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Energy and Resource-Saving Behaviours in European Union Countries: the Campbell'S Paradigm and Goal Framing Theory Approaches

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Energy and resource-saving behaviours in European Union countries: The Campbell paradigm and goal framing theory approaches

Abstract: The promotion of energy and resource-saving behaviour is one of the primary tools to enhance the reduction of resource consumption and seeking energy and resource efficiency. The aim of this study is, referring to the Campbell paradigm and goal framing theory, to analyse the main determinants of different types of energy and resource-saving behaviours in the European Union (EU) countries. In this study we revealed whether environmental and health concerns and environmental responsibility equally influenced pro-environmental behaviours and whether all types of behaviours related to energy and resource-saving were guided by the same goals. The results showed that the performance of energy and resource-saving behaviours varied across European countries, and in separate EU countries, people were more willing to perform different types of behaviour. Furthermore, respondents who were more concerned about environmental issues and health and were more environmentally responsible tended to perform a variety of actions related to energy and resource-saving. Considering separate behaviours related to energy and resource-saving, environmental responsibility significantly and positively influenced all behaviours. Environmental concern significantly and positively determined all types of behaviours except water-saving behaviour. Health concerns significantly and positively influenced only the avoidance of buying over-packaged products. Analysing the relationships among separate behaviours, we revealed that behaviours related to energy and resource-saving were guided by different goals and the cost of these behaviours are different. Thus, policymakers should consider these goals to promote energy and resource-saving behaviour in the household sector.

Keywords: energy and resource-saving; energy efficiency; environmental concern; responsibility; Campbell paradigm; goal framing theory.

1. Introduction

The consumption of natural resources increases very quickly because of the growth of the global economy and global population. The International Energy Agency estimates that by 2050, global energy consumption could increase by 34% and demand for water by 55% (OECD, 2012). Meeting this anticipated future demand for resources on the global level and in Europe, the reduction of resources growth, or alternatively, the dramatical improvement in resource efficiency, is required. It is necessary to achieve more efficient use of resources throughout their life cycle, starting with extraction, transport, consumption, and recycling, ending with waste disposal, implementing principles of the circular economy (Domenech and Walkowiak, 2019; Velenturf et al., 2019; Lonca et al., 2018).

In the EU, the most attention is paid for energy efficiency policy. Energy efficiency is an essential part of the Europe 2020 strategy (EU, 2012). Furthermore, this achievement remains on target to meet 2030 targets as well (COM, 2014). The more efficient usage of energy efficiency is required seeking the transition to a low-carbon economy, which would also help to protect against climate change. This transition can be accomplished by further improvements in existing technologies, such as renewable energy sources and electric vehicles, and investing in low-carbon infrastructures. The natural resource of efficiency plays a particular role in European policy as well (Tukkerab and Ekinsc, 2019). The European Commission (EC, 2011) put forward main rules intended to minimize the dependence of economic growth on resource use. To achieve positive changes in environmental impact and seeking resource efficiency and the reduction of resource consumption, it is necessary to consider not only to the industry and manufacturing but to the household sector as well.

The household sector is one of the largest energy-consuming sectors in the EU. Tzeiranaki et al. (2019) revealed that in 2016, household energy consumption amounted to 25.71% of the EU's final energy

consumption. Furthermore, according to the Eurostat database the final energy consumption per capita in household sector from 2014 to 2017 increased by 7.23 %. Therefore, considering the household sector, energy consumption in the EU has attracted a great deal of attention, particularly concerning energy efficiency (Borozan, 2018). The studies of water and resource consumption in the household sector are scarcer. Researchers are more focused on water and material footprints related to consumption level (Blas et al., 2018; 2019, Ottelin et al., 2018; Pothen and Reaños, 2018; Beylot et al., 2019).

Achieving energy and resource efficiency in the household sector, focusing solely on technological innovation often fails to deliver the expected results. The changes in personal lifestyle, in particular by reducing the daily use of resources and energy at home and increasing their using efficiency, are particularly important. A large number of studies assessed the relative contributions of consumer behaviour to environmental sustainability and GHG emissions (Labouze et al., 2003; Nijdam and Wilting, 2003; Tukker et al., 2006; Hallström et al., 2915; Brizga et al., 2017; Djekic et al., 2019 and etc.). Furthermore, in recent years, there has been an increasing focus on analysing people's behaviour and the determinants directly related to energy (Urban and Ščasný, 2012; Li and Just, 2018; Trotta, 2018; Paço and Lavrador 2017; Lopes et al., 2019; Wang eta al., 2018) and water (Dean et al., 2016; Han and Hyun, 2018a, b; Gabarda-Mallorquí et al., 2018; Kneebone et al., 2018) consumption, saving and efficiency. Meanwhile, regarding natural resources, direct resource-saving behaviour was analysed rather scarcely (Elgin, 2013; McGouran and Prothero, 2016). However, people can contribute to resource-saving indirectly through environmentally friendly transport usage, green purchasing, and waste reduction behaviours.

Taking transport usage into account, individuals can reduce resource consumption by using cars that are more fuel efficient or by making use of the car in a more efficient way (e.g., applying a more fuel

efficient driving style, carpooling, sharing cars, using more sustainable modes), shifting travel modes (e.g., walking, cycling, using public transport) and reducing travel distance (e.g., working at home, living near the job, fewer holidays to far-away countries, combining various trips) (Holz-Rau and Scheiner, 2019). Green purchasing behaviour is also essential regarding resource-saving, whereas green marketing activities contribute to the reduction of waste in packaging and usage of materials that are less natural (Jayaram and Avittathur, 2015; Majumdar and Swain, 2015; Zhao and Zhong, 2015; Biswas and Roy, 2015). Waste reduction behaviour is related to resource-saving and circular economy implementation (Pandey et al., 2018; Stoeva and Alriksson, 2017; Pietzsch et al., 2017). Thus, in this paper, we analysed European citizens' energy and resource-saving behaviour and main determinants encompassing directly, energy and water saving, and indirectly, environmentally friendly transport usage, green purchasing, and waste reduction behaviour in individuals' daily lives. To the best of our knowledge, no researcher has analysed all these activities in one paper. Therefore, the aim of this study is, referring to the Campbell paradigm and goal framing theory, to analyse the environmental concern, health concern and environmental responsibility impact on different types of energy and resource-saving behaviours in EU countries. In this study we revealed whether these factors equally influenced pro-environmental behaviours and whether all types of behaviours related to energy and resource-saving were guided by the same goals.

2. Literature review

2.1. Energy and resource saving behaviour, Campbell paradigm approach

Analysing more than one type of pro-environmental behaviour, authors revealed that different types of behaviour have different causal factors (Stern 2000; Landry et al., 2018; Gatersleben 2018; Liobikienė and Poškus, 2019; Liobikienė et al., 2019). Considering environmental attitudes as an environmental

concern, researchers found different results. Environmental concern is defined as degree to which individuals are concerned about dangers to earth (Kilbourne and Pickett, 2008). Therefore, some authors agreed (e.g., Urban and Ščasný 2012; Lin and Huang, 2012; Zhao et al., 2014; Chen, 2015; Arisal and Ataral, 2016; Zibenberg et al., 2018) that environmental concern influenced pro-environmental behaviour, such as energy saving, green purchasing, and waste separation behaviour. Other authors (see Vringer et al., 2007) have shown that the relationship between environmental concern and resource-saving behaviour is weak. Whitmarsh and O'Neill (2010) found the impact of environmental concerns on energy curtailments to be insignificant. Kennedy et al. (2009) stated that a gap between the perception of environmental issues and pro-environmentally friendly behaviour often exists. Considering environmental responsibility, which reveals the assumption of responsibility for their behaviour, a number of authors also found that the growth of environmental responsibility significantly influenced people's engagement to perform pro-environmental behaviour (Klöckner, 2013; Wang et al., 2014; Zareie and Navimpour, 2016; Liobikienė and Juknys, 2016; Zhu et al., 2019). However, Sarkis (2017) showed that consumers do not necessarily need to be very environmentally responsible for acting in an environmentally friendly mode. The different findings of environmental concern and responsibility impact on pro-environmental behaviour properly describe Campbell's paradigm.

Campbell (1963) presented that the primary reasons for the attitude-behaviour gap are situational constrains, abilities, and difficulties to act in accordance with declared attitudes. In light of Campbell's paradigm, Byrka (2009) stated that attitudes must overcome the behavioural difficulty representing a situational threshold. Campbell's paradigm was finally conceptualized by Kaiser et al. (2010) which stated that the performance of a behaviour is a function of behaviour difficulty or cost and peoples'

attitudes. In recent decades, Campbell's paradigm was analysed rather extensively (Byrka and Kaiser, 2013; Urban 2016; Kaiser et al., 2018; Brügger et al., 2019). This paradigm was applied to analyse pro-environmental behaviour (Ogunbode et al., 2018), sustainable travel behaviour (Taube et al., 2018), dietary intake patterns (Asvatourian et al., 2018), sustainable food consumption (Yamoah and Acquaye, 2019) and personalised energy advice (Starke et al., 2020). However, to the best of our knowledge, this theory was not applied to analyse behaviour related to energy and resource-saving. Campbell's paradigm could provide new insights and a useful framework for policymakers to induce the promotion of energy and resource-saving.

2.2. Energy and resource saving behaviour, goal framing theory approach

According to goal framing theory, people are guided by values, or goals which motivate them to behave in one's live encompassing and pro-environmental behaviour (Brunso et al., 2004; Linderberg and Steg, 2013; Steg et al., 2014; van der Werff et al., 2013; Liobikiene and Juknys, 2016) and it depends on situation cues. According to Steg et al (2014) and Linderberg and Steg (2013) there are three types of goals as: hedonistic, gain and normative goals, that govern pro-environmental behaviour. Hedonic goals make people to focus on feeling the pleasure avoid any effort and the enhancement of status is very important factor. Liobikiene et al (2020) in recent research has found that people who are guided by hedonistic goals are more linked to purchase green products due to the enchangement of their status. Furthermore, individuals with hedonistic goals can behave pro-environmentally friendly because this behaviour is pleasurable and enjoyable. Gain goals motivate people to behave in more environmentally friendly mode due to material benefit of reduction of behaviour cost. Liobikiene et al (2020) showed that materialist perform conservation behaviour due to the gain goal - to save their money. Therefore, people particularly in low income countries usually cut down electricity and water

consumption only to the money saving reason. Normative goals are related to altruistic values and for them is very important other people and what people think they should do (Steg et al., 2014). Individuals are motivated to behave in environmentally-friendly mode because they think that for other people and generations it is important to save environment and to protect it. In order to promote pro-environmental behaviour Steg et al (2014) highlighted the reinforcement of normative goal. However other goals as hedonistic and gain goals also can contribute to promotion of pro-environmental behaviour (Liobikiene et al., 2020).

Authors applying goal framing theory usually consider values which contributes to the guiding principles, which determine attitudes and behaviour. In this study we explored whether, for example, individuals who reduce household water consumption also avoid waste, and engage in other energy and resource-saving activities. Therefore, this analysis presents whether all types of behaviours related to energy and resource-saving are guided by the same goals. Energy and resource-saving behaviours could prompt by normative or gain goals. If environmental concern, which is could attributed to normative goals, did not influenced energy and resource -saving behaviours, it could be expected that gain goals are important for promotion these behaviours.

3. Methods and data

The analysis of energy and resource-saving behaviours in the EU in this study has been conducted based on the survey "Attitudes of European citizens towards the environment", which was conducted by Eurobarometer between 23 September and 2 October 2017 (EC, 2017). Generally, 27881 respondents in all EU countries from different social and demographic groups were interviewed face-to-face. The detailed interview methods and confidence intervals are presented in a report by the

European Commission (EC, 2017). The surveys in all countries were representative. The study encompasses all EU countries: Austria (AT) (N=1026), Belgium (BE) (N=1000), Bulgaria (BG) (N=1039), Cyprus (CY) (N=501), Czech Republic (CZ) (N=1007), Denmark (DK) (N=1002), Estonia (EE) (N=1007), Spain (ES) (N=1009), Finland (FL) (N=1010), France (FR) (N=1016), Germany (GE) (N=1535), Greece (GR) (N=1008), Croatia (HR) (N=1020), Hungary (HU) (N=1050), Ireland (IE) (N=1002), Italy (IT) (N=1027), Latvia (LV) (N=1002), Lithuania (LT) (N=1003), Malta (MT) (N=497), the Netherlands (NL) (N=1013), Poland (PL) (N=1009), Portugal (PT) (N=1062), Romania (RO) (N=1031), Slovakia (SK) (N=1084), Slovenia (SL) (N=1025), Sweden (SE) (N=1027), and United Kingdom (UK) (N=1386).

The energy and resource-saving behaviours were evaluated by answering the questions: "Have you cut down your water consumption/ used your car less/ and other actions in the past six months?" (Table 1). The items were measured using dichotomous values. Respondents were able to choose none, few, or all of the actions. In this paper, we analysed energy and resource-saving behaviours separately and according to the level of performing actions. Based on the number of different actions, each of the respondents was assigned to one of four groups: 1 = not saving resources at all, 4 = the most resource-saving respondents.

Table 1. The items of energy and resource-saving behaviour

Items	Number of choosing actions	Level of resource-saving behaviour
• chosen a more environmentally friendly way of travelling (e.g., walk, bicycle, public transport, electric car); • avoided buying over-packaged products; • avoided single-use plastic goods other than plastic bags (e.g., plastic cutlery, cups, plates) or bought reusable plastic products; • separated most of your waste for recycling; • reduce your water consumption; • reduce your energy consumption (e.g., by turning down air conditioning or heating, not leaving appliances on stand-by, buying energy-efficient appliances); • bought products marked with an environmental label; • bought local products; • used your car less by avoiding unnecessary trips, working from home (e.g., teleworking); • none	Many actions (7-9) Some actions (4-6) A few actions (1-3) None	4 3 2 1

In this paper, environmental and health concerns and environmental responsibility were analysed as determinants of energy and resource-saving behaviours. Environmental concern encompassed the worries about chemical and plastic impact on the environment. Meanwhile health concern revealed these worries on health. The environmental responsibility scale includes persuasion, which is addressed to reduce the environmental issues (Karimzadegan and Meiboudia,

2012). These constructs were measured using a four-point Likert scale ranging from (1) very important (or totally agree) to (4) not at all important (or totally disagree). The validity and reliability of scales were tested. The test of validity was conducted by applying Pearson Product Moment correlations. The items of the scales were valid, as indicated by the correlation between the items and the total score. The scale items' reliability statistics, by applying Cronbach's alpha, are presented in Table 2. The values of Cronbach's alpha (0,5-0,75) reveal a generally accepted, moderately reliable scale (Hinston et al., 2004).

Table 2. Mean score, Cronbach's alpha, and standard deviation of the environmental and health concerns and environmental responsibility.

Construct	**Items**	**Mean**	**SD**	**Cronbach's alpha**
Environmental concern	• I am worried about chemicals' impact on the environment;	1.60	0.718	0.779
	• I am worried about plastics' impact on the environment.	1.65	0.74	
		1.62	0.658	
Health concern	• I am worried about chemicals' impact on health	1.69	0.791	0.767
	• I am worried about plastics' impact on health	1.91	0.881	
		1.798	0.753	
Environmental responsibility	• Environmental protection importance for me	1.48	0.619	0.60
	• I agree that as an individual, I can play a role in protecting the environment	1.72	0.767	

• My lifestyle contributes to environmental issues	1.78	0.812
	1.67	0.562

The socio-demographic variables' impact on the level of resource-saving behaviour was analysed by applying analysis of variance. The *p*-value of $P<0.05$ was considered to be significant. A *t*-test was used to examine the statistical significance of differences of environmental and health concerns and environmental responsibility between respondents who take (some, few, and none) actions related to energy and resource-saving or not.

To reveal whether environmental and health concerns, environmental responsibility, separate pro-environmental behaviours, gender, or age contribute to separate energy and resource-saving behaviours in EU countries, a binary logistic regression was applied. This statistical method was chosen because the dependent variables (energy and resource-saving behaviour) were dichotomous. This statistical method also was applied by other authors (Ezebilo and Animasaun, 2011; Dhokhikah et al., 2015; Liobikienė and Minelgaitė, 2019). Using SPSS statistical software to evaluate the fit of the model, the Neglekre R2, overall percentage, and omnibus test's *p*-value were measured. The binary logistic regression model is statistically significant if the omnibus test's *p*-value is smaller than 0.05.

4. Results and discussion

The results of this study are composed of three parts. How different actions related to energy and resource-saving in different EU countries are performed in the first section of the results. In the second section of the results, the impact of socio-demographic variables, environmental and health concerns, and environmental responsibility on the level of resource-saving behaviour are presented. The last section of the results is assigned to present the primary determinants of separate energy and resource-

saving behaviours and reveal the existence of Campbell's paradigm and whether all types of energy and resource-saving behaviours are guided by the same goals.

4.1. Energy and resource-saving behaviours

The results of behaviour performance related to energy and resource-saving are presented in Table 3. As we can see, energy and resource-saving behaviours vary across European countries, and in separate EU countries, people are more willing to perform different types of behaviour. Generally, in the EU, the largest share of respondents mentioned that they separate their waste (66%). It reveals that this type of behaviour well accepted by citizens compared with other pro-environmental behaviours. Waste separation does not require any additional cost and can save expenditure on waste management. Moreover, in recent decades, people have become extensively informed about waste problems. Thus, individuals understand that it is one of the ways to reduce environmental impact due to consumption growth. In addition, the recycling infrastructure is rather developed in EU countries, and in recent years the trust of waste management system has grown (Liobikienė and Minelgaitė, 2019).

Furthermore, almost half of European respondents mentioned that they purchase local products (43%). It is essential for people to support local producers, and they trust them more. Implementing programmes such as "buy local products" also enhances the amount of these products to be purchased. Only a third of Europeans (35%) reduce their energy consumption and water consumption (27%). Thus, direct resource-saving behaviour is not very favoured in the EU. These results could be related to the fact that people do not understand the problem of increased energy and water use, and they believe that renewable energy sources will solve this problem.

Lower car usage (18%) and the purchase of ecolabel products (19%) in the EU were mentioned the least. Therefore, these types of behaviour cost the most. In terms of purchasing ecolabel products, their

material cost is higher compared to conventional products. Thus, people buying green products need to spend additional money. Furthermore, the supply of these products is low. Meanwhile, taking into account the lower car usage, decreasing the usage of a car is not convenient and requires additional efforts.

Table 3. The share of energy and resource-saving behaviours in EU

	Total N	Chosen a more environmentally friendly way of travelling (walk, bicycle, public transport, electric car)	Avoided buying over-packaged products	Avoided single-use plastic goods other than plastic bags (e.g. plastic cutlery, cups, plates, etc.) or bought reusable plastic products	Separated most of your waste for recycling	Cut down your water consumption	Cut down your energy consumption (e.g. by turning down air conditioning or heating, not leaving appliances on stand-by, buying energy efficient appliances)	Bought products marked with an environmental label	Bought local products	Used your car less by avoiding unnecessary trips, working from home (teleworking), etc.
EU 28	**27881**	**24%**	**24%**	**34%**	**65%**	**27%**	**35%**	**19%**	**43%**	**18%**
BE	1000	**34%**	**32%**	**36%**	**72%**	**38%**	**44%**	**20%**	42%	**25%**
BG	1036	17%	16%	24%	17%	15%	22%	4%	**48%**	11%
CZ	1007	**28%**	17%	24%	**67%**	**33%**	26%	13%	43%	14%
DK	1002	**33%**	19%	**38%**	**69%**	**31%**	**45%**	**52%**	41%	**22%**
DE	1535	21%	**37%**	**49%**	**70%**	20%	**36%**	**24%**	**56%**	**22%**
EE	1007	**31%**	**25%**	34%	51%	13%	28%	19%	**56%**	15%
IE	1002	24%	**31%**	30%	65%	**32%**	33%	**21%**	**44%**	**20%**
EL	1008	19%	15%	24%	57%	**31%**	31%	7%	**55%**	15%
ES	1009	23%	15%	26%	61%	**37%**	33%	8%	33%	13%
FR	1016	**26%**	**30%**	**35%**	**81%**	**37%**	**44%**	**27%**	**52%**	**21%**
HR	1020	18%	15%	17%	44%	20%	15%	12%	30%	10%
IT	1027	16%	18%	27%	57%	27%	28%	11%	32%	13%
CY	501	10%	13%	22%	58%	**34%**	35%	12%	**53%**	9%
LV	1002	**41%**	18%	26%	45%	18%	**38%**	19%	**63%**	11%
LT	1003	18%	20%	29%	**67%**	12%	20%	19%	**44%**	9%
LU	504	**29%**	**37%**	**43%**	**79%**	**37%**	**41%**	**36%**	**50%**	**20%**
HU	1050	**28%**	24%	32%	54%	**29%**	29%	11%	36%	10%
MT	497	**25%**	24%	**36%**	**72%**	**35%**	**39%**	19%	**56%**	17%
NL	1013	**50%**	21%	**54%**	**82%**	26%	**52%**	**31%**	31%	**32%**
AT	1026	24%	**39%**	**43%**	49%	24%	32%	**28%**	**64%**	**21%**
PL	1009	21%	12%	24%	55%	27%	24%	13%	23%	10%
PT	1062	8%	11%	24%	63%	**32%**	21%	4%	29%	4%

* bold numbers show countries above the EU average

** blocked cell indicated which countries use the most of each action

The activities directly related to resource-saving such as reducing water consumption occurred most in Belgium (38%), Luxembourg, Spain and France (37%), reducing energy consumption occurred most in the Netherlands (52%), Sweden (49%), and Denmark (45%). Other actions indirectly related to energy and resource-saving are as follows: avoiding buying over-packaged products occurred most in Austria (39%), Germany, and Luxembourg (37%); avoiding of single-using plastic goods other than plastic bags (e.g., plastic cutlery, cups, plates) or buying reusable plastic products as it was most in Sweden (61%), the Netherlands (54%), Germany (49%); buying products marked with an environmental label occurred most in the Scandinavian countries Sweden (71%), Denmark (52%), and Finland (38%). The choosing of more environmentally friendly way of travelling and using the car less occurred most in the Scandinavian countries as well: Sweden (55%) and (26%), Netherlands (50%) and (32%), and Finland (42%), and (26%). These results reveal that the level of the difficulties of pro-environmental behaviours can differ in the countries due to the various conditions, for example, the level of public transport or bicycle ways, waste management development, or the supply level of ecolabel products. Furthermore, energy and resource-saving behaviours also depend on environmental awareness. Liobikienė and Juknys (2016) found that saving behaviour is related to normative goals. People who are guided by hedonistic goals do not practice saving behaviour because it is inconvenient or unpleasant.

Table 4. The level of resource-saving behaviour in the EU

		Level of energy and resources saving			
Country	**Total N**	**4 LEVEL -**	**3 LEVEL -**	**2 LEVEL - a**	**1 LEVEL-**

		many actions (7-9)	some actions (4-6)	few actions (1-3)	none
EU 28	**27881**	**1752** **6%**	**7065** **25%**	**16447** **59%**	**2246** **8%**
BE	**1000**	83 8%	295 30%	613 61%	8 1%
BG	**1036**	8 1%	118 11%	658 63%	**217** **21%**
CZ	**1007**	52 5%	228 23%	645 64%	73 7%
DK	**1002**	99 10%	335 33%	509 51%	49 5%
DE	**1535**	128 8%	**538** **35%**	753 49%	94 6%
EE	**1007**	47 5%	244 24%	586 58%	115 11%
IE	**1002**	80 8%	229 23%	625 62%	63 6%
EL	**1008**	28 3%	242 24%	623 62%	115 11%
ES	**1009**	42 4%	192 19%	659 65%	113 11%
FR	**1016**	109 11%	333 33%	526 52%	42 4%
HR	**1020**	6 1%	117 11%	**713** **70%**	**177** **17%**
IT	**1027**	11	192	698	108

		1%	19%	68%	11%
CY	**501**	11	115	307	67
		2%	23%	61%	13%
LV	**1002**	35	255	637	69
		4%	25%	64%	7%
LT	**1003**	20	187	**715**	76
		2%	19%	**71%**	8%
LU	**504**	**81**	145	253	19
		16%	29%	50%	4%
HU	**1050**	40	203	712	91
		4%	19%	68%	9%
NL	**1013**	107	**390**	489	25
		11%	**38%**	48%	2%
AT	**1026**	62	338	570	50
		6%	33%	56%	5%
PL	**1009**	22	136	**710**	104
		2%	13%	**70%**	10%
PT	**1062**	13	147	**740**	156
		1%	14%	**70%**	15%
RO	**1031**	17	141	672	**180**
		2%	14%	65%	**17%**
SI	**1025**	76	327	583	39
		7%	32%	57%	4%
SK	**1084**	29	194	741	74
		3%	18%	68%	7%
FI	**1010**	**129**	**354**	469	48
		13%	**35%**	46%	5%

SE	**1027**	**237**	**498**	274	18
		23%	**49%**	27%	2%
UK	**1368**	117	331	806	91
		9%	24%	59%	7%

Considering the level of resource-saving behaviour in Table 4, we see that most Europeans (59%) are in level 3 which indicated using from 1 to 3 different actions related to energy and resource-saving (the highest levels were in Lithuania [71%], Poland, Portugal, and Croatia [70%]). In level 4, which indicated using the most different actions related to energy and resource-saving (from 7 to 9) were only 6% of all EU respondents (the highest levels were in Sweden [23%]) (almost 4 time more compared to the EU average), Luxembourg (16%) and Finland (13%). Thus, these results reveal that EU countries also vary according to the level of resource-saving behaviour. Statistically significant differences were found in all countries and in the level of energy and resource-saving groups ($p< 0,05$).

Furthermore, 8% of EU respondents noted that they do not perform any energy or resource-saving behaviours. In the newest EU members and less-developed countries as: Bulgaria, Romania and Croatia, the largest share of respondents noted that they did not perform any of the behaviours mentioned. In Belgium, Sweden, and the Netherlands the fewest respondents stated that they do not perform no actions related to energy and resource-saving (Table 4). Therefore, these results show that environmental awareness could be the most crucial factor promoting energy and resource-saving behaviours.

4.2. The determinants of the level of resource-saving behaviour

Analysing the influence of socio-demographic factors on the level of resource-saving behaviour in all EU countries, statistically significant differences were found in all of the groups (Table 5). Our results

reveal that considering differences within groups, a higher level of resource-saving behaviour was between gender. Women are more likely to perform more types of energy, and resource-saving behaviours than men are. Other authors analysing the different pro-environmental behaviours also revealed that women exhibit more pro-environmental behaviour than men do (Meyer, 2016; Casaló and Escario 2018; Vicente-Molina et al., 2018; Pícha and Navrátil 2019). Older people also are more likely to perform more actions related to resource-saving. In terms of household composition, more actions were noted when there were two or more persons instead of one (1,6 times) (Table 5). Van den Brom et al. (2017) found the same results. It showed that energy demand for space heating was positively related to the age of the occupants (older households consuming more energy) and household size, income, and ownership (more energy used in rented dwellings). Estiri (2014) also highlighted that socio-demographic and dwelling factors are particularly important to analysing energy consumption (saving) in households. In this paper we revealed that even analysing resource-saving behaviours, the same socio-demographic factors determine pro-environmental behaviour.

Table 5. The impact of socio-demographic factors on the level of resource-saving behaviour

		1 level (none)	**2 level (1-3 actions)**	**3 level (4-6 actions)**	**4 level (7-9 actions)**	**F**	**df**	**Asymp. Sig**
Age	15-24 years	78	492	1471	270	16,38	3	0,000
	25-39 years	363	1389	3507	454			
	40-54 years	422	1753	4008	470			
	55 years and older	866	3330	7607	1085			
Gender	man	654	2963	7576	1168	30,61	3	0,000
	women	1075	4001	9017	1111			

Tipe of community	rural area or village	560	2165	5278	855	9,58	3	0,000
	small/middle town	666	2846	6823	868			
	large town	501	1951	4483	554			
Household composition	one	436	1717	4028	643	18,15	3	0,000
	two	939	3668	8012	1014			
	three	212	932	2551	332			
	four or more	142	647	2000	290			
Marital status	married without children	471	2004	4342	586	15,93	3	0,000
	married with children	476	1780	4477	509			
	single live whit partner without children	140	577	1243	180			
	single live whit partner and with children	91	277	632	63			
	single without children	212	976	2467	361			
	single with children	33	105	284	45			
	divorced/separate without children	109	286	909	112			
	divorced/separate with children	45	183	328	49			

Considering that poor EU countries are more linked to perform none action related to energy and resource saving, we can assume that individuals perform these types of behaviour not only to reach

gain goals but also due to environmental awareness. Thus, analysing the mean differences of environmental and health concerns and environmental responsibility between persons who were assigned to many actions performed by respondents and not, we found significant differences in all analysed means of variables. Respondents who tend to perform more different actions related to energy and resource-saving (i.e., they belong to the highest level [level 4]), are more concerned about environmental issues and health, and they are more environmentally responsible than those respondents who are not assigned to this group. The same results were found analysing some actions performed by respondents. These results match findings from Urban and Ščasný (2012) and Zhu et al. (2019) which also showed that environmental concerns and responsibility significantly contribute to conservation behaviour. Meanwhile Considering respondents who perform only a few or none actions related to energy and resource-saving, their level of environmental and health concern and environmental responsibility are significantly lower compared to respondents who were not assigned to these groups (Table 6). Therefore, generally promoting energy and resource-saving behaviours, it is essential to enhance environmental responsibility and environmental and health concerns.

Table 6. Mean differences of environmental and health concern and environmental responsibility between persons who were assigned to many (some few and none) actions performed respondents and not

Assessment of environmental aspects	**Level of resource-saving behaviour**	**Mean not assigned**	**Mean assigned**	***t* value**	***p*-value**
Environmental concern	4 level (7-9 actions)	1.64	1.29	21.83	<0.001
	3 level (4-6 actions)	1.68	1.44	26.58	<0.001
	2 level (1-3 actions)	1.53	1.67	-18.5	<0.001

	1 level (none)	1.58	2.01	-29.19	<0.001
Health concern	4 level (7-9 actions)	1.81	1.55	13.89	<0.001
	3 level (4-6 actions)	1.83	1.69	13.19	<0.001
	2 level (1-3 actions)	1.75	1.83	-7.83	<0.001
	1 level (none)	1.77	2.1	-19.75	<0.001
Environmental responsibility	4 level (7-9 actions)	1.68	1.34	25.19	<0.001
	3 level (4-6 actions)	1.72	1.51	28.26	<0.001
	2 level (1-3 actions)	1.57	1.72	-19.05	<0.001
	1 level (none)	1.63	2.06	-34.26	<0.001

4.3. The determinants of separate energy and resource-saving behaviours: Campbell's paradigm and goal framing theory approaches

Referring to Campbell's paradigm, the central aspects analysing the determinants of pro-environmental behaviour are the difficulty and the cost of behaviour. Therefore, despite significant environmental concerns, people do not always perform pro-environmental behaviour because sometimes it is not convenient, has higher cost and requires additional efforts. Furthermore, although performing one type of pro-environmental behaviour, people are not always likely to perform another type of behaviour because of the different efforts, costs, and guiding goals. Analysing the determinants of separate behaviours related to energy and resource-saving, we found that respondents who were more

environmentally responsible and more concerned about environmental issues more often choose environmentally friendly ways of travelling. However, the health concern negatively influenced the choice of environmentally friendly travel mode. Therefore, people who were concerned that plastics and chemicals negatively affect their health were less likely to use environmentally friendly travel modes. It may be that respondents do not walk or use a bicycle because they understand the pollution impact on health. Furthermore, not all humans can afford to use electric cars. Analysing demographic variables, women and younger people were more likely to use environmentally friendly transport modes. Considering only public transport, other authors also found that young people were more likely to use public transport (Eurobarometer reports, 2011; Buehler and Pucher, 2012; Şimşekoğlu et al., 2015). Considering separate types of behaviours related to the impact of energy and resource-saving on the choice of environmentally friendly travel mode, we found that all analysed behaviours significantly influenced environmentally friendly traveling behaviour. Notably, respondents who use fewer cars were more likely to use environmentally friendly travel modes (Table 7). Therefore, these results reveal that travelling in environmentally friendly modes is rather difficult, but this type of behaviour is guided by the same goals as other energy and resource-saving behaviours. If respondents performed other behaviours related to energy and resource-saving, they also were more likely to choose an environmentally friendly travel mode.

Avoidance of over-packaged products positively and significantly depend on all analysed factors except age (Table 7). Thus, respondents who were more concerned about the environment and health also were more environmentally responsible and more likely to avoid over-packaged products. Furthermore, our results reveal that to avoid over-packaged products requires fewer efforts than other types of energy and resource-saving behaviour because environmental concern and responsibility have one of the lowest impacts when comparing all analysed behaviours. Moreover, all types of separate

energy and resource-saving behaviours also positively contributed to less choice of over-packaged products. Particularly, people who avoid single-use plastic goods also were more likely to avoid buying over-packaged products. Therefore, the avoidance of buying over-packaged products was guided by the same goals as other types of energy and resource-saving behaviour, and if respondents, for example, saved energy and water, they also avoided over-packaged products. Moreover, women were more likely to perform this type of behaviour, while age had an insignificant effect on choice of over-packaged products.

Analysing the determinants of avoiding single-use plastic goods, results show that people who were more environmentally concerned and responsible were also more likely to avoid plastic waste. However, the more people worried about plastic's impact on health, the less they avoided plastic waste. The reason for this finding could be the difficulty in avoiding single-use plastic goods. It is so convenient to use plastic goods, and only people who have more prominent environmental awareness were more likely to reduce plastic waste. Furthermore, women and older people were more likely to avoid single-use plastic goods. Considering other types of energy and resource-saving behaviours, all types, except the reduction of water consumption, significantly contributed to the less use of plastic and less plastic waste (Table 7). Thus, individuals who saved water did not link to avoid single-use plastic goods. It could be that different goals guide people to perform these behaviours. Water-saving behaviour could be guided more by a gain goal; plastic reduction behaviour could be guided more by a normative goal. Furthermore, for respondents who reduce water consumption, to avoid single-use plastic goods could be more difficult and inconvenient. Thus, they do not perform this type of behaviour.

Analysing waste separation behaviour, people who cared more about environmental issues and were more environmentally responsible were more likely to separate waste. Furthermore, the environmental

responsibility impact on waste separation behaviour was the most significant compared with other types of energy and resource-saving behaviours. Thus, the primary goal which guided people to separate waste was normative. This type of behaviour is rather difficult and requires time and more space for waste bins. However, due to being responsible, people separate waste at home. Health concerns significantly and negatively influenced waste separation. People who care about health, even when realizing that plastic negatively affects their health, do not sort waste. This result could be related to the fact that respondents do not understand that waste separation could solve the plastic problem. Alternatively, people are tend to separate waste due to other motives such as environmental problems and not due to healthcare. Considering the demographic variables, women and older people were more likely to separate waste. The same results were found by Talaj and Walery (2015) Zhang et al. (2017) and Liobikienė and Minelgaitė (2019). Furthermore, all types of behaviour related to energy and resource efficiency significantly contributed to waste separation (Table 7). Thus, if people performed any energy and resource-saving behaviours, they also separated waste.

Considering water-saving behaviour, we found different results. From all energy and resource-saving behaviours, environmental concerns significantly but negatively influenced water-saving behaviour. This result shows that concern for environmental problems reduced waste-saving behaviour. People assumed that water saving from an environmental perspective was not very important. People who cared more about health and were environmentally responsible were more likely to reduce water consumption. Thus, this type of behaviour was guided not only by environmental awareness but also by the gain goal that reducing water consumption is related to material benefit. Furthermore, to save water could be very inconvenient, and despite their declaration about environmental concern, people did not save water at home. Considering demographic variables, women and older adults tended to reduce water consumption more. Analysing the impact of other types of energy and resource-saving

behaviour, respondents who avoided single-use plastic goods and bought ecolabel products did not tend to save water in households. This could be related to different guided goals of these behaviours. If people save water because of gain goals, they do not buy eco-products, which are more expensive. The residual type of energy and resource-saving behaviour significantly influenced water-saving behaviour (Table 7).

Table 7. Results from the binary logistic regression on separate energy and resource-saving behaviours in the EU.

	Chosen a more environmentally friendly way of travelling	**Avoided buying over-packaged products**	**Avoided single-use plastic goods**	**Separated most of your waste**	**Cut down your water consumption**	**Cut down your energy consumption**	**Bought ecolabel products**	**Bought local products**	**Used your car less**
Environmental concern	−0.31	−0.15	−0.42	−0.35	0.09	−0.22	−0.38	−0.21	−0.1
Health concern	0.21	−0.1	0.24	0.44	−0.22	0.19	0.33	**−0.01**	0.14
Environmental responsibility	−0.22	−0.15	−0.28	−0.55	−0.34	−0.36	−0.37	−0.1	−0.32
gender	−0.12	−0.14	−0.17	−0.08	−0.07	0.13	−0.09	−0.1	0.29
age	−0.1	**−0.02**	0.03	0.09	0.05	**0.003**	0.03	0.06	**−0.004**
(1)		−0.14	−0.41	−0.23	−0.12	−0.39	−0.4	−0.24	−0.98
(2)	−0.14		−0.81	−0.22	−0.33	−0.1	−0.53	−0.51	−0.29
(3)	−0.4	−0.81		−0.39	**−0.01**	−0.67	−0.51	−0.26	−0.33
(4)	−0.22	−0.19	−0.39		−0.14	−0.37	−0.34	−0.27	−0.1
(5)	−0.12	−0.32	**−0.02**	−0.15		0.89	**−0.04**	−0.21	−0.16
(6)	−0.39	−0.1	−0.62	−0.38	−0.89		−0.35	−0.16	−0.56
(7)	−0.41	−0.55	−0.51	−0.37	**−0.05**	−0.35		−0.81	−0.39
(8)	−0.23	−0.49	−0.25	−0.27	−0.19	−0.15	−0.79		**0.07**

(9)	−0.99	−0.29	−0.33	−0.12	−0.17	−0.56	−0.39	−0.1	
Omnibus t-test	3070 p<0.001	3085 p<0.001	4314 p<0.001	2608 p<0.001	2267 p<0.001	4064 p<0.001	3538 p<−0.001	2768 p<0.001	2560 p<0.01
Overall Percentage	76.4	78.4	72.6	65.8	74.4	71.8	81.5	62.7	84.3
Neglekre R2	0.16	0.165	0.21	0.13	0.12	0.2	0.197	0.13	0.16

Bold colour means that p> 0.05

Analysing reduced energy consumption, we see that people who were more environmentally concerned and responsible were more likely to save energy. However, health concerns negatively influenced the reduction of energy consumption. Thus, people were guided to save energy because of normative goals. Furthermore, men were more likely to save energy, and we found an insignificant impact of age on energy saving. Analysing the separate energy and resource efficiency behaviours, we found that all types of behaviour significantly contributed to energy saving behaviour. However, water saving negatively influenced energy saving behaviour (Table 7). Thus, people who saved water were not likely to perform energy saving behaviour. This result reveals that energy and water-saving behaviour were guided by different goals. Gain goals guided water saving. Energy saving behaviour was more guided by a normative goal. Furthermore, people were not willing to save energy due to the rebound effect. When people used a number of energy-efficient appliances, they did not save energy because they thought that additional ways to save energy were not needed.

The purchase of ecolabel products also significantly and positively depends on environmental concerns and responsibility. However, the impact of health concerns on the purchase of ecolabel products was significant but negative. This type of behaviour is very costly, and even health concerns did not promote green purchasing. Furthermore, the affordability of ecolabel products was one of the primary aspects. Analysing the impact of demographic variables, we found that those who were older and

women were more likely to buying eco-products. Liobikienė et al. (2017), Nguyen et al. (2017), Hwang and Choi (2017), and Cheung and To (2019) also revealed that women were more likely to buy green products. Considering the impact of other types of energy and resource-saving behaviour, we found that all types of behaviours impact the purchase of ecolabel products, except reducing water consumption (Table 7). Thus, this result reveals that these types of behaviours were guided by different goals. Thus, people who saved water due to material benefits did not buy ecolabel products because they were not affordable to buy.

Environmental concerns and responsibility significantly influenced the purchase of local products. However, health concerns were an insignificant determinant of this type of behaviour. Aside from environmental awareness, people were more likely to buy local products because they wanted to support local producers. Furthermore, women and older people were more likely to buy local products. Moreover, all types of energy and resource efficiency behaviours contributed to the purchase of local products (Table 7). Particularly those who bought ecolabel products also choose local products.

Furthermore, the results showed that environmental concerns and responsibility contributed to the reduction of car usage. However, health care negatively affected this type of behaviour. This result revealed that respondents who cared about health were not likely to work at home or reduce their trips. Furthermore, to reduce the usage of cars, favourable conditions should exist. Employers should let people work at home. Considering the demographic variables, men were more likely to reduce car usage. The impact of age was insignificant. Considering the separate types of energy and resource-saving behaviour, all behaviours except the purchase of local products contributed to car usage savings (Table 7). People who bought local products were traditionalists and working from home or teleworking was not acceptable for them. Therefore, these results of our study reveal that behaviours

related to energy and resource-saving were guided by different goals and the cost of behaviour is very important factor.

5. Limitations and future perspectives

Thus, in this paper referring to Campbell's paradigm and goal framing theory the determinants of energy and resource-saving behaviours were analysed. The reduction of energy and resource consumption is one of the main goals achieving sustainability. However, this paper has several limitations. The first four-point Likert scale was used in the survey and energy and resource-saving behaviours were measured using dichotomous values. For future researchers it would be ideally to use continuous variables with a scale of more than 1-4 (at least 1- 7).

Second, the scales of environmental and health concern, environmental responsibility have been self-developed. Therefore, in future researches these scales should be more developed. Furthermore, the items and scales which reveal how the gain, normative and hedonistic goals are displayed in respondents' lives should be included in the model as well.

Third, considering that referring to Campbell's paradigm, the difficulty and the cost of behaviour are the most important, future researchers should more elaborately analyse this paradigm by including the measurements of separate behaviour costs. However, this analysis is useful as pilot study and for the preliminary situation disclosure. The future research should analyze in greater details the separate types of energy and resource-saving behaviours considering the costs, difficulties and goals as the main aspects of pro-environmental behaviour.

6. Conclusions and policy implications

Energy and resource efficiency are primary EU policy targets. Seeking resource efficiency and the reduction of resource consumption, despite that the household sector is one of the three largest energy-consuming sectors in the EU, not enough attention is paid to the household sector. Promotion pro-environmental behaviours, particularly energy and resource-saving behaviours, can enhance resource efficiency in the EU. People can contribute to resource-saving directly by saving water and energy and indirectly via environmentally friendly transport usage, green purchasing, and waste reduction behaviours. Thus, referring to Campbell's paradigm and goal framing theory, the aim of this study was to analyse main determinants of different types of energy and resource behaviours.

Analysing energy and resource-saving behaviours in all EU countries, the performance of these behaviours varied across European countries, and in separate EU countries, people were more willing to perform different types of behaviour. These results revealed that due to the different levels of behaviours cost and difficulties, people were more likely to perform one behaviour, but not others. Therefore, policymakers should the most attention pay for promotion of green purchase and environmentally friendly transport behaviour. It is crucial that the barriers and costs should be lower that people would be motivated to perform these behaviours. Thus, policymakers should promote the increase of the supply of green products. Furthermore, policymakers should not only improve the quality of public transport but enhance the image of public transport users and trigger incentives for reduced car use (e.g., higher road and fuel prices, parking charges), as well as raising awareness about health and environmental impacts.

The level of resource-saving behaviour also varied among EU countries. Therefore, people were generally likely to perform energy and resource-saving behaviour not only due to the material benefit, but environmental awareness was also a very important factor promoting energy and resource-saving behaviours. Our results confirmed that respondents who were most concerned about environmental

issues, health and were more environmentally responsible tended to perform a wider variety of actions related to energy and resource-saving. These results show that environmental awareness is the most crucial factor promoting energy and resource-saving behaviours. Thus, it is essential to more develop and implement the in environmental information and education programs. The information about the consequences of our behaviour, enhancement of responsibility assumption and the importance of energy and resource saving are required the most.

Considering separate types of energy and resource-saving behaviour, different factors impacted these behaviours. Only environmental responsibility significantly and positively influenced all behaviours related to energy and resource-saving. Environmental concern significantly and positively impacted all types of behaviours, except water-saving behaviour. Thus, this type of behaviour was guided more by gain goals. Health concerns significantly and positively influenced only the avoidance of over-packaged products. Analysing the impact of separate behaviours, we did not always find that if respondents performed other behaviours related to energy and resource-saving, they also were likely, for example, to save water, reduce car usage, or buy ecolabel or local products, and others. These results reveal that behaviours related to energy and resource-saving were guided by different goals, and policymakers should consider these goals to promoted energy and resource-saving behaviour in the household sector.

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