



# Methodology for Field Operational Test Implementation: Participant characteristics

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## Aim and Overview



“Participants can seriously ruin your experiment”

- Participants
  - ▶ Characteristics
  - ▶ Sample size





## Participants: sample size



FOT studies should be able to assess the functionality of the ICT system and its impact on the driver, traffic safety etc.

- Too small a sample will make it more difficult to observe any system effects
- Too large a sample increases cost of an FOT considerably.
- Appropriate sample size depends on the number of systems to be tested and the experimental design chosen



## Participants: sample size



A technical detour:

		Reality	
		No difference in treatments	Difference in treatments
d e c i s i o n	No difference in treatments	$1 - \alpha$	$\beta$
	Difference in treatments	$\alpha$	$1 - \beta$

significance

power



## Participants: sample size



### power analysis

*a priori*

*post-hoc*

determines an appropriate sample size to achieve adequate power

uses the obtained sample size and effect size to determine what the power was in the study



## Participants: sample size



However.....

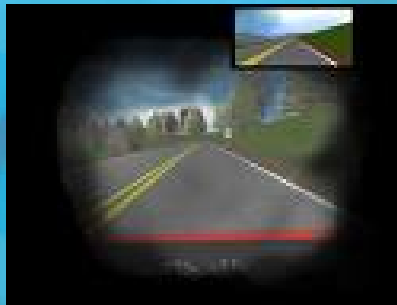
In an FOT there is also something like events.... How many events does someone need to encounter to have enough data points for a meaningful analyses?



## Participants: characteristics



- Demographics variables:
  - ▶ age
  - ▶ gender
  - ▶ socio-economic variables
  - ▶ permanent or temporary driver impairments

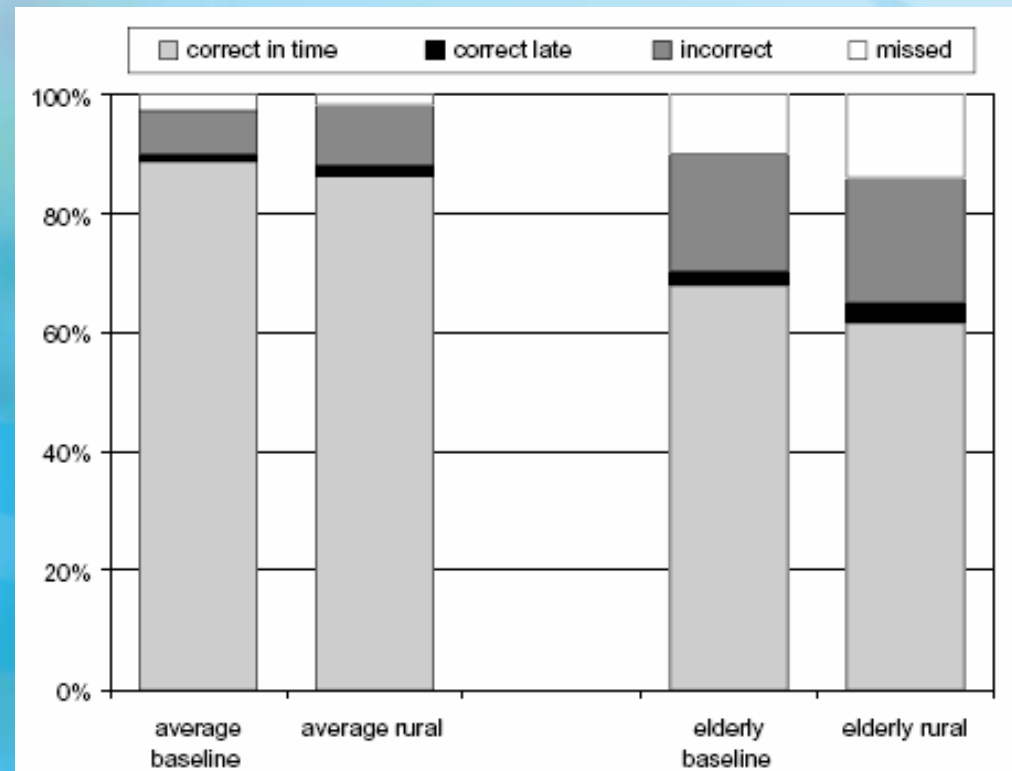




## Participants: Demographic variables

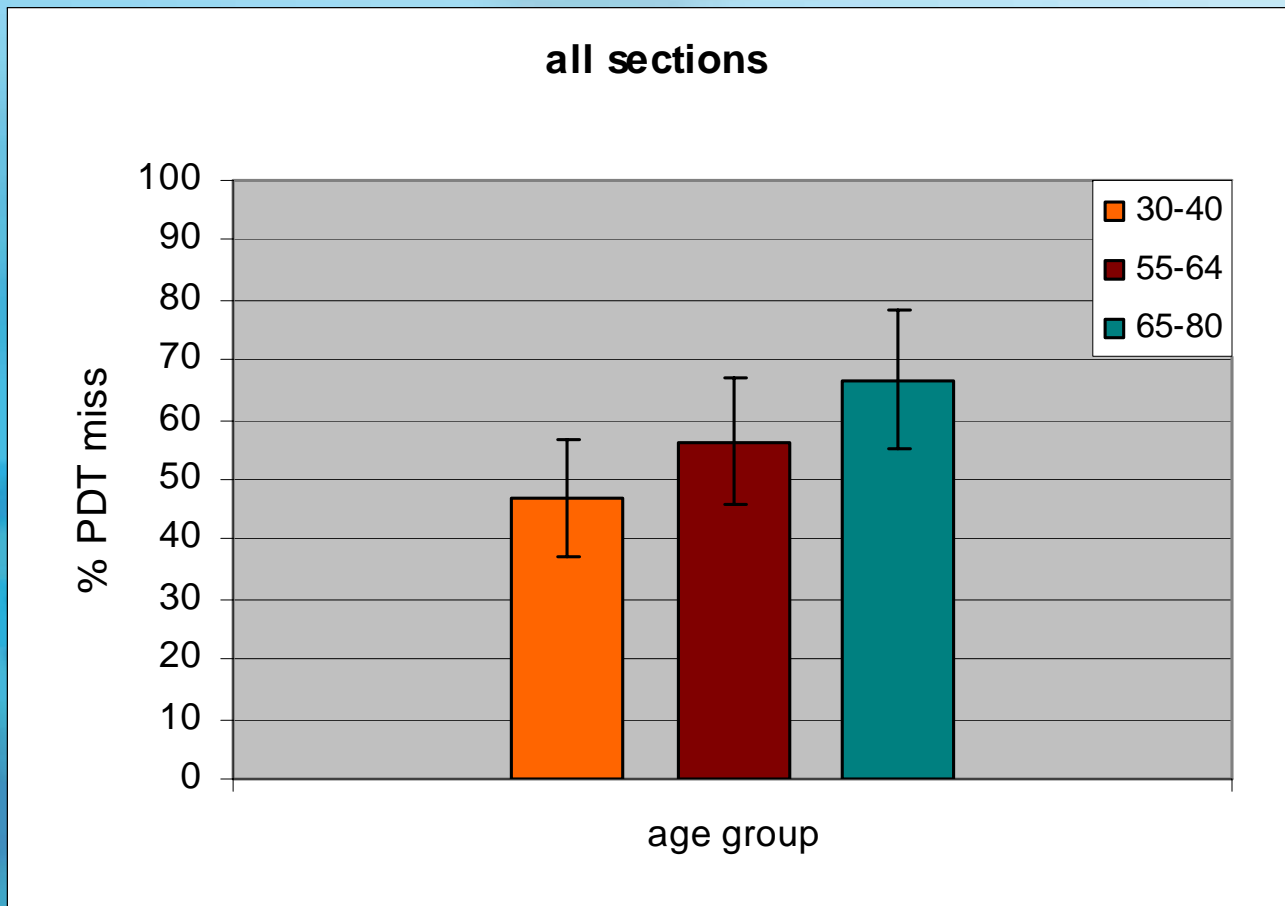


- Elderly drivers were recruited in the EU HASTE project and took part in both simulator and on-road trials. A priori hypothesis that elderly drivers may have problems with increased cognitive demand and dual tasking.
  - ▶ In the field, the effect of a secondary task was found to be more profound on older drivers, resulting in **closer car following, more speed variation and less lane keeping** compared to average drivers



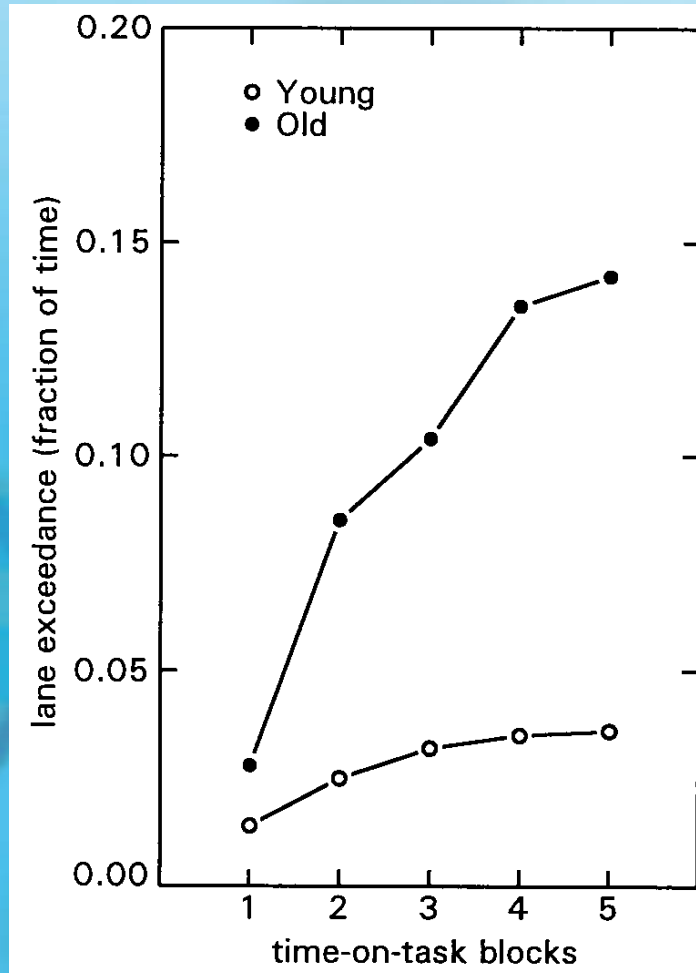


## Participants: Demographic variables





## Participants: Demographic variables





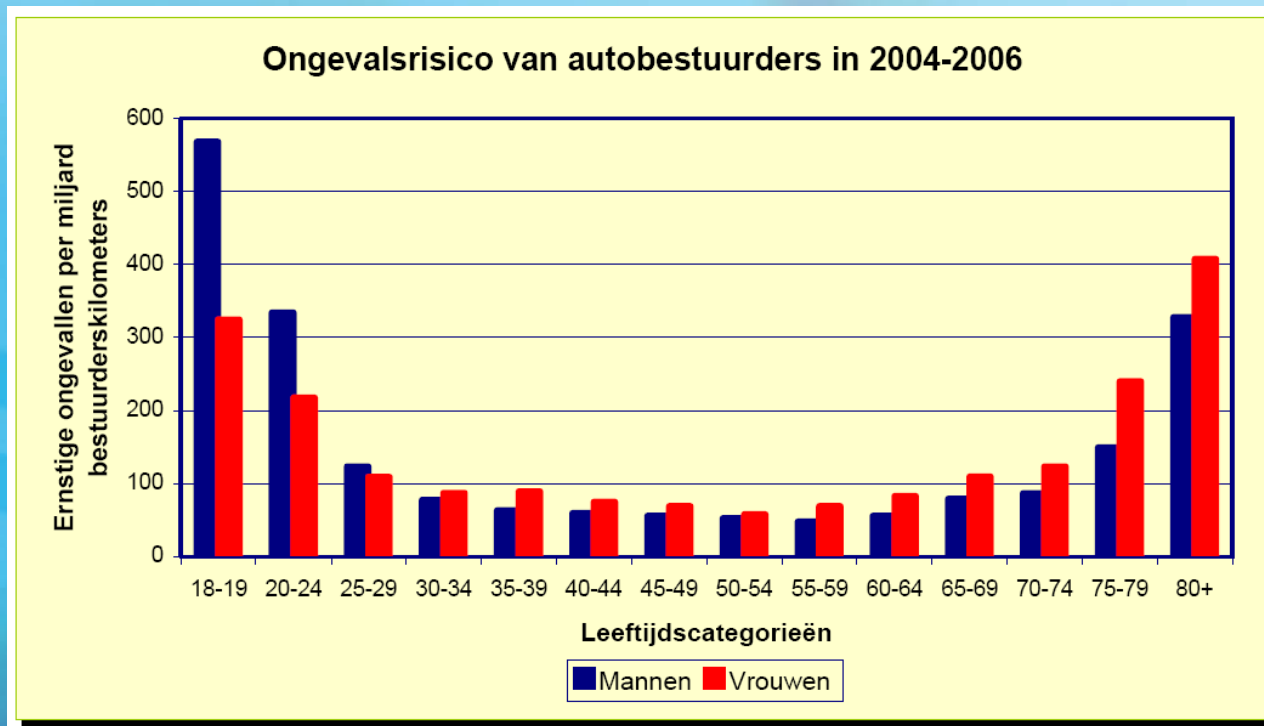
## Participants: experience



- Driving experience:
  - ▶ annual mileage
  - ▶ experience with various systems
  - ▶ accident history
  - ▶ exposure to different road types



## Experience



Novice drivers experience a higher cognitive workload while driving



## Experience



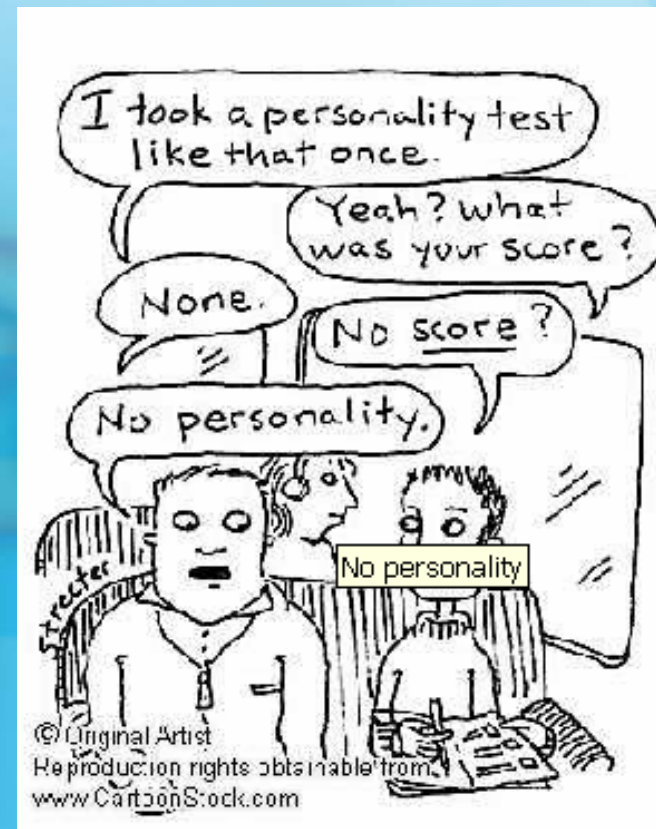
- what kind of drivers do you have / want
  - ▶ short trips – long trips
  - ▶ city driving – long distances
  - ▶ regular driving – occasionally
  - ▶ used to modern systems – “what is that??!”



## Participants: Personality



- Personality and attitudes
  - ▶ Different ways of measuring similar constructs
  - ▶ More prone to variation
  - ▶ Could be used as a selection tool.....





## Personality and attitudes



Drivers exhibiting certain traits or attitudes are known to engage in riskier driving. In a study by Rudin-Brown and Parker (2004), certain personality aspects were taken into account in the data analysis:

- Sensation seeking - A term used to describe the psychological trait where individuals seek to focus on the need for new and varied experiences through disinhibited behaviour, these include, dangerous activities, a non-conventional lifestyle, and a rejection of monotony.
  - ↳ High sensation seekers performed fewer safe braking behaviours and deviated more within the lane in the ACC condition
- Locus of control – Individuals can be described as having either an internal or external locus of control. *Internals* tend to attribute outcomes of events to their own control. *Externals* attribute outcomes of events to external circumstances.
  - ↳ Drivers with an internal locus of control maintained direct involvement with the driving task choosing to rely on their own skills, whilst those with an external locus of control relied on ACC more



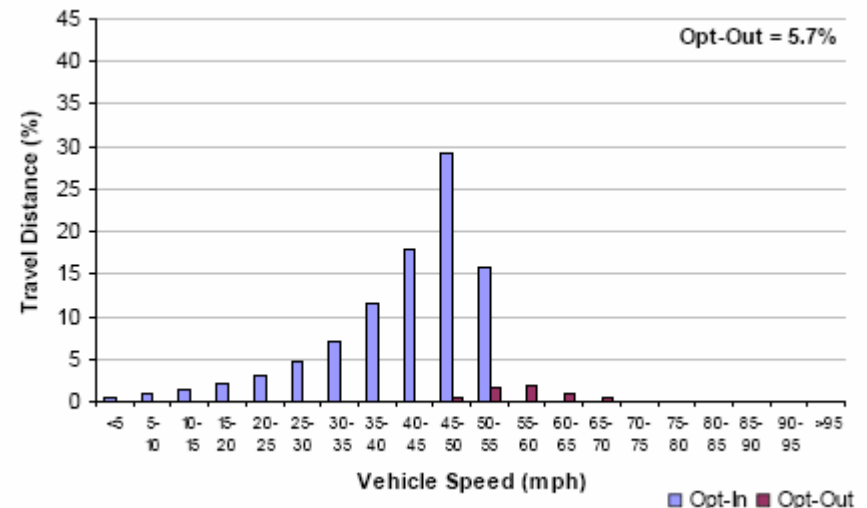
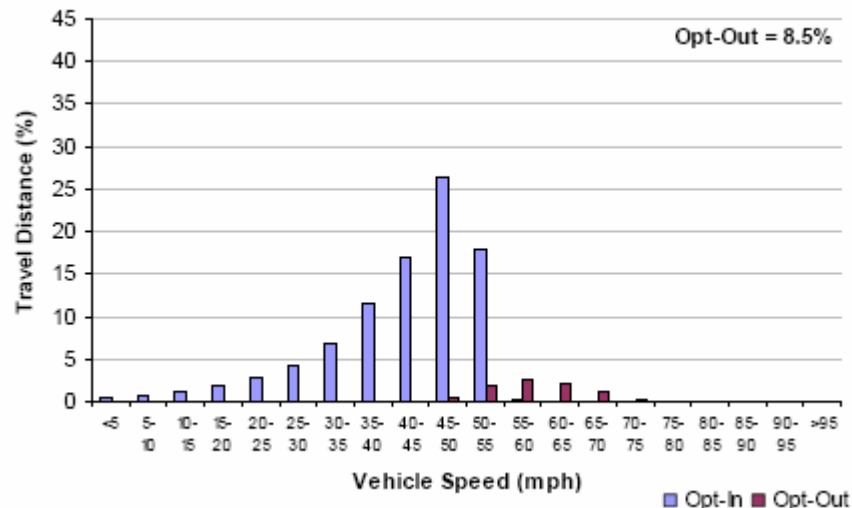
## Personality and attitudes



- Attitudes to speeding used in the ISA UK FOT to categorise drivers as intender or non-intenders using a median split.
  - ▶ Speed distributions etc. were analysed separately for the two groups, and opt-out rates were found to be different for the two groups (in some speed limit zones).

Intenders to speed

Non-Intenders to speed





## Personality and attitudes



- Measures of Sensation Seeking were taken during one of the AIDE (driving simulator) experiments to examine if an adaptive system was more “trusted” and thus realised greater safety benefits.
  - ▶ Benefits of the adaptive system were demonstrated for aggressive drivers (high sensation seeking, short followers).
  - ▶ And showed a preference for the adaptive system as they found it less irritating and stress-inducing.



## Participants: Discussion



- What kind of participants do you want in your FOT
  - ▶ what are inclusion or exclusion criteria
  - ▶ what are your possibilities to influence this
  - ▶ if you don't have much choice what kind of influence does this have and how are you going to deal with this



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