



Human Factors Workshop G

Older Driver Safety: In International Perspective

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Sponsored by Safe Mobility of Older Persons Committee, ANB60

PROMOTING SAFE DRIVING AT AN OLDER AGE

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Greek Road Safety Indicators

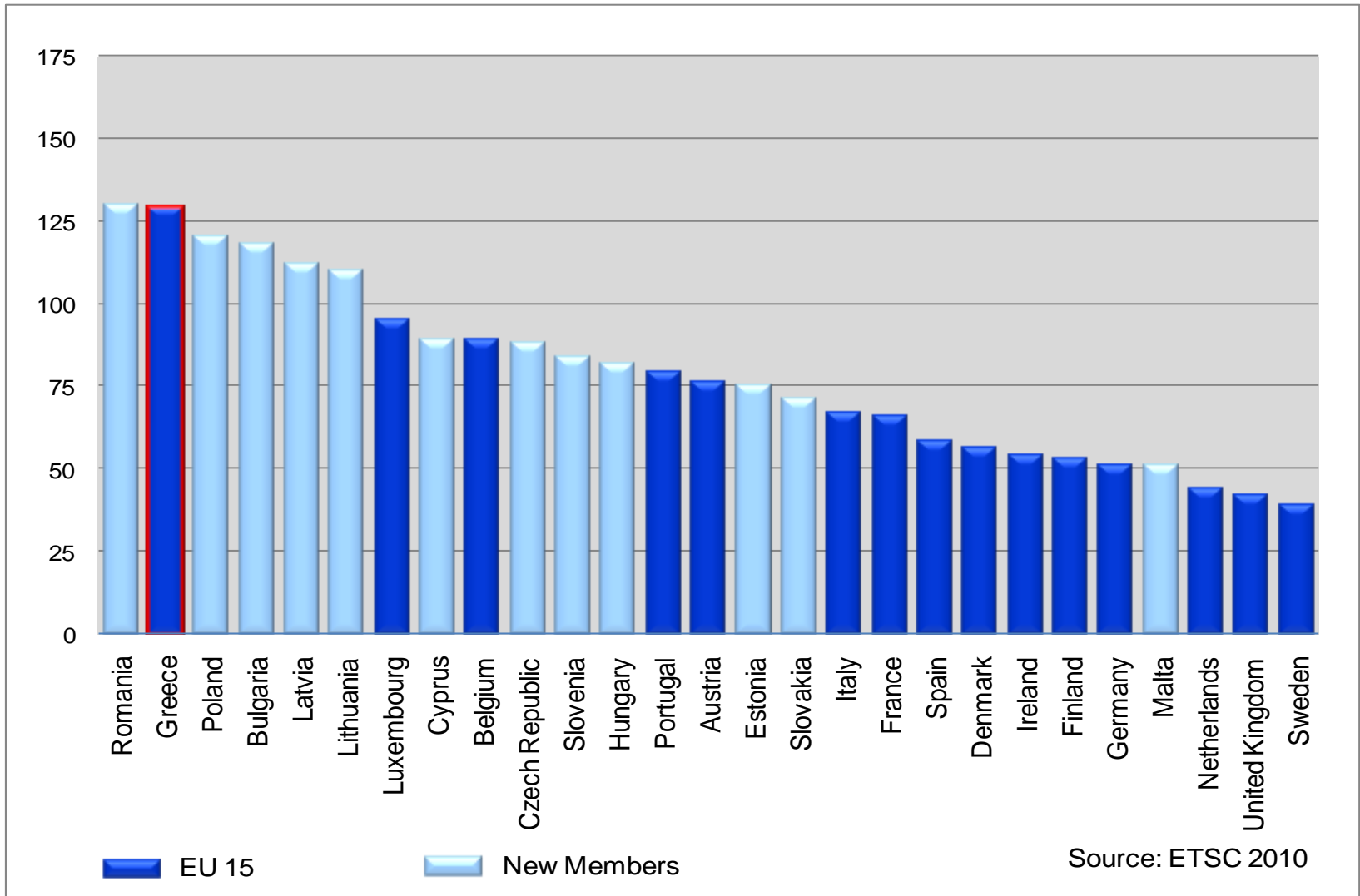
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Greek Road Safety Indicators

- During the period from 2001 to 2010 the number of road fatalities fell by **37%**. This sounds good, except ...
- This improvement was among the **lowest** in the EU, and Greece remains one of the worst performing countries among the 27 members with 130 fatalities per million of population, compared to a European average of 70 fatalities per million (2009).

Greek Road Safety Indicators

Fatalities per million population (EU27, 2009)



In Response: The Greek Road Safety Strategic Plan

The Strategic Plan for the improvement of road safety in Greece for the period 2011-2020 has been developed for the Ministry of Infrastructure and Transport by the Department of Transportation Planning and Engineering at the National Technical University of Athens (NTUA).

The Greek Strategic Plan has adopted the new European Union (EU) target of halving the overall number of road deaths in the EU by 2020, starting from 2010.

The plan proposes *infrastructure improvements* and *educational initiatives* to promote older driver safety.

Within this framework, the **Handbook for Safe Driving at an Older Age** was developed as part of a research project funded by the Greek Ministry of Infrastructure and Transport.

HELLENIC REPUBLIC
MINISTRY OF INFRASTRUCTURE
TRANSPORT AND NETWORKS

AM I DRIVING SAFELY? I'M MAKING MATURE DECISIONS!

**HANDBOOK FOR SAFE DRIVING
AT AN OLDER AGE**

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Athens, 2010

Greek language at www.saas.gr
In English at <http://users.ntua.gr/sophiav/>

Existing Situation for Older Drivers in Greece

- Senior drivers represent 9% of road fatalities (2009).
- Given the expected growth of the elderly population (33% in 2050) and the expanding freeway network, there is an urgent need for initiatives to address training and education needs for older drivers.
- Under the license renewal procedure in Greece, a medical examination by two doctors (a general practitioner and an ophthalmologist) is mandatory at the age of 65. The renewal term is three years, provided that functional ability to drive is not questioned during that period.
- *There are currently no educational programs in the public or private sectors to promote safe driving strategies for older drivers.*

Handbook for Safe Driving at an Older Age

The aims of the Handbook are:

- to help older drivers increase their self-awareness of the effects of age-related changes on their driving safety, and of the need to adapt their driving behavior;
- to help older drivers improve their knowledge and develop appropriate concern for their own safety;
- to guide them to make informed driving decisions.

The Handbook for Safe Driving at an Older Age was based:

- on self-screening and educational material for older drivers;
- on the results of a study on the driving behavior of active older drivers, aged 65-74, on a freeway in Greece.

Increasing Self-Awareness of the Need to Adapt

The Handbook focuses on driver attitudes which – it is assumed – are strongly influenced by knowledge. To this end, the Handbook:

- Addresses factors that determine task demands and the driver capabilities required to meet them.
- Provides information on how to deal with or avoid certain situations (e.g. intersection negotiation).
- Stresses the advantage of safe-driving practices, while explaining that what is considered safe and responsible driving takes into account the expectations of significant others/influential people (family, friends, doctors).
- Prompts drivers to address their concerns to professionals (doctors, occupational therapists, driving instructors).
- Presents older persons with safe transportation alternatives.

Improving Knowledge

The information given in the Handbook covers:

- maneuvers that are known to be dangerous or that pose difficulties to older drivers in general, such as intersections, yielding, left turns and defensive driving techniques;
- freeway maneuvering, visual search and hazard recognition;
- new traffic rules that have come into force, particularly on freeways;
- negative implications of age-related changes in visual, physical, and mental abilities on safe driving;
- the implications of human factor variables for driving safety (e.g. alcohol consumption, medicines and fatigue).

Offering Advice and Guidance

The Handbook uses **short tips containing clear and simple messages** to offer advice and guidance, including suggestions on how to control task difficulty. Specifically, drivers are:

- offered strategies to compensate for certain functional declines, e.g., driving in areas with good lighting conditions, in good weather, avoiding peak hours and unfamiliar areas, and adjusting driving speed;
- advised to control exposure under temporary impairing conditions (e.g., fatigue, emotions, medicines);
- encouraged to maintain physical condition and good health, and to visit their doctors for assessment, assistance and guidance.
- advised to assess and improve their driving performance with the help of a driving instructor and consider alternative means of transportation when driving is not a safe or preferred option.

How the Handbook Works

Readers of the Handbook are asked to:

- think about their own potential problems and difficulties;
- apply information about the effects of age-related declines in driving ability as well as advice regarding
 - tactical and strategic driving choices
 - evaluation of their driving abilities
 - transportation alternatives

Specific Contents of the Handbook

The Handbook for Safe Driving at an Older Age covers:

- **Safety within the car** – seat belt use; keeping the vehicle in good condition; dealing with accidents.
- **Safety in traffic** – driving at intersections; keeping safe distances; paying attention to other road users; priority rules; checks and use of mirrors; slow driving.
- **Safe practices on freeway** – traffic rules and traffic signs; lane changing; entering maneuvers; exiting maneuvers.
- **Driving and emotions** – dealing with anger; dealing with anxiety.
- **Driving in good condition** – influence of medications; good health practices.

Specific Contents of the Handbook (con't.)

- **Driving problems and age-related changes** – slower reactions while driving; vision problems; memory problems; wandering thoughts while driving; difficulties while driving in unfamiliar areas, at night, in the rain; or in heavy traffic; fatigue while driving; difficulties while driving and doing another activity; difficulties in finding a specific sign; difficulties in turning the head to look to the side or rear; difficulties in using the pedals and the steering wheel.
- **Indications of serious concern about driving ability** – including the concerns of family and friends about an older driver; traffic violations or crashes in the last one or two years; eye diseases; chronic diseases; awareness of health conditions; preparing for a transition to restricted driving or stopping driving altogether.
- **General information** – procedures for driving license renewal; using public transport; ways of getting around.

Handbook Development:

A Study of Actual vs. Perceived Driving Performance

Some of the driving difficulties and problems addressed in the Handbook were identified in a study on the behavior of active senior drivers aged 65-74 on a freeway in Greece.

The study investigated:

- the correlation between compensatory behavior and safe driving;
- the correlation between actual and self-assessed driving performance on a freeway;
- perceptions regarding road safety issues and their relationships to actual and self-assessed driving performance.

<http://users.ntua.gr/sophiav/>

Handbook Development:

A Study of Actual vs. Perceived Driving Performance

Study Participants

- Forty male drivers 65 to 74; licensed; active; in good health
- Not involved in a recent accident
- Own car used

Approach

A three-phase approach was used:

- questionnaire regarding their perceptions of road safety issues
- on-road trial to assess performance on the freeway
- self-assessment questionnaire regarding their performance assessment and feelings of danger

Handbook Development:

A Study of Actual vs. Perceived Driving Performance

On-road Trial

- 34 km section of a newly designed and constructed urban freeway (Attiki Odos)
- Daytime; good weather; normal traffic; 45 min
- Freeway driving tasks:
 - driving on the freeway and exit finding
 - lane changing
 - freeway entering and exiting maneuvers at various interchanges
 - at three freeway exits, two maneuvers in quick succession

Handbook Development:

A Study of Actual vs. Perceived Driving Performance

The main findings of the study:

1. There was evidence that study participants were aware of their performance inadequacies when driving on the freeway.
 - Performance deficiencies on the freeway were found to correlate with drivers' less favorable self assessment and with the feeling of danger that drivers experienced.
 - The correlation between compensatory behavior and study participants' perceptions of their driving ability as being less safe, implies that older persons **may perceive their difficulties in driving.**

Handbook Development:

A Study of Actual vs. Perceived Driving Performance

2. The correlations between assessed and self-assessed driving performance and perceptions of problems related to knowledge of new traffic rules and signs indicated that **drivers recognize the need to improve their performance.**
3. A factor analysis indicated that '*ability in maneuvering*', '*ability in perceiving and reacting correctly in adverse driving conditions*', '*ability in maintaining correct lateral position*' and '*ability in speed adaptation on the freeway*' underlie driver perceptions regarding their own safe-driving ability; and, that they **may be motivated to improve their performance** by using materials that can assist them in these situations.

Applying Study Results to Handbook Development: Driving Deficiencies Observed During the On-Road Trial

Deficiencies that were addressed in the Handbook are:

- Driving slower than the speed of traffic stream while not being in the right-hand lane;
- Early observations on the approach of complex situations with no repetition of checks before turning or crossing;
- Slow entrance to the freeway with delayed checks;
- Sudden slowing down or braking on the freeway while searching for the exits, signs or directions;
- Slow driving behind heavy vehicles obscuring visibility;
- Slow driving in the emergency lane.

Applying Study Results to Handbook Development: Relationship With Self-Assessment Data

Driver perceptions of safety issues correlated with actual and self-assessed performance:

1. Statistically significant correlations were found between perceived driving problems linked to cognitive abilities, and lower performance in the on-road trial.
 - ➔ Drivers who reported more frequent driving problems with perception of side stimuli⁽¹⁾ showed decreased performance in task elements of freeway maneuvers, including visual search and most of the task elements of freeway entering and exiting.

⁽¹⁾ Drivers were asked how frequently they were surprised by vehicles and pedestrians appearing from the sides very close to them.

Applying Study Results to Handbook Development: Relationship With Self-Assessment Data

2. Statistically significant correlations were found between lower performance and reported driving practices, as well as perceived potentially hazardous situations, e.g.,
- drivers who reported more frequent stopping at the end of the acceleration lane on freeways performed less adequately in visual search during freeway driving;
 - drivers who perceived a higher association with potentially hazardous situations when entering freeways showed decreased performance in visual search during the entering maneuver;
 - drivers who perceived a higher association with potentially hazardous situations when driving on freeways in heavy traffic showed decreased performance in visual search during lane changing.

Applying Study Results to Handbook Development: Relationship With Self-Assessment Data

3. Correlations with knowledge of new traffic rules and traffic signs.

Drivers who reported less adequate knowledge of new traffic rules and traffic signs:

- showed decreased performance in terms of lateral position⁽²⁾ and the use of mirrors;
- expressed a need to improve their performance (in the entering maneuver) after the on-road trial.

⁽²⁾ *Encroachment into the freeway emergency lane was one of the criteria used for assessment of this behavior.*

Will the Handbook be Accepted by Older Drivers?

A Preliminary Investigation

Study objectives

- Investigation into drivers' attitudes after they read the Handbook.
- Identification of individual characteristics that predict who might be able to recognize potential problems or difficulties in their driving after reading the Handbook; and, who intends to reread the Handbook in the future.

Approach

- Participants were asked to fill out a questionnaire.
- They were given the Mini Mental State Exam (MMSE).
- Questionnaires were considered valid for drivers with MMSE score indicating a normal cognitive function (27 or above, to account for age and education).

Will the Handbook be Accepted by Older Drivers?

A Preliminary Investigation

Study Participants

- 64 active drivers (50 male and 14 female)
- aged 65-74
- with normal cognitive functioning
- other inclusion criteria:
 - valid driving license (having passed the required medical screening)
 - no advice from a doctor to reduce or stop driving
 - no more than one accident in the previous year
 - current driving activity of at least 15 km and 2 days per week
 - completion of basic education

Will the Handbook be Accepted by Older Drivers?

A Preliminary Investigation

Results

Participants generally reported the Handbook to be useful and interesting, providing pertinent knowledge and information regarding safe-driving practices, compensation strategies and the effects of aging on driving.

A binary logistic regression analysis showed that:

- The odds correctly estimating who will report increased awareness are higher for more active drivers, with higher scores in the MMSE, with more reported accidents, and fewer years of driving experience.
- The odds correctly estimating who will report an intention to reread the Handbook in the future are higher for those drivers who have had no accidents in the previous year.

Will the Handbook be Accepted by Older Drivers?

A Preliminary Investigation

Follow Up

While the study sample represents the actual ratio of male to female drivers in this age group (65-74) in Greece, there are no data available concerning, in particular, the educational level, exposure, health status, area of residence, and income of the senior driver population.

Future research on the influence of the Handbook should examine user behavior and decisions after a period of several months:

- the driving strategies adopted;
- changes in driving style and driving practices;
- control of temporary impairing conditions;
- concerns addressed to doctors and driving instructors;
- the use of alternatives to driving; and
- re-use of the Handbook.

In Summary

- ➔ Following a study of actual and self-assessed driving performance, a Handbook has been developed as an educational intervention that is tailored to the needs and limitations of active older drivers. Its aim is to help this group increase their self-awareness of the effects of age-related changes on driving, and assist them in making decisions that lead to appropriate compensatory behaviors.
- ➔ Preliminary evidence suggests the target audience will accept the Handbook as a credible resource and which drivers might benefit the most from its use. It also suggests that repeated use of the Handbook is likely, which holds promise in promoting the idea of regular self-screening.

Looking Forward

- ➔ European Legislation requires license renewal every 10 years. This sets the stage for a system of lifelong education and training.
- ➔ The Handbook could be an integral part of initiatives to address older driver safety in Greece.
- ➔ Trusted health care professionals must engage more systematically in safe-driving issues, providing information and guidance to older drivers in making informed driving decisions.
- ➔ Insurance companies could play a useful role by providing incentives to older drivers to participate in educational programs.
- ➔ Educational programs should combine theoretical material with practical training and on-road evaluations tailored to individual needs.
- ➔ Families, relatives and friends should encourage older drivers to explore the opportunities offered by new educational programs.



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