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Sufficiency before efficiency: Consumers' profiling and barriers/facilitators of energy efficient behaviours

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ABSTRACT

Even if consumers have positive attitudes towards the environment and household energy conservation measures, and are seemingly motivated to implement them, there are factors that function as barriers to such behaviours. The literature is still insufficient in exploring variables with such negative influence and in identifying ways of shielding consumers against it. A first step towards the latter can be achieved through energy consumers' psychosocial profiles identification, i.e. configurations of consumer characteristics based on a set of psychosocial factors. To contribute in this regard, a nationwide survey of Portuguese householders aimed to identify: 1) psychosocial factors that may function as barriers or facilitators to energy conservation measures implementation; and 2) psychosocial consumer profiles defined based on facilitators, i.e. factors with a positive/facilitative influence over such implementation. Despite highly positive environmental and energy conservation attitudes, householders reported that what they did was "sufficient". This perceived "sufficiency" functioned as a justification for not "doing more" which, in addition to consumption estimation biases, seemingly constituted energy conservation barriers. Additionally, a *k*-means Cluster Analysis identified specific configurations of psychosocial factors – consumer profiles – that may function as energy conservation facilitators. Applying procedures as exemplified in this study may therefore enable tailoring behaviour change interventions to the different identified energy consumer's profiles, in order to promote energy efficient household behaviours.

1. Introduction

Why save energy? When such question is asked, people appear to have no difficulties in providing reasons why one should save or implement energy efficient behaviours at home. Nevertheless, research shows that there is a gap between people's explicit positive intentions towards energy saving behaviours and their actual behaviours (Kollmuss and Agyeman, 2002). Even if consumers are motivated to act, there are factors that impede such behaviours (see e.g. Ajzen, 1991; Bamberg and Moser, 2007). This applies for both, the individual and contextual level (Corraliza and Berenguer, 2000; Scheuthle et al., 2005). Hence to promote energy efficient behaviours it is important to clearly identify factors that may influence behaviours, and how they work as facilitators or barriers[1] (Gaspar, 2013; Gaspar et al., 2010) towards the adoption of more energy efficient behaviours. These energy efficient behaviours refer both to infrequent behaviours, such as the purchase of energy efficient appliances, energy saving devices and others, and frequent behaviours associated with a direct and indirect daily energy use such as lighting, heating and insulation, or cooking (Antunes et al., 2014).

Factors that may influence household energy behaviours might be either positive or negative. Factors with a positive influence – facilitators – can increase the probability that energy efficient

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[1] Factors that may have a negative influence over behaviours may be considered constraints or barriers depending on magnitude of the influence they exert on behaviours (see Gaspar, 2013). However, for the sake of simplicity, in this article we only refer to factors with a negative influence as barriers, without a distinction in terms of their magnitude.

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behaviours are implemented and have been widely studied (Bamberg and Moser, 2007; Corral-Verdugo, 2002; Frederiks et al., 2015a; Gardner and Stern, 2002; Stern, 2000; Stern and Oskamp, 1987; Suárez, 1998). Factors that have a negative influence over behaviours – barriers - can decrease the probability that energy efficient behaviours take place. These have been less studied in the past, although the last decade has seen an increase in findings in this field (Kollmuss and Agyeman, 2002; Gaspar, 2013; Gifford, 2011; Iglesias et al., 2015; Tanner, 1999).

Among the facilitators that the literature identifies, pro-ecological behavioural intentions (see Ajzen, 1991 for the role of intentions in behavioural change), pro-ecological behavioural goals (Lindenberg and Steg, 2007) or (positive) habits (Aarts and Dijksterhuis, 2000; Aarts et al., 1998; Klöckner and Matties, 2009; Klockner et al., 2003) are examples. In addition to these, socio-demographic factors have also been identified as facilitators of household energy behaviours, such as age, gender, place of residence and others (see Abrahamse and Steg, 2009), although these can also function as constraints (see Tanner, 1999). Motivational factors have also been mainly identified for their positive influence on behaviour (Gatersleben, 2007; Steg, 2005; Steg and Vlek, 2009), as for example: environmental concern (Poortinga et al., 2004), social norms (Schultz et al., 2007), personal responsibility, values and moral norms (Stern et al., 1999), or in association with affect and emotions (Grob, 1995). Motivational factors may also have a negative influence by constraining behaviours, for example as a result of: anti-ecological beliefs (Gifford, 2011), ambivalent attitudes (Costarelli and Colloca, 2004), implicit anti-ecological attitudes (Vantomme et al., 2005), or anti-ecological subjective norms (Schultz et al., 1995, 2007). Similarly contextual factors can have an implicit negative influence on ecological behaviour (Kaiser and Keller, 2001; Scheuthle et al., 2005), along with explicit perceived constraints (Gaspar, 2013; Tanner, 1999); while others can function either as a negative or a positive influence, such as the effect of physical infrastructures and technical facilities (Schultz et al., 1995), or the availability of products and product characteristics (Gaspar and Antunes, 2011), among others.

Further known factors with a negative influence, consist of anti-ecological goals (see Gaspar, 2013), anti-social behavior (Corral-Verdugo et al., 2003; Corral-Verdugo and Frías-Armenta, 2006) and anti-ecological habits (e.g. Gaspar et al., 2011; Kollmuss and Agyeman, 2002). In addition, cognitive constraints may also influence ecological behaviour, as in the case of effects resulting from limited cognition (see Gifford, 2011), including for example biased beliefs (Biel and Gärling, 1995; Hatfield and Job, 2001) and consumption estimation bias (Waechter et al., 2015).

While all of these studies show that behaviour is multi-determined, the understanding of how different factors with influence over behaviour relate to each other is still not fully understood. Consumer profiling, i.e. the identification of groups of individual consumers who share a set of stable similarities (a profile) identified thorough measurable variables (see Gaspar and Antunes, 2011) may allow for a better understanding of these relations. Despite the existence of some literature on energy consumers profiling (e.g. Gaspar and Antunes, 2011; Guerra Santin, 2011; Rosson and Sweitzer, 1981; Sutterlin et al., 2011), this is still insufficient to examine the role that different configurations of consumers' characteristics have on energy consumption. Within these, the role of psychosocial factors – measurable variables through individual items or scales (aggregation of items) – in the construction of such consumer profiles, is less frequently found (more commonly found are socio-demographic profiles). Examples of such psychosocial factors include for example general environmental attitudes and specific attitudes towards energy conservation measures, degree of perceived responsibility in the implementation of such measures at the household, knowledge of energy conservation measures and others. These factors can either function as facilitators or barriers towards energy efficient behaviours. An example is personal responsibility (Stern et al., 1999): if people attribute responsibility of implementing energy efficient actions to themselves (internally), this attribution functions as a facilitator; if people (externally) attribute this responsibility to other people or entities such as the government or industry, this attribution functions as a barrier, as they do not perceive to have the responsibility to act.

Within this scope, the study presented here attempted to identify: 1) psychosocial factors that may function either as barriers or facilitators to the implementation of energy conservation measures aimed at increasing energy efficiency; and 2) psychosocial consumer profiles representing configurations of consumer characteristics defined based on facilitative factors. This may provide a first step for subsequent studies aimed at identifying differences in measured energy consumption between the different energy consumers' profiles. This may allow better tailoring behaviour change interventions to the different identified energy consumer's profiles, in order to promote energy efficient household behaviours.

2. Study goals

Energy use underpins most aspects of modern life but might come at the cost of undesired environmental problems. This is seen to be particularly prevalent for developed countries, (UN, 1987; IPCC, 2007; Stern, 1997) and it will become increasingly difficult to meet the energy expectations within a fast growing human population that has increased from 1.6 billion in 1900 to 7 billion in 2011 (WWF, 2012). The amount of energy consumed by individuals within their homes accounts for a significant share of total energy consumption and CO_2 emissions, (BPIE, 2011; Deutsch, 2010; Gardner and Stern, 2002), are largely a result from currently existing lifestyles with regards to comfort, convenience and well-being, that are all understood as being normal and thus need to be satisfied, (Lehman and Geller, 2004; Shove, 2003; 2009; WWF, 2012). Adopting more energy efficient behaviours at home and changing existing behaviours might therefore be a challenge. This is because the motivation to adopt energy efficient behaviours, although facilitated by the presence of certain personal and situational factors, can also be inhibited by others namely the perception that it would decrease quality of life (see e.g. Gaspar, 2013; Gifford, 2011).

Hence, the study presented in this paper explores psychosocial factors that may have a positive –facilitators – or negative – barriers – influence over household energy behaviours and associated consumer profiles based on those psychosocial factors. Two study goals were set in this regard: 1) identify and explore the prevalence of these factors - facilitators and barriers; 2) identify psychosocial consumer profiles defined based on facilitative factors (attitudes, personal responsibility, knowledge). This enables determining which “configuration” of variables may be more detrimental or facilitative of energy conservation measures implementation, to achieve energy efficient behaviours.

Given this, the study aimed to contribute to identify potential requirements for policy making and intervention strategies to support behaviour change. These should take into account not only factors with a positive influence over behaviours but also factors that may constrain consumers from implementing energy efficient behaviours (Antunes et al., 2014). Moreover, by identifying profiles, interventions can be tailored to the different groups of individuals that fit each profile (i.e. that have characteristics similar to the profile). Such identification also allows macro/nationwide interventions, as they do not demand a focus on specific socio-