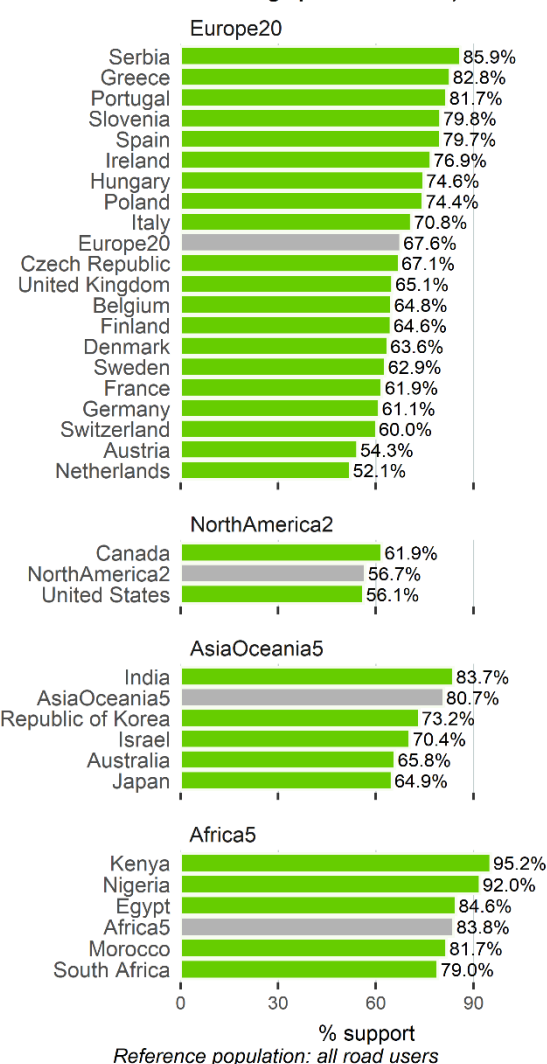


Figure 14: Support for Intelligent Speed Assistance and Dynamic Speed Warning signs, by country (% of support).

All respondents were asked about the support for these measures related to speeding. The first item refers to the installation of intelligent Speed Assistance (ISA) in new cars, which automatically limits the maximum speed of the vehicle and can be turned off manually.

As seen in Figure 14, the support of the installation of ISA differs widely between countries (43.5% to 86.2%). According to research by the Norwegian Institute for Transport Economics (TØI, 2012), ISA is the most effective driver support system and could save about estimated 41 lives per year. Nevertheless, ISAs are not obligatory in any of the ESRA2 countries at the moment. New vehicle safety requirements including the obligatory installation of ISA in new cars are planned for the EU from 2022.

The support for an installation of Dynamic Speed Warning signs is even more accepted by the surveyed road users. As shown in Figure 14, 52.1% to 95.2% of the respondents in all countries tend to support this obligation. The lowest rates of support for the former were observed in the

Netherlands. Especially road users in Kenya were found to be in favour of a legal obligation; 95.2% report their approval. This makes sense when considering the finding from chapter 3.1.4: In Kenya, 87.3% of the respondents believe that speeding is a frequent cause of a road crash. An installation of Dynamic Speed Warning signs or ISA could reduce these speeding related road crashes.

On regional level, respondents from North America indicate the lowest support for ISA (44.4%) and Dynamic Speed Warning signs (56.7%). More communicative strategies in this area could be applied to enhance the support.

3.1.6 Enforcement and reported police checks

Question: On a typical journey, how likely is it that you (as a CAR DRIVER) will be checked by the police for...

- respecting the speed limits (including checks by a police car with a camera, fixed cameras, mobile cameras, and section control systems)?

To keep drivers from speeding, police checks on a regular basis are essential. Therefore, car drivers were asked to indicate their perceived likelihood of being checked by the police for speeding on a 7-points scale (1= very unlikely to 7 = very likely). The scale was divided into 'likely' (5-7) and 'unlikely/neutral' (1-4).

As seen in Figure 15, in almost all countries car drivers consider it rather unlikely to get checked by the police for speeding on a typical journey. The proportions of respondents consider it likely to be checked by the police for respecting the speed limits (including checks by a police car with a camera, fixed cameras, mobile cameras, and section control systems) depend significantly on the region (chi-square = 148.176; df = 3; p-value < 0.001). Proportions were significantly different between all pairs of regions (p-value < 0.01): Europe20 (37.2%), AsiaOceania5 (34.9%), NorthAmerica2 (28.7%) and Africa5 (44.8%). The strength of the association of perceived likelihood and the region was small (Cramer's V: 0.077).

The European20 perceived likelihood rate of being checked by the police for respecting the speed limit is 37.2% and ranges from 24.9% in the United Kingdom and 26.1% in Denmark to 56.1% in Poland and 57.2% in Serbia. Whereas rates in NorthAmerica2 are very alike (28.9% in United States and 27.1% in Canada), AsiaOceania5 rates range from 26.2% in the Republic of Korea to 41.4% in Australia.

In Africa5 regions, the country with the highest perceived likelihood rates is Kenya with 54.3% in contrast to 30.3% in Nigeria. Looking back to chapter 3.1.5., 88.9% of the respondents from Nigeria also felt that the traffic rules are not being checked sufficiently.

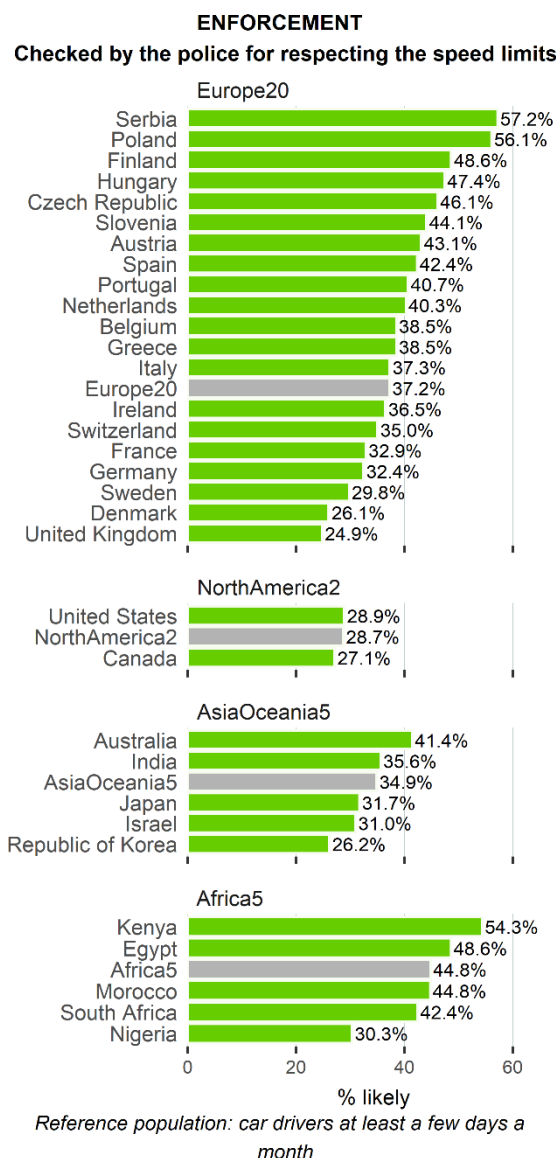


Figure 15: Perceived likelihood of being checked by the police for respecting the speed limits, by country.

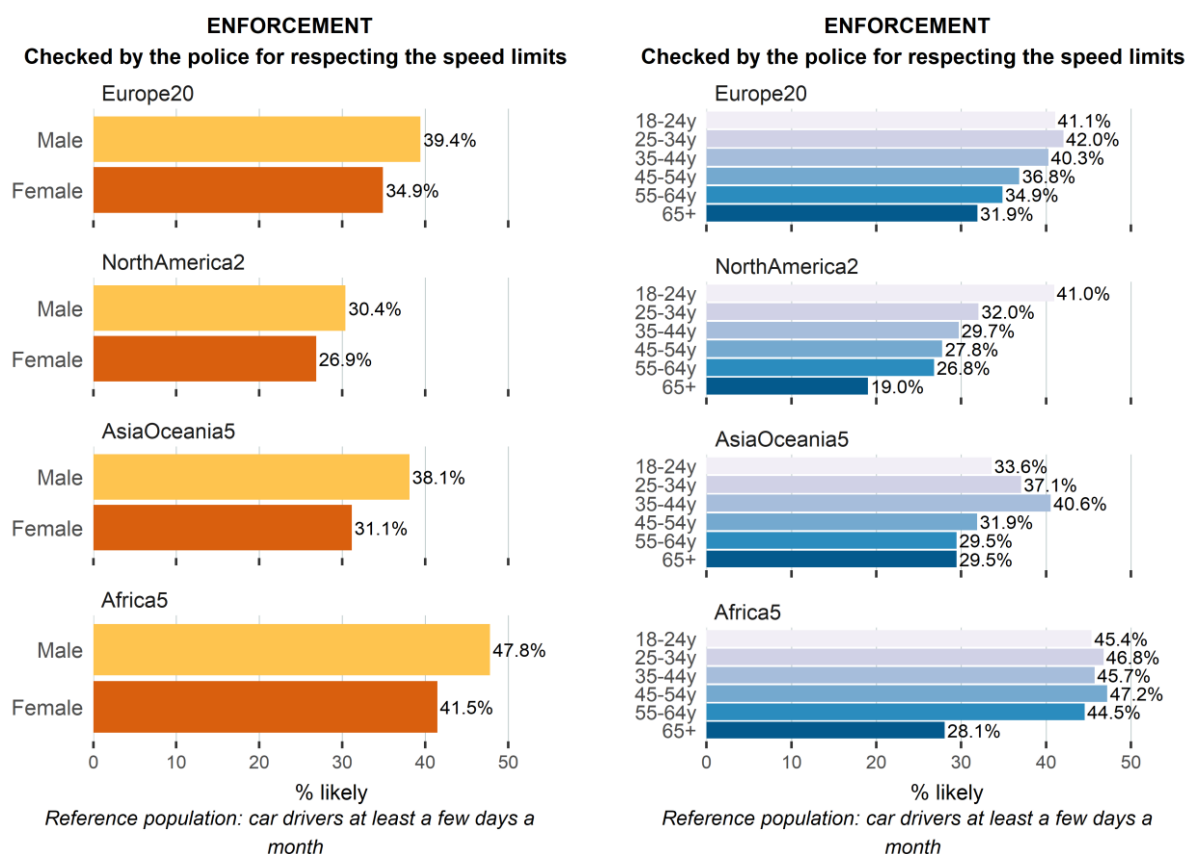


Figure 16: Perceived likelihood of being checked by the police for respecting the speed limits, by gender and age group.

Figure 16 shows the perceived likelihood of being checked by the police for respecting the speed limits by gender and age group. In Europe20, AsiaOceania5 and Africa5 males perceive the likelihood of getting checked by the police as higher than females do (p -value < 0.01 and small effect sizes in all cases). Again, this could be because males do report more speed violations than females do (chapter 3.1.1) and therefore could be more likely to be checked. To verify this assumption, gender differences in the number of actual police controls needs to be checked. The difference between males and females in NorthAmerica2 did not reach significance (30.4% vs. 26.9%).

The analysis by age group shows that proportions differ among different age groups (p -value < 0.001 in all regions). Interestingly in Africa5, the oldest age group reports a significantly lower likelihood (28.1%) of being checked for respecting the speed limits than all other age groups (p -value < 0.01). This expectation maybe provides an explanation for the speeding inside built-up areas, which is also reported by this age group the most frequent (see chapter 3.1.1).

These results provide an indication for countries with low expectations regarding police checks. Especially in combination with results from chapter 3.1.5, information is given to the countries whether a revision of their current monitoring would be advisable or not.

3.2 Advanced analyses

To further examine the association between all measured variables related to speeding, the influence of safety expectations on reported speeding, habitual driving with high speed and road crashes is explained in this section.

Driving behaviour is controlled by the expectations of a person (Holte, 2012). The theoretical reference in the relevant literature often refers to the theory of planned behaviour by Ajzen (1985) or the social cognitive theory by Bandura (1977). Expectations defined by Ajzen manifest themselves in attitudes. Attitudes and expectations in both theories are largely focused on social and not social consequences as well as the own ability to successfully perform the driving task. Whereas in both theories a distinction is made between different expectations or attitudes and the respective influence on the corresponding behaviour or the behavioural intention is postulated, Holte (2012) found that the expected social and not social behaviour consequences as well as the self-efficacy load on a common factor. Within a confirmatory factor analysis, one factor regarding a general safety expectation, which consists of the above-mentioned expectations, was confirmed. This result justifies the formation of an index (total score) to gather the aggregated general safety expectation. Thereby a corresponding behavioural model gets slimmer and provides more space for further influencing factors. On the other hand, in this way there is no theoretical justified differentiation, which is desirable or even necessary depending on the issue.

The following advanced analyses go without theoretical justified differentiation of the expectations or attitudes. The initial question is how strong the impact of an aggregated safety expectation on the habit, the self-declared (reported) speeding behaviour and the reported road crashes (dichotomized) is. Which role do gender and age of the respondents play? The reported crashes include crashes with material damage as well as crashes with personal damages. The cause of the road crash was not taken into account, so that the following analysis does not solely focus on driving with unadjusted speed but includes all causes of road crashes instead.

Using the structural equation modelling software MPlus 6.1.1 (Muthén & Muthén, 2010) the following analyses were conducted:

- (1) Confirmatory factor analysis with expectations and attitudes related to speeding, self-efficacy, individual norm (acceptability) and descriptive norm.
 - a. Model 1 with the German sample (N=1.506),
 - b. Model 2 with the overall sample of all participating countries (N=25.535),
- (2) Path analyses
 - a. Model 3 with the German sample (N=1.506),
 - b. Model 4 with the overall sample of all participating countries (N=25.535)
 - c. Model 5 multiple group analysis (32 countries, N=25.535).

3.2.1 Confirmatory factor analysis

To perform a confirmatory factor analyses, the attitude towards speeding, self-efficacy (perceived behaviour control), individual norm and the descriptive norm were included in the analyses.

The attitude towards speeding is collected with two items ('I have to drive fast; otherwise I have the impression of losing time' and 'Respecting the speed limit is boring or dull'). Cronbach's alpha for both items is .57. As mentioned in chapter 3.1.3., the answering scale for these items ranged from 1 (disagree) to 5 (agree).

Self-efficacy is measured with two items ('I trust myself when I drive significantly faster than the speed limit' and 'I am able to drive fast through a sharp curve'). Cronbach's alpha for both items is .64. This scale also ranged from 1 (disagree) to 5 (agree).

The individual norm is collected with three items (the acceptance of driving faster than the speed limit inside built-up-areas, the acceptance of driving faster than the speed limit outside built-up-areas (but not on motorways/freeways) and the acceptance of driving faster than the speed limit on motorways/freeways). Cronbach's alpha for the three items is .87. These questions were presented in a Likert scale from 1 (unacceptable) to 5 (acceptable)

The descriptive norm is collected with a single item ('most of my friends would drive 20 km/h over the speed limit in residential areas'). For this item, a Likert scale from 1 (disagree) to 5 (agree) was used.

In a first step the items of each theoretical concept are subjected to an exploratory factor analysis and reliability analysis (calculating Cronbach's alpha) using the statistical program SPSS in order to find out if it is possible to calculate sum scores. These sum scores will be used in confirmatory factor analysis.

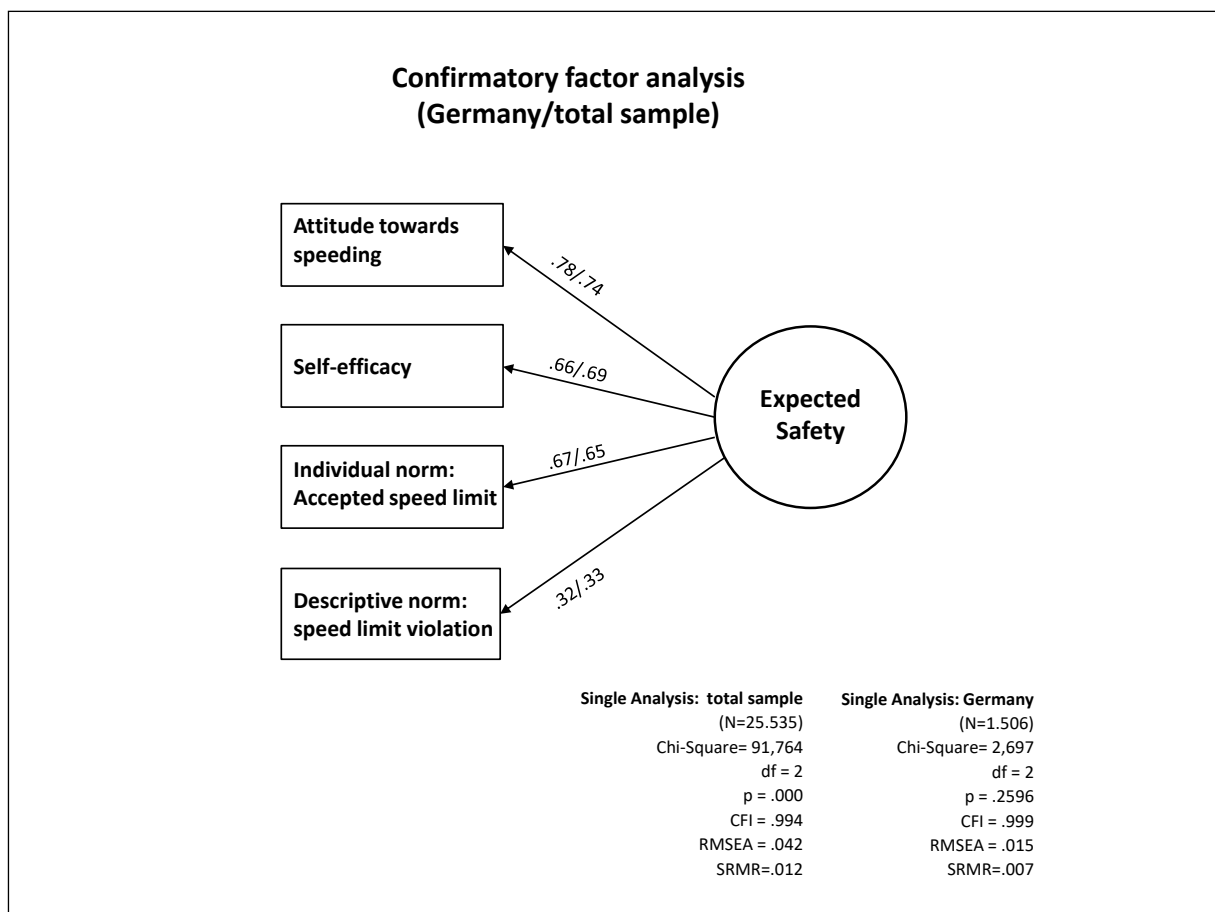


Figure 17: Confirmatory factor analysis.

The results of the confirmatory factor analysis shown in Figure 17 confirm the assumption that the concepts of expectations or attitudes load on one common latent factor. This factor is described as 'expected safety towards speeding' and is applied in the following path analysis as a main predictor to explain driving faster than the speed limit. Estimator is MLMV (maximum likelihood mean-variance adjusted).

3.2.2 Path analyses

WLSMV (weighted least squares mean-variance adjusted) is used as estimator. The path analyses for the overall sample confirm a medium effect of the safety expectations on the self-declared (reported) behaviour as well as a strong effect on the habit of speeding behaviour. A likewise medium effect emanates from the habit on the self-declared behaviour. As expected, the explained variance of accidents turns out very low (3.4% for the overall sample). Similar results were found by Holte (2012) and Holte, Klimmt, Baumann and Geber (2015). The low proportion of explained variance is based on the fact that on the one hand the accident involvement depends on situational characteristics and on the other hand, in ESRA2 not speeding alone was considered as cause of a road crash, but all sorts of causes instead.

The proportion of explained variance for the reported exceedance of speed limits as well as for the reported habits regarding speeding behaviour is quite high with 52.6% and 55.6% for the overall sample.

The validity of the theoretical model (Figure 18) has been confirmed for the overall sample as well as within the frame of a multiple group analyses for all 32 countries. The latter method is solely based on the test for 'configural invariance', thus the structural equality. A stricter test of the equality of path coefficients has not been carried out. Additionally, the results for Germany are exemplarily illustrated in Figure 18.

Following Beauducel (2001), the fit indices RMSEA (Root Mean Square Error of Approximation) and SRMR (Standardized Root Mean Square Residual) are independent of the sample size. Therefore, they are used for testing the model, in particular for the overall sample with all countries ($N=25.535$ car drivers). According to this, the RMSEA should not be greater than 0.06 and the SRMR not greater than 0.10. The calculations shown in Figure 18 fulfil both criteria. For the smaller German sample ($N=1.506$), the chi-squared test is even - as desired - non-significant ($p=.199$).

Taken together, the following statistically significant effects are observed:

- The younger the respondents, the more positive the safety expectations are; meaning that younger persons do rate driving with high speed, the acceptance as well as the exceedance of the speed limit, the perception of others and the perceived own abilities more positively than elderly do (weak effect).
- Younger respondents report an involvement in road crashes more often than elderly do (weak effect).
- Men have more positive safety expectations than women (weak effect) and furthermore report more frequently habitual driving with high speed or driving faster than the speed limit (weak effect).
- The more positive the safety expectations are, the more frequently the habitual driving with high speed or driving faster than the speed limit takes place (strong effect) and the more frequently driving faster than the speed limit within the last 30 days is reported (medium effect).
- The more frequent the habitual driving with high speed or driving faster than the speed limit is reported, the more frequently driving faster than the speed limit within the last 30 days is reported (medium effect).
- The more frequent the habitual driving with high speed or driving faster than the speed limit is reported and the more frequently the driving faster than the speed limit within the last 30 days is reported, the more likely is the involvement in a road crash (weak effect).

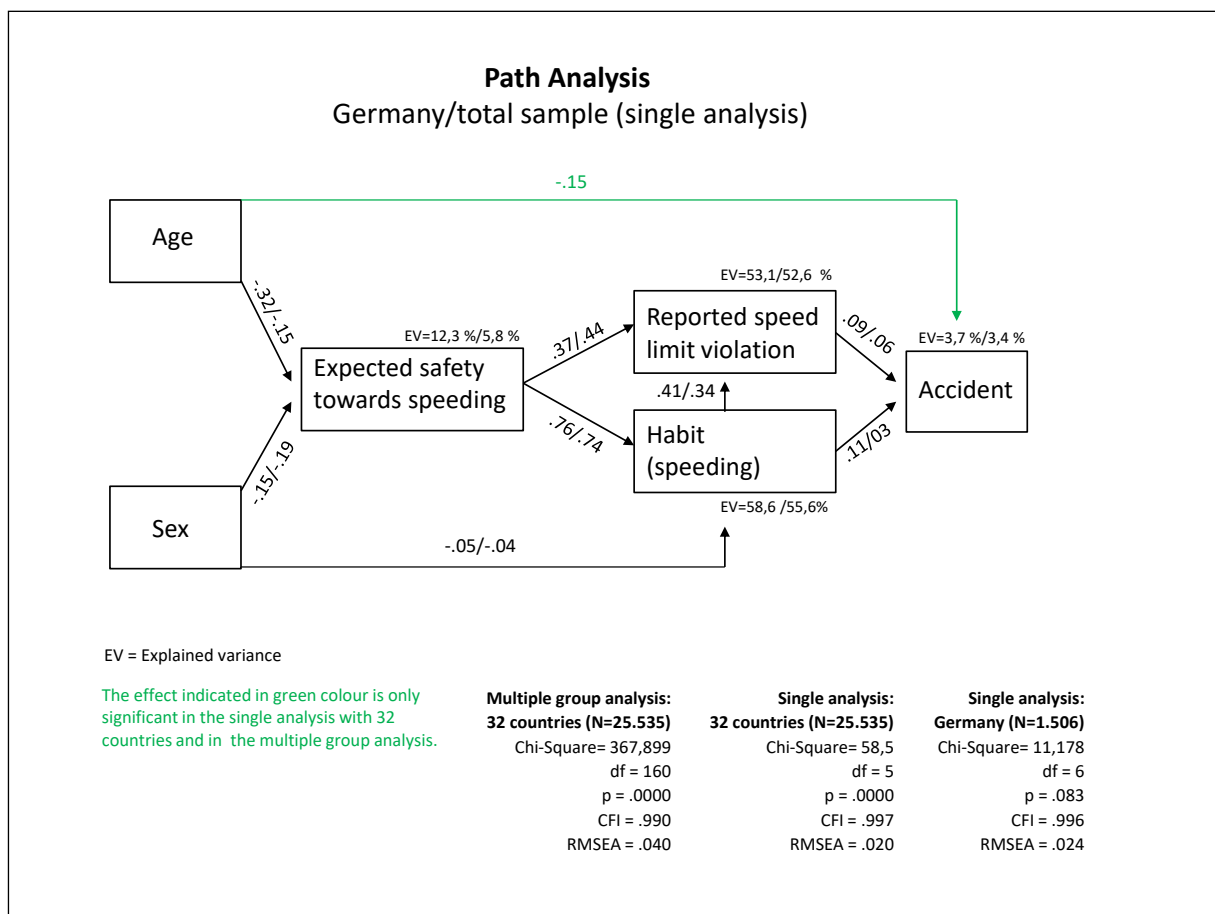


Figure 18: Path analysis.

3.2.3 Interim Conclusion

Path analyses confirm the important role of expectations on the control of speeding behaviour. Therefore, the recommendation to take into account road safety relevant expectations in the context of communicative strategies is derived. Due to the relatively strong resistance to change those expectations, this is an extremely demanding task.

The influence of age and gender must be considered weak. As is known from other studies, expectations are not per se influenced by the age or gender of the respondents, but by a series of psychological characteristics, e.g. lifestyles, sensation seeking, the impulse control ability or by the peer group (Holte, 2012; Holte, Klimmt, Baumann & Geber, 2015).

3.3 Comparison with other findings

With no point of reference, interpreting the results of this survey is very difficult. For this reason, some results from the current report are exemplarily compared below with data from ESRA1. Considering the context of speeding, the number of yearly speeding tickets is also displayed and linked to selected results regarding the support for police measures described in chapter 3.1.5.

3.3.1 Changes in self-declared speeding over time

To get an impression about the changing of self-declared speeding over time, the percentages of car drivers indicating driving faster than the speed limit in the past 12 months are juxtaposed with the data from the first edition of the ESRA survey (ESRA1) in 2015.

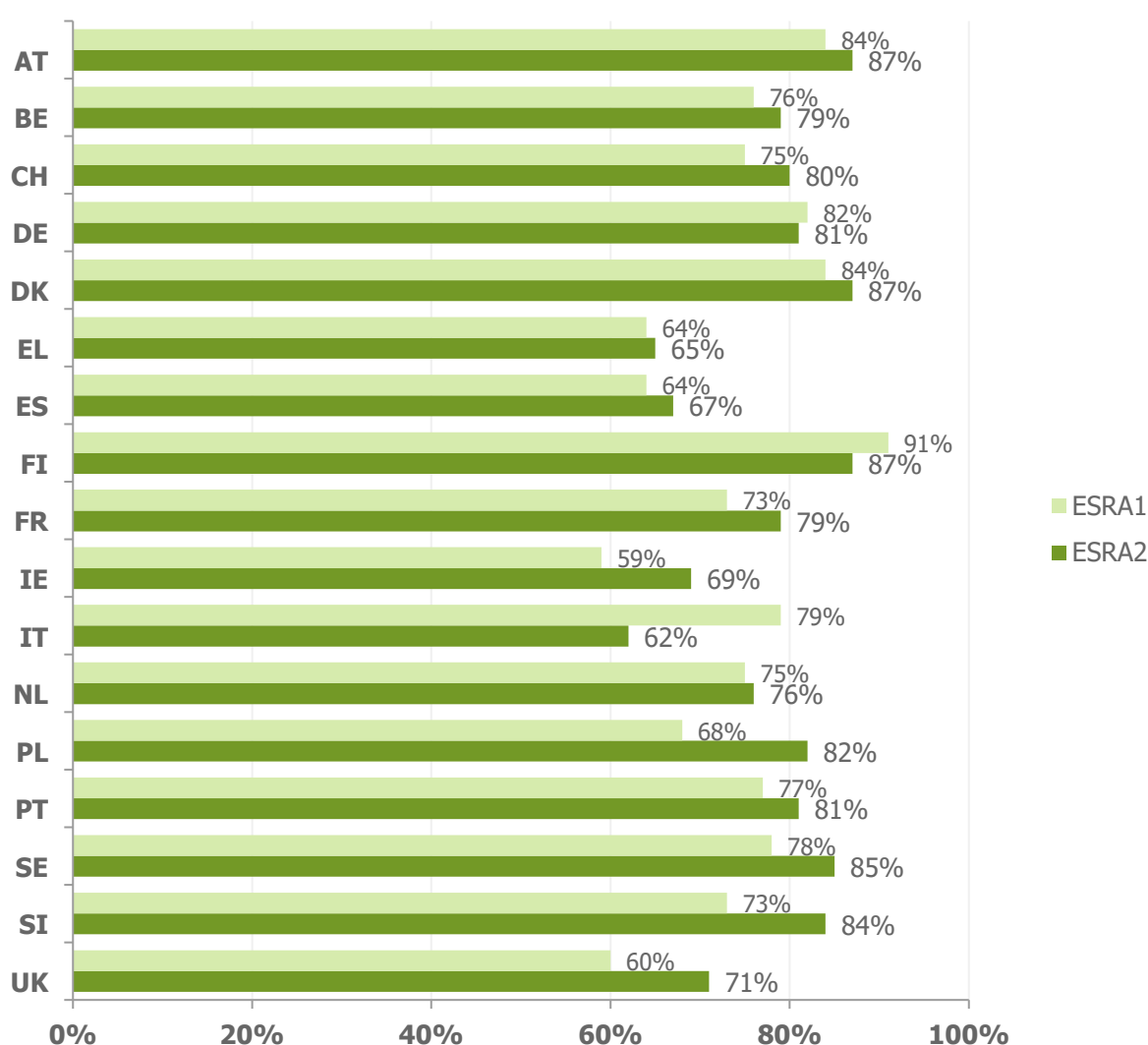


Figure 19: Self-declared behaviour on speeding over time, by country (% of car drivers that did it at least once in the past 12 months).

As shown in Figure 19, the self-declared speeding behaviour is if anything slightly lower in ESRA1 for most countries. Percentage rates for driving faster than the speed limit in Italy are noteworthy, for they are strikingly lower in ESRA2. In contrast, responses from Poland enhanced from 68% to 82% over

the years. Self-declared speeding behaviour also increased by 11 percentage points in Slovenia and the UK.

Since the collected data display the reported behaviour instead of the actual speed violations, it is difficult to draw conclusions from this. Instead of a change of the underlying behaviour pattern, it is possible that people are more willing to admit their behaviour nowadays, e.g. due to social norms. Due to many possible explanations, this illustration can only give one clue about possible changes in actual speeding behaviour.

3.3.2 Yearly speeding tickets in ESRA countries

Comparisons between countries are complicated due to different traffic laws and penalties all over the world. To extend the already reported subjective data, objective data are additionally complimented. In the context of speeding, it seems reasonable to have an exemplarily look at the number of yearly speeding tickets. Reliable numbers (adopted from ETSC, 2019) exist for eleven countries from the year 2017. For some countries, no data were provided by ETSC. In this case, additional data were used which were collected via an Expert Survey among the ESRA partners. In total, the number of yearly speeding tickets from 20 different countries is displayed.

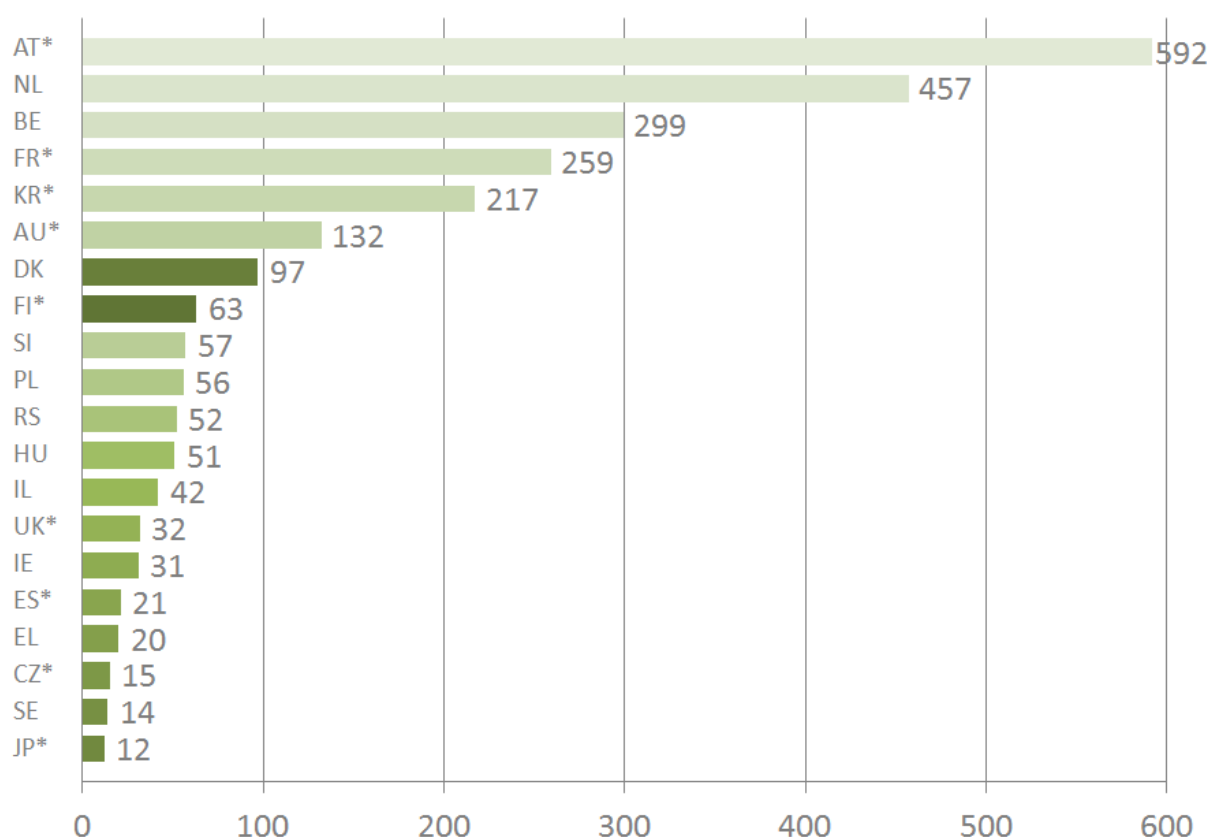


Figure 20: Number of speeding tickets per thousand inhabitants in 2017¹.

As seen in Figure 20, the number of speeding tickets differs widely between the countries. By far the most speeding tickets per thousand inhabitants were issued in Austria (592) and the Netherlands (457), followed by Belgium (299) and France (259). Nevertheless, 66.9% in the Netherlands and 65% in Belgium agree to the statement, that the traffic rules are not being checked sufficiently (see

¹ For countries marked with *, data were collected via the ESRA2 Expert Survey.

chapter 3.1.5). Taken together both results, the expectations regarding density of control seem to differ between countries. Furthermore, different understanding of rules may contribute to dissatisfaction - due to a perceived insufficiently check of traffic rules - although the number of yearly speeding tickets is quite high. From this it can be deduced that a uniform density of traffic controls does not necessarily has to be the most effective way to enhance road users' acceptability of traffic rules.

Japan, on the other hand, is the country with the lowest number of speeding tickets (12). Fitting in, 74.2% of the respondents from Japan are in favour of stricter traffic rules and 75.3% agree to the statement, that 'traffic rules are not being checked sufficiently'. Taken together these findings, the monitoring of speed violations may be reconsidered in Japan.

In Sweden, the number of issued speeding tickets is with 14 tickets per thousand inhabitants similarly low. Considering the finding that 75.2% of the respondents think traffic rules are not being checked sufficiently and only 17.4% agree to the statement 'traffic rules/penalties are too severe', respondents from Sweden don't really seem to expect consequences resulting from speed violations. Thus, the relatively high percentage rate of self-declared speeding on motorways and outside built-up areas for Sweden (80.5% and 78.4%, respectively) is not surprising either.

Data for Greece also show a low number of speeding tickets (20 per thousand inhabitants). When comparing with the opinions regarding traffic rules and penalties related to speeding, Greece has the highest agreement rates among European countries for stricter traffic rules (78.5%) as well as for the statement, that traffic rules are not being checked sufficiently (94.8%). Anyhow, still 38.5% of the Greek respondents perceive the likelihood of getting checked by the police at least once on a typical journey as likely.

For detailed analyses on a regional level, it appears reasonable to collect as many subjective and objective data as possible, to get a comprehensive overview of the country-specific road safety as well as road users' acceptability and expectations regarding current traffic rules and road safety measures.

3.4 Limitations of the data

For the data analysis the following limitations have to be noticed. First of all, a sample size of 35.036 road users from 32 different countries (including 25.535 car drivers) is quite large. An extremely large sample size leads to the fact that even small differences become significant. That may explain why nearly all chi-squared tests show a significant difference when comparing e.g. results among the four different regions. For this reason, the effect size (Cramer's V) was listed additionally. Nevertheless, it must be mentioned, that most effect sizes were lower than 0.2 or even lower than 0.1. According to Cohen (1988), a Cramer's $V = 0.1$ can be interpreted as a small and $V = 0.3$ as a medium effect. This aspect should be considered, when interpreting the results.

Furthermore, the data were gathered via an online panel survey. Please note that in the African countries a lower percentage of people have access to and use the internet (in Kenya and Nigeria less than 30%). Within the African countries the numbers of 65+ respondents who answered the ESRA2 survey were quite low (with the exception of South Africa), so that the answers of this particular age group in African countries cannot be considered to be representative. To reach all kind of target groups, different types of survey are needed in combination to provide alternative options for the respondents.

In contrast to a monitoring of road user's behaviour, by using reported data there will always be unexplained variance left, due to the neglect of objective data and situational components. Thus, it is not possible to provide sufficient explanations for the differences between countries.

In addition, an interpretation of single results is difficult. Whereas different attitudes and expectations related to speeding are measured in this survey, we don't get information about variables that may influence these expectations. There are a lot of different factors, e.g. social values, capabilities, personality, the role of status of a person, laws, road safety culture, and infrastructural differences, that are not captured within this survey. All these aspects can vary among the different countries and influence road users' responses.

To explain specific results within one country or to explain the differences between particular countries recorded in this survey goes beyond the scope of this report. These explanations cannot be derived from the present data but require further research or information.

4 Conclusions

Speeding is a major factor in road safety (ETCS, 2019) and impacts the number of crashes as well as the severity of crashes (OECD/ITF, 2018; SWOV, 2012). According to the European Commission, about 40 to 50% of the drivers exceed the speed limit (European Commission, 2015). The percentages found for European countries in the ESRA2 survey were even higher: 56.3% to 67.5% speed violations across different road areas where reported.

The self-declared speed violations among the four regions ranges from 42.7% to 56.3% for speeding inside built-up areas, 45.4% to 67.5% for speeding outside built-up areas and 46.4% to 71.6% for speeding on motorways/freeways. Also, the self-declared speeding rates are lower among females comparing to males. Whereas in the European countries speeding is more often indicated by younger drivers, in Africa the age group 65+ reports significantly more speeding than the younger age groups. The reasons for this can be many-sided and go behind the scope of this report.

Acceptability for speeding differs widely among countries. Across all regions, personal acceptability ranges from 4.8% in Serbia to 22.1% in Austria. For both, personal acceptability and perceived acceptability by others, the highest as well as the lowest rates were observed in European countries, with Austria having the highest acceptability rate in both cases. Furthermore, males tend to accept speeding rather than females do.

Regarding attitudes related to speeding, respondents in AsiaOceania5 report the highest agreement to the statement 'Most of my friends would drive 20 km/h over the speed limit in a residential area' (24.8%). In the Europe20 region, the age group 18-24 agrees significantly more frequent with the statement than the 65+ group does. Respondents from Asia Oceania also report the highest trust in themselves when driving faster than the speed limit (23.0%).

Furthermore, the intention to respect the speed limit in the next 30 days (between 70.8% and 75.9%) was much higher than the proportion of respondents who reported to have not driven faster than the speed limit in the last 30 days. This intention-behaviour gap shows that having the intention not to speed does not mean that the intended behaviour will necessarily follow. Speed management therefore must also take into account other constructs such as norms or expectations.

Concerning the perceived influence of speeding on road safety, the responses differ between all regions. Nevertheless, on average, more than half of the respondents in each region indicate speeding as an often or frequent cause of a road crash. These findings implicate that most road users are aware of the danger of speeding, even though the combined results suggest that many road users think that accidents due to speeding apply to others, but not to themselves. Furthermore, participating females perceive speeding as slightly riskier than males do.

In most countries, car drivers consider it rather unlikely to get checked by the police for speeding on a typical journey. Since the expectations regarding getting checked seem to be low, the actual process of police checks should perhaps be changed in the form of more frequent checks or continuous monitoring. Furthermore, males tend to perceive the likelihood of getting checked by the police for speeding as higher than females do.

Most of the respondents from Europe (60.8%), Asia Oceania (78.7%) and Africa (77.2%) support the installation of Intelligent Speed Assistance (ISA) in new cars (44.4% in North America) and even more support can be found for Dynamic Speed Warning signs. Taking into account the assumption that ISA is the most effective driver support system and could save about estimated 41 lives per year, as found by the Norwegian Institute for Transport Economics (TØI, 2012), more communicative strategies concerning this topic are needed to further increase the acceptance of an installation.

In the advanced analyses, deeper associations were examined. The expected safety towards speeding was used as a main predictor to describe the exceedance of the speed limit. These safety expectations were the more positive, the younger the respondents were. Furthermore, males have more positive

safety expectations than females and report more frequently habitual driving with high speed or driving faster than the speed limit. The more positive the safety expectations are, the more frequently the habitual driving with high speed or driving faster than the speed limit takes place and the more frequently driving faster than the speed limit within the last 30 days is reported. In this way, this analysis confirms the important role of expectations on the control of speeding behaviour and suggests taking into account road safety relevant expectations in the context of communicative strategies.

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.

The ESRA project has also demonstrated the feasibility and the added value of joint data collection on road safety attitudes and performance by partner organizations in a large number of countries. The intention is to repeat this initiative on a triennial basis, retaining a core set of questions in every wave allowing the development of time series of road safety performance indicators.

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Appendix 1: ESRA2_2018 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 beliefs & 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 beliefs & 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: ESRA2 weights

The following weights are used to calculate representative means on national and regional level. 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.

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.

