Differential simulator driving patterns among community-dwelling healthy and mildly neurologically impaired adults during driver distraction conditions

Mary H. Kosmidis[1], Alexandra Economou[2], Sokratis G. Papageorgiou[3], & George Yannis[4]

[1]Lab of Cognitive Neuroscience, School of Psychology, Aristotle University of Thessaloniki
[2]Department of Psychology, University of Athens
[3]Department of Neurology, "Attikon University General Hospital", University of Athens
[4]Department of Transportation Planning and Engineering, National Technical University of Athens

Objective

We explored potential differences in driving patterns under conditions with and without driver distraction in a community sample including healthy and mildly neurologically impaired adults.

Method

Participants

- 100 community-dwelling participants , currently drivers (65 men).
- Approximately half were diagnosed with a neurological disease [healthy *n*=52, mild cognitive impairment (MCI) *n*=22, Alzheimer's disease (AD) *n*=8, Parkinson's disease (PD) *n*=11, other *n*=7 (not included in present analyses)]

Procedure

- Participants drove in a simulator under four rural driving conditions:

Traffic	Distractor
Moderate	None
High	None
Moderate	Conversation
High	Conversation

- Driving variables:
  - lateral position of vehicle from the right road border (m)
  - average speed (km/h)
  - average time to collision with vehicle ahead (s)

Results

Repeated measures ANCOVAs (covariate: age) showed:

- group X distraction interactions in the high traffic condition on
  - average speed [$F(3,74)=4.251$, $p=.008$, $\eta^2=.147$]
  - projected time to collision [$F(3,74)=4.280$, $p=.008$, $\eta^2=.148$]
- group X distraction interaction in the low traffic condition on
  - projected time to collision [$F(3,70)=3.656$, $p=.016$, $\eta^2=.135$]
- group main effect on average speed in the moderate speed condition [$F(3,70)=5.962$, $p=.017$, $\eta^2=.078$]

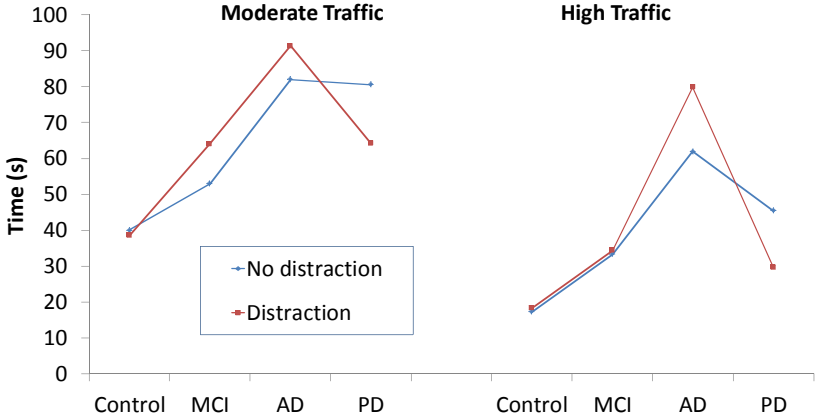

Figure 1. Projected time to collision (s)

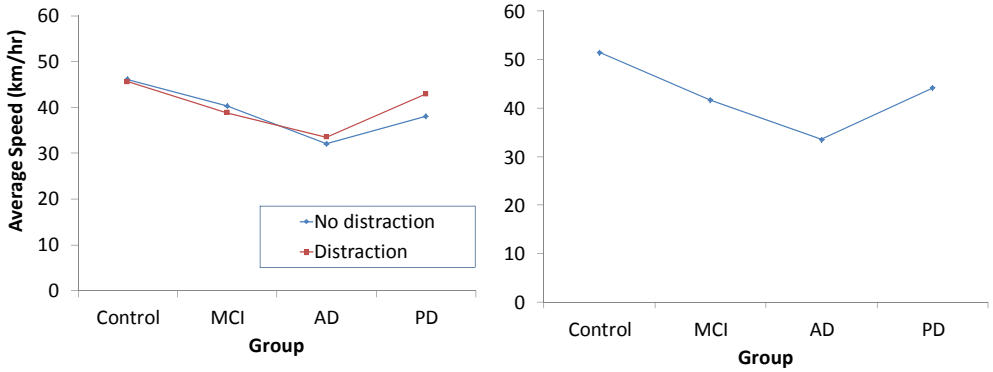

Figure 2. a) Average speed in high traffic condition b) Average speed in moderate traffic condition

Conclusions

Healthy and MCI groups drove consistently despite distraction factors, while those with AD compensated by driving more slowly and further away from the preceding vehicle. Individuals with PD reacted in counterintuitive ways. Larger samples are necessary to confirm the present findings.

European Union
European Social Fund
OPERATIONAL PROGRAMME EDUCATION AND LIFELONG LEARNING
investing in knowledge society
MINISTRY OF EDUCATION & RELIGIOUS AFFAIRS, CULTURE & SPORTS
MANAGING AUTHORITY
NSRF 2007-2013
EUROPEAN SOCIAL FUND
Co-financed by Greece and the European Union

34th Annual Conference of the National Academy of Neuropsychology
Fajardo, Puerto Rico, 12-15 November 2014