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Age and road safety performance: Focusing on elderly
and young drivers

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Research Article

Age and road safety performance: Focusing on elderly and young drivers

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ABSTRACT

The existing literature on young and elderly drivers indicates that they have the highest crash risks compared to other age groups of drivers. This study improves our understanding of the risk factors contributing to young and elderly drivers' elevated crash risk by examining self-report data from the *E-Survey of Road User's Safety Attitudes (ESRA)*. The primary objective of this study is to compare the attitudes and behaviours of young, elderly, and middle-age drivers in Canada, the United States, and Europe. The main focus is on the practice of driving while distracted by mobile phones and driving while fatigued, as these are two dangerous behaviours that demonstrate the impact age may have. The analyses consistently showed that there are differences in the responses attributable to age. In all regions, drivers aged 18–21 years consistently reported higher rates of distracted and fatigued driving and higher rates of perceived social and personal acceptability of these behaviours than drivers aged 35–54 years. Elderly drivers aged 65+ years reported even lower rates of these behaviours and acceptability. Young drivers were also the least likely to believe that distraction and fatigue are frequent causes of road crashes, while elderly drivers were the most likely to believe this. This pattern with respect to age repeats in the support for policy measures as well; young drivers are least likely to support zero tolerance policies for mobile phone use when driving, while elderly drivers are the most likely to support this measure. Multivariate logistic regression modeling confirmed that elderly drivers were the least likely to engage in the use of mobile phones while driving or driving while fatigued. Statistically significant results showed that the middle-age group was less likely than young drivers to read a text message/email or check social media while driving and driving while fatigued.

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Background

U-shaped curve

- ▶ A U-shaped curve represents the relationship between age and crash risk.
- ▶ Youngest and oldest drivers have the highest crash risk, especially when measured for fatal crashes or motor vehicle fatalities per distance driving.
- ▶ They may crash and die for different reasons, but their risks are higher compared to middle-aged drivers.
 - ▶ Young drivers: inexperienced, overconfident, peer pressure
 - ▶ Elderly drivers: cognitive and physical declines, frailty, low mileage bias

Objectives

Compare ages across regions

- ▶ The objective of this study was to compare attitudes and behaviours of young, middle-aged and elderly drivers in Canada, the US and the EU using ESRA data.
- ▶ Main focus on influence of driving while distracted by mobile phones and driving while fatigued.



Data

Table 1

Sample distribution per region [frequency, percentage by region].

| Sex | Age | Region | | | | | |
|--------|-------|--------|-------|--------|-------|---------------|-------|
| | | Europe | | Canada | | United States | |
| Male | 18–21 | 641 | 4.5% | 34 | 5.6% | 26 | 4.3% |
| | 35–54 | 4231 | 29.7% | 164 | 27.2% | 166 | 27.6% |
| | 65+ | 2151 | 15.1% | 95 | 15.8% | 90 | 15.0% |
| Female | 18–21 | 562 | 3.9% | 29 | 4.8% | 30 | 5.0% |
| | 35–54 | 4108 | 28.8% | 171 | 28.4% | 173 | 28.7% |
| | 65+ | 2557 | 17.9% | 109 | 18.1% | 110 | 18.3% |
| Total | | 14,250 | | 602 | | 595 | |

Note: Sample distribution is unweighted.

Results

Table 2
Self-declared behaviour [percentage, (95% CI)].

| Question | Age | Canada | United States | Europe |
|--|------------|------------------|------------------|------------------|
| Talk on handheld mobile phone while driving | 18–21 | 54.0 (41.7–65.9) | 70.0 (56.8–80.6) | 59.2 (56.3–61.9) |
| | 35–54 | 36.6 (31.6–41.9) | 54.6 (49.2–59.8) | 51.4 (50.3–52.5) |
| | 65+ | 28.6 (22.8–35.2) | 37.5 (31.1–44.5) | 40.7 (38.9–42.5) |
| | p-value | 0.001 | <0.001 | <0.001 |
| | Cramer's V | 0.15 | 0.20 | 0.12 |
| Talk on hands-free mobile phone while driving | 18–21 | 63.6 (51.0–74.5) | 70.8 (57.7–81.1) | 69.8 (67.2–72.4) |
| | 35–54 | 57.9 (52.5–63.1) | 64.9 (59.7–69.8) | 65.4 (64.4–66.5) |
| | 65+ | 48.1 (41.3–55.0) | 46.0 (39.2–53.0) | 56.0 (54.2–57.9) |
| | p-value | 0.035 | <0.001 | <0.001 |
| | Cramer's V | 0.11 | 0.19 | 0.10 |
| Read a text message/email or check social media while driving | 18–21 | 63.6 (51.1–74.5) | 62.8 (49.4–74.4) | 62.9 (60.1–65.6) |
| | 35–54 | 43.2 (38.0–48.6) | 53.1 (47.8–58.4) | 48.0 (46.9–49.1) |
| | 65+ | 28.1 (22.3–34.7) | 30.4 (24.5–37.2) | 35.4 (33.6–37.3) |
| | p-value | <0.001 | <0.001 | <0.001 |
| | Cramer's V | 0.22 | 0.23 | 0.16 |
| Drive when so sleepy that they had trouble keeping their eyes open | 18–21 | 60.4 (47.9–71.7) | 54.4 (41.2–66.9) | 54.1 (51.3–56.9) |
| | 35–54 | 35.5 (30.5–40.8) | 37.8 (32.8–43.1) | 42.1 (41.0–43.2) |
| | 65+ | 31.9 (25.8–38.6) | 28.4 (22.5–35.0) | 38.3 (36.5–40.1) |
| | p-value | <0.001 | 0.001 | <0.001 |
| | Cramer's V | 0.17 | 0.15 | 0.08 |

Table 6
Logistic regression models of self-declared driver behaviours.

| Independent variables (reference categories) | Dependent variable: reported behaviour (last 30 days) (0 = never; 1 = at least once) | | | |
|---|--|-----------------------------|---------------------------------|---------------------|
| | Handheld mobile phone use | Hands-free mobile phone use | Text message/email/social media | Fatigued driving |
| | Odds Ratio (95% CI) | Odds Ratio (95% CI) | Odds Ratio (95% CI) | Odds Ratio (95% CI) |
| Sociodemographic | | | | |
| Gender (Ref. category male) | | | | |
| Female | 0.76 (0.69–0.83)** | 0.77 (0.71–0.84)** | 0.84 (0.76–0.93)** | 0.58 (0.53–0.64)** |
| Age group (Ref. category 35–54) | | | | |
| 18–21 | 1.07 (0.91–1.25) | 0.93 (0.80–1.09) | 1.59 (1.35–1.86)** | 1.46 (1.24–1.73)** |
| 65+ | 0.44 (0.39–0.49)** | 0.65 (0.58–0.72)** | 0.25 (0.22–0.30)** | 0.53 (0.47–0.60)** |
| Region (Ref. category Canada) | | | | |
| Europe | 1.96 (1.53–2.51)** | 1.08 (0.89–1.32) | 1.07 (0.85–1.35) | 1.17 (0.92–1.48) |
| United States | 2.49 (1.80–3.43)** | 1.02 (0.77–1.35) | 1.52 (1.11–2.07)** | 1.02 (0.73–1.43) |
| Driving Exposure (Ref. category a few days a month) | | | | |
| 1 to 3 days a week | 1.08 (0.89–1.33) | 1.08 (0.86–1.36) | 0.91 (0.71–1.16) | 1.18 (0.95–1.46) |
| At least 4 days a week | 1.77 (1.48–2.12)** | 1.78 (1.44–2.21)** | 1.51 (1.21–1.89)** | 1.57 (1.29–1.90)** |
| Acceptability of Safe and Unsafe Behaviour (variable equal to 1 if respondent rated acceptability as 4 or 5 on 5-point scale; Ref. category 0 otherwise) | | | | |
| Social acceptability to talk on a handheld phone while driving | 1.79 (1.48–2.16)** | | | |
| Social acceptability to read a text message/email or check social media while driving | | | 1.92 (1.47–2.50)** | |
| Personal acceptability to talk on a handheld phone while driving | 3.62 (2.70–4.86)** | | | |
| Personal acceptability to talk on a hands-free phone while driving | | 2.49 (2.24–2.77)** | | |
| Personal acceptability to read a text message/email or check social media while driving | | | 7.01 (3.11–15.83)** | |
| Personal acceptability to drive when so sleepy that they have trouble keeping their eyes open | | | | 5.45 (3.46–8.58)** |
| Risk Perception (variable equal to 1 if respondent rated risk as 4 to 6 on 6-point scale; Ref. category 0 otherwise) | | | | |
| Using a handheld mobile phone while driving is often a factor in road crashes | 0.75 (0.67–0.83)** | | 0.76 (0.68–0.85)** | |
| Using a hands-free mobile phone while driving is often a factor in road crashes | | 0.78 (0.71–0.85)** | | |
| Driving while fatigued is often a factor in road crashes | | | | 0.79 (0.71–0.89)** |
| Support for policy measures (variable equal to 1 if respondent rated support as 4 or 5 on 5-point scale; Ref. category 0 otherwise) | | | | |
| Have zero tolerance for using any type of mobile phone while driving for all drivers | 0.51 (0.47–0.56)** | 0.50 (0.45–0.55)** | 0.52 (0.47–0.57)** | |

Notes: (1)* p-value < 0.05, **p-value < 0.01.

Acceptability of Safe and Unsafe Behaviour (variable equal to 1 if respondent rated as acceptable)

Social acceptability to talk on a handheld phone while driving

Social acceptability to read a text message/email or check social media while driving

Personal acceptability to talk on a handheld phone while driving

Personal acceptability to talk on a hands-free phone while driving

Personal acceptability to read a text message/email or check social media while driving

Personal acceptability to drive when so sleepy that they have trouble keeping their eyes open

Risk Perception (variable equal to 1 if respondent rated risk as 4 to 6)

Using a handheld mobile phone while driving is often a factor in road crashes

Using a hands-free mobile phone while driving is often a factor in road crashes

Driving while fatigued is often a factor in road crashes

Support for policy measures (variable equal to 1 if respondent rated as support for policy)

Have zero tolerance for using any type of mobile phone while driving for all drivers

What these tables show...

- ▶ The analyses consistently showed there are differences by age:
 - ▶ In all three regions, drivers aged 18-21 consistently reported higher rates of distracted and fatigued driving, and higher rates of perceived social and personal acceptability of these behaviours than drivers aged 35-54.
 - ▶ Elderly drivers aged 65+ reported even lower rates of these behaviours and acceptability.
 - ▶ Young drivers were also the least likely to believe that distraction and fatigue are frequent causes of road crashes, while elderly drivers were the most likely to believe it.
 - ▶ This is also true for support of policy measures: young drivers are least likely to support zero tolerance for mobile phone use when driving while elderly drivers are the most likely to support it.

Conclusions

What this means...

- ▶ Understanding similarities and differences by age can inform policies and programs to reduce crash risk:
- ▶ Young drivers, especially males report higher rates of distracted and fatigued driving in all three regions...this demographic should be a primary target;
- ▶ Road safety education efforts should focus on reducing the acceptability of these behaviours and better inform drivers about the associated crash risk because if you believe they contribute to crash risk you are less likely to engage in them.
- ▶ Encouraging drivers to refrain from using hand-held mobile phones is important in all three regions, but especially in the US where they were more likely to self-report this behaviour.