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THE IMPACT OF ROADSIDE ADVERTISING ON SAFE DRIVING BEHAVIOUR IN CITIES: A DRIVING SIMULATOR APPROACH

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OVERVIEW

- The **roadside billboard**, as a distractor, has been investigated in order to determine the extent to which it affects the safe driving behaviour.
- Most studies suggest that the existence of roadside advertising billboards, in general, **alters drivers' behaviour**, but they are quite ambiguous in quantifying this impact.

METHODOLOGY

- NTUA's Foerst Driving Simulator is a **quarter-cab simulator** with three 40'' LCD monitors
- Sample Scheme: **31 young active drivers** aged between 21 and 31 years (aver. 25.5 y.o. ± 5.1, 16 males). Most of which were NTUA students with a valid driving license and an average driving experience of 4 years.
- **4 driving scenarios** (4 min. each) in an **urban route**:
  - **Moderate traffic conditions**
    - traffic volume Q=300 vehicles/hour.
  - **High traffic conditions**
    - traffic volume of Q=600 vehicles/hour.
  - **Distraction condition**
    - advertising billboards at the roadside
  - **No Distraction condition**
- **2 unexpected incidents** in each scenario were designed and programmed to take place during the driving (8 in total):
  - sudden appearance of child chasing a ball on the roadway or of a car suddenly getting out of a parking position and getting in the road
- **1 questionnaire** afterwards, regarding their driving habits and history
- **Lognormal regression models for driving speed, and lateral position**
- **Linear regression model for reaction time**

RESULTS

Dependent Variable: Log Speed

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	1,404	,041		34,338	**,000**
Distractor	-,010	,003	-,094	-1,847	**,048**
Sex	,035	,007	,323	4,790	**,000**
Age	,004	,002	,177	2,335	**,021**
acc_in	-,016	,008	-,149	-2,008	**,047**
Traffic	-,030	,007	-,274	-4,300	**,000**
Dang_adv_in	-,009	,004	-,173	-2,453	**,016**
BrakeAverage	,016	,002	,447	6,827	**,000**
RspurAverage	-,012	,005	-,149	-2,240	**,027**

Dependent Variable: Log Lateral Position

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	,181	,052		1,901	**,049**
Distractor	,033	,012	,141	1,910	**,050**
acc_in	,060	,022	,251	2,682	**,008**
Age	-,011	,005	-,222	-2,422	**,017**
AverageSpeed	,005	,002	,202	2,243	**,027**
num_adv	-,064	,028	-,200	-2,234	**,027**
GearAverage	,097	,034	,252	2,891	**,005**

Dependent Variable: Reaction Time

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Constant	1113,24	212,319		5,243	**,000**
Distractor	145,675	82,603	,148	2,002	**,041**
Dist_week_in	145,533	51,554	,238	2,825	**,006**
Dang_adv_in	99,071	40,685	,208	2,435	**,016**
HWayAverage	-3,737	1,250	-,253	-2,990	**,003**
BrakeAverage	-66,432	27,245	-,208	-2,438	**,016**

Distractor: driving in an urban environment with the presence of billboards at the roadside (1 = yes, 0 = no)
sex: driver's gender (men= 1, woman=0)
Age: driver's age
Traffic: traffic conditions on the road (0=moderate traffic conditions, 1=high traffic conditions)
HWayAverage: middle distance of the vehicle ahead
GearAverage: the average gear used at gearbox
BreakAverage: percentage of the route the driver stepped the brake
RspurAverage: mean distance from the central axis (m)
AverageSpeed: mean speed (km/h)
acc_in: questionnaire - if the participant was involved in an accident in an urban environment (1 = yes, 0 = no)
Dang_adv_in: questionnaire - how dangerous the participant considers the existence of billboards in urban environment
(1=none, 2=low, 3 = medium, 4 = high, 5=very high)
num_adv: questionnaire - if the participant observed change to his driving behavior by the existence of billboards
(1 = yes, 0 = no)
dist_week_in: questionnaire - distance travelled per week in km in urban environment
(<15= 1, 16-50= 2, >51= 3, don't know= 0)

- Driving in an urban environment with billboards at roadsides results in **reducing the average driving speed**. The participants seem to try to counterbalance their driving behavior.
- Billboards lead the drivers to **increase their lateral distance from the right border of the road**, which indicated a more careless and potentially risky driving behavior
- The existence of roadside billboards has a **detrimental effect on reaction time of the drivers**

CONCLUSIONS

- The presence of roadside billboard led the participants to **lower driving speeds in a significant level**
- The riskiest driving profile, regarding the mean speed, extracted from the model application is **a male driver, in low traffic conditions**
- The presence of roadside advertising billboards leads the drivers to **drive more closely to the central axis of the road**, which indicates a more careless and potentially risky driving behavior
- The existence of roadside billboards **has a significantly negative impact on reaction time of the drivers**

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