PRP Prevenção Rodoviária Portuguesa

Texting distracted driving behaviour among European drivers: influence of attitudes, subjective norms and risk perception

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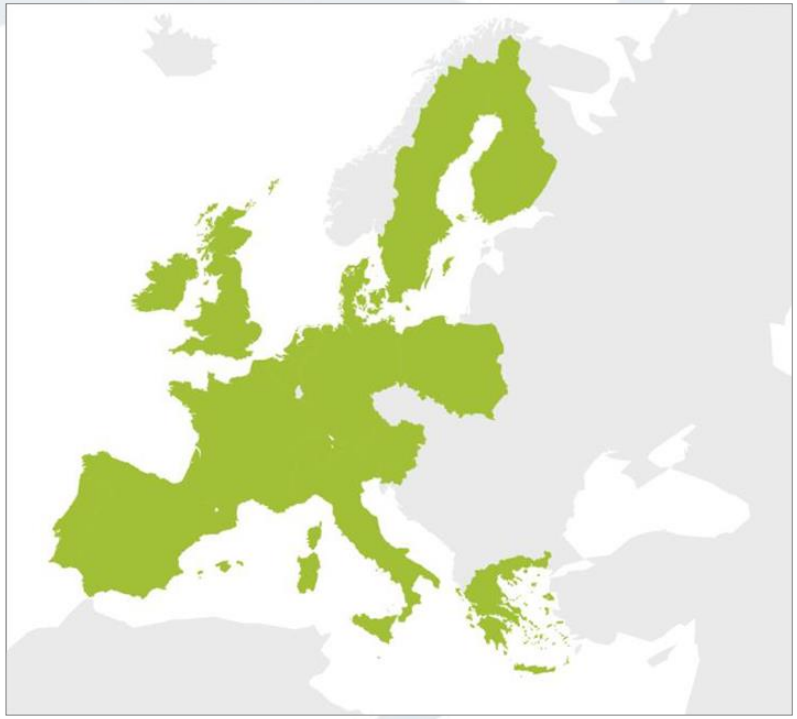
ESRA
www.esranet.eu
E-Survey of Road users' Attitudes

5th International Conference on Driver Distraction and Inattention
March 20-22, 2017
Paris, France

ESRA 2015 – European Survey of Road users' safety Attitudes



17 European countries

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, The Netherlands, United Kingdom

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Deliverables & Publications

Main ESRA report

Six thematic reports:

- Distraction and fatigue
- DUI alcohol and drugs
- Speeding
- Seat belt and child restraint systems
- Subjective safety & risk perception
- Enforcement and support for road safety policy measures

Data set and survey methodology (Torfs *et al.*, 2016)

- **ESRA survey** (European Survey of Road users' safety Attitudes)
- The ESRA survey covered a range of **subjects**, including, amongst others, self-declared unsafe traffic behaviours, social norms, risk perception, and attitudes towards those behaviours;
- Different **road safety topics** were assessed: speeding, driving under influence of alcohol or drugs/medication, distraction, fatigue, and seat belt use;
- Representative samples of the national adult populations in **17 European countries**: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, The Netherlands, and United Kingdom;
- **Target population**: adult population (18+) of each country - at least 1,000 road users for each country;
- Gender and age were used as **sampling variables** within each country;
- **Total sample size** consisted of 17,767 road users from the 17 countries;
- **Sample in this study** – 14,920 car drivers who drive at least a few days a year.

Objectives

- Assess the **self-declared behaviours**, the **attitudes**, the **risk perception**, and the **subjective norms** concerning **texting while driving**, by sex and age group;
- Study the **association** between **sending text messages while driving** (self-declared behaviour) and:
  - **Sociodemographic characteristics**;
  - **Risk perception** of sending text messages while driving;
  - **Attitudes** towards sending text messages while driving;
  - **Subjective norms** concerning sending text messages while driving;
  - **Other risky driving behaviours** (self-declared behaviours).

Statistical analysis

- **Logistic multilevel regression models** to identify the factors that influence sending text messages/emails while driving;
- A **random intercept** was assigned to the variable country (2nd level) to incorporate within-country correlations;
- **Odds ratios (OR)** with 95% confidence intervals were used as summary statistics;
- **Mediation effects** were assessed following the steps proposed by Baron and Kenny (1986);
- All the analyses were conducted **separately in the male sample and in the female sample**;
- The **sample was weighted** in all the analysis making it representative of the population surveyed. The weighting took into account the representativeness within a country (based on the age and gender – interlaced), and the proportion of a specific country within the group of 17 countries.
- **Software**: IBM SPSS® (version 23.0 for Windows®) and the R software – package lme4 (Bates *et al.*, 2015) for logistic multilevel regression models.

Measures

Self-declared behaviours

In the past 12 months, as a road user, how often did you…?

- ... send a text message or e-mail while driving
- ... read a text message or e-mail while driving
- ... other risky behaviours: talk on a hand-held mobile phone while driving, talk on a hands-free mobile phone while driving, drive faster than the speed limit, drive after drinking alcohol, ...

Response Likert scale from 1 = 'never' to 5 = '(almost) always' – dichotomized in 'never' (1)/'at least once' (2-5).

Risk perception

... how many accidents out of 100 were caused by sending a text message while driving

For the analysis, the variable was categorized in four factors based on quartiles:

- Risk 1 - Low (min - Q1)
- Risk 2 (Q1 - Q2)
- Risk 3 (Q2 - Q3)
- Risk 4 - High (Q3 – Max)

Measures

Subjective norms

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

- ... type text messages or e-mails while driving
- ... check or update social media (example: Facebook, twitter, etc.) while driving

Attitudes

How acceptable do you, personally, feel it is for a driver to…?

- ... type text messages or e-mails while driving
- ... check or update social media (example: Facebook, twitter, etc.) while driving

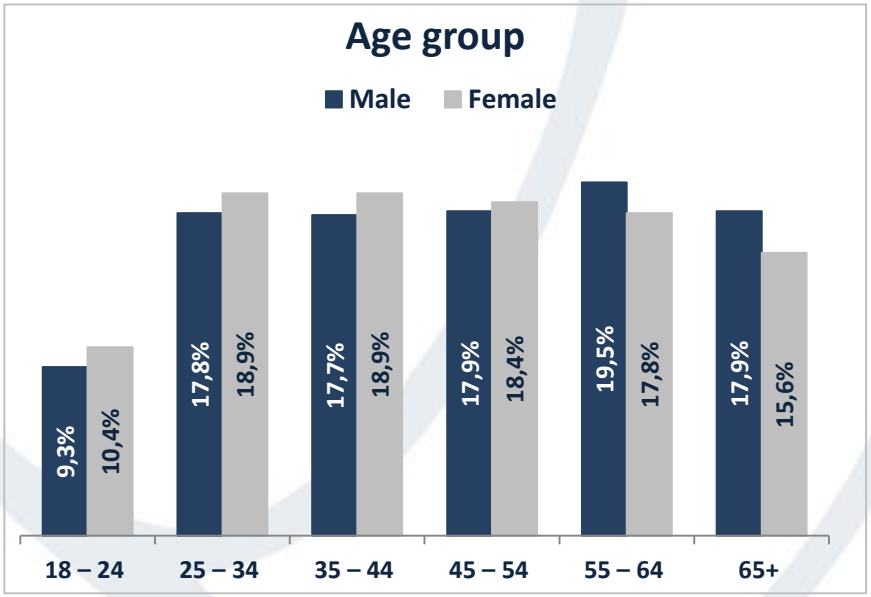
Response Likert scale from 1 = ‘unacceptable’ to 5 = ‘acceptable’.
Dichotomized in ‘unacceptable or neutral’ (1-3)/‘acceptable’ (4-5).

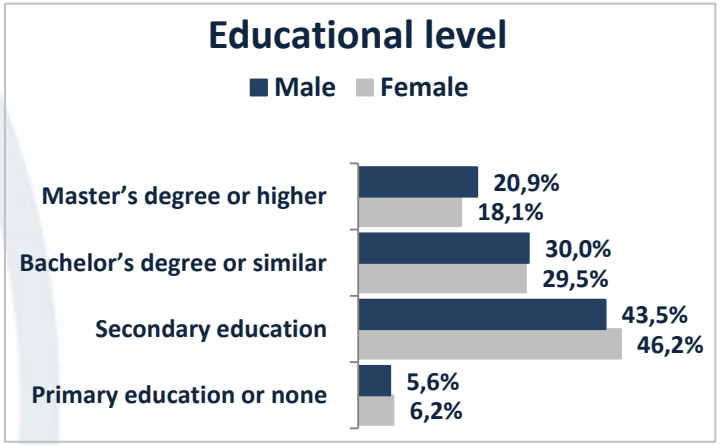
Descriptive analysis

Sociodemographic characteristics

N = 14,920 car drivers

- **Females: n = 6,988 (46.8%)**
- **Males: n = 7,932 (53.2%)**





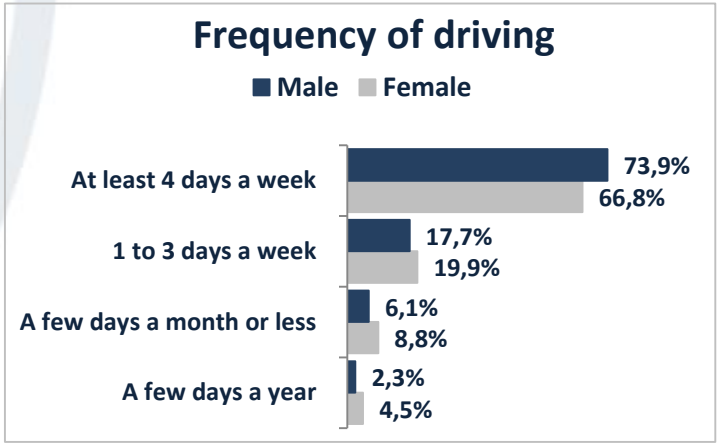
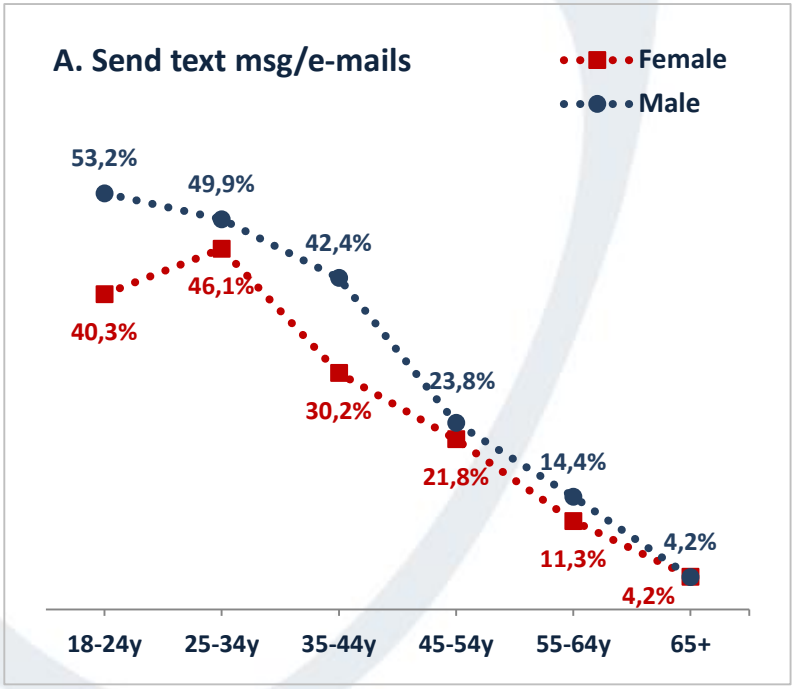


Figure 1. Sociodemographic characteristics concerning age, educational level and frequency of driving, by sex.

Descriptive analysis

Texting while driving – self-declared behaviours

In the past 12 months, how often did you... while driving?



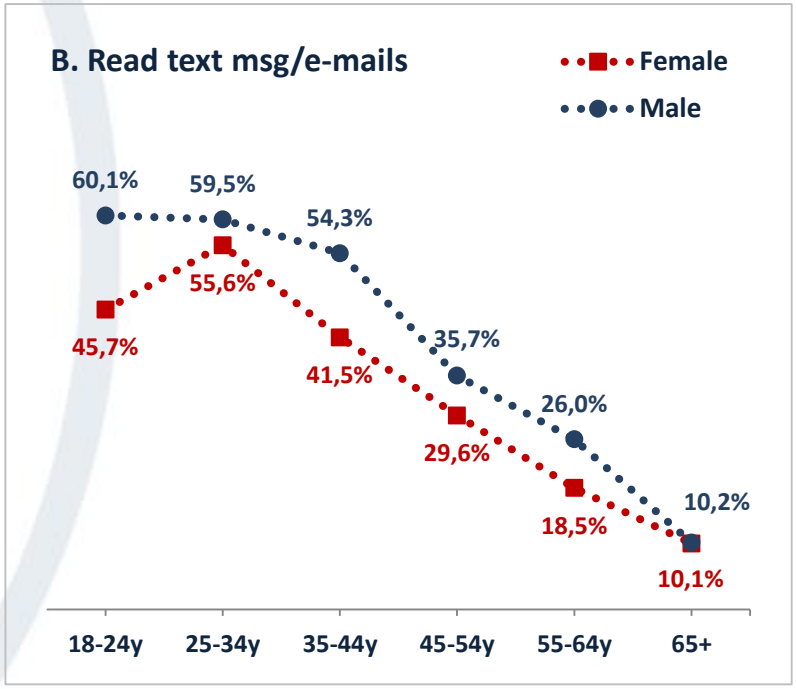
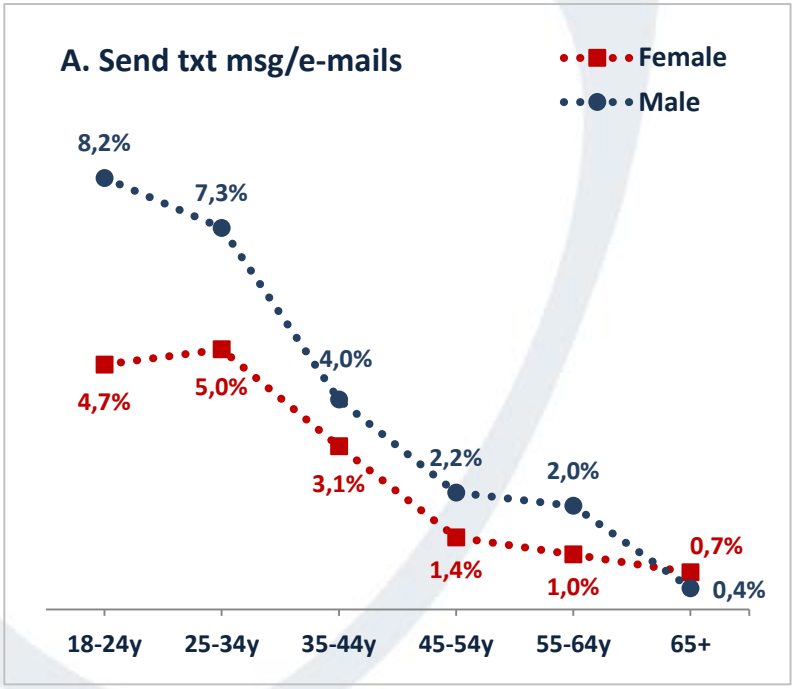


Figure 2. Self-declared behaviours concerning texting while driving, by sex and age group **(% of "at least once")**

Descriptive analysis

Texting while driving – attitudes

How acceptable do you, personally, feel it is for a driver to... while driving?



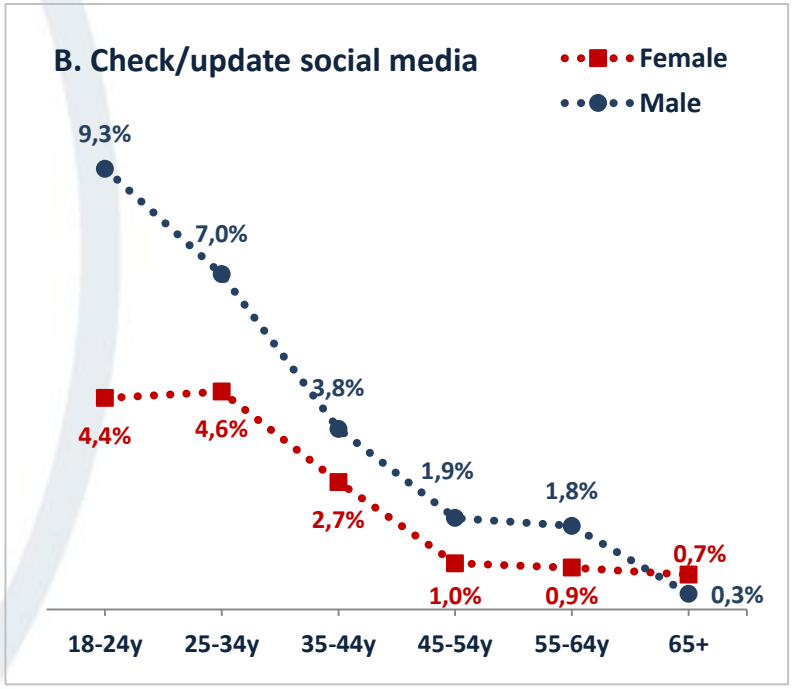
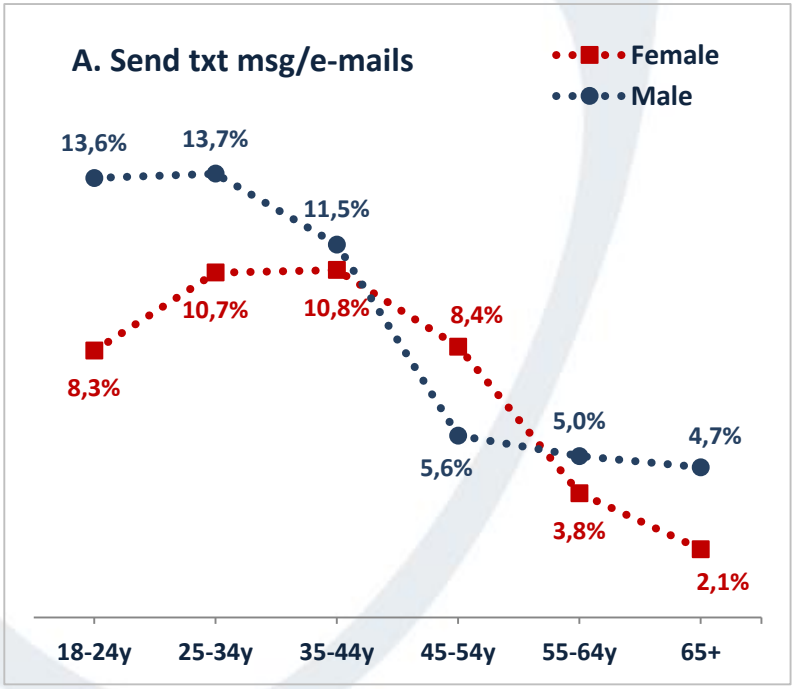


Figure 3. Attitudes concerning texting while driving, by sex and age group
(% of "acceptable")

Descriptive analysis

Texting while driving – subjective norms

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



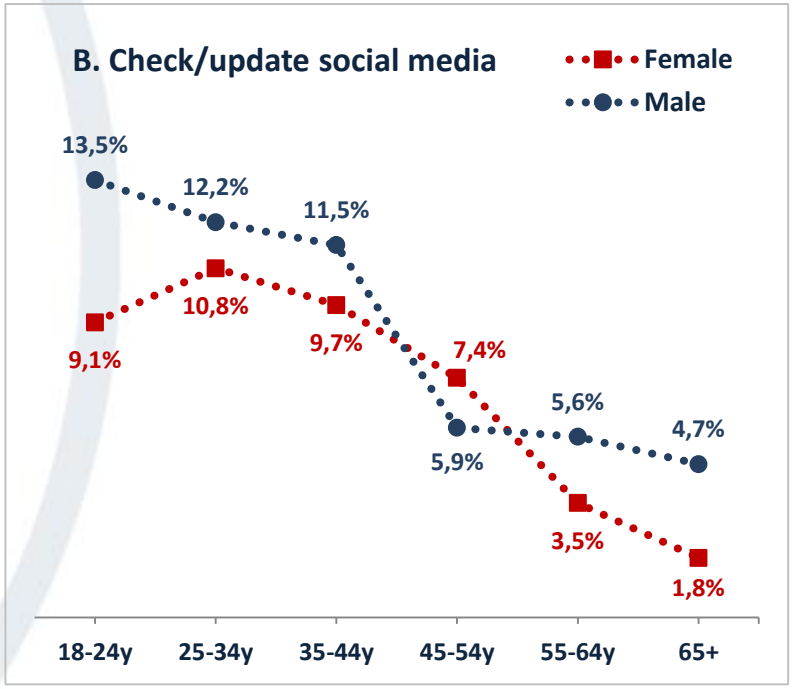


Figure 4. Subjective norms concerning texting while driving, by sex and age group
(% of "acceptable")

Descriptive analysis

Texting while driving – risk perception

How many accidents out of 100 were caused by sending a text message while driving

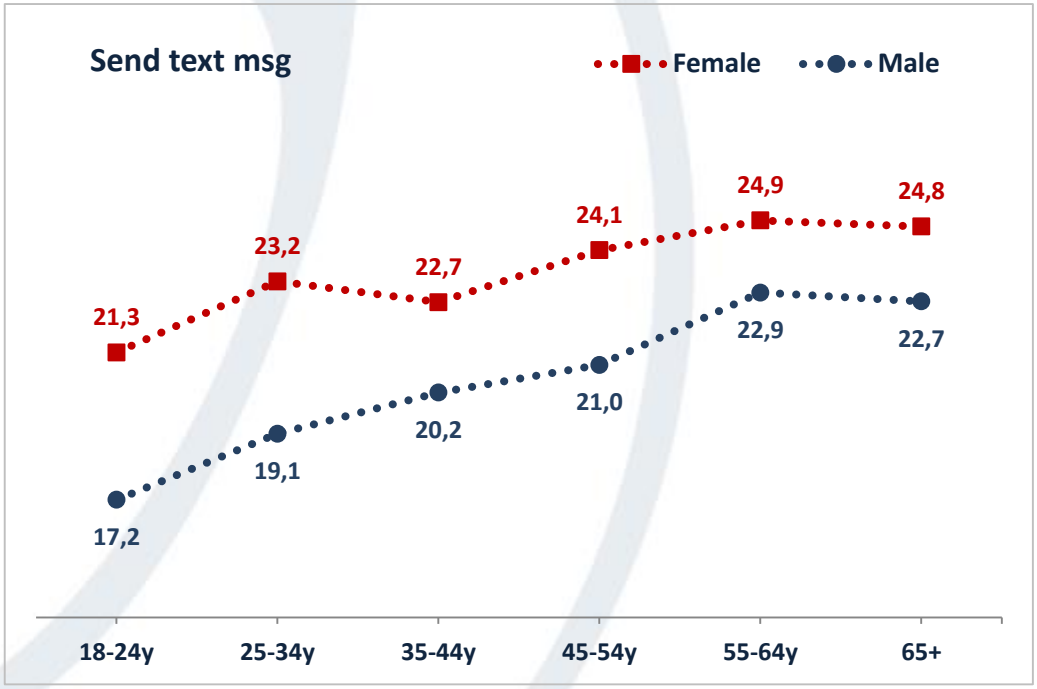


Figure 5. Risk perception concerning sending text messages while driving, by sex and age group (**number of accidents out of 100 caused by sending text messages while driving – mean**)

Descriptive analysis

Other self-declared behaviours

In the past 12 months, how often did you... while driving?

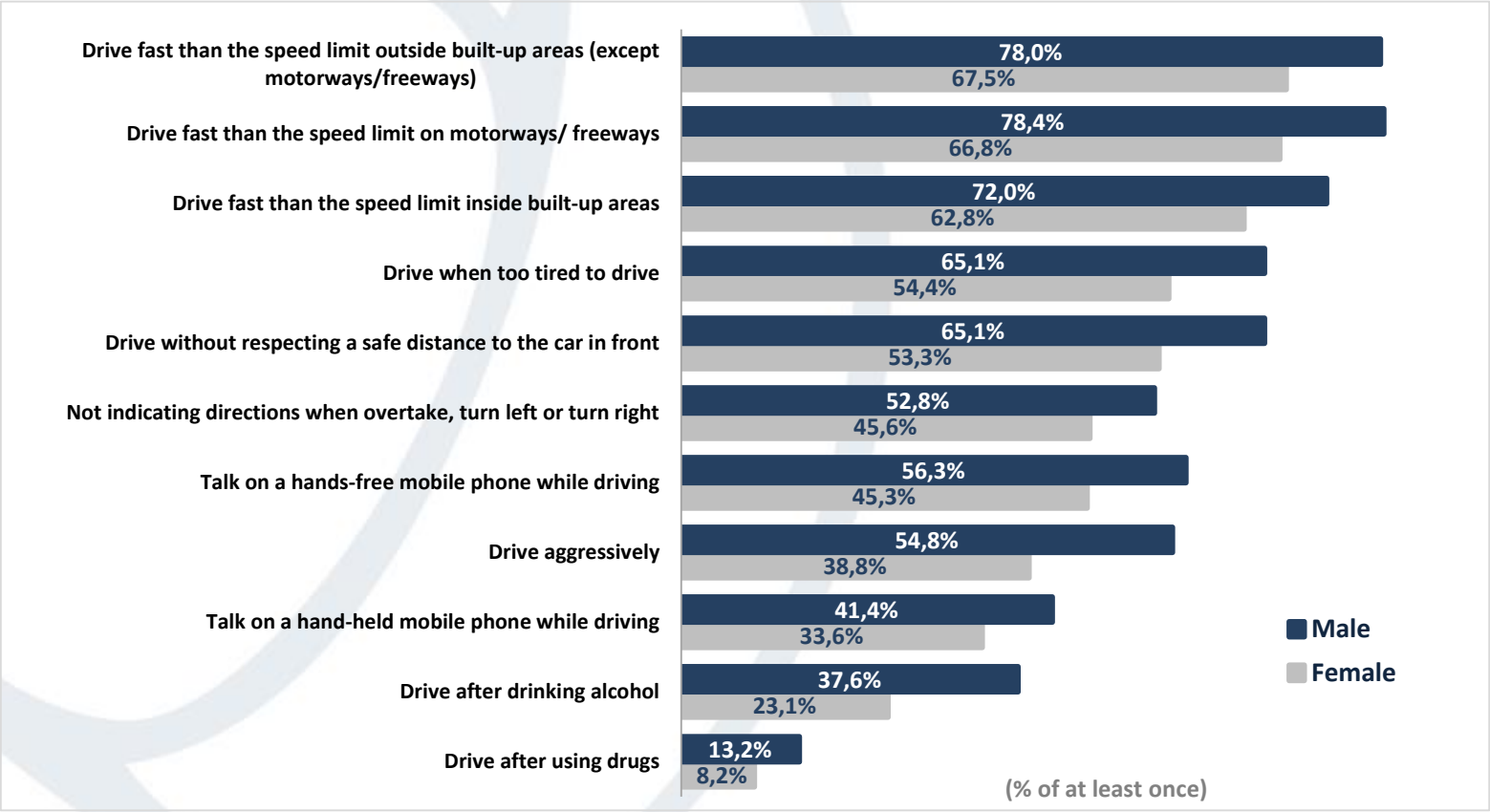


Figure 6. Self-declared traffic behaviours, by sex (**% of "at least once"**)

Predictors of sending text messages/e-mails while driving

Sociodemographic factors

Table 2. Logistic multilevel models for sending text messages or e-mails while driving: effect of sociodemographic factors (for male drivers and for female drivers).

Factors	FEMALE	MALE
	Odds Ratio (CI95%)	Odds Ratio (CI95%)
Age group		
18 - 24 (Ref.)	**1**	**1**
25 - 34	**1.04** (0.83, 1.30)	**0.77*** (0.63, 0.95)
35 - 44	**0.45**** (0.36, 0.57)	**0.57**** (0.46, 0.70)
45 - 54	**0.33**** (0.26, 0.42)	**0.23****(0.19, 0.29)
55 - 64	**0.16**** (0.12, 0.21)	**0.13**** (0.10, 0.16)
65+	**0.06**** (0.04, 0.08)	**0.03**** (0.02, 0.04)
Educational level		
Primary education or none (Ref.)	**1**	**1**
Secondary education	**1.12** (0.78, 1.60)	**0.97** (0.71, 1.32)
Bachelor's degree or similar	**1.28** (0.88, 1.87)	**1.17** (0.85, 1.60)
Master's degree or higher	**1.47*** (1.01, 2.15)	**1.22** (0.89, 1.68)
Frequency of driving		
A few days a month or less (Ref.)	**1**	**1**
1 to 3 days a week	**1.95**** (1.41, 2.70)	**1.06** (0.81, 1.41)
At least 4 days a week	**3.36**** (2.51, 4.50)	**1.46**** (1.14, 1.87)

Logistic multilevel models with country as 2nd level (random intercept); dependent variable: self-declared behaviour - send a text message or e-mail while driving (0=never; 1=at least once); $^{**}p < 0.01$; $^{*}p < 0.05$.

Predictors of sending text messages/e-mails while driving

Attitudes, subjective norms, and risk perception

Table 3. Logistic multilevel models for sending text messages or e-mails while driving: effect of attitudes, subjective norms and risk perception (for male drivers and for female drivers).

Factors	FEMALE	MALE
	Odds Ratio (CI95%)	**Odds Ratio (CI95%)**
Attitudes (acceptable vs. unacceptable/neutral) [1]	**8.78**** (5.91, 13.04)	**4.70**** (3.50, 6.30)
Subjective norms (acceptable vs. unacceptable/neutral) [2]	**0.90** (0.69, 1.18)	**1.51**** (1.23, 1.86)
Risk perception [3]		
Risk 1 - Low (min - Q1) (Ref.)	**1**	**1**
Risk 2 (Q1 - Q2)	**0.80*** (0.66, 0.96)	**1.00** (0.85, 1.17)
Risk 3 (Q2 - Q3)	**0.78*** (0.63, 0.96)	**0.87** (0.72, 1.04)
Risk 4 - High (Q3 – Max)	**0.58**** (0.48, 0.70)	**0.91** (0.76, 1.08)

Logistic multilevel models with country as 2nd level (random intercept); dependent variable: self-declared behaviour - send a text message or e-mail while driving (0=never; 1=at least once); adjusted for age, education level and frequency of driving; **$p < 0.01$; *$p < 0.05$.

[1] "How acceptable do you, personally, feel it is for a driver to send text messages or e-mails while driving?";

[2] "Where you live, how acceptable would most other people say it is for a driver to send text messages or e-mails while driving?";

[3] Number of accidents, out of 100, caused by sending a text message while driving. Variable categorized based on quartiles.

Predictors of sending text messages/e-mails while driving

Other self-declared behaviours

Table 4. Logistic multilevel models for sending text messages or e-mails while driving: effect of other risky traffic behaviours (for male drivers and for female drivers).

Factors [1]	FEMALE	MALE
	Odds Ratio (CI95%)	Odds Ratio (CI95%)
Talk on a hand-held mobile phone while driving	**6.96**** (5.68, 8.53)	**7.37**** (6.13, 8.85)
Drive fast than the speed limit (inside built-up areas)	**1.63**** (1.27, 2.10)	**2.37**** (1.82, 3.09)
Drive after drinking alcohol	**1.95**** (1.55, 2.45)	**1.72**** (1.42, 2.07)
Drive after using drugs	**6.89**** (4.60, 10.30)	**4.73**** (3.60, 6.21)
Drive when too tired to drive	**0.91** (0.74, 1.12)	**1.58**** (1.28, 1.93)
Drive aggressively	**1.32**** (1.07, 1.64)	**1.10** (0.91, 1.34)
Drive without respecting a safe distance to the car in front	**1.78**** (1.42, 2.22)	**1.23** (0.98, 1.53)
Not indicating directions when overtake, turn left or turn right	**1.40**** (1.13, 1.72)	**1.65**** (1.36, 2.00)

Logistic multilevel models with country as 2nd level (random intercept); dependent variable: self-declared behaviour - send a text message or e-mail while driving (0=never; 1=at least once); adjusted for age, education level and frequency of driving; **$p < 0.01$; *$p < 0.05$.

[1] Self-declared behaviours: 0=never; 1=at least once in the past 12 months.

Mediation effects

Subjective norms → Attitudes → Self-declared behaviour

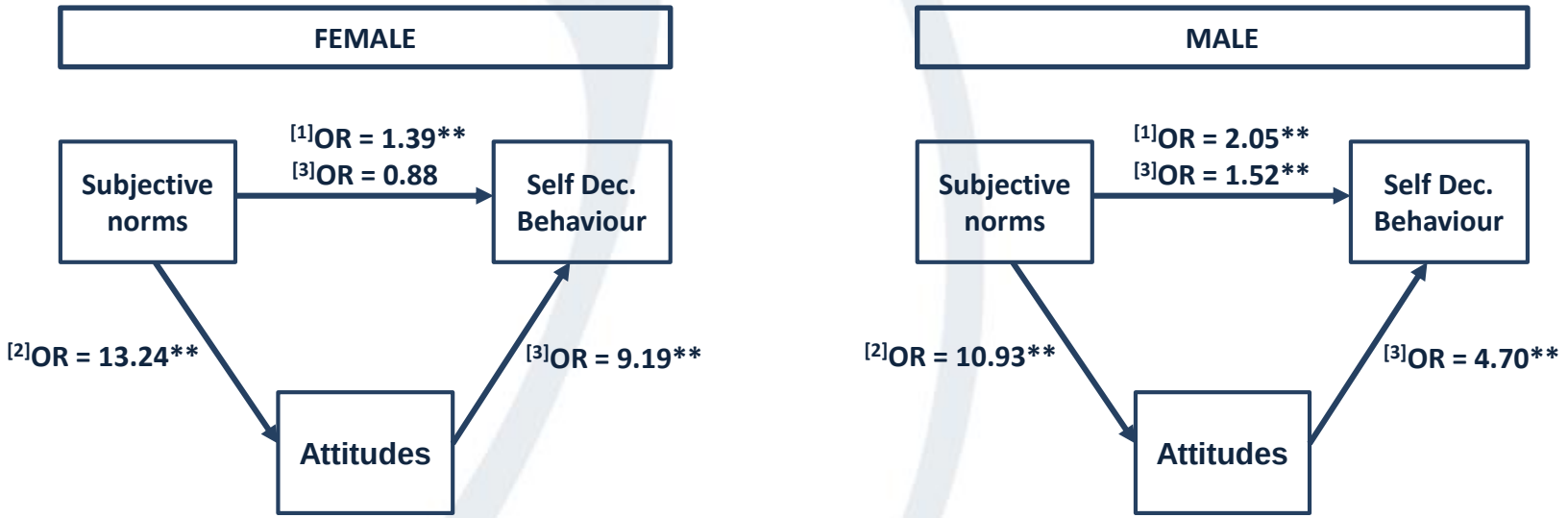


Figure 6. Mediation effects of attitudes on the relationship between subjective norms and self-declared behaviour of sending text messages/e-mails while driving, in female and male samples.

Logistic multilevel models with country as 2nd level (random intercept); adjusted for age, education level and frequency of driving;

OR – Odds Ratio; $^{**}p < 0.01$; $^{*}p < 0.05$.

[1] Model 1: Independent Variable: subjective norms -> Dependent Variable: self-declared behaviour;

[2] Model 2: Independent Variable: subjective norms -> Dependent Variable: attitudes;

[3] Model 3: Independent Variables: subjective norms & attitudes -> Dependent Variable: self-declared behaviour.

Conclusions

- The likelihood of sending text messages/emails while driving decreases with the increase of the age among men, and among women (only after 35 years old);
- Women with higher educational level are more likely to send text messages/emails while driving;
- The likelihood of sending text messages/emails while driving increases with the increase of the frequency of driving (stronger effect among women);
- Risk perception of sending text messages/emails while driving has a negative effect on the self-declared behaviour among women, but not among men;
- Attitudes towards sending text messages/emails while driving have a strong effect on the self-declared behaviour (stronger effect among women);
- Subjective norms concerning texting while driving affect the behaviour among men, but not among women;
- Attitudes mediate the relationship between subjective norms and the self-declared behaviour of sending text messages/e-mails while driving;
- Strong association between sending text messages/emails while driving and other risky driving behaviours.

References

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