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

Alain Areal

Authors:
- Carlos Pires – Prevenção Rodoviária Portuguesa, Lisboa, Portugal
- Sofia Tavares – Departamento de Psicologia, Escola de Ciências Sociais and Centro de Investigação em Educação e Psicologia, Universidade de Évora, Évora, Portugal
- Alain Areal – Prevenção Rodoviária Portuguesa, Lisboa, Portugal
- José Trigoso – Prevenção Rodoviária Portuguesa, Lisboa, Portugal
ESRA 2015 – European Survey of Road users’ safety Attitudes

www.esranet.eu

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

17 European countries
Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, The Netherlands, United Kingdom
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.
MATERIALS AND METHODS

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)
MATERIALS AND METHODS

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).
RESULTS

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.
RESULTS

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”)
RESULTS

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”)
RESULTS

Descriptive analysis

Texting while driving – subjective norms

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

A. Send txt msg/e-mails

B. Check/update social media

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

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?

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive fast than the speed limit outside built-up areas (except motorways/freeways)</td>
<td>78.0%</td>
<td>67.5%</td>
</tr>
<tr>
<td>Drive fast than the speed limit on motorways/freeways</td>
<td>78.4%</td>
<td>66.8%</td>
</tr>
<tr>
<td>Drive fast than the speed limit inside built-up areas</td>
<td>72.0%</td>
<td>62.8%</td>
</tr>
<tr>
<td>Drive when too tired to drive</td>
<td>65.1%</td>
<td>54.4%</td>
</tr>
<tr>
<td>Drive without respecting a safe distance to the car in front</td>
<td>65.1%</td>
<td>53.3%</td>
</tr>
<tr>
<td>Not indicating directions when overtake, turn left or turn right</td>
<td>52.8%</td>
<td>45.6%</td>
</tr>
<tr>
<td>Talk on a hands-free mobile phone while driving</td>
<td>56.3%</td>
<td>45.3%</td>
</tr>
<tr>
<td>Drive aggressively</td>
<td>54.8%</td>
<td></td>
</tr>
<tr>
<td>Talk on a hand-held mobile phone while driving</td>
<td>41.4%</td>
<td>33.6%</td>
</tr>
<tr>
<td>Drive after drinking alcohol</td>
<td>37.6%</td>
<td>23.1%</td>
</tr>
<tr>
<td>Drive after using drugs</td>
<td>13.2%</td>
<td>8.2%</td>
</tr>
</tbody>
</table>

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

(%) of at least once)
**RESULTS**

Predictors of sending text messages/e-mails while driving

**Sociodemographic factors**

<table>
<thead>
<tr>
<th>Factors</th>
<th><strong>FEMALE</strong></th>
<th><strong>MALE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 24 (Ref.)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>25 - 34</td>
<td>1.04 (0.83, 1.30)</td>
<td>0.77* (0.63, 0.95)</td>
</tr>
<tr>
<td>35 - 44</td>
<td>0.45** (0.36, 0.57)</td>
<td>0.57** (0.46, 0.70)</td>
</tr>
<tr>
<td>45 - 54</td>
<td>0.33** (0.26, 0.42)</td>
<td>0.23** (0.19, 0.29)</td>
</tr>
<tr>
<td>55 - 64</td>
<td>0.16** (0.12, 0.21)</td>
<td>0.13** (0.10, 0.16)</td>
</tr>
<tr>
<td>65+</td>
<td>0.06** (0.04, 0.08)</td>
<td>0.03** (0.02, 0.04)</td>
</tr>
</tbody>
</table>

| 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 2^{nd} 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.
RESULTS

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).

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

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).

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

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.
RESULTS

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.
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


