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Are Greeks Knowledgeable Enough about Environmental Issues?

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#### **ABSTRACT**

The focus of this paper is the examination of Consumers' Environmental Knowledge (CEK). A scale to measure CEK has been constructed and the development procedure is presented. The procedure provided a 27-item, 3-choice construct, measured on a 'Right-Wrong' basis that indicated accepted level of reliability. In addition the ability of CEK to influence the Pro-environmental Purchasing Behaviour was tested in a household survey in Thessaloniki Greece. The results indicated that the more knowledgeable consumers are younger, better educated and hold relatively higher incomes, while house-persons were found less knowledgeable than their counterparts. The positive, moderate correlation coefficient between knowledge and behaviour indicated that at least to an extent people better informed about environmental issues were more likely to act in favour of the environment when making their purchasing choices.

**Keywords:** environmental knowledge, pro-environmental behaviour

# Are Greeks Knowledgeable Enough about Environmental Issues?

# **INTRODUCTION**

Ecologically oriented consumer research has been introduced in the English written literature three decades ago. In Greece it actually started in middle nineties. Research has been directed to examine ecological consumer behaviour and its influential factors, most usually attitudes and demographics. A number of theoretical models have been developed to conceptualize and test the relationships between sets of antecedents and behaviour (see Jackson, 2005, p. vi).

In comparison to other factors, assumed to be able to affect ecological behaviour, environmental knowledge has been rather neglected. There are many unanswered issues, such as what consumers actually know or think they know or perceive about environmental problems and protection and how this knowledge reflects on their behaviour. However, there have always been authors such as Arbuthnot and Lingg (1975), Synodinos (1990), Martin and Simintiras (1995), who believed that knowledge, might be considered as an important predictor variable for both pro-environmental attitudes and behaviour; also that low consumers' compliance in ecological behaviours, e.g. recycling, result from a lack of knowledge (Schultz, 2002). Public policy makers responsible for pro-environmental policies need dependable information about what citizens understand with regard to the environmental problems and the necessary measures to protect the physical environment. Also, firms which adopt ecological strategies should be interested not only on their customers' purchasing patterns, attitudes and preferences (Stefanou et al., 2003) but also in what consumers actually know about the eco-friendly offerings. In any case, it seems that investigating consumers' environmental knowledge is not an easy task. The problems derive from either the difficulty in defining the content of environmental knowledge and/or the development of the appropriate scale to measure it. In Greece it has been previously suggested that there is a need of a sufficient for Greek consumers, reliable and valid scale to measure environmental knowledge (Tilikidou, 2001, p. 203).

This study aimed to develop a consumer oriented environmental knowledge scale, sufficient for the Greek marketing environment and examine its impact on the proenvironmental purchasing behaviour.

### REVIEW OF THE LITERATURE

Early environmental knowledge scales have been developed by Maloney and Ward (1973), Ramsey and Rickson (1976), Arbuthnot (1977) and Arcury and Johnson (1987). In their meta-analysis paper Hines *et al.* (1987) reported that the reviewed seventeen studies provided a corrected correlation coefficient of .299 between knowledge and environmental behaviour. Later on, Leeming *et al.* (1995) presented the Children's Environmental Knowledge Scale (CHEKS), while Laroche *et al.* (1996) published the Ecoliteracy scale to measure the respondents' ability to identify or define a number of ecologically-related symbols and concepts towards the environment, but they concluded that Ecoliteracy was not a good predictor of green purchasers.

Schann and Holzer (1990) distinguished 'factual' knowledge (knowledge about definitions and causes of environmental damage) from 'action-related' knowledge (what can people do to protect the environment). They were followed by Tanner and Kast (2003) who found that 'action-related' knowledge was a positive, though weak, correlate of green purchasers.

Schultz (2002) understood knowledge related to the recycling as a subjective understanding, namely beliefs, of three types: 'procedural' (when, where and how to recycle), 'impact' (consequences) and 'normative' (what other people do) knowledge. Reviewing a variety of studies he found that knowledge had been indicated as a strong correlate of recycling behaviour. However, he concluded that knowledge does not provide a motive to recycle, but instead it is a lack of knowledge that is a barrier to behaviour.

Amyx *et al.* (1994) claimed that 'subjective' knowledge about the environment was a better predictor of green purchasing intentions than 'objective' knowledge. In other words, people, who thought they knew about environmental problems, were more likely to buy green, than people, who really knew about these problems. Subjective knowledge though, is rather an opinion or a belief in content, actually a kind of attitude. Schlegelmilch *et al.* (1996) found that their subjective scale did not manifest strong relationships with pro-environmental behaviours. Tilikidou (2001, p. 189) adopted the Lemming's *et al.* (1995) objective CHEKS to examine its relationships with an intergraded construct of the Ecologically Conscious Consumer Behaviour (ECCB). It was found that CHEKS correlated to attitudes but not to any type of behaviour.

The literature review indicated that excellent scales for a given place and time may not be sufficient for other populations. Also, that some of them contained pieces of expert knowledge, very unlikely for a consumer to have been informed about, such as green house gases, poisons in the water, rare species extinction etc. However, a considerable number of items sufficient to be included in the under construction measure were found through literature search. In addition to the academic literature, brochures provided by national and global organisations were taken into consideration, e.g. those by Greenpeace and the Greek Ministry of Environment.

#### **METHODOLOGY**

The methodology of this study consisted of two stages: a) a measure development procedure to construct a scale of Consumers' Environmental Knowledge (CEK) and b) an exploratory field research to test the impact of CEK on Pro-environmental Purchasing Behaviour (PPB).

## The measure development

Following the suggestions of Churchill (1979), Spector (1992) and Robinson *et al.* (1991) the measure development procedure incorporated the following steps: domain definition, in-depth interviews, brain storming, focus group, items generation, a preliminary survey to students, item analysis, reliability estimation, and face validity estimation.

**Domain definition**: Engel *et al.* (1995, p. 337) wrote that "at a general level knowledge can be defined as the information stored within memory". Consumer knowledge has been

described by Mowen and Minor (1998, p. 106) as the amount of experience with and information about particular products or services a person has. Engel *et al.* (1995, p. 337) wrote that "the subset of total information relevant to consumers functioning in the marketplace is called consumer knowledge". Following the above suggestions Tilikidou (2001, p. 60) defined Environmental Knowledge as "the subset of total information, relevant to environmental issues, a consumer holds". The later definition was followed in this study. Also, an effort was taken to ensure that the under construction measure would have certain characteristics such as: it should be an objective scale sufficient to be measured on a 'right-wrong' basis, it should not be too long or too difficult for consumers to answer, it should contain issues that have been published or have been announced by the media in the Greek society, it should hopefully cover as many as possible of the separate components of the whole body of environmental problems and in overall it should focus on 'what a consumer actually knows about each one of his/her everyday behaviours that might harm or protect the physical environment'.

**In depth Interviews:** Executives of ecological groups and organizations, local authorities and academics were interviewed. 15 interviews were taken in total. The main question was: "In accordance to your speciality what are the issues that a consumer should be aware of in order to act pro-environmentally?"

**Brainstorming:** 10 students of the Marketing Department of the Thessaloniki TEI were given assignments of a secondary data research on environmental knowledge. Then they were gathered in a discussion group to express their opinions on what topics the under construction scale should contain.

**Focus group:** A mixed focus group of 12 persons, 6 consumers and 6 experts was organised. The following 6 topics had been pre-decided to be discussed by one consumer and one expert, each through a semi-structured procedure: genetically modified organisms, environmentally friendly products, bioclimatic buildings, recycling, forest-trees-animals and atmosphere and water pollution. The procedure was videotaped. A thorough study of the records provided fruitful information as to each one of the above topics, which served as the components of the under construction scale.

**Item generation pool and pre-testing**: Editing and re-editing of the items followed to gain the initial items generation pool. In an effort to cover all the components 61 items in total were generated. They were measured on a 'Right-Wrong' basis out of three choices. A students' survey was then conducted in order to pre-test the initial measure of environmental knowledge. A stratified sample of 202 students of the TEI of Thessaloniki was used and the data were input in the analysis.

**Refinement of the scale**: Item analysis was conducted by the employment of the item-to-total correlation and alpha-if-item-deleted techniques to refine the measure. The weak items were eliminated. The procedure left 27 items (Cronbach's alpha=0.7695) in the final, refined measure of Consumers' Environmental Knowledge (CEK) (see Table 1). The final scale was handed to three experts who expressed satisfaction with relevance to the face validity (Tull and Hawkins, 1993) of the total measure.

## The consumers' survey

The CEK scale was included in a structured questionnaire together with the scale of Proenvironmental Purchasing Behaviour (PPB), the development of which has been presented elsewhere (see Tilikidou and Delistavrou, 2005). The PPB consists of 23 items, measured on a 7- point frequency scale from 1= Never to 7=Always. The survey was conducted in 328 households of the Municipality of Thessaloniki. 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). The Cronbach's alpha values were 0.7493 and 0.8806 for CEK and PPB respectively.

### **RESULTS**

The PPB scale (range 23-161, Mean 84.35), indicated 'occasional' to 'rare' engagement of consumers in Pro-environmental Purchasing Behaviour.

The total level of Consumers' Environmental Knowledge was found to be low (range 1-27, Mean 11.26). The frequencies in CEK indicated that 6 questions were answered correctly by more than 60% of the sample, 11 questions were answered wrongly by more than 60% of the sample, while the remaining 11 questions were answered correctly by approximately half of the consumers (Table 1). Consumers seem to be very well informed about issues such as 'what is recycling', glass containers being environmentally friendlier than plastic or aluminium containers', 'coal and petroleum being nonrenewable', 'heaters being the heavier energy consumers in a household' and 'detergents containing soap being friendlier than those containing whiteners or grains'. On the contrary the great majority of consumers seem to know nothing about issues such as 'a video on stand-buy consumes 19 times more energy than when it is playing', 'full recycling of the used paper packaging can conserve energy equal to what is consumed by the city of Athens in 4 months', 'the water closets that conserve more water are those that give a shower flow', that 'there are no eco-labelled videos' and surprisingly that 'the recycled paper production is one third of the total paper production', 'Greece produces yearly urban waste 400 kgr per person' and that 'according to the EU directive the recycling of paper must reach the 65 % of the total used paper.

### [Table 1 about here]

The ANOVA One-way was applied to explore the mean differences in CEK across demographical categories. Statistically significant relationships (p<0.01) were found with age, education, income and occupation (Table 2).

## [Table 2 about here]

Pearson's parametric *correlation* indicated a statistically significant (p<0.01) positive and moderate relationship between CEK and PPB (r=0.325), while *simple regression* indicated that 10.3% (adjusted R square) of the variance in PPB may be attributed to the influence of CEK. The resulting equation was:

**PPB=69.06** +**0.325 EK** (p<0.01).

#### DISCUSSION

The scale of knowledge (CEK) that has been developed and tested indicates some characteristics that might be discussed. It is well consumer oriented as it contains items

relative to the every-day consumers' behaviours. It does not contain many complex scientific expressions. Its internal consistency may be accepted, although further improvement is definitely desired. Further, the validity of the scale should certainly be one of the future research tasks, as in this study only the face validity was examined. Factor analyses and/or SEM might be employed in future efforts to create a reliable and valid measure.

The total low level of environmental knowledge may be attributed to deficient education, rare promotion of environmental information by the Greek media and time lag national pro-environmental policies in comparison to some other EU countries. However, the considerably lower scores in certain items (e.g. K7, K8, K20, K21 and K24) may be attributed to the difficulty of the relevant questions. Indeed, in these items consumers were asked to choose the right percentage of energy or water consumption or recycling goals. In future research re-editing of selected items might be considered.

Certain evidence of direct correlation between knowledge and purchasing behaviour was for the first time provided with reference to the Greek population. The relevant finding may be attributed to the fact that both scales (of knowledge and behaviour) have been purposively developed for consumers (not for experts) and are designed specifically for the Greek environment. The results found are somewhat more satisfying than those of previous efforts, for example the examination of the Lemming's *et al.* (1995) scale in Tilikidou (2001).

On the other hand the results of this study are in line with similar efforts in other countries which conclude that the task to reveal the role of knowledge in proenvironmental behaviour change faces noteworthy difficulties (Laroche *et al.*, 1996; Schlegelmilch *et al.*, 1996). A closer look at the regression output of this study indicates that a significantly low percentage of the variance in the purchasing behaviour is explained by the level of knowledge. This result implies low relevant magnitude of knowledge among other predictors of behaviour, which were not included in this study. In this study the focus was primarily placed on the construction of the knowledge scale and not on the insights of the purchasing behaviour. Future research might examine the ability of knowledge among other factors (e.g. attitudes or psychographics) to influence a broader variety of behaviours than buying (e.g. post-purchasing behaviours and non-purchasing activities).

### CONCLUSIONS AND IMPLICATIONS

The primary aim of this study was to provide an objective, contemporary, reliable and valid scale, sufficient for measuring the level of environmental knowledge among Greek consumers. A secondary aim of the study was to test the ability of the environmental knowledge to impact on the pro-environmental purchasing behaviour. The measure development procedure resulted in a 27 items Consumers' Environmental Knowledge scale. The total level of environmental knowledge among Greek consumers was found to be low. More knowledgeable consumers are younger, better educated and holding relatively higher incomes while house persons were found less knowledgeable than their counterparts. The positive, moderate correlation between knowledge and behaviour indicated that at least to an extent people better informed about environmental issues

were more likely to act in favour of the environment in their purchasing behaviour.

Educators of environmental studies may get detailed information with regard to certain topics that should be included in their programs. Courses of environmental education among pupils and students should incorporate pieces of knowledge relevant to the environmental problems that are caused by the every-day consumption activities. Business marketing eco-friendly products should build their strategies not only on the basis of their customers' purchasing attitudes and preferences but also on the basis of what consumers actually know, or should know about their products. Local authorities and public policy makers should include in their communication strategies clear information about those issues that consumers were found to be rather unaware of. What we need is to educate young people about what they should keep in mind with reference to recycling, conservation of energy, water and fossil fuels, also products and packaging that are less harmful to the environment.

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Table 1: Consumers' Environmental Knowledge

140	le 1: Consumers' Environmental Knowledge  Items	Right Answers (%)
K1.	Recycling means that: A) used material return to their original form in	(7*)
	<b>order to be used again</b> B) the paper is being transformed to fertilizers	76.5
	C) used materials are sold second-hand for alternative use	
K2.	Friendlier to the environment is the: A) glass containers B) plastic	7.5.0
	containers C) aluminum containers	75.0
K3.	Coal and petroleum are examples of: <b>A) Fossil fuels</b> B) Alternative	75.0
ļ	sources of energy C) Recycled resources.	75.0
K4.	An example of a non-renewable resource is: <b>A) Petroleum</b> B) Ocean	(1.2
	water C) Sunlight	64.3
K5.	Which of the following consumes more energy in a household? A) TV	92.0
	B) stereo C) heater	83.8
K6.	An old house, if bioclimatically renovated, could conserve energy up to:	40.9
	A) 20% <b>B) 60%</b> C) 90%	40.9
K7.	How many times more energy does a video on stand-buy consume than it	13.4
	consumes when playing or recording? A) 9 times B) 19 times C) 29 times	13.4
K8.	Full recycling of the used paper packaging can conserve energy equal to	
	what is consumed by: A) the city of Athens in 4 months B) the city of	8.5
	Athens in 6 months C) Greece in 6 months	
K9.	A special automatic system in an air-conditioning device may reduce	25.6
	energy consumption by approximately: A) 10% B) 20% C) 50%	23.0
K10		25.9
	consumption up to: A) 5% <b>B) 15%</b> C) 30%	23.7
K11	A solar heater may reduce the electric bill up to: A) 20% B) 40% C)	35.4
	60%	
K12	,	43.3
	<b>phosphates</b> B) are free of grains C) are paper packaged	15.5
K13	Friendlier to the environment are the detergents that: A) contain soap	66.5
	B) contain whitener C) contain grains	
K14	Friendlier to the environment are the whiteners that: A) contain chlorine	43.9
T7 1 7	B) contain oxygenous combinations C) contain alcohol	
K15	Ecological electric devices are those that do not contain in their cooling	52.7
T7.1.C	circuit A) resistors B) chlorofthoriocarbon (Freon) C) plastic	
K16		41.7
	contains Genetically Modified Organisms (mutant) more than: <b>A) 9%</b> B)	41.5
V17	29% C) 49%	
K17	$\mathcal{E}$	25.2
	by the consumption activities of private households? A) up to 10% B)	25.3
V10	up to 40% C) up to 60%	
V19	I harm more the environment when I buy: <b>A) very small fish</b> B) medium	49.7
<b>V</b> 10	fish C) large fish  Therm more the environment when Luces A) mineral water P) bettled	
K19	,	51.5
	water C) tap water	

K20	Water-closet that conserves more water is the one that : A) give a shower flow B) give a small flow C) are built in the bowl	17.4
K21	Which part of the total paper production is the recycled paper? A) one out of six <b>B) one out of three</b> C) two out of three	12.5
K22	Small red recycling bins in the streets are for: A) aluminium B) glass C) batteries	43.6
K23	Greece produces yearly urban waste per person approximately up to: A) 100 kgr <b>B) 400 kgrs</b> C) 800 kgrs	24.1
K24	According to a relevant EU directive the recycling of paper must reach a percent of: A) 45% B) 65% C) 85%	17.7
K25	Which is the less harmful to the environment? <b>A) a ceiling blower</b> B) an environmentally friendly air-conditioning device C) a DVD player	41.5
K26	I protect the environment when choosing local products mostly because: A) they are cheaper than the imported products <b>B) less energy is consumed for their transportation</b> C) they are purer and healthier than the foreign products	49.7
K27	There are no eco-label products in the product category of: A) P/Cs B) TVs C) video	21.0

<sup>\*</sup> The right answer is marked in bold

Table 2: ANOVA (one way) of CEK across demographics

Table 2: ANOVA (one way) of CEK across demographics									
	N	Mean	Std.	$\mathbf{F}$	Sig.				
	<b>Deviation</b>								
Gender									
Men	126	11.4444	4.0547	.352	0.553				
Women	202	11.1485	4.5915						
Total	328	11.2622	4.3891						
Age									
15 - 24 years old	98	11.5816	4.5768	3.446	0.003				
25 - 34 years old	72	12.0556	4.1922						
35 - 44 years old	61	11.7049	3.9847						
45 - 54 years old	48	11.2500	4.1795						
55 - 64 years old	22	8.9545	4.7757						
65 - 74 years old	20	9.6500	4.0559						
more than 75	7	6.7143	3.4983						
years old									
Total	328	11.2622	4.3891						
Education									
Some elementary	4	5.7500	1.7078	10.468	0.000				
Elementary	24	7.0833	3.2826						
High school	98	10.3367	4.0332						
Student	76	12.0921	4.5641						
Graduate	109	12.2752	4.0228						
Post-graduate	17	13.5882	4.1391						
Total	328	11.2622	4.3891						
Income									
< 3.000 €	15	11.1333	5.3966	2.529	0.015				
3.001 - 6.000 €	39	10.5641	5.2755						
6.001 - 10.000 €	51	9.9412	4.4516						
10.001 - 15.000 €	56	10.3929	4.0393						
15.001 - 20.000 €	52	12.1154	3.7083						
20.001 - 25.000 €	38	11.5789	3.8669						
25.001 - 30.000 €	25	12.7600	4.6213						
> 30.001 €	48	12.5625	4.0048						
Total	324	11.2963	4.3825						
Occupation									
Professional	43	11.8837	4.1416	4.999	0.002				
Employee	156	11.4167	4.3120						
Houseperson	31	8.4516	3.5855						
Unemployed or	98	11.6327	4.5778						
student	, ,								
Total	328	11.2622	4.3891						