Symposium

Strategies to change behavior: the effectiveness and acceptability of different types of strategies to change behavior

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Introduction

In order to reduce environmental problems we need to know which strategies are most effective in promoting behavior change. However, in order for strategies to be implemented they also need to be acceptable. This symposium will therefore discuss strategies to change behavior as well as factors influencing the acceptability of strategies.

Previous research has shown the importance of providing feedback to change behavior (Abrahamse, Steg, Vlek & Rothengatter, 2005). In this symposium we will study different types of feedback: individual feedback, group feedback and feedback on normative aspects. The influence of a different type of environmental stimulus, music, on our behavior will also be discussed.

Next to discussing different types of strategies to change behavior, this symposium will also focus on different types of behavior. Several aspects of household energy consumption will be addressed. Also, the influence of an environmental stimulus on driving behavior will be argued.

The first presentation will focus on the influence of different types of feedback on household energy consumption. The impact of continuous, normative and individual feedback on energy consumption is addressed.

The second presentation also discusses reducing household energy use via feedback. Along with feedback, the effect of goal setting and information was tested. In addition, this presentation will focus on the effect of the inhabitants' environmental identity on saving energy.

The use of proper technological devices may be another strategy to reduce energy consumption. Therefore the final presentation on household energy use focuses on the influence of technology on energy saving behaviors. More specifically, it was tested if providing homeowners with infrared thermography images of the home increased energy savings.

The fourth presentation focuses on a different environmental stimulus to change behavior, namely: music. Previous research has shown that music can implicitly change our behavior. In this presentation the influence of music on driving behavior in a complex traffic setting will be discussed.

Next to the effectiveness of strategies to change behavior, it is important to study the acceptability of measures. In order for people to adopt certain measures they have to find the measures acceptable. The final presentation focuses on the acceptability of different types of measures. The acceptability of push versus pull measures will be discussed, as well as the acceptability of efficiency versus curtailment measures.

Overall this symposium will discuss the effectiveness and acceptability of different measures in order to change energy use of households and driving behavior.

References

Abrahamse, Steg, Vlek & Rothengatter (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology, 25,* 273-291.

Presentation 1: Promoting environmental behaviour via feedback: Energy conservation in households

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Introduction

The two studies presented here investigate motivational processes such as norm activation and the influence of values in relation to different feedback strategies. Studies on feedback interventions have generally found that frequent feedback is more effective than infrequent and that initially high consumers of energy lower their consumption more than initially low consumers. Previous research however lacks in the attention to underlying psychological determinants of energy use and energy savings (Abrahamse, Steg, Vlek, & Rothengatter, 2005).

Study 1

The study investigates the effects of continuous feedback via a display on energy consumption behaviors. 40 Survey participants living in separate or semidetached houses in two different small cities in Sweden participated in the study.

Method. Households were randomly assigned to one of two conditions; Display and Control. Energy displays were installed in households in the Display condition.

Results. Participants were split on low or high initial energy consumption. The results for the initially high energy consuming group showed significant difference in energy savings between the conditions. Controlling for background factors, the display condition reduced significantly more than the control group. Biospheric values were found to be an important motive to reduce the energy consumption. No significant differences between the conditions were found for the initially low consuming group.

Study 2

This study compares the influence of individual feedback (ie. weekly reports of energy use) and normative feedback.

Method. 120 households participated in the study. Households were randomly assigned into two experimental conditions (normative and individual feedback) and one control group.

Results. Households given normative feedback saved significantly more energy than the control condition. Further, the results show that initially high consumers of energy show the highest reduction of energy, mainly in the norm condition.

Values were found to interact with the feedback given; participants prioritizing egocentric values were more influenced by the normative feedback, while participants prioritizing biospheric values were comparatively more influenced by individual feedback.

Discussion

The results thus suggest that continuous feedback via a display is most effective for high energy consuming households. The results also suggest that normative feedback is more effective than individual feedback when given on weekly basis. Finally the type of feedback given interacts with values. The finding that participants prioritizing egocentric values were more influenced by the normative feedback may indicate that competitive motives are activated among these participants.

References

Abrahamse, Steg, Vlek & Rothengatter (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology, 25,* 273-291.

Presentation 2: Reducing energy use in a master-metered apartment

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Household energy use in master-metered apartments is on average 30% higher than in households with individual meters. In master-metered apartments only the energy

use of the group is available; inhabitants have no information on their individual usage and there is hardly an incentive to change their energy use. Previous studies have shown that providing households in master-metered apartments with feedback on their energy use is effective in reducing their energy use (e.g. McClelland & Cook, 1980). However, energy use remained much higher than in households with individual meters. In our study we wanted to test if the effectiveness of interventions in master-metered apartments can be enhanced by stressing the environmental identity.

Several studies have revealed the importance of environmental identity as a predictor of behaviour (e.g. Whitmarsh & O'Neill, 2010). An environmental identity is the extent to which acting environmentally friendly is an important part of who you are. An environmental identity prescribes a course of action that is compatible with individuals' sense of who they are (Clayton & Opotow, 2004). Someone who has a strong environmental identity will be motivated to behave in an environmentally friendly way, in order to maintain this self-identity. We tested if an intervention in a master-metered apartment is more effective when next to providing feedback on energy use, the environmental identity is stressed.

We conducted our study in a master-metered apartment in the city of Groningen. A pre-study showed that the inhabitants strongly endorse sustainability. The participants indicated to find sustainability more important than for example comfort and affordability. This is also reflected in the mission that the inhabitants of the building formulated together. Part of their mission is to be sustainable. The building is divided into wings; three wings participated in the study. The first wing served as the control group and did not receive any feedback about their energy use. The second wing received an energy reduction goal of 20%, information on how to reduce energy use and weekly feedback on the total electricity use of their wing. The third wing received the same information as the second wing and additionally their environmental identity was stressed. Their environmental identity was stressed by indicating the mission of the building on the sheet with feedback, the logo of the building was presented and participants were reminded in the feedback that they indicated to find sustainability very important. Energy use was measured through electricity meters that were placed in each wing. And through questionnaires in which participants indicated what appliances they have and how much they use them.

The pre-measure of electricity use lasted from November 2010 until January 2011. In January participants filled in a questionnaire measuring energy use through self-report. From February on, participants received weekly feedback about their electricity use for ten weeks. When the feedback stopped participants again filled in a questionnaire to measure their electricity use via self-reports. The results of the intervention and the differences between the three wings will be discussed.

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Presentation 3: Promoting energy saving actions via the technology of thermal imaging: applying a concrete notion to a bricks and mortar issue?

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60% of UK domestic energy is used to heat homes. Almost all homes would benefit

from a package of measures which could reduce energy demand and reduce Co^2 emissions from the housing sector by 22% (EHCS, 2007). The UK government have suggested occupier inertia as a barrier, a "lack of appreciation of true energy costs and long term benefits of energy efficiency measures" and have called for a behavioural focus (DTI, 2006). Targeting homeowners directly may achieve further demand.

New and visual technologies have the potential to improve this awareness. Technologies used in interventions can act as change agents, by displaying information not easily understood through traditional methods, mediating how information is received and drawing attention to specific issues. In doing so, it has been argued that this process may change perceptions, as a route to actions (Midden, Kaiser and McCalley, 2007) and may have a persuasive effect on behaviours. Previous authors have proposed that making abstract or inaccessible issues more realistic and tangible may be key in reaching individuals. However, there are gaps in our knowledge about the pathway from exposure to behaviour (Sheppard, 2005; Steg, 2008), and this empirical project was designed to investigate this process.

Specifically, homeowners may 'know' their need to avoid the waste of energy, as an abstract notion, but this abstraction may need further encouragement to become more relevant and induce action. Using infrared thermography, the project visually and vividly displayed cold ingress and heat loss from participant's homes and tested what effect that specific or concrete representation would have on the homeowners? The purpose was to investigate whether exposure to the images would facilitate an increase in energy saving behaviours, and to investigate the process underpinning such behaviours.

100 households were allocated to a thermography group (who received tailored reports), or a control group, during this yearlong field study. All households were exposed to a range of interventions aimed at encouraging pro-environmental behaviours in the home, including energy audits. The thermography group received the thermal

images as one additional intervention. Householders exposed to the images were more likely to engage in a simple energy saving behaviour; installing draught proofing ($p = 0.01$). In addition householders exposed to the images perceived their homes as less efficient than the control ($p < 0.001$) and felt they knew less about how to conserve energy ($p = 0.05$).

Results suggest that exposure to the tailored images prompted the homeowner to take actions, not considered beforehand, to save heat loss, particularly where the energy saving action was a simple one to enact. Findings suggest there is the possibility of achieving further energy savings by using technologies to persuade and enhance the manner in which energy saving information is conveyed or tailored. We discuss the pathway from exposure to behaviour, key factors in strengthening the pathway and the role of mediating technologies.

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Presentation 4: Music as an environmental stimulus and its effect on driving behavior

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In everyday life, we listen to music as a background stimulus in a variety of settings

such as in shops, restaurants and traffic. It has been documented that music has the power to implicitly affect our behaviors such as moving faster or slower in shops due to fast and slow tempo music (Milliman, 1982). In addition, when the music is congruent with the environment or when it is liked, it may increase the liking for the environment (North et al., 2003). However, how does it affect our behaviors when we are supposed to work on a task in a complex setting, such as driving?

Driving is almost always accompanied by music (Dibben & Williamson, 2007). However, the effects of music on driving performance are rather unknown or results are mixed and providing evidence for both negative and positive effects. We hypothesized that music is a demanding environmental stimulus, and when the traffic environment is also demanding then drivers will be more attentive to compensate for the cognitive overload induced by music. As a consequence, the task would be more effortful, while there would be no difference in performance due to overcompensation.

For this purpose, we used the driving simulator and created a driving environment high in complexity and including various hazardous scenarios. Sixty-nine participants were randomly assigned to either music or no-music groups. Participants in the music group created a play list that consists of their favorite songs. In order to make the music demanding, we played the songs with a high volume (90dBA). In addition to driving in the simulator, participants completed scales measuring their mental effort during driving and level of pleasure and arousal.

Results revealed that participants in the music group reported higher mental effort ratings throughout the whole time when driving. This shows that apart from the complexity of the environment, when the music is demanding (loud), it adds extra cognitive load on the task. However as expected, higher mental effort lead to higher need for compensating for the possible negative effects of music. As a consequence for the majority of the critical situations, there was no difference in the performance of music and no-music groups, and in two of the critical situations music group performed better than no-music group. Repeated measures was run to compare pleasure and arousal levels within groups before and after the simulated driving. Ratings of pleasure did not change before or after the drive for both of the groups, indicating that listening to music did not increase the pleasure one gets from driving.

Results suggest that drivers are able to compensate for high cognitive load in demanding situations, and although mental effort is much higher while listening to music and driving, they still perform well or sometimes even better.

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Presentation 5: The golden combination of policy features? Increasing acceptability of environmental policies

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Introduction

Over the years, various policies have been proposed aiming to reduce environmental problems. However, many policies are not being implemented because of lack of public support. Therefore, it is important to investigate which factors influence the acceptability of such policies, as this reveals how policies should be designed or adapted to increase public support. In this study, we examine to what extent policy acceptability depends on specific features of policies.

More specifically, we examined to what extent push versus pull measures (i.e. reward versus punishment) and the behavioural target of the policy (i.e. efficiency or curtailment behaviour) influences policy acceptability. Push measures as well as curtailment behaviours are both perceived as restrictive measures, and therefore they are evaluated as less acceptable than pull measures and efficiency behaviours (i.e. main effects). However, we expect that people will especially evaluate policies as unacceptable if they are perceived as "double restrictive" (i.e. a push measure that targets curtailment behaviour).

Method

A questionnaire study was conducted among representative samples of 7 European countries ($N = 6,045$). Respondents evaluated the acceptability of six policies aimed at reducing household energy consumption. The policies systematically varied on two features (i.e. 2x2 within subject design): 1) push (punishment) or pull (reward) measure; 2) target behaviour: curtailment or efficiency.

To test the robustness of our results, we also varied the behavioural domain of the policy (i.e. transport, sustainable energy and home).

Results

A factorial repeated-measure ANOVA showed that, as expected, participants evaluated push measures as less acceptable than pull measures, while policies targeting curtailment behaviours were less acceptable than policies targeting efficiency behaviours. In line with our hypothesis, we found a consistent and strong interaction-effect between the policy features on acceptability across all behavioural domains. Push measures targeting curtailment behaviours were far less acceptable than push measures targeting efficiency behaviours. Pull measures were believed to be acceptable regardless of the target behaviour of the policy.

Discussion

Importantly, our results reveal that push measures are not always evaluated as unacceptable. They are particularly regarded as unacceptable when they target curtailment behaviours.

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