



Energy efficiency in households: The effectiveness of different types of messages in advertising campaigns



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ABSTRACT

The current enormous levels of energy waste are among the main culprits for climate change. Research in the field of energy has suggested the need for more effective public awareness advertising campaigns to modify consumer behaviour and reduce waste. An experimental study was conducted to analyse the effectiveness of various types of information to improve behavioural intentions in relation to energy efficiency. A two-by-two factorial design was followed in which the independent variables were economic benefits and specific behavioural guidelines related to energy efficiency. A control group was also included. The dependent variables were the degree of informational persuasion in the campaign and future behavioural intention. The study included 176 participants. Our results confirm that messages on energy efficiency combining specific behaviour guidelines and economic benefits are more effective than those based on either type of information alone. Also, specific messages are found to be more effective than generic ones.

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1. Introduction

Climate change is currently one of the most severe and complex environmental problems at the global level. One of the main causes of climate change is the excessive energy consumption associated with current lifestyles. Among other authors, Steffen et al. (2015) highlight that since 1950 the use of energy has increased five-fold. Thus, the reduction of greenhouse gas emissions has become a global challenge that calls for a joint economic and technological commitment, and consumer collaboration. Consumers need to be encouraged to engage in suitable pro-environmental behaviour to help achieve this aim.

Numerous studies have addressed the issue of saving energy and have provided suggestions on designing tools to promote saving electricity at home (Abrahamse, Steg, Vlek, & Rothengatter, 2005; Abrahamse, Steg, Vlek, & Rothengatter, 2007; Dwyer, Leeming, Cobern, Porter, & Jackson, 1993; Fischer, 2008; Katzev & Johnson, 1987; Spence, Leygue, Bedwell, & O'Malley, 2014; Stern, 1992). However, some limitations are encountered that make it difficult to draw conclusions about what strategies are the most

effective, how and to what extent they should be used, and what specific behaviours they should address. Delmas, Fischlein, and Asensio (2013) provide an extensive meta-analysis of experimental studies on information strategies targeting energy use. They reported different methodological limitations of many of the studies reviewed, including a lack of control groups, the combined use of different strategies, and small sample sizes. These limitations make it difficult to identify which types of messages are most effective in promoting changes in attitudes and behaviour. In this study we aim to analyse the effectiveness of two commonly used strategies, overcoming these methodological deficiencies.

Abrahamse et al. (2005) provide a review and an evaluation of different interventions for encouraging households to reduce energy consumption. Based on 38 studies on the subject, the authors, following the general taxonomy for behaviour change interventions proposed by Geller et al. (1990) and Dwyer et al. (1993), classify the interventions into two categories: antecedent strategies, which focus on factors that precede pro-environmental behaviour; and consequence strategies, which focus on factors that result from pro-environmental behaviour. Antecedent strategies include: commitment (written or oral promises to save energy), goal setting (establishing specific objectives for energy reduction) and information (providing information on the causes, consequences and solutions related to saving energy). Consequence strategies include feedback (giving households information about their energy

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consumption, or energy savings) and rewards (monetary rewards meant to serve as an extrinsic motivator to conserve energy). They conclude that interventions obtained varying degrees of success: information increases knowledge levels, but not always behaviours; rewards effectively improve energy conservation, but with short-term effects; and feedback has also proven to be effective, mainly when given frequently. However, they acknowledge that methodological problems cloud these conclusions.

More recently, [Osaldiston and Schott \(2012\)](#) and [Delmas et al. \(2013\)](#) conducted two additional meta-analyses. [Osaldiston and Schott \(2012\)](#) review 253 experimental strategies for promoting pro-environmental actions comprising the period from 1980 to 2009. [Delmas et al. \(2013\)](#) analysed 156 experimental studies focused on energy conservation behaviour conducted between 1975 and 2012. Based on a review of all these studies, the authors confirm that the strategies analysed feature different levels of effectiveness in different studies. Thus, for example, several studies validate commitment as an effective strategy to reduce energy consumption in the long term ([Katzev & Johnson, 1983](#); [Pallak & Cummings, 1976](#)), although some others indicate that this only works in the short term ([Katzev & Johnson, 1984](#)). Studies based on goal setting ([Becker, 1978](#); [McCalley & Midden, 2002](#)) concluded that these strategies are more effective when combined with feedback. Also, information strategies have proven to be very effective, especially when combined with other intervention strategies, i.e. [Delmas et al. \(2013\)](#) concluded that information campaigns are effective, as participants reduced their energy consumption by an average of 7.4%. Some studies show that feedback strategies are effective in reducing household energy consumption ([Seligman & Darley, 1977](#)), but there are also studies that do not find this strategy useful ([Corner & Randall, 2011](#); [Fischer, 2008](#); [Katzev, Cooper, & Fisher, 1980–1981](#)). Likewise, rewards seem to have a positive effect on energy reduction ([McClelland & Cook, 1980](#); [Slavin, Wodanski, & Blackburn, 1981](#); [Winett, Kagel, Battalio, & Winkler, 1978](#)), but others indicate ([Pitts & Wittenbach, 1981](#)) that this effect can be negligible in the long term. [Osaldiston and Schott \(2012\)](#) concluded: “The most important conclusion is that there is no one treatment that is highly effective across all the possible pro-environmental behaviour. Certain treatments seem to be more effective for certain behaviours” (p. 280). Consequently, in this work we are going to focus on studying one type of environmental behaviour, saving energy, and one type of antecedent strategy: information; more specifically, the kind of information provided to promote the change in attitude and/or behaviour.

As indicated above, information campaigns tend to be ineffective. For example, [Staats, Wit, and Midden \(1996\)](#) evaluated the effects of a governmental mass media campaign conducted in the Netherlands on the greenhouse effect. The instruments used in the campaign were television commercials, billboards, posters and brochures. The results were quite limited: knowledge about the greenhouse effect enhanced marginally; only one behaviour (separate disposal of chemical waste) improved after the campaign; and an increase in behavioural intention was found, but only among those who already engaged in pro-environmental behaviour.

The discipline of Social Psychology has long been aware of strategies for changing attitudes and behaviour. Thus, the theory of planned behaviour ([Ajzen, 1991](#)) views perceived control as one of the most influential factors for both attitudes and behavioural intention. Along the same line, [Bamberg and Moser \(2007\)](#) suggested, in their meta-analysis of psychosocial determinants of pro-environmental behaviour, the inclusion of specific action guidelines as a means to increase perceived behavioural control. These guidelines included providing information on precise and effective measures, such as using energy-saving light bulbs, turning off

standby settings, or fully loading washing machines and dishwashers. Thus, one of the types of information we propose to analyse is specific behavioural guidelines.

The series of TV spots designed by [Winett, Leckliter, Chinn, Stahl, and Love \(1985\)](#) are an example of communication campaigns to promote energy-saving measures through behavioural control. The TV messages were aimed at middle-class homeowners, and depicted various energy-saving measures. Each one in the series included reasons for saving energy, arguments regarding the consequences of not adopting the measures and energy-saving procedures. In addition, the viewers received a booklet with cartoons describing the energy-saving measures presented. The group that received this information (the TV segments and the booklet) significantly reduced energy consumption, down 10% compared to the control group. Similar studies have shown that messages with motivational priming that include specific guidelines for action (e.g. walking instead of driving, or buying green energy) are more effective than those that only portray the need to make sacrifices to protect the environment (e.g. [Gifford & Comeau, 2011](#)).

Communication strategies that provide information about the economic benefits for citizens of pro-environmental behaviour have also been studied. Contradictory results have been reported on the expediency and efficacy of such strategies. For example, [Whitmarsh \(2009\)](#) found that the main motivation to adopt effective behaviour against climate change, such as turning off lights or using energy-saving light bulbs, was economic rather than pro-environmental. This finding has been supported by other studies ([Demski, Spence, & Pidgeon, 2013](#); [Eurobarometer, 2007](#); [Ofgem, 2011](#)). However, still other studies alleged the limited effectiveness or drawbacks of using this strategy ([Abrahamse et al., 2005](#); [Bolderdijk, Steg, Geller, Lehman, & Postmes, 2013](#); [Corner & Randall, 2011](#); [Fischer, 2008](#); [Thøgersen & Crompton, 2009](#)) or even an opposite effect ([Delmas et al., 2013](#)). The reported drawbacks include the rejection of pro-environmental values, lack of extrapolation to other environmental behaviour, and a decrease in pro-environmental behaviour once the economic incentive disappears. Along this line, the second type of information that we intend to analyse is publicising the economic benefits of pro-environmental behaviour, in our case, energy savings.

Recently, [Spence et al. \(2014\)](#) carried out two studies in the UK to reduce energy consumption at home. They presented participants with information about energy use and three different areas: energy (kilowatt-hours), pollution (carbon dioxide, CO₂), or costs (pounds sterling). The data suggest that receiving information on CO₂ production was useful for promoting pro-environmental behaviour, and the impact of information on energy and costs was also observed. There were no significant differences between the three types of information. On the basis of these results, they suggested that economic information should not be ignored in environmental communications because it can complement other types. Nevertheless, the study has some methodological limitations, including the lack of a control group.

[Hidalgo, Casado, and García-Leiva \(2014\)](#) also compared the effectiveness of advertising messages that include only information on the negative environmental effects of CO₂ versus messages that combine two types of informative variables: specific behaviour guidelines and accumulated cost savings from applying these guidelines. Their results support the initial hypothesis that the group of participants that receives behavioural guidelines and information on economic savings would have higher scores on self-efficacy, pro-environmental attitudes, and behavioural intention. However, due to limitations in the experimental design it was not possible to analyse each type of information separately. These and other methodological limitations make it difficult to identify which types of messages are most effective in promoting changes in

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