



National Technical University of Athens  
Road Safety Observatory

[www.nrso.ntua.gr](http://www.nrso.ntua.gr)

Monday  
**15**  
May  
at 14:00

# Workshop

in the framework of the

FOURTH UNITED NATIONS GLOBAL ROAD SAFETY  
WEEK  
8-14 May 2017



Save Lives  
#SlowDown

The future of road safety research

NTUA Zografou Campus, Athens

Railways Amphitheatre of the  
Department of Transportation Planning and Engineering

## Monitoring Driver Distraction **Distract**

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Together with:

Eleonora Papadimitriou, Dimos Pavlou, Sophia Vardaki,  
Costas Antoniou, John Golias, George Yannis

# Distract Project



**Title:** DISTRACT – Causes and impacts of driver distraction: a driving simulator study

**Objective:** The analysis of the effect of road, traffic and driver risk factors on driver behaviour and accident probability at unexpected incidents, with particular focus on distracted driving

**Duration:** 2012-2015

**Funding:** Ministry of Education, Lifelong Learning and Religious Affairs (NSRF programme)

**Members:** An interdisciplinary research team:

- Dpt. of Transportation Planning and Engineering NTUA
- Dpt. of Neurology of the University of Athens Medical School, UoA
- Dpt. of Psychology, School of Philosophy, Pedagogy and Psychology, UoA





# The problem

- **Human factors** are the basic causes in 65-95% of road accidents (Salmon et al., 2011)
- Human factors involve a large number of specific factors that may be considered as accident causes, including **Driver Distraction**
- Driver distraction may include four different types: **physical** distraction, **visual** distraction, **auditory** distraction and **cognitive** distraction (Ranney et al., 2000)
- Driver distraction factors can be subdivided into those that occur **outside the vehicle** (external) and those that occur **inside the vehicle** (in-vehicle)





# Experimental procedure

A driving simulator experiment took place based on the following conditions

## Area type

- Urban area (2,1 km long, single carriageway)
- Rural area (1,7km long, separated by guardrails)

## Traffic scenarios

- Low traffic (QL=300 vehicles/hour)
- High traffic (QH=600 vehicles/hour)

## Distracted Conditions

- Cell phone use
- Conversation with the passenger

## Unexpected incidents

- Child crossing the road
- Sudden appearance of an animal





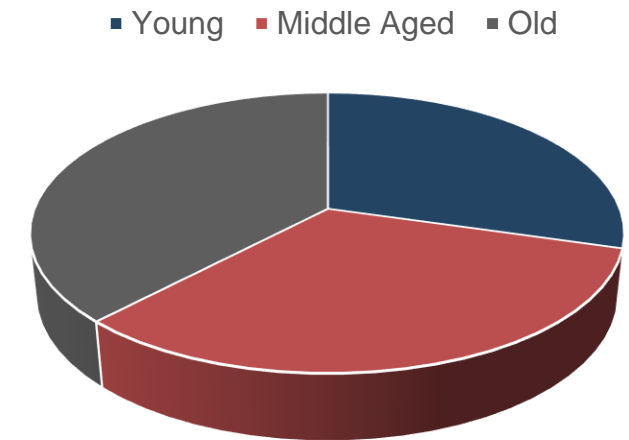
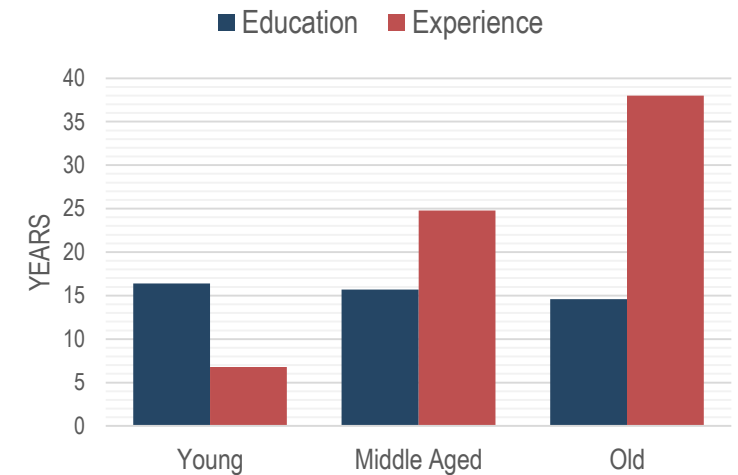
# Analysis framework

Data for 95 participants were collected from the driving simulator experiment and analysed by means of a dedicated statistical analysis method including:

- **Descriptive analysis** (correlation tables, boxplots)
- **Regression analysis** (6 general linear mixed models)
- **Factor Analysis** (2 factor analysis)
- **Latent analysis** (4 structural equation models)

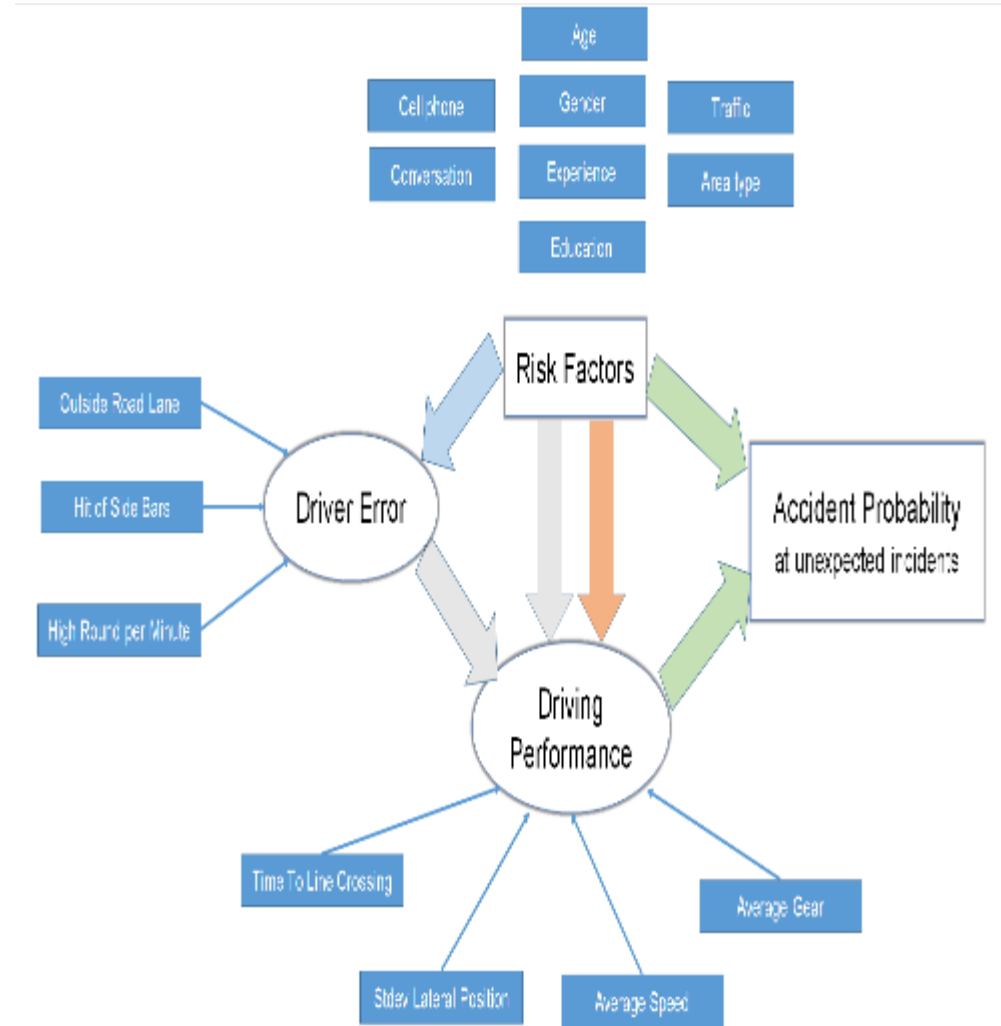
## Questionnaires

- Driving behaviour questionnaire
- Self-Assessment and memory questionnaire



# Main findings (1/2)

- Two unobserved (latent) variables have been developed regarding overall **driving performance** and **driver error** based on driving simulator parameters
- The effect of **several risk factors** has been quantified directly of driving performance, driver error and accident probability at unexpected incidents
- **Driver characteristics** play the most crucial role in overall driving performance (gender, age, experience, education)
- Neither conversing with a passenger nor talking on the cell phone has a statistical significant impact on **driver error**



# Main findings (2/2)

- Results regarding the effect of driver distraction indicate the different effect on driving performance between **cell phone use** and conversation with the **passenger**
- Development of **risky driver profiles** regarding driver error and accident probability at unexpected incident
  - more likely to commit **driving errors** are young or old female drivers at urban areas
  - more likely to be involved in an **accident** at an unexpected incident are female drivers in low traffic conditions while talking on the cell phone





# Future challenges

- Driver distraction demonstrates a continuously increasing prevalence becoming a **major road accident risk factor**.
- Investigation of the different types of driver distraction from the different **new technology devices** is necessary
- There is need for further investigation of the distracted driver **compensatory behaviour**.
- **Structural Equation Models** are very useful in analysing large data sets on driver safety behaviour.





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