Road user safety attitudes towards driver fatigue

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Abstract

Driver fatigue has been identified as a human factor causing major road safety problems in crash occurrence. The objective of this paper is to present the key findings on road user safety attitudes towards driver fatigue as identified by the second edition of the ESRA survey. Data from more than 35,000 road users in 32 countries were collected through an extensive online panel questionnaire survey concerning the opinion of participants on several aspects of road behaviour. The questions on fatigue concern the personal acceptability of fatigued driving, the perception of fatigued driving as crash cause and self-declared fatigued driving in the past 30 days. These variables and their interrelationships were further analysed via Random Forest analyses and binary logistic regression models. The results of this paper reveal the public attitudes and perceptions concerning driver fatigue; in addition, some solutions on preventing driver fatigue and mitigating its effects are discussed.

Data Collection

Data were gathered from more than **35,000 road users** in 32 countries through a **questionnaire survey**. The fatigue aspects which were analysed are:

- **Self-declared** fatigued driving in the past 30 days
- **Personal acceptability** of fatigued driving
- Perception of fatigued driving as an **accident cause**

Descriptive Statistics

Descriptive statistics on answers about driver fatigue by:

- **country** and world region
- **age** per region
- **gender** per region

Methodology

Two statistical modelling approaches were employed:

- **Random Forest Analysis** (personal acceptability of fatigued driving, perception of fatigued driving as an accident cause).
- **Logistic Regression Model** (self-declared fatigued driving).
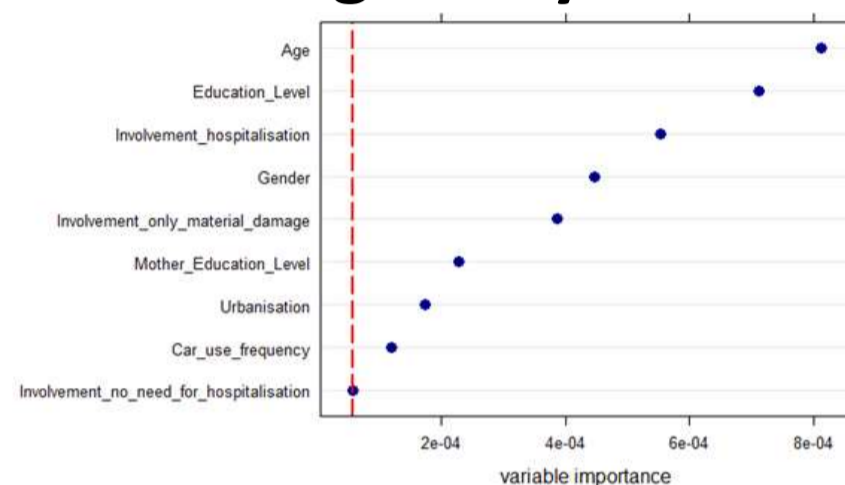
Modelling Analysis

Figure 1. Variable importance ranking from Random Forest Analysis (personal acceptability of fatigued driving)

- The most important factors are **age, educational level** and the frequency of **past involvement in road crashes**.
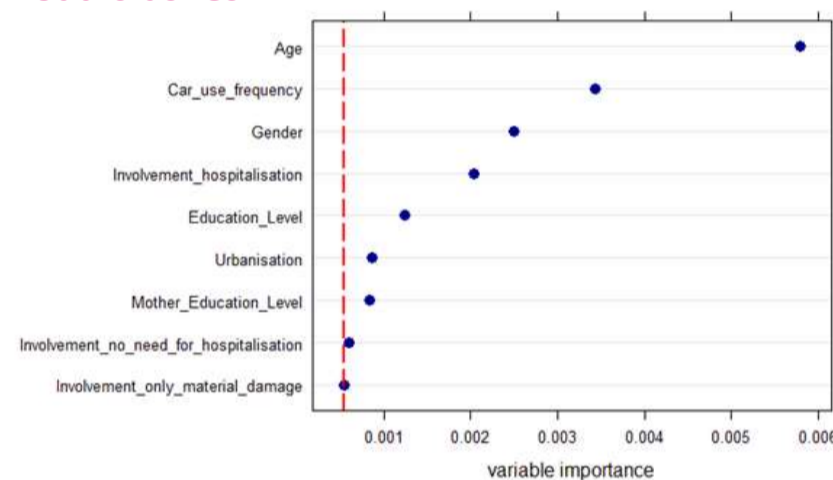

Figure 2. Variable importance ranking from Random Forest Analysis (perception of fatigued driving as an accident cause)

- The most important factors are **age, frequency of car use** and **gender** followed by the frequency of involvement in road crashes.

Table 1. Binary logistic regression model for driving while tired

Dependent variable: "Over the last 30 days, how often did you as a car driver drive when you were so sleepy that you had trouble keeping your eyes open?" (0=never; 1=at least once)		
Variables	Categories	Odds Ratio (CI 95%)
Gender	(Male)	–
	Female	0.53** (0.50-0.56)
Age group	(55+)	–
	18-34 yrs.	1.30** (1.21-1.39)
	35-54 yrs.	1.08* (1.01-1.15)
Educational level	(Master's degree or higher)	–
	Primary education or none	0.50** (0.43-0.59)
	Secondary education	0.49** (0.46-0.53)
	Bachelor's degree or similar	0.54** (0.51-0.58)
Personal acceptability: Driving when you have trouble keeping the eyes open	(Unacceptable/Neutral)	–
	Acceptable	6.53** (5.34-7.97)
Risk perception: Driving while tired is the cause of a road crash involving a car	(Not that often)	–
	Often	0.60** (0.56-0.63)
Urbanisation Level	(Semi-urban and Rural)	–
	Urban	0.71** (0.67-0.75)

Statistical significance: *p<0.05, **p<0.01

- The odds of driving when tired for **women**, in comparison with men, decrease by 47%.

- When comparing with the drivers aged 55+, the odds of driving when tired increase by 30% for drivers **aged 18 to 34**, and by 8% for drivers **aged 35 to 54**.

- The odds of driving when tired for drivers with **primary education level or lower**, in comparison with drivers with a Master's degree or higher, decrease by 50%.

- When comparing with the drivers who live in semi-urban and rural areas, the odds of driving when tired decrease by 29% for drivers who live in **urban areas**.

Results

- Less than 3% of road users find fatigued driving **personally acceptable**.

- In all countries worldwide a large majority of road users **perceive tired driving as a frequent cause of accidents**.

- In most countries one fifth to one quarter of car drivers report to **have driven while having trouble keeping eyes open** in the past 30 days.

- The **personal acceptability** of fatigued driving is slightly higher among the younger age groups.

- **Self-declared fatigued** driving rates are higher for male drivers than for female drivers.

- Drivers who think it is **acceptable to drive being so sleepy** that you have trouble keeping your eyes open are 6.5 times more likely to drive while tired.

Conclusions

- An active safety culture and **fatigue management** are the best measures to address driver fatigue.

- **Awareness-raising campaigns** provide car drivers with behavioural advice and helpful instructions that may assist in fatigued driving prevention.

- **State-of-the-art technologies**, devices and systems have been installed in vehicles for driver assistance, including **fatigue detection and warning**.

- Drowsiness detection systems are only an aid and drivers themselves have the **prime responsibility** for fatigued driving prevention.

Acknowledgment