



Housing-related lifestyle and energy saving: A multi-level approach



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ARTICLE INFO

Keywords:

Housing-related lifestyle
Energy saving
Consumer innovativeness
Multi-level latent class analysis

ABSTRACT

A new instrument for measuring housing-related lifestyle (HRL) is introduced and employed for identifying national and cross-national HRL segments in 10 European countries ($N=3190$). The identified HRL segments are profiled and the practical importance of HRL for everyday energy-saving efforts in the home and for the energy-consumer's openness to new energy saving opportunities (i.e., energy saving innovativeness) is investigated. The HRL instrument's 71 items load on 16 dimensions within five lifestyle elements. Multi-group confirmatory factor analysis reveals that the instrument possesses metric but not scalar (measurement) invariance across the 10 countries. Multilevel latent class analysis is used to classify participants to HRL segments and the 10 countries into regions with similar segment structure. The optimal solution has seven HRL segments and three country classes, which are profiled in terms of relevant background characteristics. A multivariate GLM analysis reveals that when differences in housing-related lifestyles are controlled, neither country of residence nor the interaction between lifestyle and country of residence influence energy saving innovativeness or everyday energy-saving efforts. However, these two behavioural tendencies vary significantly and substantially between lifestyle segments. The study shows that HRL segmentation is a useful tool for creating more targeted and effective energy-saving campaigns.

1. Introduction

Housing is considered a key lifestyle domain, for several reasons. Several basic human needs are satisfied by housing, from shelter and security to social relations and recognition.¹ Housing costs are also the largest single expenditure for most European households, accounting for 23% of disposable incomes, on average, in the 28 EU countries (in 2014).² Obviously, this share varies substantially between households, however. For example, it has been estimated that the cost per person of maintaining the same standard of living is around 40% lower in a two-person household than in a one-person household (He et al., 2010). More than half of the population in each of the EU countries live in owner-occupied dwellings, varying from 52% in Germany to 96% in Romania (in 2014),³ and the share is increasing, which may also partly be a lifestyle choice (Andrews et al., 2011). Further, European homes are increasingly stocked with a broader range of domestic appliances, including TV sets, dishwashers, consumer electronics, information and communication equipment, and a rising demand for air conditioning and cooling technologies, in some countries (European Environment Agency, 2014). According to some observers, this development reflects that the home increasingly is a core identity project for many people

(Quitza and Røpke, 2008).

At the same time, housing is one of the three consumption domains that are responsible for the largest share of negative environmental impacts (the other two being food and transport, cf., e.g., Steen-Olsen and Hertwich, 2015; Tukker, 2015). In Europe, energy consumption in residential buildings – for space heating, water heating and use of electric appliances – accounts for about 27% of total final energy consumption (Eurostat, 2015) and approximately the same share of greenhouse gas (GHG) emissions (European Environment Agency, 2012). Further, Bin and Dowlatabadi (2005) calculated that only about one third of the energy use and CO₂ emissions related to private consumption is directly used in connection with consumer acquisition, use and disposal of products and services. About two thirds is indirect, occurring in connection with exploration, production and delivery.

The aforementioned trends in housing-related lifestyles obviously have implications for household energy consumption and environmental impacts, both directly (e.g., heating, cooking, electricity consuming for lightening and appliances, personal hygiene) and indirectly (e.g., the energy and other resources embodied in material objects). For example, due to the growth in domestic appliances, demand for electricity for appliances and lighting increased from 16% of household

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¹ <http://www.ohchr.org/en/issues/housing/pages/housingindex.aspx>.

² <http://appsso.eurostat.ec.europa.eu/nui/show.do>.

³ http://ec.europa.eu/eurostat/statistics-explained/index.php/Housing_statistics.

energy consumption in 2000 to 19% in 2012 (Gynther et al., 2015). Despite this, the overall household energy consumption per dwelling in Europe actually decreased in this period, at an average rate of 1.5% per year. However, this decrease was eaten up by an increase in the number of dwellings, not least due to a growing number of one-person households (Gynther et al., 2015).

However, whereas the link between energy consumption and households' socio-demographic characteristics (Abrahamse and Steg, 2009; Frederiks et al., 2015) and profiles (McKenna et al., 2016) has been extensively researched, the evidence regarding a relationship between lifestyle and energy consumption in the home is mostly inferential. This is partly due to a scarcity of published studies including lifestyle as explanation for energy consumption (or saving) in the home, partly that these studies often do not actually measure people's lifestyles, but instead used available secondary data (Bin and Dowlatabadi, 2005; Wei et al., 2007), socio-demographic characteristics (Sanquist et al., 2012) or attitude items (Chen, 2014) as indicators of lifestyle. There is a lack of research clearly defining lifestyle with regard to housing and a lack of systematic research on how energy consumption and efforts to save energy in the home are related to residents' lifestyle. This is the research gap targeted by the present paper.

A precise conceptualization of housing-related lifestyle (HRL) is proposed and a new instrument for measuring HRL is presented and employed for identifying national and cross-national HRL segments in 10 European countries, using multi-level latent class analysis. The practical importance of a person's housing-related lifestyle is then explored by investigating the impacts of housing-related lifestyles on everyday energy-saving efforts in the home and on the energy-consumer's openness to new energy saving opportunities (i.e., energy saving innovativeness). Finally, it is discussed how segmentation of private households in terms of housing-related lifestyle can benefit campaigners wanting to target the housing and living markets, including campaigners in the fields of energy-saving and home-improvement.

2. Research background and theoretical framework

2.1. Lifestyle research

In everyday language, the lifestyle concept is mostly associated with lifestyle media and consumption that can be used to define or express one's identity (e.g., home, furniture, but also clothing, means of transportation, music). Qualitative research has documented that the lifestyle concept is part of everyday language in modern society and that affluent consumers speak comfortably about more or less sustainable lifestyles (Evans and Abrahamse, 2009; Lorenzen, 2012).

Lifestyle research is not limited to a specific discipline (Jansen, 2011), but has especially evolved within sociology and marketing. In marketing, the lifestyle concept was first introduced by Lazer (1963), who defined lifestyle as a systems concept that refers to a distinctive mode of living in its broadest sense, embodying "the patterns that develop and emerge from the dynamics of living in a society." Lifestyle research in marketing is primarily used for market segmentation (Plummer, 1974; Vyncke, 2002). With the development of the affluent consumer society, demographic characteristics became less and less predictive of consumer behaviour and "psychographic" (Demby, 1974) or lifestyle segmentation was proposed as a more effective way to divide consumers into relatively homogeneous groups. These are survey-based approaches, where lifestyle groups or segments are identified by first using a data reduction technique, such as factor analysis, multi-dimensional scaling or correspondence analysis, and then a cluster analysis based on the dimensions found in the data.

The lifestyle concept also has a long history in sociology (see Lorenzen, 2012, for a recent review). Weber (2002/1921) used the term *Stilisierung des Lebens* and argued that social groups differ in terms of lifestyle. Bourdieu (1984) views lifestyle as the "practical

metaphor" of the *habitus*. Similarly, Giddens (1991) defines lifestyles as routines that include the presentation of self, consumption, interaction, and setting. By definition, then, lifestyles are shared routines, which is also a key concept in current transition research (Schot et al., 2016). According to contemporary sociology, lifestyles are made up of relatively consistent and coherent bundles of social practices (Spaargaren and Vliet, 2000). They are constrained by context (e.g., financial limitations, health, and family commitments), but not determined by it. An important function of lifestyles is that they "assist in organizing self-identity and self-expression" (Lorenzen, 2012). According to Lorenzen (2012), lifestyles "incorporate materials, practices, and themes connected by a life narrative that pulls these together with a coherent result." Hence, lifestyle change not only requires the changing of practices, but also the story people tell about those practices, "their narrative of self-identity." In contemporary sociology, lifestyle research can both be based on qualitative methods (e.g., Evans and Abrahamse, 2009; Lorenzen, 2012) and on quantitative methods, including factor and cluster analysis of survey data (e.g., Axsen et al., 2012; Sanquist et al., 2012).

In both sociology and marketing, it is increasingly acknowledged that people do not necessarily have just one, but may have several interconnected lifestyles. Marketing researchers have suggested the existence of domain-specific lifestyles (van Raaij and Verhallen, 1994), of which especially food-related lifestyles have been intensively researched (Grunert, 1993; Thøgersen, 2017). However, there are also studies of lifestyles in other domains, including energy-related lifestyles (Bin and Dowlatabadi, 2005; Sanquist et al., 2012), transport-related lifestyles (Lee and Sparks, 2007; Thøgersen, 2016), and web-usage-related lifestyle (Bregman et al., 2005). Also, the theorizing about domain-specific lifestyles is not linked to a specific domain, but suggests that meaningful lifestyles can be identified in most important life domains, including, for example, housing. The basic proposition behind domain-specific lifestyles is that a person's lifestyle needs not be consistent across domains and therefore descriptions of lifestyles should be restricted to specific life domains (van Raaij and Verhallen, 1994).

2.2. Operationalizing domain-specific lifestyles

The most extensively and systematically studied domain-specific lifestyle is food-related lifestyle (FRL), which has primarily been studied by marketing scholars and by means of a survey-based approach. A FRL model was originally proposed by Grunert (1993) and further developed and applied in a wide range of studies covering countries all over the world (e.g., Grunert et al., 2001; Grunert et al., 2011; Nie and Zepeda, 2011; Thøgersen, 2017).

Grunert (1993) characterizes his approach to lifestyle research as a deductive, cognitive approach. A lifestyle is conceived as a mental construct, which is different from, but explains behaviour. Specifically, he defines a lifestyle as "the system of cognitive categories, scripts, and their associations, which relate a set of products to a set of values" (Grunert et al., 1993). This cognitive lifestyle theory can be viewed as a useful micro-foundation for contemporary sociological conceptions of lifestyle. Actually, the practical operationalization of a domain-specific lifestyle proposed by Grunert and his colleagues fits these sociological conceptions quite well.

In sociological terms, Grunert's (1993) FRL model includes two types of meaning-producing narratives related to food: purchase motives and food quality aspects, as well as three broad social practices related to food provision: ways of shopping, cooking methods and consumption situations. In the cognitive psychology terminology by Grunert and associates, "narratives" and "social practices" are referred to as "cognitive categories, scripts, and their associations." In any case, the mentioned five elements are assumed to capture the key characteristics of an individual's food-related lifestyle.

Inspired by psychological means-end chain theory (Gutman, 1982),

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