Young Drivers and Alcohol Impaired Driving:
a driving simulator experiment

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Presentation Outline

	Subject
1.	Alcohol and driving
2.	Experimental Design
3.	Data Analysis and Results
4.	Discussion

Alcohol and Driving

- repeatedly linked to high accident <u>rates</u> and <u>severities</u>

- associated with high external costs (rescue, hospitalization, …)

- more dangerous among <u>young people</u> for all BAC ranges

- Driving impairment:

  - difficulties in perceiving roadway information,

  - exacerbating fatigue,

  - longer breaking distances,

  - inaccurate steering,

  - **longer reaction times.**

Alcohol and Driving

❖ <u>Driving Simulator Experiments:</u>

- few in number despite the obvious potential

- mainly focus on combined effects (drugs, sleeplessness, …)

- not considered differentiated BAC levels

   however:

   ➢ results can offer (useful) insights!

❖ <u>Participants:</u>

    – N=49, F(male)=53,1%

    – non-abstaining drinkers

    – mean age=23.2, SD=2.7

❖ <u>Laboratory:</u>

    – Department of Transportation Planning and Engineering (NTUA)

    – Driving simulator (Foerst F12PT-3L40)

    – Breath alcohol test device (Lion SD-400)

Experimental Design

❖ <u>Procedure:</u>

1. Pilot Session (instruction, equipment)

2. Baseline driving session (4 minutes)

3. Questionnaire on alcohol and driving patterns

4. Alcohol ingestion (100ml of liquor over 10 minutes)

5. 'Intoxicated' driving session (1hour following administration)

➢ Predefined triggering events allowed for estimating **<u>reaction times</u>**

Data Analysis and Results

❖ <u>Dependent Variable:</u>

   – **Reaction Time** while intoxicated

❖ <u>Regressors:</u>

   – Driver attributes

   – BAC level

   – Baseline reaction time

❖ <u>Modeling approach:</u>

   – Multiple linear regression

     ▪ Fixed Parameters

     ▪ Random parameters

      the influence of the independent variables affecting reaction time varies across individuals

❖ Effect on the value of reaction time : (+) increasing (-) decreasing

Variables	Model 1		Model 2	
	fixed	random	fixed	random
Baseline reaction time	+	+		
BAC level	+	+	-	-
third/ first BAC			-	-
Exercise >4h per week	-	-	-	-
Respecting speed limits	-	-	-	-
Time since last meal	-	-	-	+
High self-confidence	+	-	-	-
1-2 drinks per week	-	+		
Never drink and drive			+	+

Data Analysis and Results

❖ <u>Major Findings:</u>

- BAC levels have a stronger effect on reaction times compared to baseline driving skills (*don't drink n' drive…*)

- Exercising for less than 4h per week significantly increases reaction times while intoxicated (*go work out…*)

- Variables related to weight, age, and sex were not found to be significant (*boyz and girls not that different after all…*)

- Strong heterogeneity among individuals (*but we all are different…*)

- Faster alcohol absorption is associated with better driving performance regardless of absolute BAC level (*need to think of this…*)

Discussion

✓ Significant differentiations across individuals regarding driving performance while intoxicated

✓ Behavioral patterns regarding drinking, driving, and driving after drinking significantly affect driving performance when intoxicated

Limitations:

- sample size,

- lack of additional performance measures

- inherent shortcomings of driving simulators