INVESTIGATING WHICH FACTORS AFFECT LATERAL POSITION VARIABILITY THROUGH A DRIVING SIMULATOR EXPERIMENT

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OVERVIEW
- Considering that inappropriate lateral positioning is a key accident contributory factor, lateral control measures are some of the most commonly used driving behaviour metrics
- Lateral control measures assess how well drivers maintain vehicle position within a lane
- The objective of the present research is to quantify the effect of several risk factors including distraction conditions, driver as well as road environment characteristics on lateral position variability through a driving simulator experiment

RESULTS
- The distribution of driving trials is presented per area type and order of trials
- A significant number of participants came up with simulator sickness symptoms during the experiment and did not manage to complete all the trials
- The random effect contributes significantly to the fit of the model

CONCLUSIONS
- Results confirm the initial hypothesis that cell phone use has a negative effect on driving performance and road safety as it was proved that while talking on the cell phone lateral position variability was significantly increased
- Conversation with the passenger did not significantly affect the position of the vehicle
- Female middle aged/older drivers while driving at urban areas achieved the highest lateral position variability

METHODOLOGY
- The driving simulator consisted of 3 LCD wide screens 42”, driving position and motion base, total field of view 170 degrees, validated against a real world environment
- The experiment started with a practice drive (10-15 min) until the participant fully familiarized with the simulation environment
- Afterwards, the participant was asked to drive two sessions (approximately 20 minutes each). Each session corresponded to a different road environment:
  - a rural route, single carriageway, zero gradient, mild horizontal curves
  - an urban route, at its bigger part dual carriageway, separated by guardrails. Two traffic controlled junctions, one stop-controlled junction and one roundabout were placed along the route
- During each trial, 2 unexpected incidents were scheduled to occur:
  - sudden appearance of an animal on the roadway
  - sudden appearance of a child chasing a ball on the roadway or of a car suddenly getting out of a parking position
- Sample consisted of 95 participants counterbalanced per gender and age group (young, middle-aged, older)

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