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The Effects of Knowledge and Attitudes upon Greeks' Pro-Environmental Purchasing Behaviour

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ABSTRACT

This article presents an examination of pro-environmental purchasing behaviour (PPB) and how it is influenced by demographics, environmental knowledge (a factor rather neglected so far) and attitudes (environmental unconcern). PPB was found to be adopted at a rather low level; less than 20% of Greeks may be characterized as relatively frequent pro-environmental purchasers. The higher scores were obtained with reference to energy and water conservation, reduction of overall consumption and avoidance of products containing genetically modified organisms. The consumers also declared they very often choose the eco-friendly alternative of a product when there is no significant price difference. The results indicated that professionals, 35–55 years old, holding a graduate and/or a postgraduate degree and with an annual income of 25–30 thousand Euros are those who are more engaged in PPB in Greece. PPB was found to be correlated positively and moderately with environmental knowledge and negatively and moderately with environmental unconcern. Copyright © 2006 John Wiley & Sons, Ltd and ERP Environment.

Introduction

THERE HAVE BEEN MANY SUGGESTIONS DURING THE LAST THREE DECADES THAT PUBLIC POLICY AND business should become more environmentally sensitive and socially responsible to respond to the increasing environmental concerns of the public (Kinnear *et al.*, 1974; Antil and Bennett, 1979; Balderjahn, 1988; Pickett *et al.*, 1993; Schlegelmilch *et al.*, 1996; Roberts and Bacon, 1997). In Greece ecologically related consumer research started in the mid-1990s. Tilikidou (2001) examined an integrated set of ecologically conscious consumer behaviours, while Fotopoulos and Krystallis (2002) offered more insights with regard to the market of organics.

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However, there is much left to be further understood in reference to what would make consumers incorporate environmentally related criteria in their several purchasing choices. How are consumers influenced by what they know, feel or believe? Understanding consumers is crucial, as there is some evidence that 30–40 percent of environmental degradation has been brought about by the consumption activities of private households (Grunert and Grunert, 1993). On the other hand the green markets are still very slow in Greece. Businesses – willing to adopt environmentally friendly strategies – need to understand better what would bring consumers closer to environmentally friendly choices. Also public policy makers, responsible for environmental education and environmental protection, need dependable information with reference to what consumers actually know about the environment.

Following further research suggestions of previous studies, this study aimed to fill in some of the gaps in the ecologically related consumer research in Greece. The pro-environmental purchasing behaviour (PPB) was examined as well as its potential antecedents. Factors that might influence PPB, such as demographics and attitudes, were incorporated. Focus was placed on the examination of environmental knowledge and its impact on PPB, due to the fact that this factor has been rather neglected by the academic literature so far.

Related Literature and Theoretical Framework

With regard to the green markets, suggestions have been made that we should understand ecological products not as 'environmentally friendly' but rather as 'environmentally less harmful' (Polonsky, 1995), as any production and consumption activity is in a way environmentally harmful (Ottman, 1993, p. 49). The optimum direction requires actual reduction of the overall consumption to reduce the overall environmental damage, as even the green markets may very well increase consumption (Kilbourne *et al.*, 1997). In fact, consumption is constantly enhancing in the so-called 'developed' countries, while in Greece final consumption expenditure has been almost doubled between 1995 and 2003 (NSSG, 2004).

The review of previous results indicates that early research (e.g. Kinnear *et al.*, 1974; Webster, 1975) focused mainly on conservation of energy or water. Later on, consumption choices were incorporated (Antil, 1984; Balderjahn, 1988), while even later the agenda was lengthened as more eco-friendly products appeared in the marketplaces (Schlegelmilch *et al.*, 1996; Roberts and Bacon, 1997, Tilikidou, 2001). In Greece, Tilikidou and Delistavrou (2005) included in the concept of the pro-environmental purchasing behaviour all available environmentally less harmful choices as well as the reduction of the overall consumption.

With reference to the demographics, previous research results (Table 1) indicated that education has been found to be a positive antecedent of pro-environmental purchase. The other demographical characteristics, though, provided contradictory results and the overall picture remains rather ambiguous.

Environmental knowledge has been rather neglected as a possible correlate of purchasing behaviour, although it has been employed in some studies of recycling research, reviewed by Schultz (2002). A small number of scales have been published in accordance with subjective (perceptions, beliefs) knowledge (Amyx *et al.*, 1994; Schlegelmilch *et al.*, 1996) or objective (concrete, actual information) knowledge (Maloney and Ward, 1973; Arcury, 1990; Leeming *et al.*, 1995; Laroche *et al.*, 1996). Most of the studies did not indicate a relationship between knowledge and behaviour (Table 1). Measuring knowledge has not been an easy task, possibly because a scale excellent for a certain place and time might not be sufficient for other environments or populations. In Greece, Tilikidou (2001) adopted the Leeming *et al.* (1995) scale but it was found to be unrelated to any type of pro-environmental behaviour.

With regard to attitudes, positive relationships, usually moderate, have been reported between attitudes and purchasing behaviour (Table 1). It has been many times claimed that there is a gap between

Independent variable	Relationship	Studies
Age	Positive	Balderjahn, 1988; Scott and Willits, 1994; Roberts, 1996
	Negative	Buttel, 1979
Education	Positive	Buttel and Flinn, 1976; Balderjahn, 1988; Arcury, 1990; Scott and Willits, 1994; Roberts, 1996, Tilikidou, 2001
Income	Positive	Webster, 1975; Balderjahn, 1988; Arcury, 1990; Scott and Willits, 1994; Tilikidou, 2001
	Negative	Roberts, 1996
Gender	Women	Webster, 1975; Roberts, 1996
	Men	Arcury, 1990; Scott and Willits, 1994
Attitudes	Positive	Crosby et al., 1981; Antil, 1984; Balderjahn, 1988; Scott and Willits, 1994; Schlegelmilch et al., 1996; Roberts, 1996; Minton and Rose, 1997
Knowledge	Unrelated	Maloney and Ward, 1973; Pickett et al., 1993; Laroche et al., 1996; Tilikidou, 2001
	Positive	Antil, 1984; Arcury, 1990

Table 1. Previous research results of pro-environmental purchasing behaviour across demographics, attitudes and knowledge

what people think and what people do (Peattie, 1995, p. 154; Shrum et al., 1996). In the ecologically related research, it has not been surprising to estimate socially desirable high levels of concern and agreement to the necessity of environmental protection (Thørgensen, 1996). With relevance to behaviour though, the relevant scores are never high. As stated by McCarty and Shrum (2001), 'when a consumer acts pro-environmentally the cost for the individual is immediate, while the benefit is at best long-term or even not visible'.

It was also observed that most of the scales that have been used to measure attitudes so far were designed to estimate positive attitudinal scores (see, e.g., Bohlen et al., 1993; Tilikidou, 2001, p. 246). In a previous study by Tilikidou and Delistavrou (2005) focus was placed on the negative attitudes in order to better understand how they inhibit pro-environmental behaviour. An 'environmental unconcern' scale was purposively developed and used; it indeed provided better evidence of correlation than scales of pro-environmental attitudes, which have been previously examined in the same geographical area (e.g. Tilikidou, 2001, p. 135). 'Environmental unconcern' was constructed to mirror negative attitudes concerning eco-friendly products and consumption more than general environmental issues.

In an effort to fill in some of the gaps indicated by the literature review, the theoretical framework of this study was based on the following assumptions: pro-environmental purchasers are expected to buy less, consume less, choose environmentally less harmful products, and incorporate environmental criteria in their purchasing behaviour; they are also expected to be more knowledgeable than their counterparts in accordance to environmental protection and less unconcerned about environmental problems.

Methodology

A survey was conducted in 12 municipalities of the urban area of Thessaloniki, Greece, which includes 274 200 households according to the 2001 census of the National Statistical Service of Greece (NSSG, 2001). The sampling method was a combination of the two-stage area sampling and the systematic method (Tull and Hawkins, 1993, p. 544; Zikmund, 1991, p. 471). For the sample size the NSSG formula was used, which requires 2‰ of the population size in household surveys (NSSG, 2001). The sampling frame was a map of the Thessaloniki urban area. In the first stage, 30 city blocks were randomly selected. In the second stage, the investigated households in each block were selected through the systematic

method (one every 10 apartments). One adult member of the household served as interviewee. Personal interviews were taken by trained marketing students. The refinement of the collected data resulted in 400 usable questionnaires.

The questionnaire contained 73 variables in total. The dependent variable was the pro-environmental purchasing behaviour (PPB), while the independent variables were demographics, the environmental unconcern (EU) and the consumers' environmental knowledge (CEK).

The PPB and the EU scales were adopted from Tilikidou and Delistavrou (2005). The PPB scale contains 23 items measured on a seven-point frequency scale from 1 = never to 7 = always. The EU scale contains 18 items, measured on a seven-point Likert scale from 1 = absolutely disagree to 7 = absolutely agree. These two scales had been previously constructed through a thorough measure development procedure, which followed mainly Churchill's (1979) suggestions. When the two scales were tested for the first time they indicated 'exemplary' (according to Robinson *et al.*, 1991, p. 13) reliability estimations. It is noted that reliability is defined as 'the extent to which a measurement is free of variable errors'. It indicates the 'internal consistency' of a scale, which is usually measured by the value of Cronbach's alpha. These values were found to be 0.9322 and 0.8570 respectively for PPB and EU during their development process. In this project the alpha values were found to be 0.8722 and 0.8217 respectively.

With regard to environmental knowledge Tilikidou and Delistavrou (under review) recently made an effort to construct a consumer oriented, objective scale, sufficient for the Greek society. The measure development procedure followed suggestions by Churchill (1979), Robinson *et al.* (1991) and Spector (1992). It is noted in brief that this procedure consisted of several stages, such as domain definition, in-depth interviews, brainstorming, focus group, item generation, a preliminary survey in students, item analysis, reliability estimation and face validity estimation. The initial item pool consisted of 61 items, among which 27 were kept after the refinement process that incorporated item-to-total correlation and alpha-if-item-deleted techniques. Any effort to refine the scale further did not lead to better evidence of reliability. The refined construct was named consumers' environmental knowledge (CEK). Each item is measured on a 'right–wrong' basis, out of three choices. The CEK was utilized in this project to be tested for the first time in a large scale household survey. It indicated an acceptable reliability level, as the Cronbach's alpha value was found to be 0.7637.

Results

The demographics of the sample (Table 2) were not significantly different from the relevant population parameters when the *t*-test was applied, with the exception of gender, in which women are over-represented. It was decided to accept this discrepancy due to the fact that usually more women than men are involved with household activities.

Bivariate and Multivariate Analyses

The dependent variable, namely pro-environmental purchasing behaviour (PPB) is a multi-item variable, which has been measured on an interval scale. The two independent variables environmental unconcern (EU) and consumers' environmental knowledge (CEK) are both multi-item too, measured on an interval and ratio scales respectively. All of them may be considered continuous variables. Thus, parametric statistical techniques (e.g. correlation and regression) were judged sufficient to be employed in data processing (Churchill, 1995, p. 814). For the examination of demographics as the dependent variable is continuous and each demographic is considered to be categorical the analysis of variance was selected.

	N	Mean	Std deviation	F	Sig.
Gender					
Men	160	83.2813	19.5140	0.772	0.380
Women	240	85.0667	20.1786		
Total	400	84.3525	19.9100		
Age					
15–34 years old	205	82.4829	19.2951	3.743	0.025
35–54 years old	126	88.3413	20.2117		
more than 55 years old	69	82.6232	20.3738		
Total	400	84.3525	19.9100		
Education					
Some elementary	7	78.1429	13.8495	5.284	0.000
Elementary	30	76.1000	16.4513		
High school	126	82.1349	19.0827		
Student	96	81.1458	19.4876		
Graduate	122	89.8033	20.2410		
Post-graduate	19	95.5789	21.1590		
Total	400	84.3525	19.9100		
Income					
<3000 €	20	86.7500	16.0718	3.413	0.001
3001–6000 €	50	82.1800	14.5556		
6001–10 000 €	60	81.2000	18.1554		
10 001–15 000 €	74	77.7297	21.7049		
15 001–20 000 €	64	88.2344	19.7940		
20 001–25 000 €	45	86.3111	22.4801		
25 001–30 000 €	30	94.9667	18.0048		
>30 001 €	53	86.7736	20.0803		
Total	396	84.4621	19.8367		
Occupation					
Professional	52	88.7692	19.5394	3.181	0.024
Employee	186	86.0054	21.3824		
Houseperson	38	78.1316	14.7303		
Unemployed/student	124	81.9274	18.5583		
Total	400	84.3525	19.9100		

Table 2. Analysis of variance (one way) of pro-environmental purchasing behaviour across demographics

The PPB scale takes theoretical values from 23 to 161, obtained a mean of 84.35, which is lower than the median (92), and indicates 'occasional' to 'rare' engagement in PPB. First, the *analysis of variance* (one-way ANOVA) was employed to indicate the differences of means in PPB across the categories of each demographical characteristic. This technique (Table 2) indicated statistically significant relationships ($p < 0.01$) between PPB and education (graduate and postgraduate) and income (25–30 thousand Euros) as well as ($p < 0.05$) with age (35–55 years old) and occupation (professionals). The categories in the parentheses obtained the higher means.

The consumers' environmental knowledge (CEK) scale takes theoretical values from 0 to 27 and obtained a mean of 11.44, indicating rather low knowledge of environmental issues. The environmental unconcern (EU) scale takes theoretical values from 18 to 126 and obtained a mean of 59.07, indicating a fairly low level of unconcern towards the environmental problems.

Then, the *Pearson's parametric correlation* was employed to indicate the statistical significance, the sign (negative or positive) and the strength (the *r* coefficient) of the relationships between PPB and each one of the independent variables, namely the EU and CEK. The correlations indicated that the PPB provided statistically significant relationships ($p < 0.01$), positive and moderate with CEK ($r = 0.347$) and negative and moderate with EU ($r = -0.491$).

Last, *the multiple regression* was employed to indicate the percentage of variance (R^2) in PPB that is explained by the interactive effect of the two independent variables upon PPB. The multiple regression is also able to indicate the amount of change in the dependent variable at a unit change of each one of the independent variables according to the resulting equation: $Y = a + b_1X_1 + b_2X_2$. The technique indicated that the interactive effect of EU and CEK explains the 28.1% (adjusted R^2) in the variance in PPB. The resulting equation is

$$PPB = 106. \ 191 - 0.425 \ EU + 0.219 \ EK \qquad (p < 0.01).$$

The K-Means Clusters of PPB

In an effort to gain a deeper understanding of the associations among the variables under examination a non-parametric technique, namely *cluster analysis*, was employed. Among various types of cluster analysis, the *K-means cluster analysis* was selected, as it is able (Malhotra, 1999, p. 610) to classify cases into relatively homogeneous groups, indicating distinct degree of engagement for each group in the variables under examination. This application of cluster analysis is mostly used in marketing research to form groups of consumers for market segmentation purposes (Sudman and Blair, 1998, p. 563). The technique provides information with reference to the size of the segments and the relative importance of each item into each segment.

The behavioural items (A01–A23) of the PPB scale were entered in the analysis and a three cluster solution was found appropriate for interpretation (Table 3). Cluster 1 grouped 143 (35.75%) consumers, who indicated the lower cluster centres in all behavioural items. Cluster 2 contained 182 (45.5%) consumers, who obtained scores higher than those in the first cluster but considerably lower than those in the next cluster. Cluster 3 contained 75 (18.75%) consumers, who obtained the highest scores in all cases (see Table 3). The three clusters were named respectively *conventional purchasers, occasional pro-environmental purchasers* and relatively *frequent pro-environmental purchasers*.

Further, the scores of the knowledge and the attitudes scales were examined separately in each cluster. As expected, it is observed in Table 4 that the mean of CEK was found to be higher in the third cluster (14.17) than in the other two (10.30 and 11.01 respectively), while the mean of EU was found to be lower in the third cluster (46.93) than the relevant means in the first and the second clusters (65.59 and 58.95). It is apparent that consumers obtaining higher level of knowledge and lower level of unconcern are those who form the cluster of frequent pro-environmental purchasers.

Discussion

The findings indicated a rather low compliance in pro-environmental purchasing behaviour (see Table 3/whole sample). The most adopted behaviours (items A19, A20, A21 and A22) are those that concern energy and water conservation, reduction of overall consumption and avoidance of products containing genetically modified organisms. One can never be sure whether these behaviours are driven by a conscious decision to help environmental protection or they are motivated by people's financial or health concerns or both. In any case, these results indicate that there are potentials for success in business

Items		Whole sample		Cluster centres		
		Mean	Std dev.	Cluster 1	Cluster 2	Cluster 3
A01	I choose the environmentally friendly alternative of a product, if there is no significant price difference	4.82	1.52	4.41	4.72	5.84
A02	I choose the environmentally friendly alternative of a product, if there is one, regardless of price	3.54	1.56	3.06	3.37	4.88
A03	I am interested in asking about the environmental consequences of a product before buying it	3.55	1.57	2.83	3.63	4.75
A04	I try to find eco-label products	3.38	1.66	2.43	3.51	4.87
A05	I prefer to buy organic fruits and vegetables	3.85	1.80	3.10	3.85	5.31
A06	I prefer environmentally friendly detergents, even if they are more expensive	3.31	1.68	2.24	3.49	4.88
A07	I prefer to buy environmentally friendly detergents, even if they are not equally effective	2.57	1.50	1.78	2.66	3.87
A08	I would change my usual detergent brand for another, more friendly to the environment	3.53	1.68	2.41	3.83	4.96
A09	I prefer to buy recycled paper stationery	3.55	1.81	2.10	4.16	4.81
A10	I prefer recycled toilet paper, tissues	3.53	1.78	2.06	4.18	4.75
A11	I choose the recycled paper products, although they are not that beautiful (white)	3.48	1.84	1.89	4.25	4.65
A12	I prefer the recycled paper products, even if they are more expensive	2.99	1.68	1.59	3.55	4.25
A13	I buy organic wine	2.65	1.78	2.09	2.26	4.64
A14	I buy organic pasta	2.62	1.64	1.88	2.48	4.37
A15	I buy organic clothing	2.58	1.74	2.05	2.46	3.88
A16	I buy ecological toiletry	3.09	2.00	2.08	3.46	4.12
A17	I prefer products in recyclable packaging	2.89	1.50	2.20	3.00	3.92
A18	I prefer food products in reusable containers	3.67	1.70	3.05	3.76	4.67
A19	I try to use less water	4.78	1.85	4.34	4.91	5.28
A20	I try to use less energy	5.13	1.64	4.71	5.27	5.60
A21	I try to reduce overall consumption	5.16	1.59	4.76	5.27	5.63
A22	I try to avoid products that contain GMOs	5.90	1.45	5.64	5.88	6.44
A23	If I am to buy an electric appliance I am interested in finding out if it is eco-friendly	3.80	1.78	2.95	3.88	5.20

Table 3. Pro-environmental purchasing behaviour

	Cluster 1		Cluster 2		Cluster 3	
	Mean	Std deviation	Mean	Std deviation	Mean	Std deviation
Consumers' environmental knowledge (CEK)	10.3007	4.5780	11.0110	4.4523	14.1733	3.3344
Environmental unconcern (EU)	65.5944	13.2502	58.9505	13.2691	46.9333	15.9419

Table 4. Means of CEK and EU across clusters of PPB

offerings that focus on energy conservation or reassurance that products are free of GMOs. They should be taken into consideration by marketers of heating or air-conditioning systems and/or by the food industry.

The results of this study confirmed to an extent previous findings in the same geographical area (Tilikidou, 2001, p. 205; Tilikidou and Delistavrou, 2005). Particularly in the case of organics, the findings indicated moderate scores in behaviour, which comes in line with previous results provided by Fotopoulos and Krystallis (2002). Among organics the most favourable are the vegetables and fruits, although they are three times more expensive than the conventional products. Organic wine, pasta, clothing and toiletries are even more expensive and rare to find.

A closer look at the items of Table 3 indicates that Greeks are more willing to choose eco-friendly products (A01) if they are not significantly different in price and efficacy. It is possible that consumers make an environmentally friendly choice more willingly when other motives such as finance and health are added to their environmental concerns. Arguments have been previously made that consumers are most likely to adopt any type of pro-environmental behaviours where cost and/or inconvenience are minimized (Peattie, 1995, p. 93; Ottman, 1997, p. 23). These claims have been verified with regard to recycling (see, e.g., Shrum and McCarty, 2001; Davies *et al.*, 2002) or with regard to the non-purchasing behaviours (Tilikidou and Delistavrou, in press). With reference to the purchasing pro-environmental choices the results of this study confirm – from a certain point of view – the above mentioned arguments. Practitioners in the marketplaces should keep in mind that consumers are naturally reluctant to pay twice as much for a kilo of organic tomatoes when all the prices of vegetables have been unacceptably raised since the institution of the Euro in Greece. Marketers should not expect consumers to search thoroughly to find the eco-label on a product or which detergent is truly biodegradable or not, or what the logo 'eco' on a package means: economic or ecological? On the other hand, they do take the trouble to search for products free from GMOs because their health might be in danger.

The demographical profile of the relatively frequent purchasers should also be discussed. It has been indicated many times in the same geographical area that those who might be called 'ecologically conscious consumers' are people with relatively high levels of education and income (Tilikidou, 2001, p. 186; Tilikidou and Delistavrou, 2004, 2005). With regard to the education level the results are not surprising and link with the relationship between pro-environmental behaviour and knowledge. With regard to income though, it has first to be noted that the variable measurement concerns the family income. Second, the reported level of income should never be taken as accurate; it is common knowledge in Greece that the really high incomes never appear in the tax returns. Third, it has to be noted that the actual consumption level of each household (e.g. size of house, cars, monthly expenses etc) was not examined. On the other hand, a family that makes up to 30 thousand Euros should by no means be considered as 'rich people', who constantly over-consume, live in luxurious houses, travel a lot, drive expensive cars etc. They are most probably people who are well educated, hard working and concerned enough to seek an environmentally friendly product if it is not considerably more expensive than the conventional alternative. It might be reasonably argued that this is not the consumer group that in total consumes less and thus pollutes less; this is true at least in comparison to other groups, for example retired people with a pension of 600 Euros. Unfortunately though, these indeed less consuming groups would never be able to formulate a target group for businesses interested in ecological strategies; it would be a utopia to expect people who are not able to fulfil their basic needs to buy less and incorporate environmentally friendly criteria in their purchasing choices.

What is really added by this study to our understanding of the subject regards the results concerning consumers' environmental knowledge (CEK). The environmental knowledge has been only once examined before in the same population by the utilization of the Leeming *et al.* (1995) Children's Environmental Knowledge Scale (CHEKS), which indicated a very low level of knowledge and no relationship

to any type of pro-environmental behaviour (Tilikidou, 2001, p. 189). In that study less than one out of five consumers managed to answer the items of CHEKS. In the present study the whole sample managed to answer the newly developed scale of CEK. There are a few topics on which the great majority of the sample gave the right answer. The relevant items refer to the definition of recycling, friendly packaging, less harmful detergents and heaters consuming much electrical energy. The CEK was found to be positively and moderately correlated with PPB. The relevant findings may be attributed to the fact that both CEK and PPB have been purposively developed for Greek consumers and focus on everyday consumption activities. On the other hand, the correlation evidence is not very strong. This means that it is still questionable whether knowledge may be considered as a direct motive to behaviour, though it seems fairly established that a lack of knowledge is a barrier to purchasing change, as Schultz (2002) similarly argued with regard to recycling.

The total level of CEK (although somewhat higher than in the past) was found to be again rather low. This fact may be probably attributed to education, rare promotion of environmental information by the Greek media and time lag national pro-environmental policies in comparison to other EU countries. The lowest scores were found in those items (K07, 08, 20, 21, 24 and 27) that concern the exact percentage of energy and water consumption, recycling goals and the eco-label products (Table 5). These items might be criticized as too difficult for a consumer or even an expert to recall the exact answer, and re-editing should be considered. On the other hand, the relevant findings are somewhat surprising; at least some of these issues (K21 and K24, that concern recycling) do appear often in the media, the newspapers and of course in several very often visited sites of the Internet. The elimination of these items from the measure of CEK did not provide any better correlation with PPB or better evidence of reliability of the CEK scale. Thus, it was decided to keep these items, mainly because they provide useful implications with regard to issues about which very few people seem to be informed, no matter how important they might be. Useful implications might be driven by these findings. For example, favourable ecological sites might consider incorporating in their messages prompts to young people to shut down their PCs and videos during the night; recycling programmes should promote the goal of 65% for paper in 2010 etc.

The examination of attitudes indicated fairly low negative attitudes overall. A closer look at the findings of Table 6 though indicates that the beliefs that ecological products are expensive and hard to find are rather strong; also that a consumer does not feel responsible to pay from his own pocket in order to protect the environment (E03, 14 and 15). Considerable scepticism was also expressed with reference to incorporation of environmentally related criteria when voting for a political party (E09).

It seems that examining negative attitudes towards the environment provides more accurate results than previous measurement of pro-environmental attitudes in the same geographical area (e.g. Tilikidou, 2001, p. 135). The total level of negative attitudes was found to be rather low but not extremely low. The relevant findings indicate – if read in reverse – that there is evidence of a positive level of pro-environmental concerns among Greeks. However, measuring positive pro-environmental attitudes in the past indicated extremely high scores and raised the suspicion of over-estimation and social desirability (Tilikidou, 2001, pp. 135, 196). In addition the correlation coefficient between negative attitudes and behaviour was found to be stronger than previous estimation of the correlation coefficient between positive attitudes and behaviour (e.g. Tilikidou, 2001, p. 150). These findings indicate that most probably a more accurate path to follow is to examine what inhibits than what motivates pro-environmental behaviour.

Conclusions and Implications

There is much to be added to our understanding of cognitive, affective and psychographic effects on pro-environmental behaviours. An overall look at the results of this study verifies Jackson's (2005,

		Right answers (%)
K01	Recycling means that: **(A) used materials return to their original form in order to be used again** (B) paper is being transformed to fertilizers (C) used materials are sold second-hand for alternative use	75.5
K02	Friendlier to the environment is: **(A) glass containers** (B) plastic containers (C) aluminium containers	75.5
K03	Coal and petroleum are examples of: **(A) Fossil fuels** (B) alternative sources of energy (C) recycled resources	75.5
K04	An example of a non-renewable resource is: **(A) Petroleum** (B) ocean water (C) sunlight	63.8
K05	Which of the following consumes more energy in a household? (A) TV (B) stereo **(C) heater**	83.8
K06	An old house if bioclimatically renovated could conserve energy up to: (A) 20% **(B) 60%** (C) 90%	39.3
K07	How many times more energy does a video on stand-by consume than it consumes when playing or recording? (A) 9 times **(B) 19 times** (C) 29 times	13.3
K08	Full recycling of used paper packaging can conserve energy equal to what is consumed by: **(A) the city of Athens in 4 months** (B) the city of Athens in 6 months (C) Greece in 6 months	9.8
K09	A special automatic system in an air-conditioning device may reduce energy consumption by approximately: (A) 10% **(B) 20%** (C) 50%	31.8
K10	The refrigerator of a household consumes a percentage of the total energy consumption up to: (A) 5% **(B) 15%** (C) 30%	29.0
K11	A solar heater may reduce the electric bill up to: (A) 20% **(B) 40%** (C) 60%	35.0
K12	Most friendly to the environment detergents are those that: **(A) are free of phosphates** (B) are free of grains (C) are paper packaged	43.3
K13	Friendlier to the environment are the detergents that: **(A) contain soap** (B) contain whitener (C) contain grains	66.8
K14	Friendlier to the environment are the whiteners that: (A) contain chlorine **(B) contain oxygenous combinations** (C) contain alcohol	45.8
K15	Ecological electric devices are those that do not contain in their cooling circuit (A) resistors **(B) chlorofluorocarbon** (Freon) (C) plastic	52.5
K16	There is a regulation to record on the packaging of a product if it contains Genetically Modified Organisms (mutant) more than: **(A) 9%** (B) 29% (C) 49%	36.8
K17	What percentage of the environmental degradation has been brought about by the consumption activities of private households? (A) up to 10% **(B) up to 40%** (C) up to 60%	26.3
K18	I harm the environment more when I buy: **(A) very small fish** (B) medium fish (C) large fish	51.0
K19	I harm the environment more when I use: (A) mineral water **(B) bottled water** (C) tap water	55.0
K20	The water-closet that conserves more water is the one that: **(A) gives a shower flow** (B) gives a small flow (C) is built in the bowl	18.8
K21	What part of the total paper production is recycled paper? (A) one-sixth **(B) one-third** (C) two-thirds	13.3
K22	Small red recycling bins in the streets are for: (A) aluminium (B) glass **(C) batteries**	41.8
K23	Greece produces yearly urban waste per person approximately up to: (A) 100 kg **(B) 400 kg** (C) 800 kg	23.5
K24	According to a relevant EU directive the recycling of paper must reach a percentage of: (A) 45% **(B) 65%** (C) 85%	17.5
K25	Which is the least harmful to the environment? **(A) a ceiling blower** (B) an environmentally friendly air-conditioning device (C) a DVD player	39.0
K26	I protect the environment when choosing local products mostly because: (A) they are cheaper than the imported products **(B) less energy is consumed for their transportation** (C) they are purer and healthier than the foreign products	49.5
K27	There are no eco-label products in the product category of: (A) PCs (B) TVs **(C) videos**	22.5

Table 5. Consumers' environmental knowledge
The right answer is marked in bold.

		Mean	Std deviation
E01	To be honest I don't feel that environmental problems affect my personal, every day life	2.28	1.63
E02	There are other problems that bother me more than environmental destruction does	3.82	1.88
E03	Personally, I am not ready to pay from my pocket to protect the environment	4.06	1.83
E04	My personal responsibility is to leave to my children belongings, not a clean environment	2.57	1.65
E05	Governments and international organizations, not me, should take the necessary measures to protect the environment	3.63	2.09
E06	I have never been seriously concerned about issues such as ground water and sea pollution	3.15	1.75
E07	I don't believe that the environment would be protected if we used less water, electricity and oil	2.47	1.50
E08	I don't think that I have anything to do with the destruction of animals or plants	3.39	1.96
E09	The environmental policies of the main political parties is not the main issue I consider when deciding how to vote	4.81	1.66
E10	I do not think we should sacrifice economic development just to protect the environment	2.96	1.56
E11	More money to environmental protection means less money for jobs	2.86	1.56
E12	Consumption is not to be blamed for environmental destruction	2.38	1.52
E13	The benefits of modern consumer products are more important than the pollution which results from their production and use	2.77	1.59
E14	It is hard to find ecological products	4.56	1.83
E15	I believe ecological products are more expensive	4.76	1.75
E16	Most ecological products are less beautiful	3.29	1.62
E17	Most ecological products are of lower quality	2.47	1.43
E18	I am not sure if the so called ecological products are not another advertisement trick	2.85	1.65

Table 6. Environmental unconcern

p. 18) argument about the difficulty and complexity of the change towards pro-environmental behaviours.

It was found that pro-environmental purchasing behaviour (PPB) is not in the mainstream among Greek consumers' choices. Those that enhance PPB – more than their counterparts do – are professionals, 35–55 years of age, holding a graduate and/or a postgraduate degree and living on a family annual income of 25–30 thousand Euros. These consumers were also found to be more knowledgeable and less unconcerned with regard to environmental problems.

Public policy makers and businesses interested in marketing eco-friendly products need to realize that consumers are interested in avoiding products that contain GMOs and they are willing to reduce their overall consumption as well as energy and water consumption. They choose ecological products if they are not expensive. Even if these behaviours are driven by other motives, such as health concerns or financial motives, in practice they contribute to environmental protection and should be encouraged. However, the crucial prerequisites for green market growth are price, distribution and quality. *K*-means indicated that less than 20% of consumers can be characterized as relatively frequent pro-environmental purchasers. This segment is not going to get larger if the eco-friendly offerings keep being more expensive, less appealing and difficult to find. Communication strategies should focus on minimizing consumers' unconcern, which inhibits behavioural change towards pro-environmental consumption. With regard to public policy, it is noted that millions are spent every year on environmental education programmes funded by national and European authorities. In these programmes emphasis should be placed upon what is the right thing to do or avoid in favour of environmental protection in our everyday consumption activities.

As mentioned above, the descriptive statistics as well as the internal consistency estimates in PPB and EU of this study were found to be similar to the relevant findings of previous research in the same

geographical area. This similarity adds to the reliability and stability of the incorporated scales, which seem sufficient to be used in duplication of this study in other similar geographical areas. However, a measure development process never ends, as stated by Spector (1992). The knowledge scale, for example, should probably contain items with regard to price and quality of the eco-friendly products. Certain items need to be re-written and tested again. In addition, the validity of the scales should be further examined together with an assumed social desirability effect, the non-examination of which is a limitation of this study. Further research might also examine the impact of environmental knowledge upon pro-environmental behaviours other than purchasing (e.g. pro-environmental post-purchasing activities).

Another limitation of the study concerns the examination of the pro-environmental purchasers' actual willingness to reduce their consumption levels. Future research may include other factors too, such as the quantities of goods and services consumed by each household, members of the family, size of house, cars etc. in order to examine the relationships of these factors to the pro-environmental purchasing choices. Further research should also face more deeply the insights of motives that would better describe pro-environmental behaviours, e.g. the special weight of each aspect of personal well-being or society's and nature's well-being.

Also, the rather limited ability of the interactive effect of knowledge and attitudes to predict behaviour implies that there are other factors (probably values and other personality variables) that motivate or inhibit ecologically conscious consumer behaviour. For example, studies in the same geographical area revealed the roles of anti-materialistic values and locus of control over politics (Tilikidou and Delistavrou, 2004, 2005, in press). Previously, Shrum and McCarty (2001) examined the impact of 'individualism' and 'collectivism' upon recycling behaviour. Incorporating these types of variable in future studies together with knowledge and attitudes might provide better evidence of correlations and regressions.

Overall, it is concluded that, although this study filled in some of the gaps in ecologically related consumer research, there is much more to be further understood if marketers in Greece 'need and want' to implement sufficient strategies towards sustainable consumption.

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