



# Driver motivation & psychology

J.W. Bolderdijk,  
 University of Groningen





# Traffic safety

- › Societal costs
  - 40.000 fatalities per year in EU
  - 3.5 million injured
- › Individual safety (SWOV, CBS)
  - 1 lethal accident in 285 million km





# Cause of accidents: behavior

- > Errors, lapses
  - Non-volitional
  - Driver fatigue, mobile phones
- > Violations
  - Often volitional
  - **Risk-taking**
- > Violations need specific interventions
- > Why do people take risks?

Afwijkend rijgedrag

Lapses

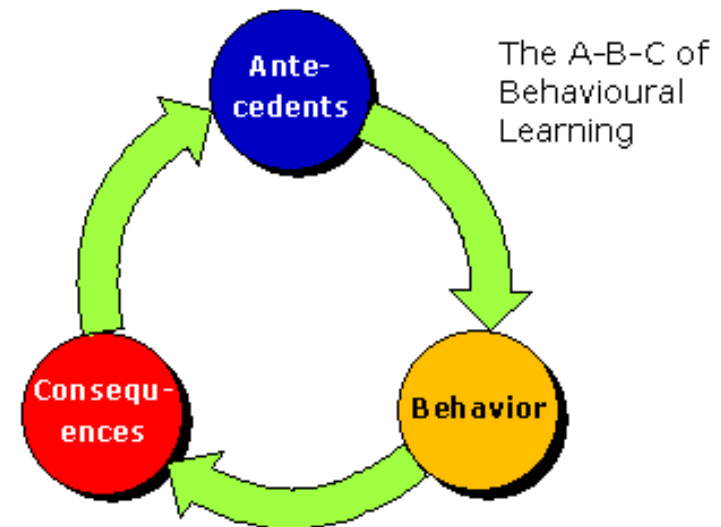
Errors

Violations



# Operant conditioning & driving

- > Behavior  $\leftrightarrow$  Consequences
- > Experience = learning consequences
- > Risk-taking is reinforced, safe behavior is punished





# Illusion of control

- › Illusion of control disrupts risk-perception
  - Throwing dice (Langer, 1975)
  - Lotteries
- › Prominent in young men
- › Type of car
  - SUV > citycar
- › Relevant in driver training



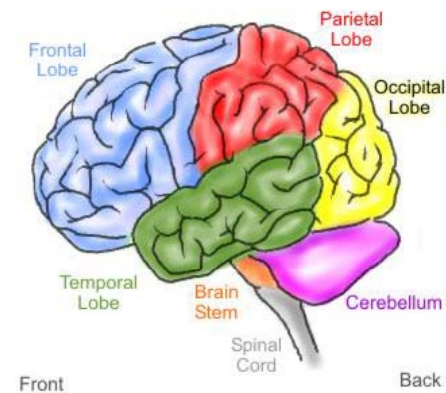


# Optimism bias

- › My driving is better than average
  - Majority agrees
- › Too positive about own skills
- › Optimism bias & sensation seeking
- › Prominent in young men



Regions of the Human Brain





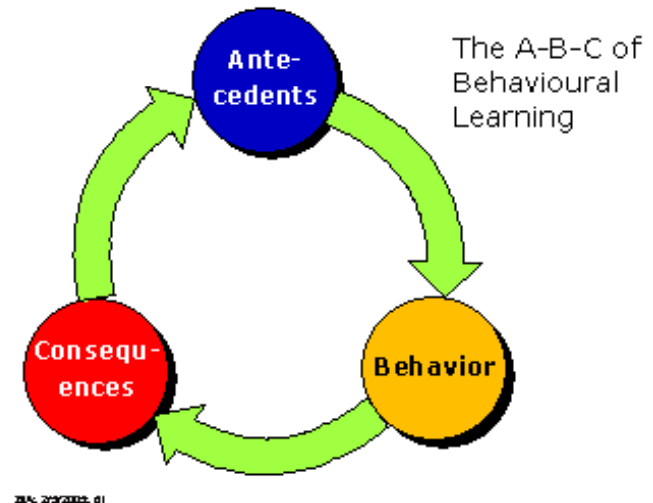
# Behavioral adaption

- › Safety gains compensated by increased risk-taking (Wilde et al., 1982; 1984)
- › Mixed evidence
  - Yes: Road lighting and wider roads
  - No: Helmets, safety belts



# Enforcement

- › Sanction probability > sanction size
  - Government
    - Laserguns
    - Radars







# Current interventions

- > Effective, but limited
  - Safety technology: Behavioral adaption
  - Enforcement: Only locally effective
  - Education: Cognitive biases
- > GPS-based PAYD insurance



# Payd field experiment

- › Discount (50 euros/month) on insurance fee for
  - not speeding (more time to react, less speed variance, reduced severity)
  - reducing driving volume
  - avoiding driving on dangerous hours



# Research design

- > GPS monitoring
- > Incentive + delayed feedback
- > 'Ideal' experiment
  - Random allocation to control or experimental group
  - Pre & Post measurement

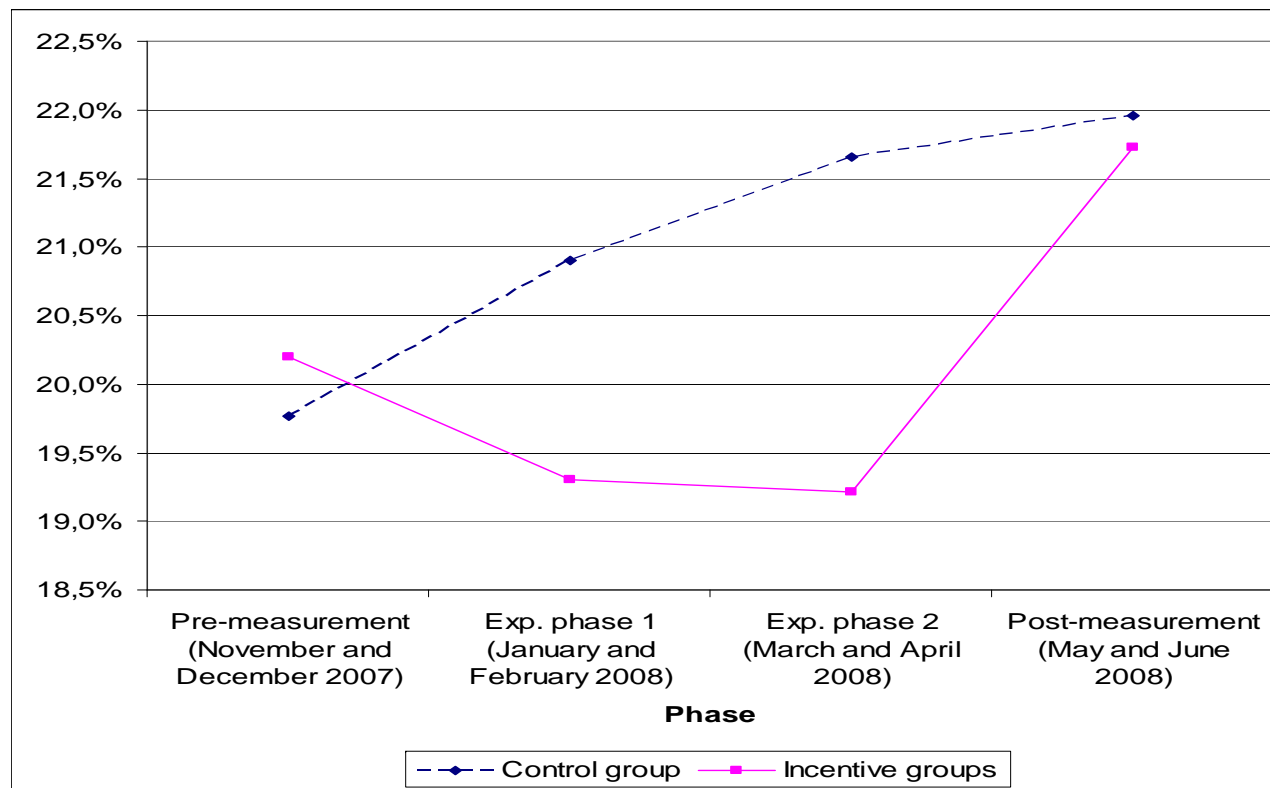


# Payd field experiment





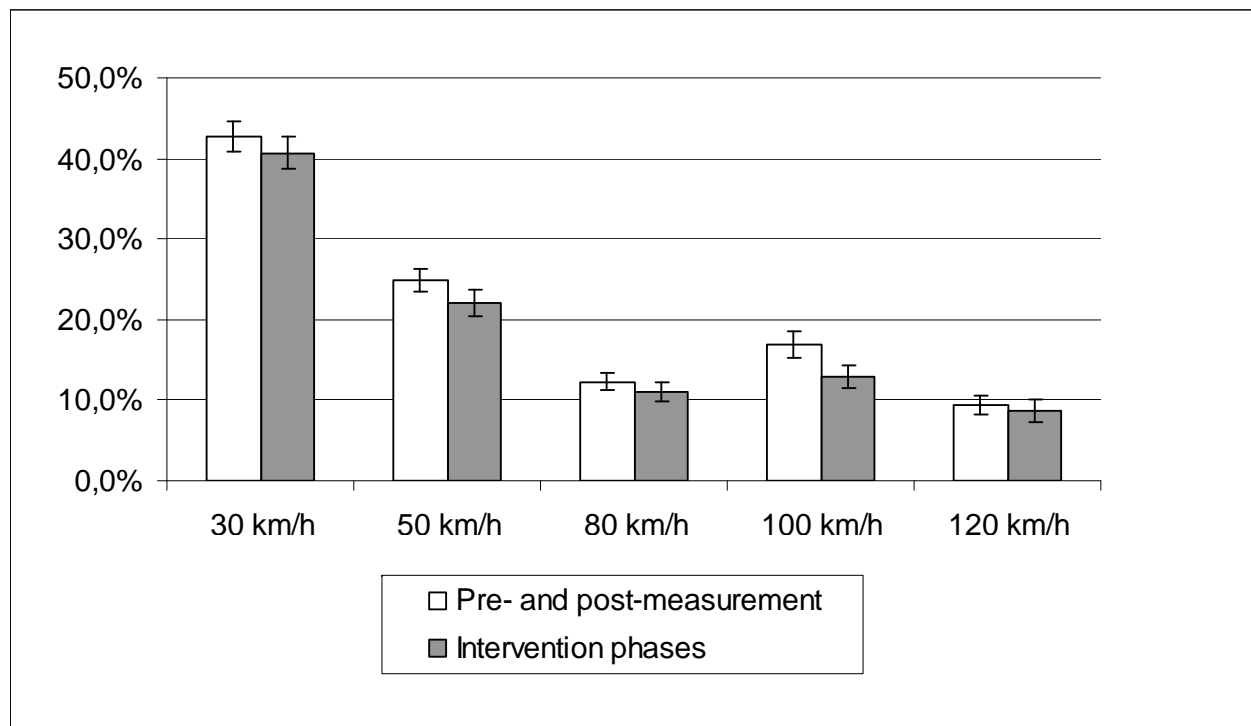
# Payd field experiment



Bolderdijk,  
Knockaert,  
Steg,  
Verhoef  
(2010)



# Payd field experiment





# Lessons

- › Effects
  - › 14% overall decrease in speeding
  - › Change in driving style, not volume
  - › No change in habits
  - › Presence of monitoring device (Hawthorn effect)
- › Implementation
  - › GPS is not 100% reliable
  - › Privacy not an issue to participants



# Maximize impact of PAYD

- › Is economically feasible incentive large enough?
  - Non-linear relation with incentive size
  - Non-monetary incentives (demerit points)
- › Additional interventions:
  - instant feedback (e.g. Hultkrantz & Lindberg)
  - facilitate behavior change
  - moralization





# End

[j.w.bolderdijk@rug.nl](mailto:j.w.bolderdijk@rug.nl)