

i-STUTE: WP1

Advisory Board

27th April 2017

David Elmes
david.elmes@wbs.ac.uk
+44 (0)782 4540 996

Daniel Read
daniel.read@wbs.ac.uk
+44(0)7713 355412

Victoria Haines
V.J.Haines@lboro.ac.uk
+44 (0)1509 226915

Rebecca Hafner
rebecca.hafner@wbs.ac.uk

WP1's Work Packages

- ◎ **WP1.1: Review and synthesis of existing activities.**
 - A review of how economic, policy and behavioural factors influence the adoption of new technologies relevant to heating/cooling technologies.
- ◎ **WP1.2: Business model typology.**
 - What are the existing business models adopted by energy service providers in the UK? What are the new alternatives are under consideration? How do they match the requirements for successful introduction identified in our review?
- ◎ **WP1.3: Behavioural Insights – Case studies.**
 - Case studies analysis of where business models succeed or fail to build their understanding of customer needs and behaviours, develop relationships with those customers and provide propositions that customers adopt.
- ◎ **WP1.4: Behavioural Insights – Experiments and focus groups.**
 - Experiments & focus groups to provide converging evidence on a range of value propositions, zeroing in on features likely to lead to success or failure.

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

PROMOTING BEHAVIOURAL CHANGE TO REDUCE THERMAL ENERGY DEMAND IN HOUSEHOLDS

Rebecca Hafner *, David Elmes & Daniel Read *

Warwick Business School,
University of Warwick,
Coventry,
CV4 7AL

* Corresponding authors. Email: rebecca.hafner@wbs.ac.uk; Tel. +44(0) 24 765 22101; Email: daniel.read@wbs.ac.uk; Tel. +44(0) 24 765 23816

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.

- 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?
- Discounting: When will I get it?
- Habit: What do I usually do?

Status: Research strand complete. Paper under final (third) review for publication in the Journal 'Energy Efficiency'

WP1.4: Behavioural Insights

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

Updates since last Advisory Board:

- ⊙ Experiments 1.4.1a & 1.4.1b – Alignability effects and preference formation
 - Status: Study complete. **Final re-write of paper complete, and paper under final (third) review for publication in *Energy Efficiency***
- ⊙ Experiment 1.4.2a – Temporal Discounting
 - Status: Study complete, white paper written
- ⊙ Experiment 1.4.2b – Follow-up on discounting effects
 - Status: **Study complete, two study journal article in preparation for *Psychology & Marketing***
- ⊙ Experiment 1.4.3 – Norms and feedback frames
 - Status: Study Complete. **Paper under review at *The Journal of Environmental Psychology*. Conference presentation at BECC 2017, October 2017**
- ⊙ Experiment 1.4.4a – Messenger Effects
 - Status: **Data collection and analysis complete. Paper submitted to *Nature Climate Change***
- ⊙ 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**

WP1.4: Behavioural Insights

Experiment 1.4.4 – Messenger Effects

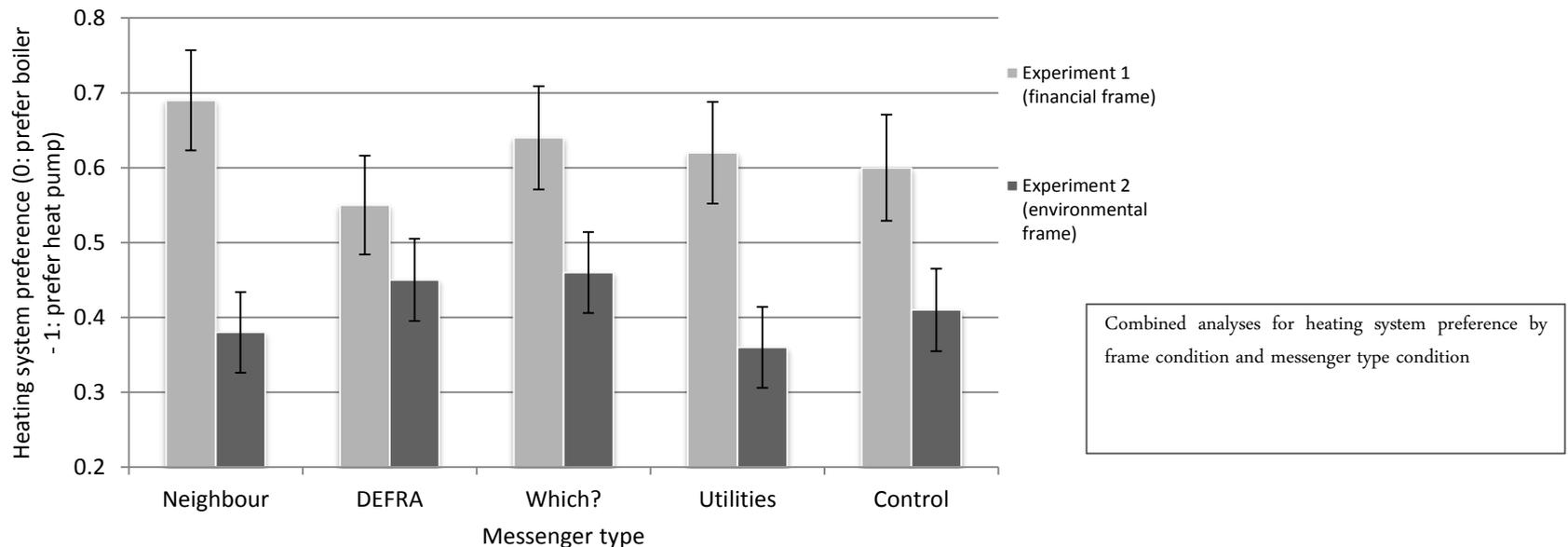
- ⦿ Can variations in messenger source type be used to increase selection of energy efficient vs. standard technologies?
- ⦿ Participants given a choice of a standard heating system (a gas boiler) and a relatively more energy-efficient option (a heat pump)
- ⦿ Information on either the financial (Experiment 1) or environmental (Experiment 2) benefits of ‘choosing green’ delivered by one of four identified messenger types:
 - Neighbour
 - DEFRA representative
 - Which? representative
 - Utility company representative
- Versus ‘no messenger’ control (i.e. information provided as part of experimental scenario)

WP1.4.4: Messenger Effects

- ⦿ No effect of messenger type identified on choice behaviour in either experiment
- ⦿ Theorize this may be due to increased level of task involvement making subjects less susceptible to focus on accompanying peripheral message cues
- ⦿ Consistent with previous research into messenger effects
- ⦿ Overall, messenger effects demonstrated to have little persuasive potential for changing behaviour *in this context of large-scale purchase decisions*

WP1.4.4: Messenger Effects

Results show the influence of the financial frame (this choice saves you money) vs. the environmental frame (this is better for the environment) BUT not an influence of messenger *in this context of large-scale purchase decisions*



Next Steps:

- Follow-up study looking at messenger effects with *varying* levels of initial financial outlay to determine thresholds
- Below what threshold of savings or task engagement do framing or messenger effects change their influence.

So what have we demonstrated in WP1.4...

For the type of significant investments we consider...

- ◎ Alignment effects
 - Be careful that people “write across” information
 - Priming can engage higher order thinking
- ◎ Discounting effects
 - People are more patient in our context than previous research would suggest
- ◎ Norms & feedback effects
 - Normative information *can* help but can be overwhelmed by other influences (e.g. savings)
- ◎ Messenger effects
 - Not significant for the decision type and process we’ve considered
- ◎ And the *relative* impact....?

WP1.3: Behavioural Insights - Case studies.

- ◎ Work package started September 2014, as scheduled
- ◎ Case Studies:
 - 1.3.1 Thermal stores (LU)
 - Data collected on current use of heating and future role of thermal stores
 - Publication in early stages of preparation, pending staff replacement
 - 1.3.2 Heat emitters (LU)
 - Completed; review report published
 - 1.3.3 Smart displays & Control (WBS, leveraging Innovate UK funded work)
 - Halted as supported company changed focus onto technical issues
 - 1.3.4 Perception Gaps (WBS, leveraging Innovate UK funded work)
 - Progress halted: PhD withdrew due to ill health
 - Existing RA (Rebecca Hafner) will try to pick up some of the work....
 - Abstract accepted to present at the TEDDINET Ctech symposium on Managing Energy Use in Non-domestic Buildings, 26th June 2017
 - 1.3.5 Nudgeathon



WARWICK BUSINESS SCHOOL
THE UNIVERSITY OF WARWICK

CELEBRATING
50
YEARS
1967-2017

The University of Warwick my.wbs



[ABOUT WBS](#) [COURSES](#) [RESEARCH](#) [BUSINESS](#) [EXECUTIVE EDUCATION](#) [NEWS](#) [EVENTS](#) [CONTACT](#)

Nudgeathon will tackle reducing energy use - Behavioural Science in action



NUDGEATHON
BEHAVIOUR / INSIGHT / CHANGE





What arose from the Nudgeathon?

- ⦿ Themes for research and demonstration
 - Signage
 - TRVs
 - Feedback & “shadow” bills
 - Communication
- ⦿ A two stage programme of implementation across Campus
 - Initial research within this AY as part of dissertations
 - Preparation for work in the next AY, including any summer actions
- ⦿ Contributions from the Energy Systems Catapult...
 - The language of comfort services
 - The standards set for buildings to offer & meet certain levels of comfort

WP1.2: Business Model Typology

- ⦿ Delayed start: failed to recruit PhD student then Faculty work for a period (Dr Fred Dahlmann)
 - Initial evaluation of Heat Pump Innovation network completed
- ⦿ Scope of work defined has been rapidly taken up by commercial companies and consultancies
 - Resources reallocated to WP1.3 Nudgeathon work

WP1: Publications and dissemination

- ⦿ WP1.1 (Review paper) – Journal article under final review
 - **Hafner, Elmes & Read. (2017). Promoting Behavioural Change to Reduce Thermal Energy Demand in Households. *Energy Efficiency (Under Review)***
- ⦿ WP1.4.1 (Alignability effects) – Two study journal article under final review
 - **Hafner, Elmes & Read. (2017). Exploring Alignability Effects and the Role of Information Structure in Promoting Uptake of Energy Efficient Technologies. *Energy Efficiency (Under Review)***
- ⦿ WP1.4.2 (Discounting effects) – Two study journal article currently in preparation
 - **Hafner, Elmes & Read. (2017). Exploring the Role of Choice Framing and Patience (Willingness to Wait) in New Technology Adoption. *Psychology and Marketing (In Preparation)***
- ⦿ WP1.4.3 (Norms and feedback frames) – Journal article under review at The Journal of Environmental Psychology
 - **Hafner, Elmes & Read. (2017). Exploring the Comparative Impact of Normative Information and Financial/Environmental Feedback Frames in Promoting Pro-Environmental Behaviour, and Increasing Uptake of Energy-Efficient Technologies. *Journal of Environmental Psychology (Under Review)***
 - **Abstract submitted for presentation at BECC 2017 (The Behaviour, Energy and Climate Change Conference. 15th – 18th October 2017, Sacramento, California)**
- ⦿ WP1.4.4 (Messenger effects) – Two study journal article submitted to Nature Climate Change, second large-scale follow-up study to follow
 - **Hafner, Elmes & Read. (2017). Exploring the Role of Messenger Effects in Promoting Uptake of Energy-Efficient Technologies. *Nature Climate Change (Under Review)***

BEIS: Industrial Strategy Consultation



Department for Business, Energy & Industrial Strategy: Building our Industrial Strategy

i-STUTE Centre Response to Consultation

Prepared by:

Prof Bob Critoph, Department of Engineering, University of Warwick
Prof Neil Hewitt, School of the Built Environment, Ulster University
Prof Graeme Maidment, School of the Built Environment and Architecture, London South Bank University
Dr Vicky Haines, Loughborough Design School, Loughborough University
Prof David Elmes, Warwick Business School, University of Warwick.

This submission is from the i-STUTE Centre (the interdisciplinary centre for Storage, Transformation and Upgrading of Thermal Energy). The Centre is part of a set of investments by Research Councils UK into End Use Energy Demand reduction, grant reference number EP/K011847/1. See <http://www.i-stute.org/>.

This submission is an organisation's response and can be published. Please contact the Centre Director, Prof R.E. Critoph at R.E.Critoph@warwick.ac.uk if there are any questions.



- ⦿ There are improvements and innovations to the technologies available for heating and cooling that will significantly impact cost and performance in the marketplace.
- ⦿ Energy systems that combine generation, storage and network-aware controls can both provide consumer comfort and manage network needs / associated emissions.
- ⦿ These energy systems require dynamic use of both thermal and electrical storage at varying levels of scale.