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from Research to Deployment
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Overview

The objective of this research is the investigation of the effect of road and traffic environment parameters on **different types of distracted driving**. For this purpose, a driving simulator experiment was carried out at the simulator of the National Technical University of Athens, in which participants were asked to drive under different road and traffic conditions (urban/rural area, high/low traffic), and under different types of distraction (conversation with passenger, mobile phone).

The data collected from the driving simulator experiment include both **longitudinal** control measures (mean speed, headways), **lateral** control measures (lateral position) and the reaction time of the driver at unexpected incidents.



The results suggest that participants either talking on the mobile phone or with a passenger drive at lower speed and with increased headway compared to driving without any distraction source, especially in rural areas with low traffic. Furthermore, conversation with passenger indicates higher variability in vehicle lateral position and **increased reaction times at unexpected incidents**.

Experiment design

distrACT



This study is carried out within the framework of the research project **Distract** carried out by an **interdisciplinary research team of engineers, neurologists and psychologists**.

Currently the experiment is at an early stage and **50 participants** (20 females and 30 males) aged 25-75 years old (M=57,3) have completed the driving trials in a full factorial within-subject design.

The driving simulator experiment begins with a practice drive (5-10 minutes). Afterwards, the participant drives the two sessions (~20 minutes each).

- A **rural route** that is 2.1 km long, single carriageway and the lane width is 3m, with zero gradient and mild horizontal curves
- An **urban route** that is 1,7km long, at its bigger part dual carriageway, separated by guardrails, and the lane width is 3.5m



The **traffic scenarios** include:

- Moderate traffic conditions, corresponding to an average traffic volume Q=300 vehicles/hour
- High traffic conditions, corresponding to an average traffic volume of Q=600 vehicles/hour

The distraction conditions examined concern undistracted driving, driving while conversing with a passenger and driving while conversing on a mobile phone.

Results

Mean speed

- In rural areas drivers reduce the speed while distracted either by talking on the mobile phone or by conversing with the passenger
- In urban areas, drivers do not change the mean speed in the different distract situations

Speed	Rural area		Urban area	
	High Traffic	Low Traffic	High Traffic	Low Traffic
Conversation	46,44	50,66	31,55	34,46
Mobile phone	46,83	50,39	31,61	35,39
NO Distraction	47,10	56,55	32,26	34,52

Lateral position

- In rural areas there are no differences in the standard deviation of the lateral position with or without distraction
- In urban areas, distracted drivers show somewhat increased variability in lateral position, especially when driving and talking on the mobile phone

Headway

- In rural areas during conversation with passengers, drivers keep much larger headways from the vehicle ahead

Reaction time

- Distracted drivers have higher reaction times in urban areas in low and high traffic

Reaction time	Rural area		Urban area	
	High Traffic	Low Traffic	High Traffic	Low Traffic
Conversation	1,63	1,69	1,66	1,57
NO Distraction	1,65	1,37	1,53	1,46

- the highest reaction time while conversing with the passenger occurs in low traffic in rural areas

Conclusions

- Results suggest that the specific methodology and design **confirm the initial hypotheses** and reveal differences between driving without any distraction source, conversing with the passenger or talking on the mobile phone
- **Increased headways** regarding driving while conversing with the passenger and driving without any distraction source were observed in all scenarios
- Drivers talking on the mobile phone as well as conversing with passengers were found to have difficulty in the variability of maintaining the **vehicle position on the lane** while driving in especially in urban areas
- Drivers while conversing with the passenger found to have **higher reaction times**



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