

i-STUTE: WP1

Exploring Consumer Decision Making Processes in the Energy Efficient Solutions Market

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WP1.1: Overview and Output

- ◎ WP1 - Review of psychological barriers to the adoption of new heating/cooling technologies relevant to i-STUTE known to contribute to the energy efficiency gap
 - Presented as paper 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

- ◎ Paper currently under review at Journal of Applied Energy

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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Abstract (199 words)

A reduction in thermal energy consumption in buildings is vital for achieving the reductions in CO₂ emissions that are part of EU-2020 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; the 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 buildings.

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

- 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

- ⊙ A series of experiments aiming to explore the theoretical choice processes underpinning decisions made in the energy retail market
- ⊙ Experiment 1.4.1a – Aligned versus non-aligned information
 - **Status and output: Complete and written up as white paper**
- ⊙ Experiment 1.4.1b – Follow-up on alignability effects
 - **Status: Design nearing completion, testing to commence shortly**
 - **Output: Aim to publish as two study paper (with 1.4.1a)**
- ⊙ Experiment 1.4.1c – Eye-tracking insight into heating choice
 - **Status: Design nearing completion, testing to commence shortly**
- ⊙ Experiment 1.4.2 – Temporal Discounting
 - **Status: Pilot study design complete, ready to commence data collection. Aim to use results to inform large-scale intervention study to start early spring 2016**
- ⊙ Experiment 1.4.3 – Norms and Action Inertia
 - **Status: Design nearing completion, testing to commence shortly**
- ⊙ Experiment 1.4.4 – Messenger Effects
 - **Status: Design discussions underway**

WP1.4: Behavioural Insights

- ⦿ Experiment 1.4.1a – Boiler/Heat Pump Choice (Alignability effects)
- ⦿ Follows from previous decision making research into alignable/non alignable features effect
 - Use of alignable/non-alignable information varies according to decision context. People place more weight on alignable features if options are similar (e.g. same brand)
 - Exploring whether this generalises to choice of new technologies (i.e. similar versus dissimilar product types)
- ⦿ Compares boiler/boiler with boiler/heat pump
- ⦿ Each feature used interchangeably as alignable/non-alignable
- ⦿ Which attribute-type has the greatest influence on choice in this domain?
- ⦿ What is the underpinning explanation for this effect?
- ⦿ How can we use this knowledge to present new technologies in an optimal way, so as to encourage consideration?

Experiment 1.4.1a

Household Heating Systems 2015

Scenario

Please imagine you are about to buy a new heating system for your home. you have narrowed your choice down to the two options, which will be presented side by side on the next screen.

Please take your time to carefully consider these provided options.

Both are standard condensing boilers, which are fuelled by gas.

First we will show you the different attribute levels available for the boilers you are choosing between, as provided by the manufacturer

Each attribute has additional explanatory information which is available if you hover your mouse over the info points provided, highlighted by this symbol (?)

Please carefully review the two options as you will then be asked to select which option you would prefer as your new heating system.

When you are ready please click next to view the two options.

Next >>

Household Heating Systems 2015

Feature Comparison



	Boiler P	Boiler Q
Product Lifespan	Lifetime	
Appliance Volume (Litres)	70 (small)	350 (large)
NOx Emission Class	3	3
Brand Reliability Rating	★★★★★	★
Concealed user controls?	Yes	Yes
Electricity usage on Standby (W)	2	10
Hot Water Temperature Control?	No	No
Warranty (Years)	15	
System Pressure Gauge?	Yes	Yes
Availability of Parts	Widespread	
Timer?	Yes	Yes
Temperature Range	Extensive	Limited
Ease of Installation		Difficult
Hot Water Flow Rate (Litres/min)		9
Uptake in UK	High	
Efficiency Rating		75

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WP1.4: Behavioural Insights

- ⦿ Initial data collection complete (200 participants), but bug detected in programme which meant data unfortunately unusable
- ⦿ Re-run now complete (206 participants)

Results

- ⦿ Evidence for increased probability of selecting superior alignable options when products are similar (boiler/boiler): $t(94) = 10.25, p=.00$. 86.3% of participants found to prefer whichever option was presented as the superior alignable option.
- ⦿ This is mediated by an increased tendency to copy non-alignable information over when options are similar
- ⦿ Conversely, when faced with dissimilar products (boiler/heat pump) no effects of alignability are found: with 49.5% preferring the superior alignable option: $t(110) = .09, p=.93$
- ⦿ C.f. previous research for dissimilar goods – highlighting potential design effects due to non-randomization of features, or perhaps due to added dimension of environmental consideration (vs. standard snack choice)
- ⦿ Offers insight into different processing strategies used when assessing same versus different technologies

WP1.4: Behavioural Insights

Discussion/ Rationale for Study 1.4.1b – Follow-up on Alignability Effects

- ⦿ So what is the explanation for this shift in focus when options differ? And can this somehow be used to promote choice of new technologies?
- ⦿ May be explained due to shift in construal levels – are people focused more on maximizing output in immediate situation, or on higher-order goals?
- ⦿ Presenting standard choice may elicit lower-level or concrete construals; whilst added dimension of environmental considerations (i.e. when introducing heat-pump) may be more likely to elicit higher level, or abstract construals
- ⦿ 1.4.1b to explore impact of construals and attribute alignability in greater detail
- ⦿ Predict there will be an increased probability of making a green versus non-green choice when higher-level construals are activated. Further, that there will be an interaction between construal level and alignability – with non-aligned information and high-level construals providing the conditions under which ‘green’ choice will be most viable
- ⦿ Implications for promoting consideration of any new technology – in terms of informing the type of information structure and processing strategy most likely to lead to desired behaviour

WP1.4: Overview and Output

- ⦿ Experiment 1.4.1c – Eye-tracking insight into heating choice
 - **Outline:** Study aims to provide an alternative perspective of the same research questions, whilst allowing us to explore potential discrepancies between stated and revealed motivations, using non-conscious eye-movements
 - **Output:** Design nearing completion, testing to commence shortly. White paper in preparation and study also to be written up separately for publication

- ⦿ Experiment 1.4.2 – Temporal Discounting
 - **Outline:** Exploring methods for overcoming discounting effects in field of domestic heating, and thus increasing the attractiveness of green technology investment. Initial ideas include: reframing debt as investment; focusing on increasing salience of shorter term benefits (as opposed to psychologically distant long term benefits); and focusing on falling (vs. rising) payment plans to overcome debt aversion
 - **Output:** Pilot study design complete, ready to commence data collection. Aim to use results to inform large-scale intervention study to start early spring 2016. White paper in preparation. To be written up as two study article for publication

WP1.4: Overview and Output

- ⦿ Experiment 1.4.3 – Norms and Action Inertia
 - **Outline:** Exploring the comparative impact of normative and default interventions in increasing new technology selection
 - **Output:** Design underway. Data collection to commence shortly

- ⦿ Experiment 1.4.4 – Messenger effects
 - **Outline:** Experiment to explore the impact of messenger influence on likelihood of selecting new vs. standard technologies
 - **Progress:** Design discussions underway

Summary

- ◎ **WP1.1: Review and synthesis of psychological barriers to behaviour change**
 - Completed – Ongoing dissemination through papers & conferences
- ◎ **WP1.4: Behavioural Insights – Empirical work**
 - Experiment 1.4.1a completed following delays
 - Analysis complete and study written up as white paper
 - Follow-up Experiment 1.4.1b to commence shortly
 - Preparations for 1.4.1c (Eye-tracking), and 1.4.2 (Discounting) studies also underway and to commence shortly
 - Preparation for subsequent experiments (1.4.3 and 1.4.4 onwards) underway
 - **Together these studies will inform behaviour change efforts designed to promote consideration of new technologies:**
 - 1) **How can the choice environment most effectively be structured?**
 - 2) **What is the impact of eliciting alternate processing strategies?**
 - 3) **And how can we overcome the many psychological barriers to behaviour change identified in earlier report?**

Thanks for listening

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