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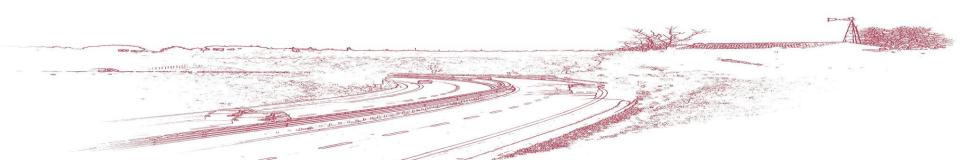
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Assessment of Driving Simulator Studies on Driver Distraction

P. Papantoniou, E. Papadimitriou, G. Yannis,

National Technical University of Athens, Greece





Objective

 A critical assessment of the strengths and limitations of driving simulator studies on driver distraction

Outline

- Definitions and types of driver distraction
- Advantages and limitations of driving simulator experiments
- Literature review of driving simulator studies on driver distraction
- Comparative assessment of the examined driving studies
- Conclusions









Review of Driving simulator experiments

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- Driver distraction factors can be subdivided into those that occur inside the vehicle and those that occur outside the vehicle.
- **Basic characteristics** have been identified and analysed for each experiment reviewed:
 - **Distraction source examined** (mobile phone, conversation with passenger, music, eating, visual, cognitive etc.)
 - **Sample characteristics** (size, gender, age distribution, benefits, questionnaire)
 - **Experiment design (**Practice trial, trial duration, counterbalancing, road environment, traffic conditions)
 - Driving related Outcomes









- Assessment of Driving simulator experiments
- Most experiments are based on very small samples, limited to rural road environment and no explicit (if at all) simulation of ambient traffic
- Participants in almost all driving simulator experiments implemented a practice scenario, but no specific performance measures were used to assess the driver's familiarization
- No pattern could be identified as regards the selection of number and duration of trials
- In 30% of studies no counterbalancing in the different trials was reported

	Paper details	Distraction Source							Sample Characteristics							
	Authors	year	cell phone	conversation	visual - cognitive	music	INIS	advertisign signs	eat, drink, alcohol	sample size	% male	25-	26-55	55+	benefits	
1	Laberge et.al	2004	•	٠						80	50%					Î
	Drews et.al	2008	•	•						96	25%		٠		٠	1
	Charlton	2009	•	•						112	50%		٠	٠	٠	1
4	Yannis et.al	2011	•	٠					٠	42	48%	٠				
5	Horbery et al	2006	•		٠					31	-		٠	٠		-
6	Reed-Jones et al	2008	•			٠				32	44%	٠				
7	Yannis et.al	2011	•			٠			•	48	50%	٠				1
8	Rakauskas et al	2004	٠							24	50%					
9	Kass et al	2007	•						•	49	49%	٠	٠	٠	¢	1
10	Bruyas et al	2009	٠							30	50%	٠	٠		٠	
	Reimer et al	2010	•							60	60%	٠			٠	-
12	Schlehofer et al	2010	•						1	69	36%	٠			•	
13	White et al	2010		٠					1	40	50%					
	Maciej et al	2011		٠						33	52%	٠		····-	٠	
15	Noy et al	2004			٠					24	63%	٠	٠		٠	1
16	Donmez et al	2006			٠					28	-		٠	•	٠	1
17	Donmez et al	2008			٠				1	48	52%	٠	1		٠	
18	Liang et al	2010			٠					16	50%		٠		٠	1
19	Fofanova et al	2011			٠					20	80%			٠		
20	Muhrer et al	2011			٠					28	50%	٠	٠		٠	-
21	Metz et al	2011			٠				1	40	55%		٠			1
22	Chan et al	2012			٠					30	-	٠	٠			-
23	Kaber et al	2012			٠				1	20	50%	٠			٠	
24	Zhang et al	2012			٠					24	50%		٠	٠		
	Hatfield et al	2008				٠	•			27	48%		•		٠	
26	Chisholm et al	2008				٠				19	53%	٠			٠	· ······
	Garay-Vega et al	2010				٠				17	71%		٠		٠	-
	Young et al	2012				٠			1	37	46%	٠	٠		٠	
	Hughes et al	2012				٠				21	5%	٠	٠			-
	Jamson et al	2005					٠		1	48	-		٠	1		
	Donmez et al	2007			1		٠		1	29	48%	٠	1		٠	
32	Reyes et al	2008					٠			12	50%		٠	1	٠	
	Jamson et al	2010			1		٠		1	18	50%		٠		٠	
34	Benedetto et al	2011					٠		-	15	80%				[
35	Birrell et al	2011					٠			25	56%		٠			
	Terry et al	2008						٠	[78	55%	٠	٠	٠	[[-
	Young et al	2009						٠		48	60%		٠		٠	
	Bendak et al	2010						٠	1	12	100%	٠	٠			-
39	Edquist et al	2011						٠		48	63%	٠	٠	٠	٠	
	Rakauskas et al	2008		Ĩ					٠	45	100%			(٠	
	Young et al	2008							٠	26	62%		٠	٠	٠	-
										40	50%		·	÷	:	-9

Conclusions

- The most common distraction sources examined are mobile phone use, conversation with passengers and visual distraction, as well as their comparisons
- The design and implementation is still inconsistent and often does not conform to experimental design principles
- Large consensus on less critical components (e.g. practice drive, use of questionnaires), and large variability in the more critical components (e.g. number and duration of trials)
- Need for larger scale, more standardised rigorous experiment designs and more uniform measures of driver distraction





