



i-STUTE: WP1

MC Update

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WP1.1: Overview and Output

- ◎ WP1.1: Review of psychological barriers to the adoption of new heating / cooling technologies known to contribute to the energy efficiency gap
 - Paper presented at SUSTEM 2015 conference, July 2015, organised by the Newcastle IDRIST, one of the working with EUED teams
 - <http://research.ncl.ac.uk/sustem/sustem2015conference/proceedings/>
 - Also presented as part of a behaviour change symposium at 11th Biennial Conference on Environmental Psychology, August 2015, in Groningen, The Netherlands
 - Also presented at BEHAVE2016, The 4th European conference on Behaviour and Energy Efficiency, 8th – 9th September 2016, held in Coimbra, Portugal
- ◎ Status: **Research strand complete. Paper under final (third) review for publication in the Journal 'Energy Efficiency'**

WP1.1: Review and synthesis of psychological barriers to behaviour change

PROMOTING BEHAVIOURAL CHANGE TO REDUCE THERMAL ENERGY DEMAND IN HOUSEHOLDS

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Keywords: Behavioural science; sustainability; energy-efficient technology; demand reduction; behaviour change; choice optimisation

Abstract (200 words)

A reduction in thermal energy consumption in buildings is vital for achieving the reductions in carbon dioxide (CO₂) emissions that are part of EU-2030 targets. A key challenge faced by behavioural scientists is to understand what encourages people to adopt more efficient ways of achieving a satisfactory thermal experience. We review the psychological barriers to reducing thermal energy demand in the context of energy-efficient technology adoption, and discuss ways these barriers may be overcome. The barriers include: demand on cognitive resources due to decision complexity; tendency to procrastinate and discount future consequences; deferral to simplifying strategies including repeating past experience and copying the behaviour of others; the desire to act in ways that maintain a positive self-image; and inertia due to fear of regret that one's decision might be 'wrong'. We discuss behavioural approaches to overcome these barriers, such as emphasising public choice of "green" technology, reframing of benefits, simplifying and optimising the choice environment, focusing on symbolic attributes of new technologies, and changing the temporal structure of costs and benefits. We provide a framework of suggestions for future research which together constitute an important first step in informing behaviour change efforts designed to reduce thermal energy consumption in households.

- Consideration of these seven psychological barriers to behaviour change, with consideration of how each may counteract or supersede rational economic choices, and how each may be overcome in order to reduce the energy efficiency gap and encourage uptake of new technologies

- Action inertia: Why do I have to change?
- Social norms: What do my friends or neighbours do?
- Messenger effects: Who told us?
- Emotions: How does it make me feel?
- Perceived behavioural control: Can I do it?
- Delay discounting: When will I get it?
- Habit: What do I usually do?

WP1.4: Overview

- ⊙ Programme of empirical work to explore the theoretical choice processes underpinning decisions made in the energy retail market

Progress since last MC meeting:

- ⊙ Experiments 1.4.1a & 1.4.1b – Alignability effects and preference formation
 - Status and output: **Strand complete. Final re-write of paper complete, and paper under final (third) review for publication in the Journal 'Energy Efficiency'**
- ⊙ Experiment 1.4.2a – Temporal Discounting
 - Status: Study complete, and written up as white paper
- ⊙ Experiment 1.4.2b – Follow-up on discounting effects
 - Status: **Design complete, data collection currently underway**
- ⊙ Experiment 1.4.3 – Norms and feedback frames
 - Status: **Data collection and analysis complete. Paper currently under review at The Journal of Environmental Psychology**
- ⊙ Experiment 1.4.4a – Messenger Effects
 - Status: **Data collection and analysis complete. Paper completed and ready for submission**
- ⊙ Experiment 1.4.4b – Follow up study into parameters of messenger effects in pro-environmental choice
 - Status: **Design in process and data collection to commence shortly**

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WP1.4: Behavioural Insights

Experiment 1.4.3 – Norms and feedback frames

- ⦿ How can subtle variations in the decision frame be used to increase selection of energy efficient vs. standard technologies?
- ⦿ Participants given a choice of a standard heating system (a gas boiler) and a relatively more energy efficient option (a heat pump).
- ⦿ Varying decision frames:
 - Normative frames – Participants were vs. were not given normative information about what the majority of others in their neighbourhood had opted to do when faced with the same choice set, prior to making their decision.
 - Feedback frames were varied by providing participants with information on either financial or environmental savings that could be achieved by choosing the heat pump.

WP1.4: Behavioural Insights

Experiment 1.4.3 – Norms and feedback frames – Preference formation

- ⦿ A 2 (Normative information: Yes vs. No) X 3 (Feedback type: Financial; Environmental; None) ANOVA revealed a significant interaction between normative information and feedback frame condition was also found to be significant: $F(1,555) = 4.32, p = .04, \eta^2 = .008$ (Figure 1). Impact of feedback frames was found to be reduced when normative information was provided.
- ⦿ When no normative information was provided, the persuasive influence of the financial frame was *increased* – highlighting this as an effective means of encouraging uptake of new technologies in this instance. Conversely, the environmental frame was not found to differ significantly from the control.

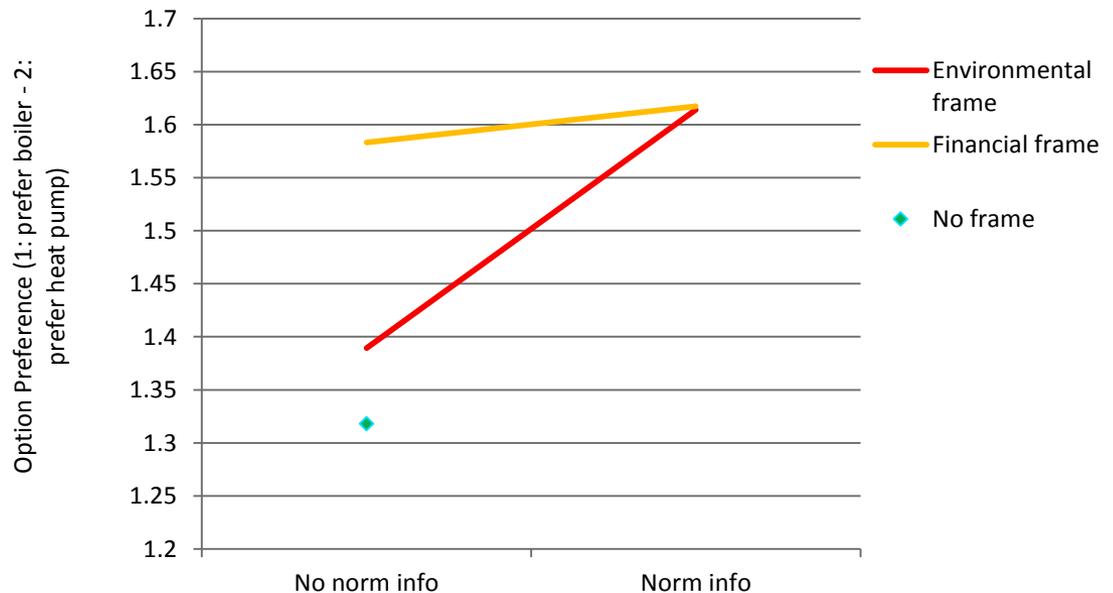


Figure 1. Line graph displaying the interaction between normative information and feedback frames on option preference

WP1.4: Behavioural Insights

Experiment 1.4.3 – Norms and feedback frames – Real life choice behaviour

- ⦿ A (Normative information: Yes vs. No) X 3 (Feedback type: Financial; Environmental; None) ANOVA revealed a marginal main effect of normative information on real life choice behaviour: $F(1,552) = 3.40, p = .07, \eta^2 = .006$. Participants were marginally more likely to state they would consider installing a heat pump in real life, if they were versus were not given normative information (M 's = 5.78 vs. 5.30) respectively.
- ⦿ No effect of feedback frame was found on our real life choice measure: $F(2,552) = .52, p = .60, \eta^2 = .002$.
- ⦿ Marginal interaction found between normative information and feedback frame condition: $F(1,552) = 2.35, p = .13, \eta^2 = .004$ (Figure 2)

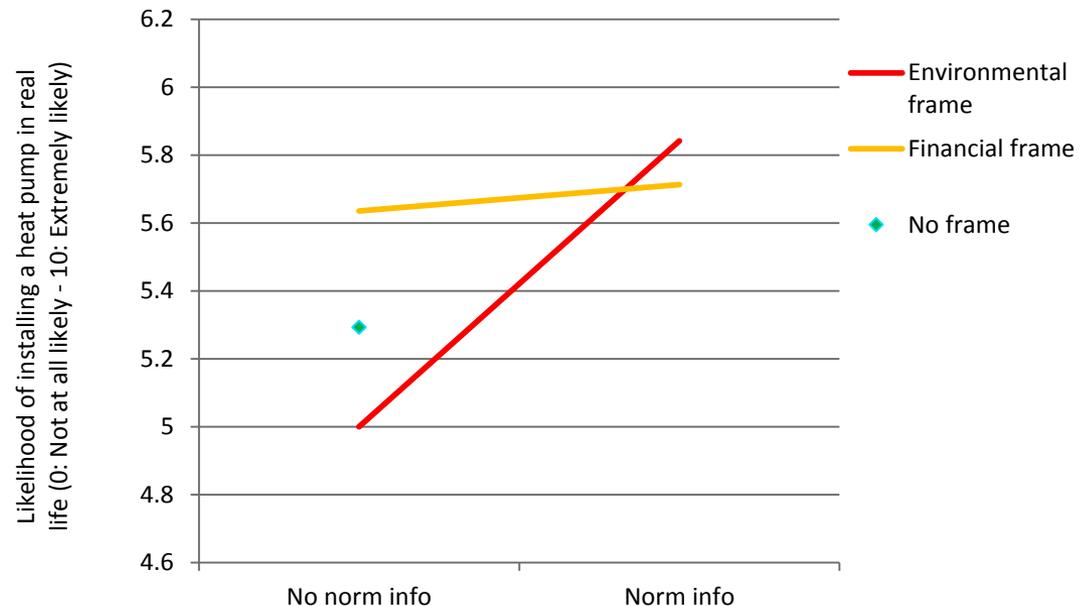


Figure 2. Line graph displaying the marginal interaction between normative information and feedback frames on predicted real-life choice behaviour

WP1.4: Behavioural Insights

Experiment 1.4.3 – Norms and feedback frames

- ⦿ Normative and financial feedback information useful strategies for ‘nudging’ behaviour in this context
- ⦿ Social marketing decision frame – people want to project a positive self-image and be seen as morally conscious
- ⦿ Activation of this mindset appears to overrule any supplementary feedback information
- ⦿ When social consequences of choice not made highly salient, monetary marketing frame becomes most effective strategy for guiding choice

WP1.4: Behavioural Insights

Experiment 1.4.3 – Norms and feedback frames – Dissemination

- ⦿ Paper complete and currently under review at The Journal of Environmental Psychology

- ⦿ Abstract submitted for presentation at:
 1. ICEPDM2017 - 19th International Conference on Environmental Policy and Decision Making. 29th – 30th July 2017, Zurich, Switzerland

 2. BECC 2017 – The Behaviour, Energy and Climate Change Conference. 15th – 18th October 2017, Sacramento, California

Thanks for listening

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