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PORTUGUESE CONSUMERS' GREEN PURCHASE BEHAVIOR: AN ANALYSIS OF ITS ANTECEDENTS AND A PROPOSAL OF SEGMENTATION

ABSTRACT

This study analyzes how “Knowledge about environmental problems,” “Perceived consumer effectiveness,” and “Recycling behavior” can predict “Reported purchase of green products in general,” and “Reported purchase of specific green products.” Another objective of this study is to identify different consumer segments based on antecedents of green purchasing behavior, observing demographic profiles and willingness to buy this type of products. The data was collected in Portugal with the use of an online survey and the instrument was composed of five scales, adapted from previous studies. The results confirm the existence of a positive relationship between the constructs. It is also possible to identify three segments of consumers: “Less involved,” “Moderate,” and “Ecologists.” This study has some practical implications, showing that consumption of green products can be stimulated if consumers are more aware of environmental problems and understand the importance of their individual behavior to prevent them.

Keywords: Green Purchase, Green Consumer, Consumer Behavior, Segmentation.

O COMPORTAMENTO DE COMPRA DO CONSUMIDOR VERDE: UMA ANÁLISE DOS SEUS ANTECEDENTES E UMA PROPOSTA DE SEGMENTAÇÃO

RESUMO

Este estudo analisa o modo como o “conhecimento sobre os problemas ambientais”, a “percepção sobre o poder do consumidor”, e o “hábito de reciclagem” podem predizer a “compra de produtos verdes em geral” e a “compra de produtos verdes específicos”. Um outro objectivo do estudo é o de identificar diferentes segmentos de consumidores com base nos antecedentes do comportamento de compra de produtos verdes, o de descrever o seu perfil demográfico e a sua intenção de comprar este tipo de produtos. Os dados foram recolhidos em Portugal através de um inquérito por questionário. O instrumento era composto por cinco escalas, adaptadas de estudos anteriores. Em geral, os resultados confirmam a existência de uma relação positiva entre os construtos mencionados. É também possível identificar três segmentos de consumidores: “os menos envolvidos”, “os moderados” e “os ecologistas”. Este estudo tem algumas implicações práticas, mostrando que o consumo de produtos verdes pode ser estimulado se os consumidores estiverem mais conscientes dos problemas ambientais e compreenderem a importância do seu comportamento individual para os prevenir.

Palavras-chave: compra de produtos verdes, consumidor verde, comportamento do consumidor, segmentação.

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1 INTRODUCTION

In recent decades, ecological issues have become increasingly important, with the involvement of governments, institutions, and media, primarily due to increasing environmental degradation and over-consumption of natural resources. To accommodate these concerns, companies have developed strategies to launch products that are environmentally friendly. Consumers are becoming more sensitive towards these environmental problems and adopting a growing proclivity to approve companies that have an environmental conduct and to accept eco-friendly products (Laroche et al., 2001; Ali et al. 2011).

Knowledge regarding the conscious consumers' behavior and the determinants of green purchases stand as important input factors for marketing strategies of these companies. This information is also important for academics that are interested in this thematic and carrying out research on this subject. In fact, environmental behaviors and purchasing of green products has been studied by several authors all over the world: China (Chan, 2001), Malaysia (Sinnappan & Rahman, 2011), Brazil (Monteiro et al., 2008; Silva et al. 2015), Egypt (Mostafa, 2007), Pakistan (Ali et al., 2011), UK (Barr, 2007), Lithuania (Banytė et al., 2010), Romania (Sima, 2004), Greece (Tilikidou, 2007) and Spain (Andrés et al, 2003). However, few studies have been developed in Portugal about environmentally conscious consumers (Paço & Raposo, 2009, 2010; Afonso, 2010), though this country is in a stage of maturity with regard to fast moving consumer goods market and with a considerable number of brands offering green products.

Previous research (Bohlen et al., 1993; Kim & Choi, 2005; Tan & Lau, 2011) has found significant precursors of green purchase; this study intends to further examine how "Knowledge about environmental problems," "Perceived consumer effectiveness," and "Recycling behavior" can predict "Reported purchase of green products in general," and "Reported purchase of specific green products."

Several studies have been carried out to identify the profile of green consumers based on their attitudes and behaviors in relation to environmental issues (Kara Chan, 1999; Paço & Raposo, 2009, 2010; Banytė, 2010; Sima, 2014). Taking these studies as a starting point, the present investigation intends to identify different consumer segments based on antecedents of green purchasing behavior, to observe their demographic profile and their willingness to buy these types of products.

To achieve these objectives, we conducted a survey using a sample composed of 315 consumers between 18 and 55 years in Portugal. The foundation for the construction of the instrument was the scales used in earlier investigations of Bohlen et al (1993) and Kim and Choi (2005). We performed a multiple regression and a cluster analysis to fulfill our purposes.

2 LITERATURE REVIEW

2.1 Dimensions that can influence green purchase

Adoption of a green attitude by companies and designing products that are environmental friendly is an undisputable trend that has been observed in the last decades (Kassaye, 2001). These green products, such as energy-efficient light bulbs, detergent containing biodegradable ingredients, and recyclable or reusable packaging, are presented as "environmentally safe," "eco-friendly," or "recyclable" (Shamdasani *et al.*, 1993, Mostafa, 2007).

Consumers exhibit a growing predisposition to accept eco-friendly products (Laroche et al., 2001; Ali et al. 2011). In fact, since the seventies the environmentally conscious consumer has been the subject of studies. The studies in this area vary considerably, due to the number of dimensions that might influence consumers to purchase green products. In this study we considered five dimensions that were recurrently used in previous studies. Table 1 shows these five dimensions and some of the studies in which they were used.

Table 1 - Constructs re-currently used in previous studies

DIMENSIONS	AUTHOR (YEAR)
Knowledge about environmental problems	Maloney et al. (1975); Bohlen et al. (1993); Gendall et al. (1995); Schlegelmilch et al. (1996); Laroche et al. (1996); Chan (2001); Bui (2005); Junaedi (2007); Tilikidou (2007); Mostafa (2007)
Perceived consumer effectiveness	Kinnear et al. (1974); Webster (1975); Ellen et al. (1991); Straughan & Roberts (1999); Kim and Choi (2005); Majláth (2010); Nurse et al. (2010); Afonso (2010); Tan & Lau (2011)
Recycling behavior	Bohlen et al. (1993); Schlegelmilch et al. (1996); Werner & Makela (1998); Laroche et al. (2001); Barr (2007); Ribeiro & Veiga (2011); Wright (2011); Berndt & Gikonyo (2012)
Reported purchase of green products in general	Bohlen et al. (1993); Schlegelmilch et al. (1996); Chan & Lau (2000); Laroche et al. (2001); Tanner & Kast (2003); Kim & Choi (2005); Bui (2005); Lee (2008); Tan (2011)
Reported purchase of specific green products	Bohlen et al. (1993); Schlegelmilch et al. (1996); Follows & Jobber (2000); Loureiro et al. (2001); Laroche et al. (2001); Kim & Choi (2005);

2.2 Knowledge about environmental problems

One dimension that has been studied in the context of green purchasing is 'Knowledge about environmental problems' (Bohlen et al., 1993). That is to say: the level of knowledge that an individual has about environmental issues. Environmental education and knowledge plays an important role in preparing people to have a positive and constructive attitude towards the environment and thus contributing to the resolution of some environmental problems (Sudarmi et al., 2001). Knowledge of environmental problems may be positively correlated with green purchase behavior. A scale measuring 'Knowledge about environmental problems' of Bohlen et al. (1993) and Schlegelmilch et al. (1996) identified this dimension as a predictor of purchase behavior of green products in general, as well as the purchase of products made from recycled paper products.

2.3 Perceived consumer effectiveness

Previous studies have considered the importance of perceived consumer effectiveness. That is, the consumers' conscience that their individual behavior can have a significant impact in combating environmental degradation (Ellen et al, 1991; Kim & Choi, 2005; Tan & Lau, 2011; Tan, 2011). This perspective assumes that consumers can be convinced that their pro-environmental behavior can be useful in minimizing environment deterioration. Most of the research conducted previously on the effect of individual behavior showed a positive association between this variable and environmentally conscious purchasing behavior

(Webster, 1975; Ellen et al, 1991; Straughan & Roberts, 1999; Kim & Choi, 2005; Majláth, 2010; Nurse et al, 2010; Lau & Tan, 2011).

2.4 Recycling

Environmentally conscious behavior involves actions reflecting the citizens' sustainable perspective. In previous studies, recycling was identified as one of the components of this behavior (Berndt & Gikonyo, 2012). Processes associated with recycling, reduction of waste, and reuse of products, are regarded as environmentally conscious behavior (Barr, 2007; Berndt & Gikonyo, 2012). The importance of this variable subsists in the fact that it may reflect a general attitude towards the environment that goes beyond the specific act of recycling. For example, recycling behavior was found to be positively correlated with a concern about environmental issues (Simmons & Widman, 1990; Kaufmann et al. 2012). Also, Bohlen et al. (1993) identified recycling behavior as a variable able to predict the behavior of purchasing green products.

2.5 Purchase of green products

A key aspect in the context of this research is the purchase of green products. We will establish a distinction between purchases of green products in general and specific. This differentiation is based on Bohlen et al. (1993) and Schlegelmilch et al. (1996) studies. In their scales, they considered a difference between statements related with the purchase of green products in general (e.g. "green products") and those that were related with specific products (e.g. "I

buy ecological detergents" or "I buy products not tested on animals").

In recent decades, several studies have been conducted on the purchase of green products in general (Bohlen et al. (1993); Schlegelmilch et al. (1996); Chan & Lau (2000); Laroche et al. (2001); Tanner & Kast (2003); Kim & Choi (2005); Bui (2005); Lee (2008); Tan (2011), and the purchase of specific green products (Bohlen et al. (1993); Schlegelmilch et al. (1996); Follows e Jobber (2000); Loureiro et al. (2001); Laroche et al. (2001); Kim & Choi (2005). Much of this research has examined these dimensions as variables that are influenced by others, such as the effect of individual behavior (Lau & Tan, 2011; Kim & Choi, 2005), personality (Straughan & Roberts, 1999); social groups and/or collectivism (Lee, 2008; Laroche et al, 2001; Kim & Choi, 2005); and Recycling behavior (Schlegelmilch et al, 1996; Paço & Raposo, 2009; Gikonyo & Berndt, 2012).

2.6 Profiling the green consumer

Various studies have been searching for a consumer's segmentation based on environmental attitudes and behaviors. Kara Chan (1999) carried out a study with 704 shoppers in Hong Kong, based on their past purchase decisions of environmentally friendly and not-so-friendly products. Three segments of consumers were identified: Heavy green consumers (27% of the sample), Medium green consumers (38%), and Light green consumers (35%). Heavy green consumers had higher education, in general were sensible and concerned towards environment issues, accepted being influenced by other individuals, the government, and green organizations and considered themselves green consumers. Light green consumers had lower education levels (primary or below) and these consumers found environmental friendly products difficult to access and were less influenced by government campaigns and mass media. Medium green consumers presented balanced scores in all the variables. The study didn't identify significant differences between the segments in terms of gender or age.

Banytė (2010) identified four groups of Lithuanian citizens according to their level of ecological awareness: "black consumers" (14%), living a material wellbeing lifestyle, and having low ecological awareness; "grey consumers" (26%), with medium ecological awareness; "greyish green consumers" (36%), willing to create an image of green consumption and exhibiting a high ecological awareness and, finally, the "green consumers" (24%), living in an environmentally friendly way and having a very high ecological awareness.

Sima (2014) presented a study performed in Romania (by the Research Institute for Quality of Life - Terra Millennium III, in 2008) which segmented the population into four groups: Eco-indifferent (8%), who do not show any particular concern for the environment; Eco-neutral (28%), who have altered their consumer behavior towards the environment because of functional reasons; Eco-supporters (11%), who exhibit environmentally responsive behaviors, and finally Eco-promoters (53%), who considerably changed their behavior in the recent years.

In the Portuguese market, Paço & Raposo (2009, 2010), conducted a survey among 887 Portuguese citizens and classified three segments:

The "uncommitted," representing 36% of the sample, consisted mainly of young individuals between 18 and 34 years old. They showed low scores in some environmental aspects like "environmentally friendly buying behavior" and "recycling," although they revealed some "Environmental knowledge.

The "Undefined," which represented 29% of the sample, included individuals from higher age groups and lower levels of education. They showed a positive attitude towards "recycling" but considered that their role as consumers were low in terms of "effectiveness."

The "Green Activists," 35% of the sample, was composed of individuals in the age groups 25-34 and 45-54 years, with higher education and qualified jobs. They presented positive scores on "Perceived consumer effectiveness," "Environmentally friendly buying behavior" and "Recycling."

3 HYPOTHESES AND RESEARCH QUESTIONS

Based on previous research that found significant antecedents of green purchase, this study intends to examine how "Knowledge about environmental problems," "Perceived consumer effectiveness," and "Recycling behavior" can predict "Reported purchase of green products in general," and "Reported purchase of specific green products." This objective is operationalized in the following four hypotheses (Figure 1):

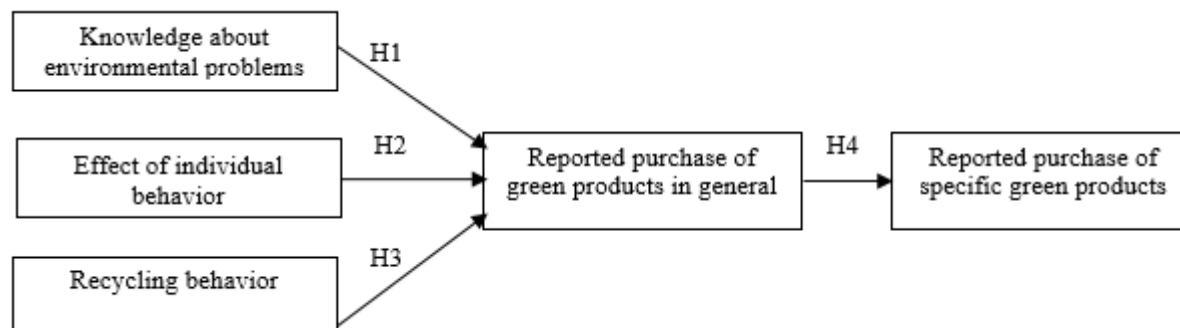
Hypothesis 1: Knowledge about environmental problems directly and positively relates to reported purchase of green products in general.

Hypothesis 2: Individual behavior directly and positively relates to reported purchase of green products in general.

Hypothesis 3: Recycling behavior directly and positively relates to reported purchase of green products in general.

Hypothesis 4: Reported purchase of green products in general directly and positively relates to reported purchase of specific green products.

Figure 1 - Conceptual Framework



Another objective of this study is to identify different consumer segments based on antecedents of green purchasing behavior, to observe their demographic profile and their willingness to buy these types of products. We present three research questions:

RQ1: Is it possible to identify different consumers segments based on the variables “Knowledge about environmental problems,” “Effect of individual behavior” and “Recycling behavior”?

RQ2: If so, what are the predispositions of each segment to purchase green products?

RQ3: What is their profile in terms of age, gender and level of education?

4 METHOD

Through a self-administered questionnaire, data collection was done. The instrument was composed of five scales, adapted from two previous studies, in order to ensure the quality and validity of the instrument. The scales “Knowledge about environmental problems,” “Recycling behavior,” “Reported purchase of green products in general,” and “Reported purchase of specific green products” were previously used by Bohlen et al. (1993); and the scale of “Effect of individual behavior” was previously used by Kim & Choi (2005).

Measurement of “Knowledge about environmental problems” involved a list of topics such as “acid rain,” “sea/river pollution,” “global warming,” etc., and used a 5 point scale ranging from “I know nothing about the subject” (1) and “know much about the subject” (5). “Effect of individual behavior” scale measured the opinion that each

individual had about his behavior and consequent impact on the environment. It was measured with a 5 point scale ranging from “totally disagree” (1) and “totally agree” (5). “Recycling behavior” evaluated the frequency of separation of waste, including paper, plastic, glass and metal. The items were presented on a 5 point scale ranging from “never” (1) and “always” (5).

In this study, it was not possible to analyze the actual purchase of green products, since this was not directly observed, it was only possible to analyze the report of the purchase made by the subjects interviewed, which is why we decided to use the term “reported purchase.” Scales that measured “reported purchase of green products in general” and “reported purchase of specific green products” presented items related to the buying behavior of the respondents, and used a 5 point scale ranging from “totally disagree” (1) and “totally agree” (5).

The questionnaire also included a group of questions designed to gather demographic information, namely: age, sex, academic background and activity.

The data was collected with the use of an online survey. A snowball sampling method was used in order to reach out to potential participants. In this method, the researcher initially contacts a small group of people and uses these participants to establish contacts with other individuals (Bryman, 2008; Malhotra, 2010).

The snowball sampling method has been used in several quantitative research studies in diverse areas, such as consumer ethnocentrism (Watchravesringkan, 2011), satisfaction with services (Srivastava & Rai, 2013), consumer financial values (Guo et al., 2013), and socialization and organizational commitment (Perez et al., 2013). In some studies the snowball sampling was used in online surveys, particularly in areas like Direct

marketing (Kaniewska-Seba et al., 2014), Wine consumer research (Szolnoki & Hoffmann, 2013) and E-word-of-mouth in the travel industry (Filieri & McLeay, 2014).

Snowball sampling presents disadvantages such as some possible biases concerning representativeness (Szolnoki & Hoffmann, 2013), but it presents the advantage of reaching a larger sample for less cost and time (Norman & Russell, 2006). Assuming the pros and cons of this method, we considered that with this approach we could spread our sample to a more diverse population than using a convenience sample of university students. In fact, we were careful to include some aspects in our procedures to avoid the excessive homogeneity of our snowball sample, telling the respondents to suggest other individual with different features.

We emailed a brief presentation of the study, along with a link to the survey, to the researcher's entire mailing list with contacts living in Portugal. In this communication, we informed respondents that their anonymity would be preserved and that their answers would only be used for statistical purposes. We asked them to resend the link to the survey to other individuals of their circle

of contacts. These contacts should be of different ages and professions, and residents of different cities, in order to achieve diversity in the individuals of the final sample. This measure has proven to be positive to the extent that the ending sample, composed of 315 subjects, had some variation in the characteristics of its individuals.

5 RESULTS AND DATA ANALYSIS

5.1 Profile of the respondents

The sample was composed of 315 individuals, 57.1% female and 41.2% male. Regarding age, 30.5% were 18-25 years old, 31.1% were 26-35, 23.2% were 36-45, and, finally, 15.2% were 46-55. The sample showed diversity regarding academic background: 12.1% of the respondents had High School level education, 46.7% had Graduate level education, and 41.3% had Post-graduate level education. On the subject of activity, 41.6% were employed, 13.7% were self-employed, 38.4% were students, 5.7% were unemployed, and finally 0.6% were retired (table 1).

Table 2 - Profile of respondents

VARIABLES		N	%
Gender	Female	180	57.1
	Male	135	42.9
Age	18-25	96	30.5
	26-35	98	31.1
	36-45	73	23.2
	46-55	48	15.2
Academic Qualifications	High School	38	12.1
	Graduate	147	46.7
	Post-graduate	130	41.3
Activity	Student	121	38.4
	Unemployed	18	5.7
	Self-employed	43	13.7
	Employee	131	41.6
	Retired	2	0.6
Total		315	100.0

5.2 Scales reliability

In the first step of data analysis, internal consistency was measured by computing Cronbach's coefficient alpha for each one of the original scales. The Cronbach's alpha coefficients of the dimensions

were satisfactory, with values ranging between $\alpha=0.71$ and $\alpha=0.92$. All the values were within or above the acceptable level of 0.7 (Table 2). After having checked for internal consistency of each one of the scales, the composite was obtained through the mean score of the various items.

Table 3 - Constructs, items and Cronbach's Alpha

CONSTRUCTS	ITEMS	CRONBACH'S ALPHA
Knowledge about environmental problems	Acid rain	0.893
	Sea/river pollution	
	Air pollution from power stations	
	Global warming	
	Ozone layer depletion	
	Pollution of drinking water	
	Pollution from pesticides/insecticides	
	Destruction of the rain forests	
	Building in unspoiled areas	
	Radiation from storage of nuclear waste	
	World population explosion	
Perceived Consumer Effectiveness	Each person's behavior can have a positive effect on society by signing a petition in support of promoting the environment.	0.719
	I feel I can help solve natural resource problem by conserving water and energy.	
	I can protect the environment by buying products that are friendly to the environment.	
	I feel capable of helping solve the environment problems.	
Recycling behavior	Recycling paper	0.921
	Recycling glass	
	Recycling plastics	
	Recycling metals	
Reported purchase of green products in general	I choose the environmentally-friendly alternative if one of a similar price is available	0.727
	I choose the environmentally-friendly alternative regardless of price	
	I try to discover the environmental effects of products prior to purchase	
Reported purchase of specific green products	I buy recycled paper products	0.731
	I buy products not tested on animals	
	I buy environmentally-friendly detergents	
	I buy organically grown fruit and vegetables	
	I buy ozone-friendly aerosols	

5.3 Descriptive analysis

In order to understand general attitudes and behavior of respondents, a descriptive analysis was carried out involving the final constructs (Table 3). The constructs concerning antecedents of green purchasing behavior showed positive results. Although the first construct had reached a moderate result, we can observe that the subjects admitted having had some knowledge about environmental problems. One possible explanation for these moderate results is the specificity of these themes. The majority of the individuals has possibly had a previous contact with the words (Acid rain, Radiation, among others) but could not explain the processes involved in detail.

Regarding the effect of individual behavior, the sample shows a tendency to believe that their efforts have an impact on the environment. Advertising campaigns telling people that they can, individually, contribute to the preservation of the planet may be one of the causes of these beliefs.

Additionally, people implementing recycling habits can be partially explained by the constant incentives to the practice of separating waste.

Regarding the reported purchase of green products in general, it is observed that the vast majority buys ecological products moderately. The same can be observed in the case of purchasing specific green products.

Table 4 - Descriptive analysis of the constructs

CONSTRUCTS	MEAN	STANDARD DEVIATION
Knowledge about environmental problems	3,70	0.56
Effect of individual behavior	4,04	0.53
Recycling behavior	4,09	0.94
Reported purchase of green products in general	3,33	0.71
Reported purchase of specific green products	3,35	0.69

5.4 Simple and multiple Linear Regressions

In order to test these hypotheses, simple and multiple linear regressions were carried out. Multiple regression analysis was conducted to test the relationship between independent variables (knowledge about environmental problems, effect of individual behavior, and recycling behavior) and dependent variable (reported purchase of green products in general). Table 4 shows that the three independent variables explain the green purchase behavior in general at 31% ($R^2 = 0.318$; $F=49,715$; $p<0.001$).

Recycling behavior stands out to be the most important dimension in influencing reported purchase of green products in general ($\beta=0.361$;

$p<0.001$). Hence, H3 is supported. Effect of individual behavior, as proposed in Hypothesis 2, is the second important dimension that affects respondents purchase of green products in general ($\beta=0.315$; $p<0.001$), meaning Hypothesis 2 is supported. Knowledge about environmental problems also influences the purchase of green products in general ($\beta=0.162$; $p<0.005$) giving support to H1.

Finally, a simple linear regression was performed to evaluate how well the purchase of green products in general predicted reported purchase of specific green products. The independent variable explains the dependent variable at 40% ($R^2 0.407$; $F=216,479$; $p<0.05$). Therefore, H4 is also supported.

Table 5 - Simple and Multiple Linear Regressions

Multiple Linear Regression	Independent variables	Dependent variable		
		Reported purchase of green products in general		
		β	t-value	p-value
	Recycling behavior	0.361	7,595	0.000
	Effect of individual behavior	0.315	6,634	0.000
	Knowledge about environmental problems	0.162	3,410	0.001
		$R^2 = 0.318$; $F=49,715$; $p<0.001$		
Simple linear regression	Independent variable	Dependent variable		
		Reported purchase of specific green products		
		β	t-value	p-value
	Reported purchase of green products in general	0.639	14,713	0.000
		$R^2 0.407$; $F=216,479$; $p<0.001$		

5.5 – Clusters analysis

After analyzing the relation between the variables of the model, we aimed to identify different segments of consumers based on the antecedents of green purchasing behavior (Knowledge about environmental problems, Effect of individual behavior, and Recycling behavior). To fulfill this objective, a cluster analysis was conducted with the purpose of subdividing the sample into homogeneous segments.

First, Ward's method with the Squared Euclidean distance was used to identify the number of clusters within the sample. An examination of the Agglomeration Schedule, as well as the Dendrogram, suggested three clusters to be most acceptable. The second step involved a non-hierarchical K-means analysis on the three-cluster solution discovered in the hierarchical clustering procedure. Table 5 presents the summary statistics of the three cluster solutions that were derived from the K-means analysis. The cluster descriptors are based on

standardized scores that have a zero mean and a standard deviation of one.

Table 6 - Characteristics of the clusters – Z scores

CONSTRUCTS	Cluster 1 n=163 (51.7%)	Cluster 2 n=76 (24.1%)	Cluster 3 n=76 (24.1%)	F	Sig.
Knowledge about environmental problems	0.53	-1.12	-0.01	129,947	0.000
Effect of individual behavior	0.35	0.33	-1.08	93,148	0.000
Recycling behavior	0.56	-0.32	-0.87	94,500	0.000

To describe the segments using the initial constructs, a one-way ANOVA was performed to test for significant differences between the groups. The univariate F-tests indicated that the respondents' values for these constructs differed significantly across the three groups at the $P < 0.01$ level.

Multiple comparisons with Tukey's HSD, as a post hoc test, were conducted to examine the between-group differences (table 6). We completed the description of the segments adding in this analysis the constructs regarding (general and specific) green purchase using the same procedure.

Table 7 - Segments profiling

CONSTRUCTS	SEGMENTS			ANOVA		Post-hoc
	Ecologists	Moderate	Less involved	F	Sig.	
Knowledge about environmental problems	4.00 (0.40)	3.05 (0.45)	3.69 (0.41)	129,947	0.000	1>3>2
Recycling behavior	4.62 (0.54)	3.77 (0.87)	3.26 (0.95)	94,500	0.000	1>2>3
Effect of individual behavior	4.23 (0.41)	4.22 (0.38)	3.47 (0.47)	93,148	0.000	1,2>3
Reported purchase of green products in general	3.63 (0.65)	3.15 (0.61)	2.89 (0.64)	38,491	0.000	1>2>3
Reported purchase of specific green products	3.59 (0.59)	3.11 (0.73)	3.07 (0.66)	22,765	0.000	1>2,3

We completed the segments profiling by adding some demographic characteristics, such as age, sex and level of education (table 7). Cross-tabulation analysis and chi-square statistics were used to assess whether there were any statistical differences between the groups.

Chi-square showed no significance in either the variable sex ($X^2(2, N=315) = 1,444, p > .05$) or in the variable level of education ($X^2(4, N=315) = 8,018, p > .05$). However, age showed significant differences between the segments ($X^2(6, N=315) = 18,404, p < .05$).

Table 8 - Segments demographics

DEMOGRAPHICS	CATEGORIES	Ecologists (n=163)	Moderate (n=76)	Less involved (n=76)	Total
Sex ($p=0,486$)	Female	97 (59.5%)	44 (57.9%)	39 (51.3%)	180 (57.1%)
	Male	66 (40.5%)	32 (42.1%)	37 (48.7%)	135 (42.9%)
Age ($p=0,005$)	18-25	47 (28.8%)	18 (23.7%)	31 (40.8%)	96 (30.5%)
	26-35	41 (25.2%)	30 (39.5%)	27 (35.5%)	98 (31.1%)
	36-45	41 (25.2%)	21 (27.6%)	11 (14.5%)	73 (23.2%)
	46-55	34 (20.9%)	7 (9.2%)	7 (9.2%)	48 (15.2%)
Level of education ($p=0,091$)	Secondary	15 (9.2%)	11 (14.5%)	12 (15.8%)	38 (12.1%)
	Graduate	69 (42.3%)	40 (52.6%)	38 (50.0%)	147 (46.7%)
	Postgraduate	79 (48.5%)	25 (32.9%)	26 (34.2%)	130 (41.3%)

Segment 1, "Ecologists," consist of 51.7% of the sample. They have a relatively high knowledge about environmental problems, are very sensible to recycling and do so frequently, and believe their behavior helps the environment. They are the group more willing to buy green products, although they do it in a temperate way (table 6). This segment has a higher percentage of female consumers, is comprised of every age group and presents a great number of graduate and post-graduate individuals (table 7).

Segment 2 represents 24.1% of the sample and was labeled "Moderate." This segment shows weak knowledge about environmental problems, but they have the tendency to recycle and believe that their behavior can make a good effect in society. Their buying habits of green products are restrained (table 6). This group shows a balance between male and female individuals, and is mainly composed by young adults with a graduate degree (table 7).

Segment 3, represent 24.1% of the sample and was labeled "Less involved." This group shows some knowledge about environmental problems but they are less sensible to recycling and more skeptical regarding their role towards the environment. They also have a modest score in green purchasing behavior (table 6). This segment consists of a balance between male and female individuals and is mainly young consumers with a graduate degree (table 7).

6 DISCUSSION

This study intended to examine how some variables may influence green products purchase among Portuguese consumers. In particular, we proposed to evaluate the relation between "Knowledge about environmental problems," "Effect of individual behavior," "Recycling behavior," "Reported purchase of green products in general," and "Reported purchase of specific green products."

The first outcomes of the study are related to the research instrument itself, which was initially used in other countries. The analysis of internal consistency of dimensions was satisfactory, which contributes to confirm that the scales previously used in UK (Bohlen et al (1993) and USA (Kim & Choi, 2005) may also be applied in other countries, such as Portugal.

Through the descriptive analysis of each construct it was found that individuals are moderately informed about environmental issues, believe that their efforts indeed have an impact on the environment, recycle their household waste at high frequency, and sometimes purchase green products moderately.

Using regression analysis, we could confirm the existence of a positive relationship between "Knowledge about environmental problems," "Effect of individual behavior," "Recycling behavior" and "Reported purchase of green products in general." Results also showed a positive relation between these variables and "reported purchase of specific green products."

These outcomes are in line with the results obtained in previous studies that showed a positive association between these variables. Schlegelmilch et al. (1996) identified "Knowledge about environmental problems" as a predictor of purchase behavior of green products in general. Other studies found a positive relation between the "Effect of individual behavior" and green purchasing (Straughan & Roberts, 1999; Kim & Choi, 2005; Majláth, 2010; Nurse et al, 2010; Lau & Tan, 2011). Finnally Bohlen et al. (1993) identified "Recycling behavior" as a variable able to predict the purchasing of green products.

"Knowledge about environmental problems" is a very important aspect of this process; without it, is more difficult for consumers to understand how they can assume an ecological purchase behavior. Another important variable that predicts green buying behavior is the "Effect of individual behavior." This implies that a consumer believes that he has the ability to contribute significantly to the changing global ecological landscape. Furthermore behaviors, such as recycling, can be indicators of ecological buying behavior. A consumer, who acts sustainably, by separating waste, tends to make more sustainable choices when acquiring products. Thus, we can say that the green consumer is someone sufficiently informed, aware that his individual actions will make a difference at a more global level, and usually does the separation of household waste.

This study also proposed to identify different consumer segments based on the antecedents of green purchasing behavior. Three segments were identified with different traits. Two segments, representing almost half of the sample, exhibit a modest or weak predisposition to green purchase behavior. The "Moderate" show a low level of knowledge about environmental problems, but they have the tendency to recycle and believe that their behavior can make a good effect towards the environment. However, their buying habits of green products are restrained. "Less involved" show a weaker connection with this variable and a reluctant green purchase behavior. Both groups present a balance between male and female individuals, are mainly young consumers with a graduate degree.

The "Ecologists" represent the other half of the sample; stand out as a group with a relatively high knowledge about environmental problems, a

considerable sensibility to recycling and a notion that their behavior helps the environment, being the group more willing to buy green products. They are mainly composed of graduate and post-graduate female consumers from every age group. These results are attuned with the study of Tikka, et al. (2000) that found that females have more positive attitudes toward nature and the environment than male individuals. They are also in harmony with the results obtained by Roberts (1996) which states that females performed on a more "ecologically conscious consumer behavior" level than male consumers. The fact that this segment is mainly composed by graduate and post-graduate consumers confirms the results of previous studies in which education performed a positive correlation with environmental concerns and behavior (Van Liere & Dunlap, 1981; Zimmer et al., 1994, D'Souza et al. 2007).

Implications for professionals

From a business standpoint, it is possible to elicit some contributions for marketers concerning green products. First, if knowledge about environmental problems is a predictor of green purchase, it is essential to improve the eco-literacy of each individual (Laroche et al, 2001). This can be increased through campaigns that inform and promote ecological behavior. Moreover, consumers also need to be properly informed about the benefits for the environment of a particular product, whether at the moment of purchase or through labels to certify their sustainable characteristics (Dahlstrom, 2010).

Second, companies should be alert to the fact that consumers will only make changes in their purchasing patterns if they are convinced that their actions will have a significant impact on the environment. Therefore, it is necessary to show the consumer that purchasing green products plays an important role in combating ecological problems (Kim & Choi, 2005; Tan & Lau, 2011). This also can be increased through marketing communication campaigns concerning these products.

Third, professionals should identify consumer groups who also practice other kinds of green behavior, such as recycling, and use these as indicators of green purchase behaviors. Since recycling is a predictor of green purchasing behavior, companies can develop campaigns, in the context of corporate social responsibility, that stimulate recycling, building its image as a green brand.

Fourth, special attention should be given to the "Ecologists" segment, composed mainly by graduate and post-graduate women, particularly sensible to these subjects. These groups can be

targeted as influencers of their friends, colleagues groups and families to move towards a more environmentally conscious buying behavior.

Last, we underline the fact that a green product should present not only benefits to the environment, but also similar performances in comparison with traditional products, so that consumers are willing to make a greener exchange.

Limitations and suggestions for future research

Similar to any research that uses a convenience sample as the basis for data collection, the results of this study do not represent a perspective of Portuguese consumers in general. In fact, a great part of the sample had education levels above the undergraduate degree; therefore a replication of the study should use a larger number of individuals.

In relation to the green consumer segmentation, future research should seek for a more complete portrait including: buying habits on specific green products, preferred brands, and media consumption routines. Such details may help companies in their marketing and communication strategies.

We conclude with a reminder that companies that sell green products should progress in their knowledge about consumer behavior and, in particular, about the variables that lead to a green purchase. As we analyzed, the reported purchase of green products appears in the context of other variables, such as "Knowledge about environmental problems," "Effect of individual behavior," and "Recycling behavior." These variables should be taken into consideration in the marketing strategies of green products undertaken by these companies.

Given the importance of understanding the behavior of the environmentally conscious consumer, it is fair to say that there will still certainly be plenty to explore on this subject.

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