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Human dimensions of sustainable energy systems

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Environmental psychology

- › Interaction human and environment
 - Environmental conditions influence human behaviour and well-being
 - Human behaviour affects environmental quality



Psychology and ESI

- › Behaviour changes needed in ESI
 - Change user behaviour
 - use less or adapt demand to supply
 - Adopt and use of energy efficient technology
 - Adopt and use monitoring/control technology
 - Adopt and use renewable energy sources and different energy carriers
- › Acceptability of ESI and policies



Acceptability future energy systems

- › Centralised energy production preferred above own and particularly local production
- › Autonomous control preferred above automated technology
 - But high control is frustrating

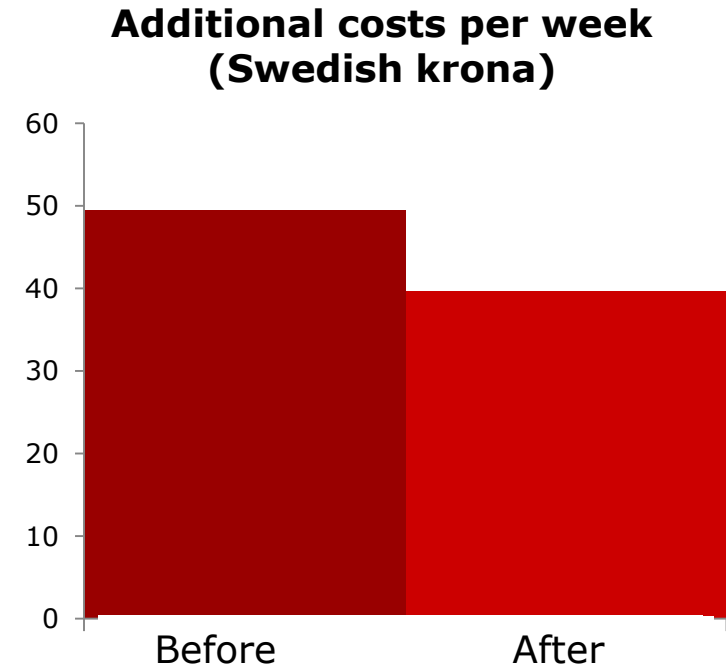
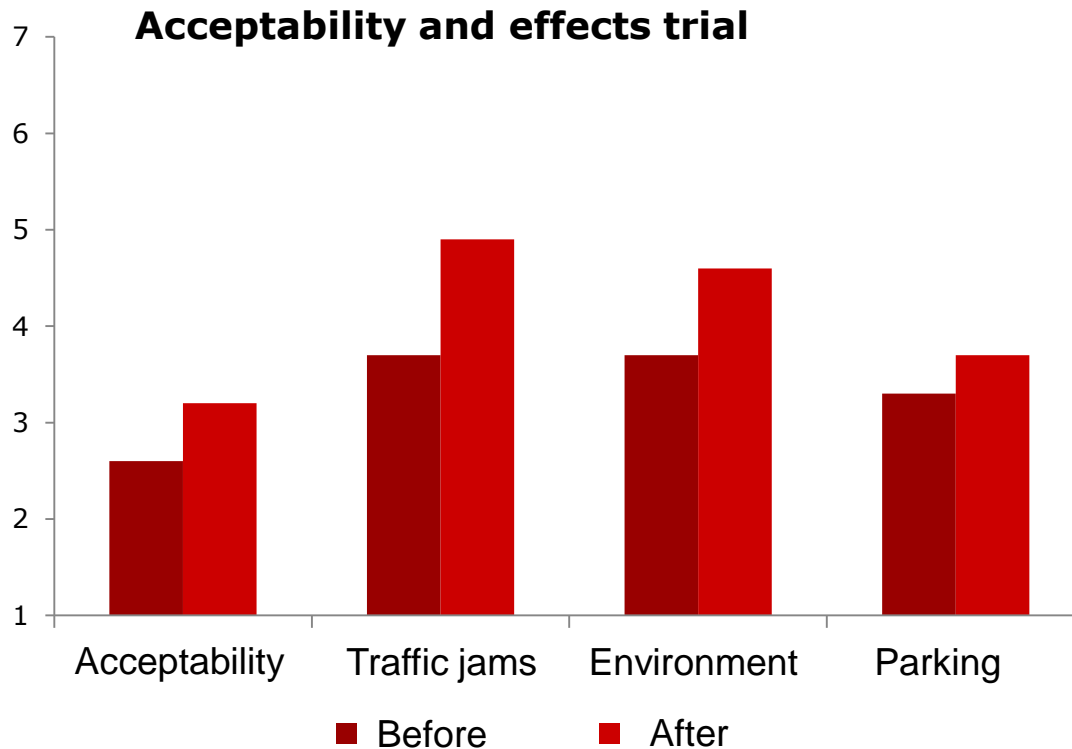


Acceptability and effectiveness

- › Does acceptability increase after the implementation of unpopular policies?
- › Stockholm congestion charging trial
- › Before and after measurement
 - Acceptability
 - Expected and actual effects
- › Hypothesis: acceptability increases because effects more positive than expected



Effects: Stockholm









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De Groot & Steg (2007, 2008); Hansen, Steg, & Suhlman (forthcoming); Jakovcevic & Steg (2013); Ünal, Steg, Rumpf, & Granskaya (forthcoming); Steg, Abrahamse, & Dreijerink (2005); Steg, Perlaviciute, Van der Werff, & Lurvink (2014)



Value conflict

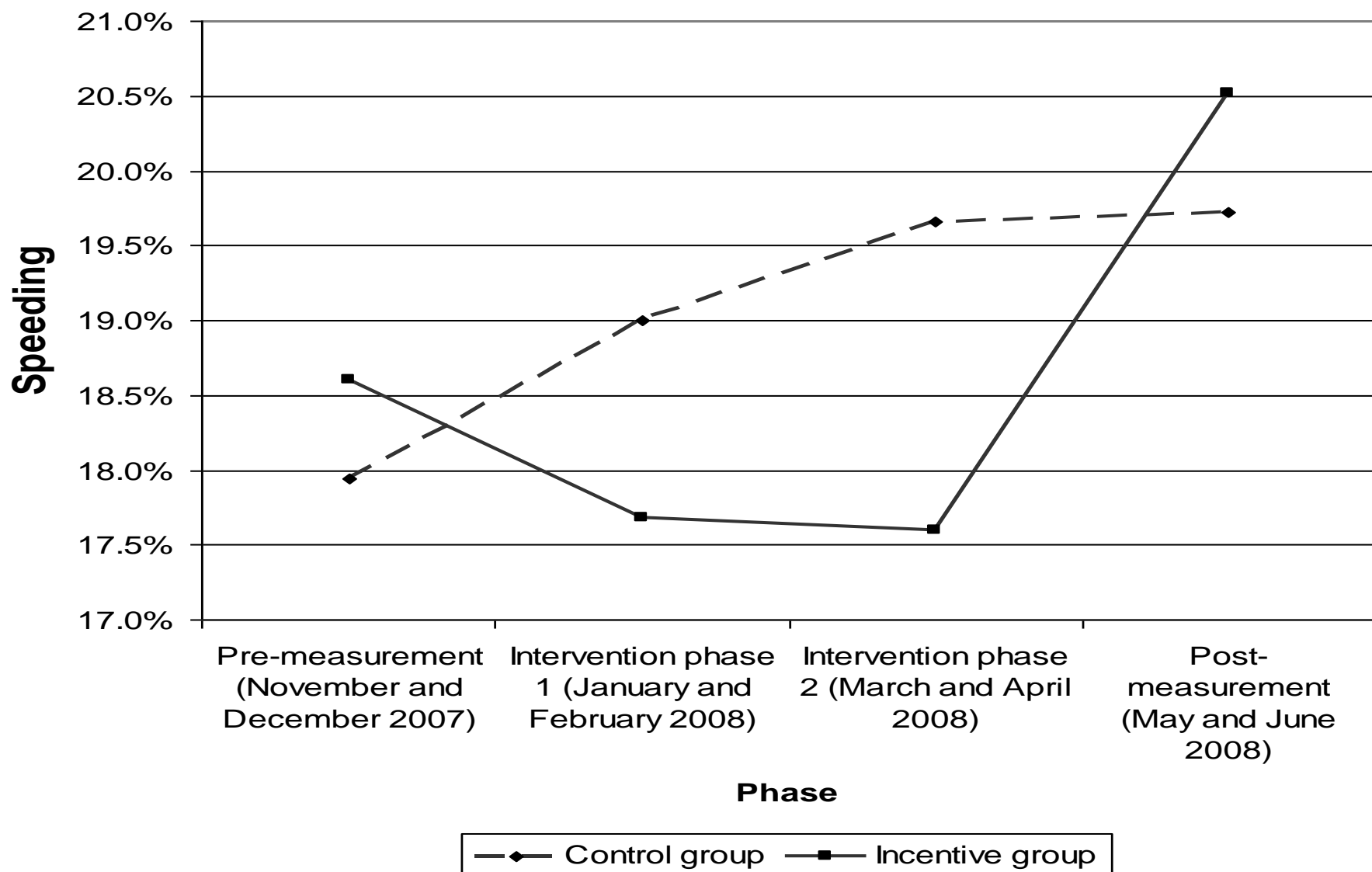
- › Pro-environmental actions are often costly, effortful or inconvenient
- › Reduce value conflict
 - Make pro-environmental actions beneficial
 - Strengthen or activate biospheric values



Effects of PAYD

- › PAYD: discount on insurance fee when driving safe and environmentally sound
 - not speeding
- › Monitor driving behaviour via GPS before, during and after the trial
- › Experimental and control group







Environment

Do You Care About the Environment?

Take a coupon for a FREE
professional tire check!



Source: www.fueleconomy.gov

- Like balloons, your tires lose pressure over time.
- Improper tire pressure increases fuel consumption which *harms our environment*.
- Properly inflating tires cuts back vehicle emissions.



Participating stations:

Snappy Lube #23
1402 N. Main Street
Blacksburg, VA 24060

Snappy Lube #24
2405 Market Street
Christiansburg, VA 24073

Money

Do You Care About your Finances?

Take a coupon for a FREE
professional tire check!



Source: www.fueleconomy.gov

- Like balloons, your tires lose pressure over time.
- Improper tire pressure increases fuel consumption, which is expensive.
- Properly inflating cuts back fuel costs.



Participating stations:

Snappy Lube #23
1402 N. Main Street
Blacksburg, VA 24060

Snappy Lube #24
2405 Market Street
Christiansburg, VA 24073

Control

Take a coupon for a FREE
professional tire check!



Source: www.fueleconomy.gov

- Like balloons, your tires lose pressure over time.
- The average U.S. driver travels 12,000 miles yearly.
- Not everyone checks their tires regularly.

Participating stations:

Snappy Lube #23
1402 N. Main Street
Blacksburg, VA 24060

Snappy Lube #24
2405 Market Street



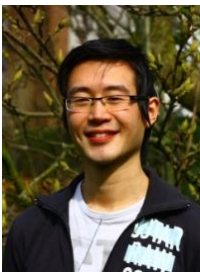
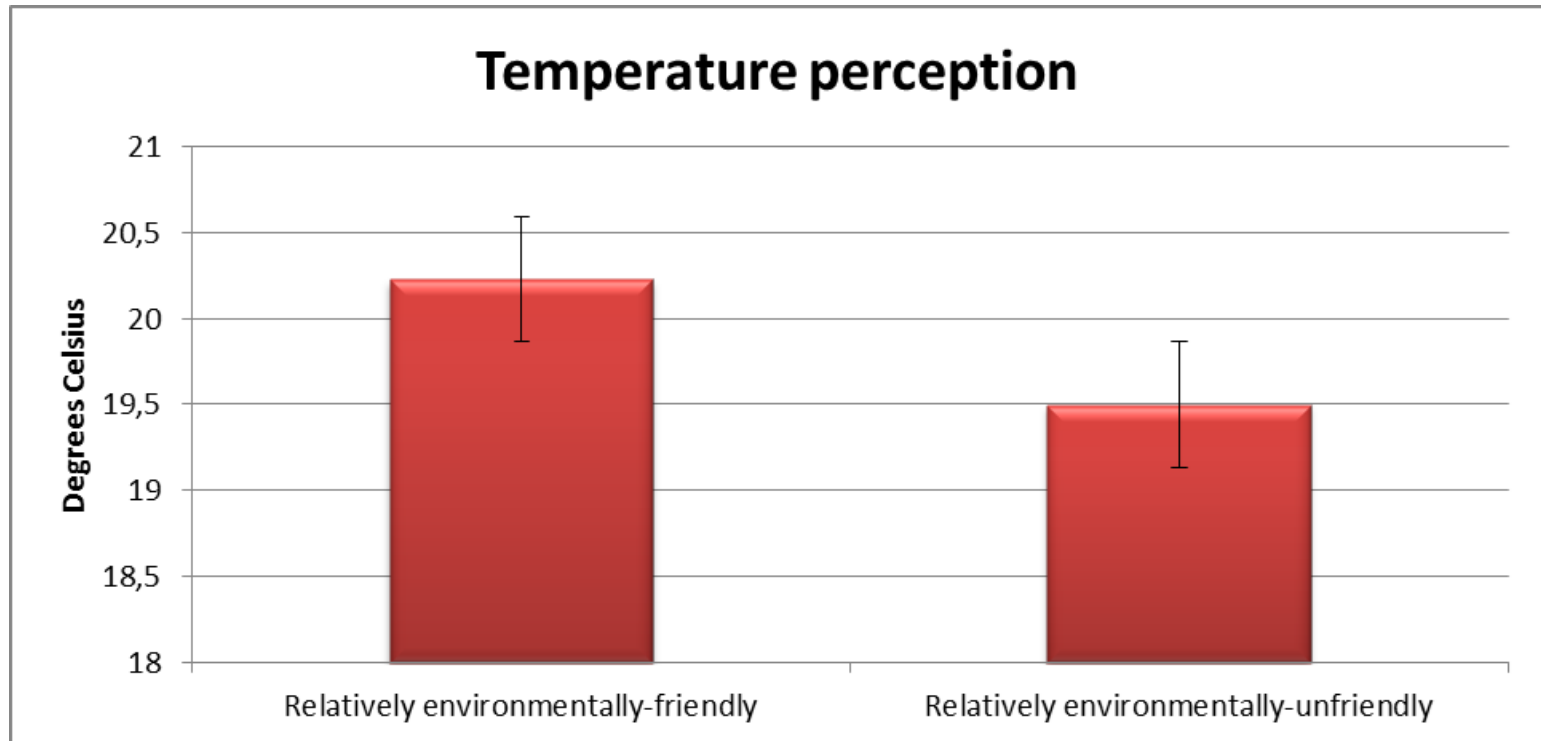


Pro-environmental behaviour and well-being

- › Sometimes pleasurable – hedonic wellbeing
- › Oftentimes meaningful – eudaimonic wellbeing
- › Acting pro-environmentally associated with positive feelings
 - Particularly if behaviour is autonomous and when a person strongly values the environment
 - Encourages pro-environmental actions

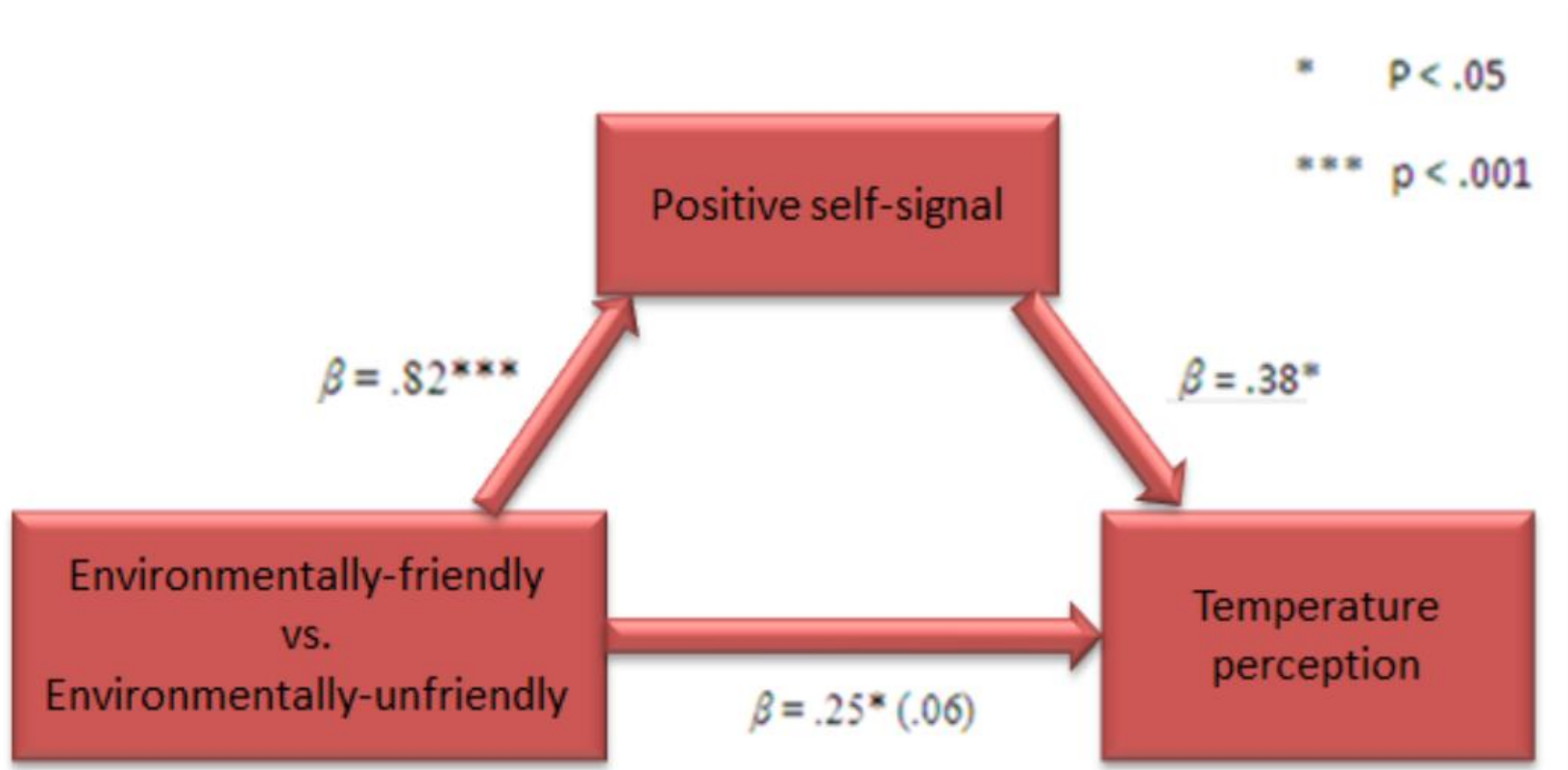


Pro-environmental behaviour and warm glow





Positive self-signal





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Prediction interest in local renewable energy systems

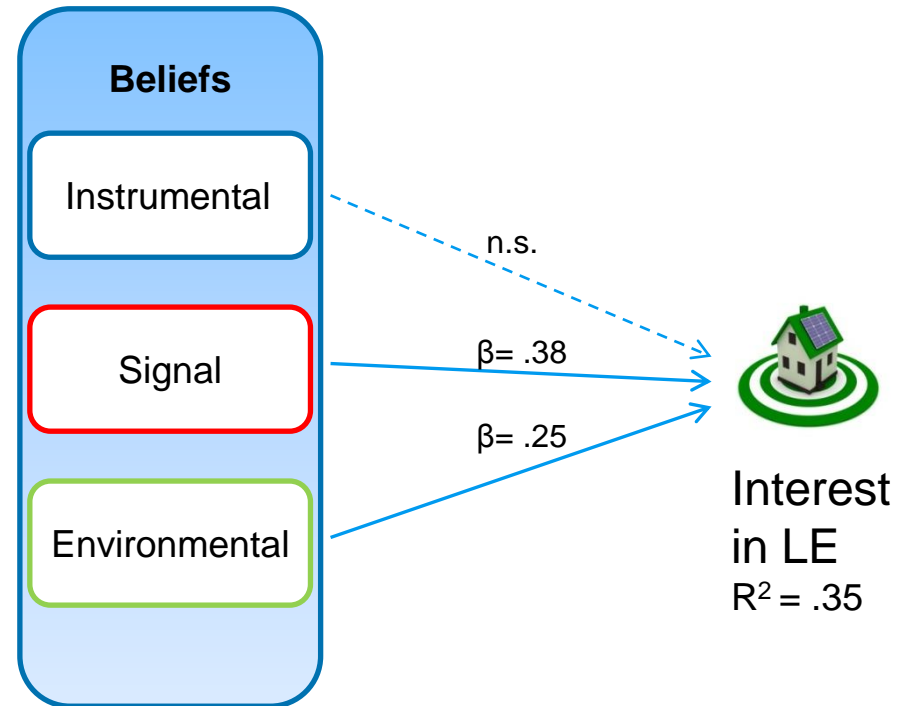
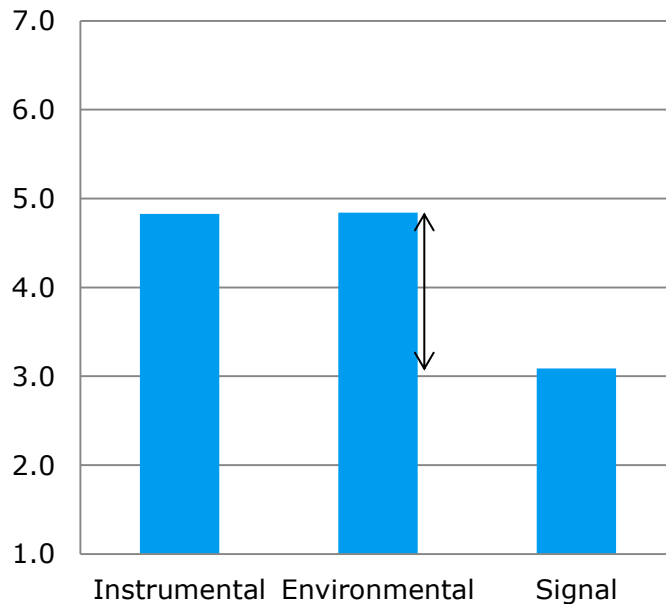
- › Instrumental aspects
 - e.g. costs, security of supply
- › Environmental aspects
 - e.g. CO₂ emissions
- › Signaling to self or others
 - e.g. status, express yourself





Symbolic value

Importance ratings





Biospheric values and behaviour

- › Values influence behaviour mainly indirectly
 - Affect importance and evaluations of consequences of actions
 - Affect information processing
 - Identity: link consequences to the self



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Unregistered HyperCam 2

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Values and preferences

Egoistic and biospheric values:

- › Define what is important
 - consequences for self or environment
- › Shape overall positive or negative views
- › Help maintain positive or negative views
 - Motivated cognition – I support (or oppose) it, so it has many (dis)advantages



Values and beliefs nuclear power

- › Strong egoistic values
 - Nuclear power more acceptable
 - More positive egoistic *and* environmental consequences
- › Strong biospheric values
 - Nuclear power less acceptable
 - Risks more, environmental benefits less likely
- › Strong negative correlations between risks and benefits



Values and preferences for local renewable energy systems

- › Strong egoistic values
 - renewable energy systems less acceptable
 - environmental benefits less likely
- › Strong biospheric values
 - renewable energy systems more acceptable
 - egoistic disadvantages less likely



Tailored information and feedback

- › Assess household energy use based on possession and use of goods and appliances
 - Before and after intervention
- › Tailored information via interactive webpage
- › Feedback on energy savings



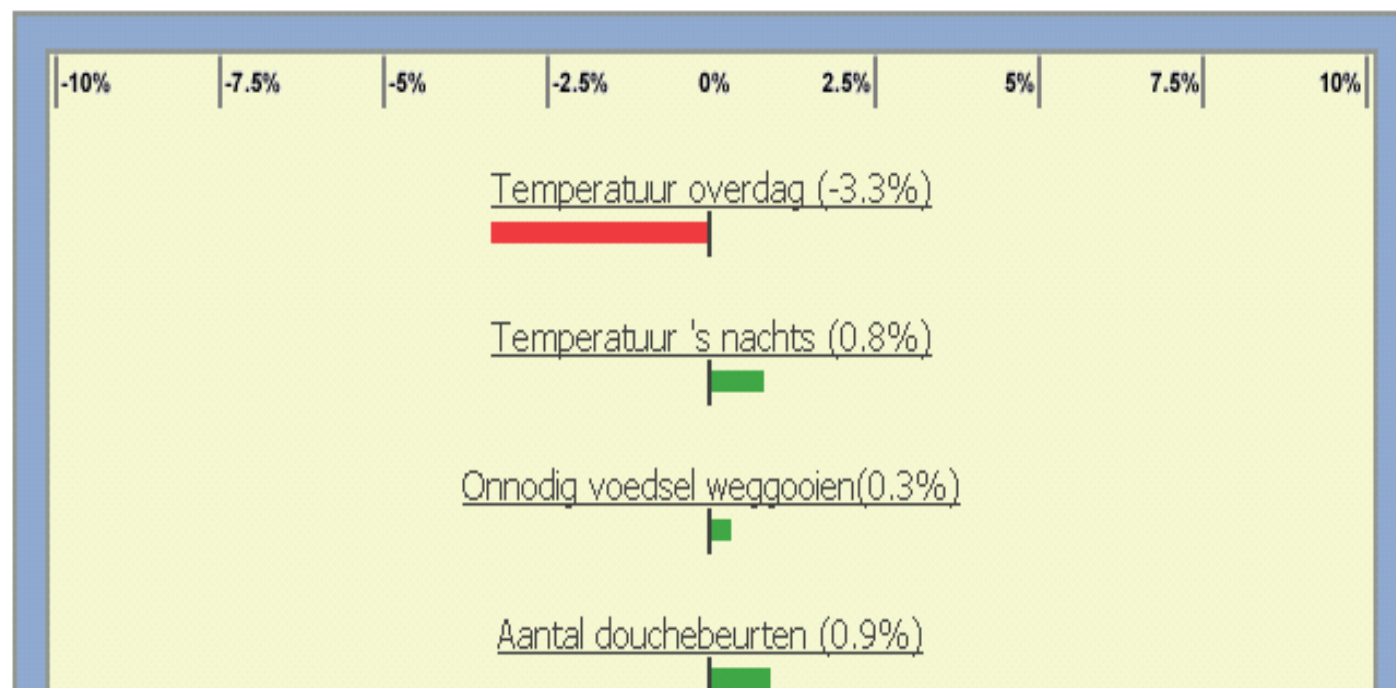
[Wat heeft u bespaard ?]

In de onderstaande figuur is weergegeven hoe uw energiegebruik is veranderd ten opzichte van het begin van dit experiment.

De **groene** balken geven weer op welke terreinen u energie heeft bespaard.

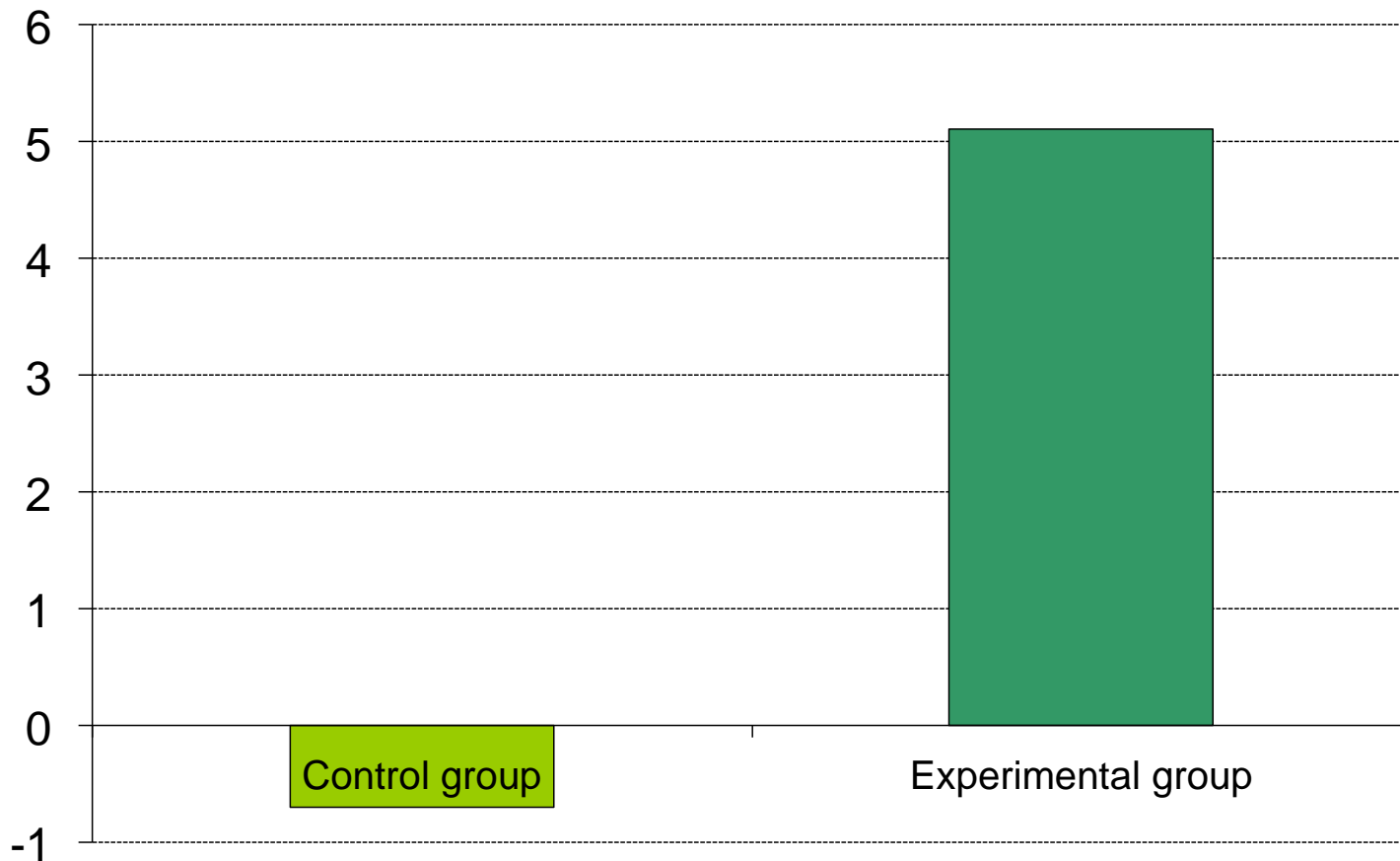
De **rode** balken geven weer op welke terreinen u meer energie bent gaan gebruiken.

Hoe langer de balken, hoe groter de verandering in uw energiegebruik.





Mijnenergieadviseur.nl: Results



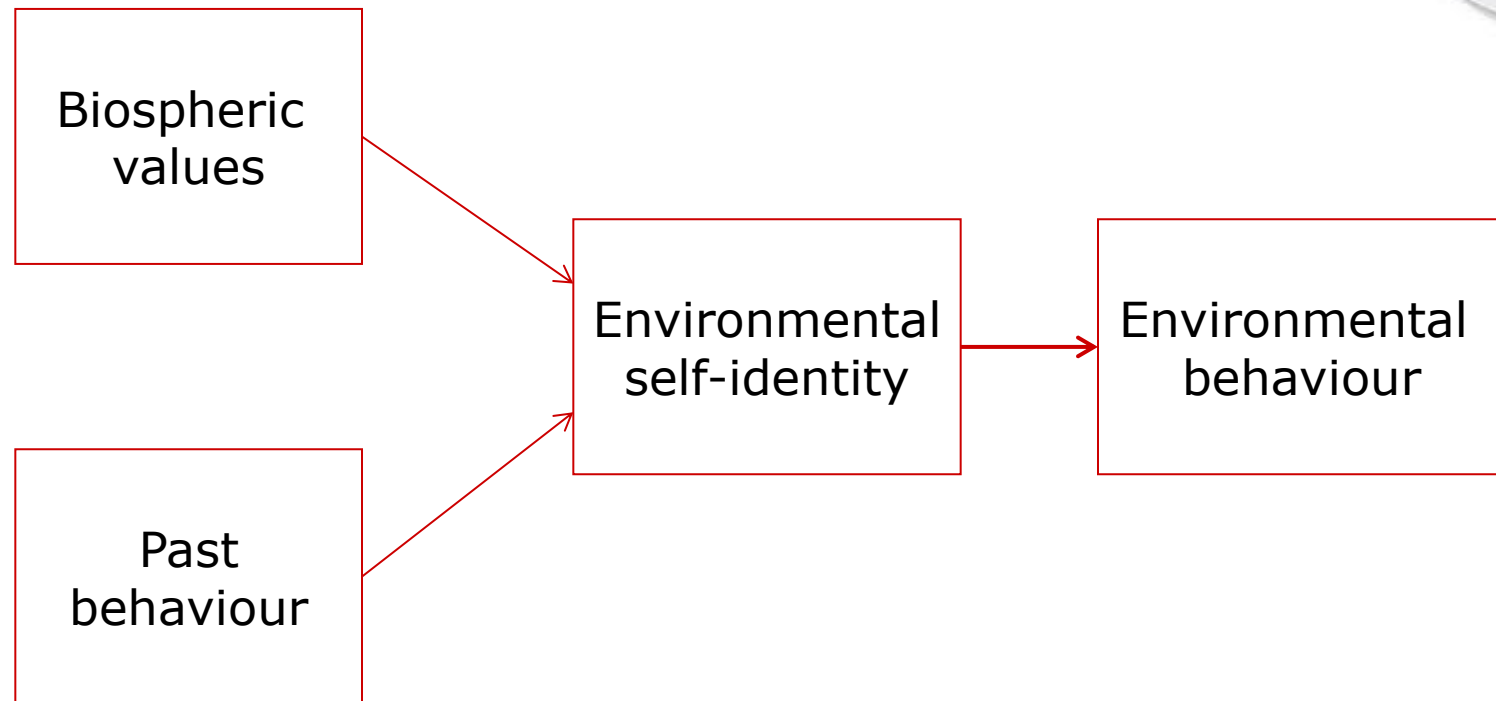


Values and persuasion



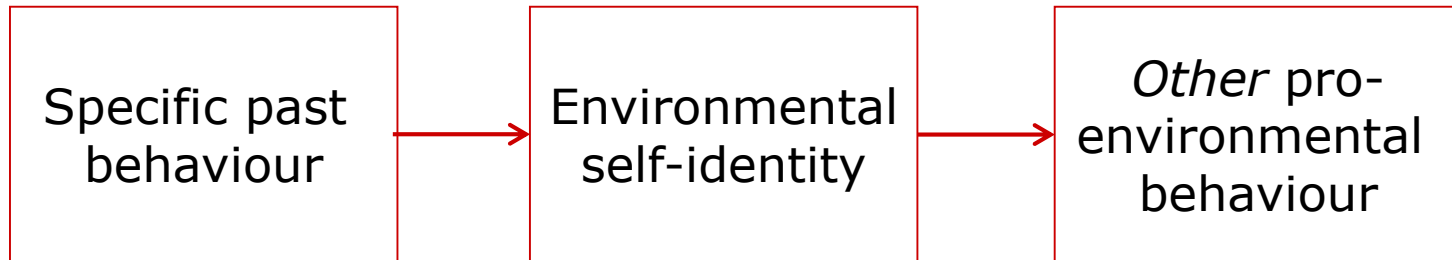


Environmental self-identity





Positive spill-over



- › Particularly if the initial behaviour strongly signals your identity
 - Many different behaviours
 - Costly behaviour
 - Unique behaviour



Situational cues activate and support values

- › Conflicting goals
 - Behavioural costs
- › Value signalling behaviour of others
 - Norm (dis)respect cues



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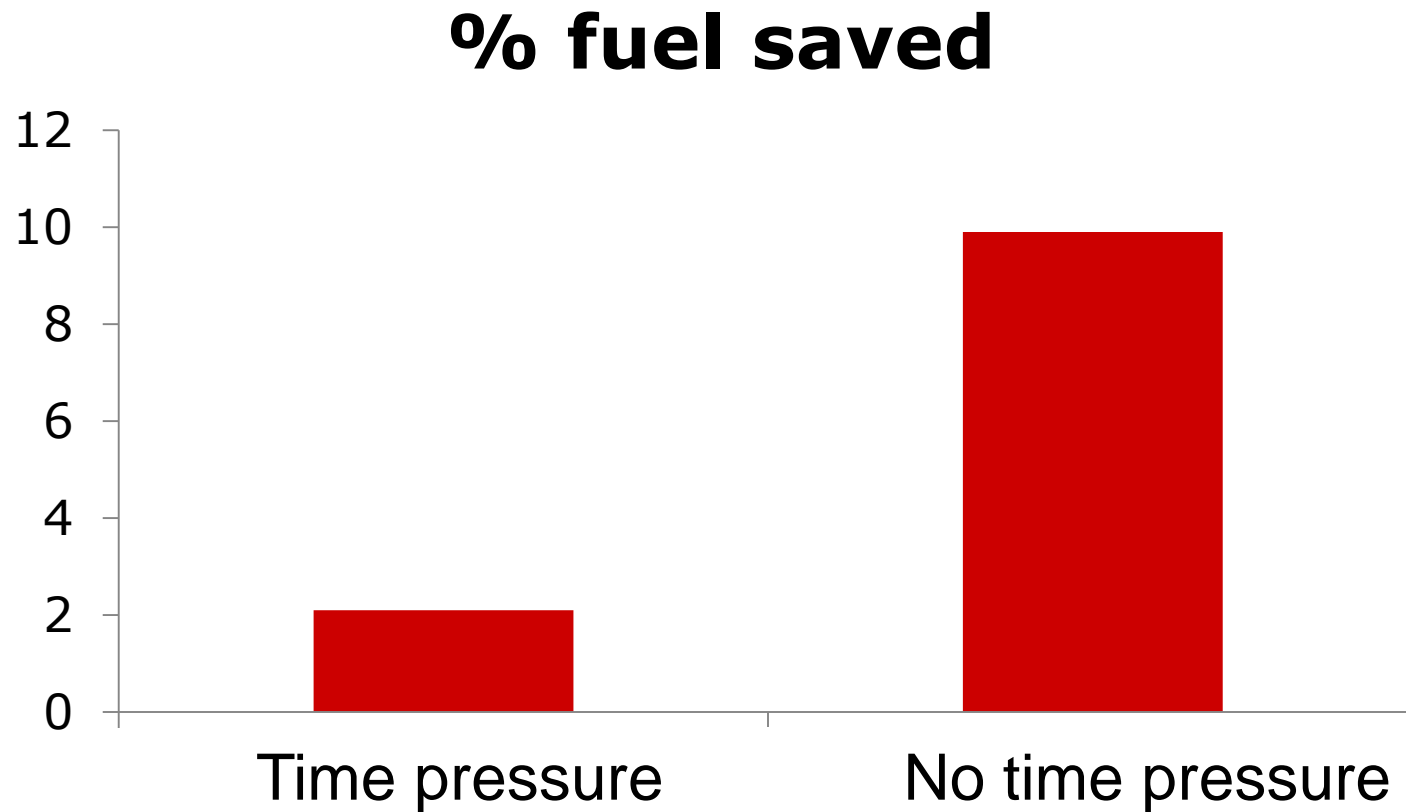
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Conflicting goals



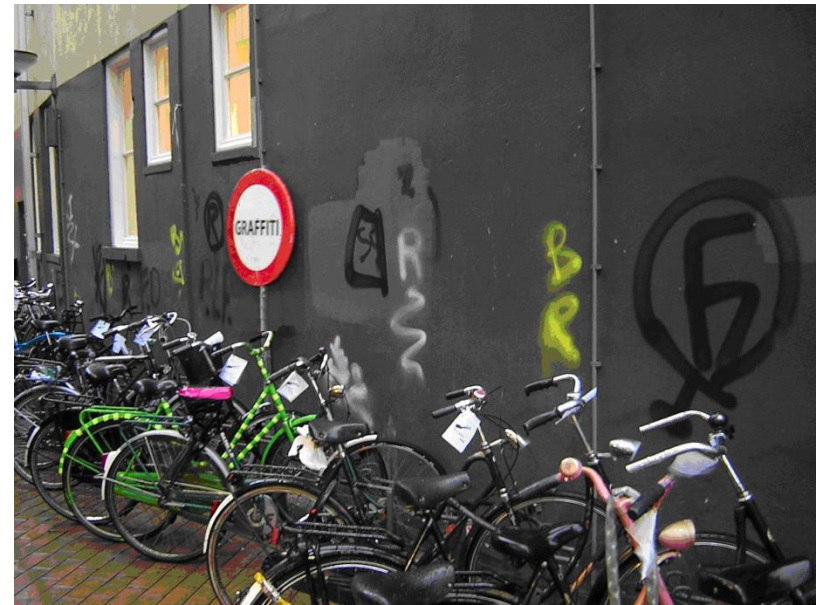


Mental load

- › Less fuel saved if traffic complexity is high
- › When mental load is high, prioritise tasks
 - Block out less relevant information



Study 1

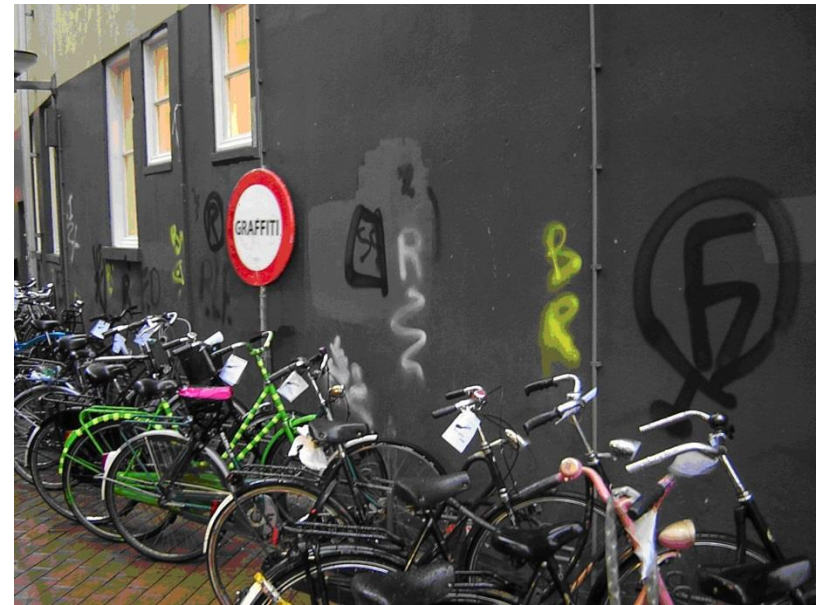


Graffiti versus no graffiti
Flyer at handlebar of bicycles
How many people litter the flyer?



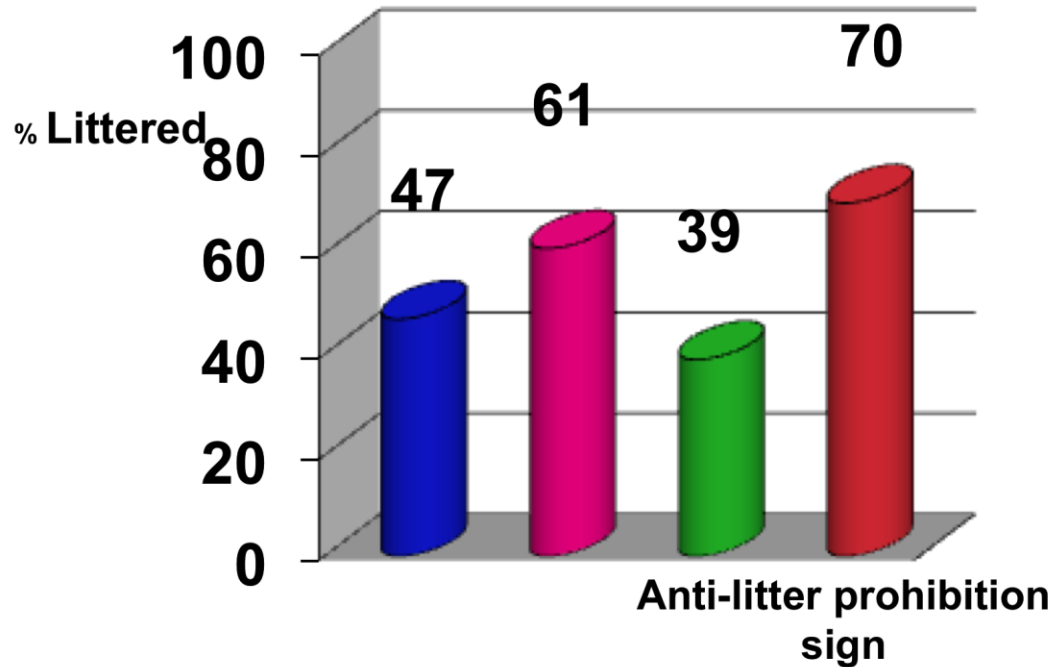


Study 1



No graffiti (N= 77) **33%**

Graffiti (N=77): **69%**



■ 1 litter free

■ 2 littered environment

■ 3 litter free environment

■ 4 littered environment



Study 5/6



Graffiti versus litter versus clean
Envelope containing 5 Euro note sticking out of mailbox
How many people steal the envelope?



Study 5/6



No graffiti or litter (N=71) **13%**

Graffiti (N=60) **27%**

Litter (N=72) **25%**





Clean environment
Picking up soda can
Sweeping

40%
64%
82%



Conclusions

- › Reduce conflict between biospheric values and other values
- › Target situational cues that activate and support biospheric values
 - Value relevant cues
 - 'Good' behaviour of others
 - Reduce costs of pro-environmental actions
- › Normative route: solid base and cost efficient



Psychology and policy making

1. Which behaviour causes the problem?
2. Which factors influence the behaviour?
3. Which strategies can be implemented to change these factors and behaviour
 - Acceptability and expected effects



Mission PERSON

Platform for Energy Research in the Socio-Economic Nexus

To unite and advise on European top-class socio-economic energy research on the human dimensions of sustainable energy transitions to promote a secure, clean and efficient energy system.

PERSON

Research agenda

1. Understanding energy behaviour
2. Promoting sustainable energy behaviour
3. Acceptability of sustainable energy systems and policies



Scope PERSON

The scope of PERSON is SSH energy research with societal impact, with a main focus on the role of the consumer in the energy transition. Deliverables will address issues of **consumer behaviour** and **consumer acceptability** needed to promote **sustainable energy transitions**.

Deliverables PERSON

1. unite European top researchers in SSH research working on energy transitions;
2. draft a common SSH research agenda on the human dimension in energy transitions;
3. serve as an expert platform advising practitioners, market players, policy makers and other research disciplines by sharing the most relevant scientific knowledge;

Deliverables PERSON

4. respond actively to new developments in both the research field and current debates in society;
5. stimulate interdisciplinary and transdisciplinary approaches to provide answers to best practices in the field of energy transitions through the consumers
6. create societal impact towards a secure, clean and efficient energy system.
7. actively contribute to shape the European Energy Union goals set by the European Commission.

Thank you!
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