

TITLE: DELIMITING THE ENVIRONMENTALLY CONSCIOUS CONSUMER. A CLUSTERING ANALYSIS APPROACH

Abstract:

Given the growing concern over environmental destruction it is useful for both business and government leaders to characterize consumers by their consciousness, knowledge and behaviour regarding the state of the environment. This study uses clustering analysis to define four consumer segments and to propose strategies to reach consumers and achieve their commitment to environmental protection.

Keywords: ecological consumer behaviour, cluster analysis, environmental consciousness

Track: CONSUMER BEHAVIOUR

Introduction

In industrialized and developing countries polls demonstrate that there is a high level of concern about environmental destruction. In 2002, in Europe, between 72 and 89 percent of citizens demonstrated concern about the environment, depending upon the specific issue about which they were questioned. Forty-five percent of Europeans thought that the state of the environment could be improved by making lifestyle changes. Forty-four percent of Europeans polled thought that humans cause irreparable damage to the environment, while only 4% thought that humans act in harmony with the environment (European Commission, 2002.)

In the context of this information it is interesting for business and government leaders to characterize consumers based on their level of concern for the environment, their knowledge of the state of the environment and their behaviour to help address the problem of environmental destruction. With this information, marketing strategies can be developed to reach different consumer groups (De Pelsmaker and Roozen, 1988). Marketing literature generally distinguishes between four and six consumer groups in relation with their attitudes toward environment (Kinnear and Taylor, 1973; Seoanez and Angulo, 1997; Sánchez Rivero, 2001 and Fundación Entorno, 2001). There is a broad range of variables that have been analyzed as determinants of behaviour and attitudes regarding the environment, including education level (Uusitalo, 1990; Granzin and Olsen, 1991; Luque Martínez, 1998; Rowlands et al., 2002), age (Anderson and Cunningham, 1972; Downs and Freiden, 1983; Uusitalo, 1990; Granzin and Olsen, 1991; Roberts, 1996; Rowlands, 2003), income (Kinnear et al., 1974; Webster, 1975; Aaker and Bagozzi, 1982; Downs and Freiden, 1983; Granzin and Olsen, 1991; Allen et al., 1993; Roberts, 1996; Garcés et al., 1999; McCarty and Shrum, 2001), habitat (Antil, 1984; Samdahl and Robertson, 1989; and Schwepker and Cornwell, 1991), political orientation (Aragonés and Amérigo, 1991; Bohlen et al., 1993; De Pelsmacker and Roozen, 1998; Rowlands et al., 2003), and descent (Brooker, 1976; Davies et al., 1995; Roozen, 1997; Grunert, 1993).

Continuing this line of investigation, the present study proposes a delimitation of consumer segments based on affective, conative and cognitive perception of the environment. Finally, the study suggests strategies to develop and reinforce respectful consumer behaviour toward the environment.

Methodology: Procedure and Measurement Scales

Personal interviews were conducted (*Hall Tests*) in four cities representing the socio-demographics of each major geographic area of Spain (North, South, East and Central Spain.) A convenience sample of women, with quotas by age, was drawn. The final sample size was 694, with a sample error de 3.72%, and a confidence level of 95.5%, based on the total Spanish population of women 18 years or older.

Likert measurement scales from 1 to 5 were used in the questionnaires (except for the non-metric socio-demographic characteristics, which were true/false questions). Table 1 shows the reliability figures, reference scales and final form.

Table 1: Measurement Scales

Variable	Reference and final form	Reliability
Behaviour	Maloney and Ward (1973); Maloney et al. (1975); Antil (1984) and authors' original design design. Four types of behaviour (Likert type): <ul style="list-style-type: none"> • I pay attention to what the political party that I vote for does in relation to the environment. [PARTY] • I regularly seek information about what I can do to improve the state of the environment. [INFO] • I don't make a special effort to buy products packaged in recyclable material. (-) [RECI] • In some instances I have changed brands and/or products for ecological reasons. [PROD] 	N.A.
Affect [AFFEC]	Maloney and Ward (1973); Maloney et al. (1975); Antil (1984) and authors' original design. Three item sum scale (Likert type): <ul style="list-style-type: none"> • I am concerned that the government doesn't do anything to control pollution. • I am upset when I think about the destructive effect of pollution on plants and animals. • When I think of industrial pollution I feel frustrated and angry. 	0.653 ^a
Knowledge [KNOW]	Authors' original design., Outline by Maloney et al. (1975) Three item sum scale (True/False): <ul style="list-style-type: none"> • The president of Germany is a member of an ecological party. • CFCs are gasses which affect the ozone layer, but do not contribute to global warming. • We can define ecology as the study of pollution and how to control it. 	0.525 ^b
Perceived consumer effectiveness [PCE]	Ellen et al. (1991). Two item sum scale (Likert type): <ul style="list-style-type: none"> • There is not a lot that an individual can do to have an effect on the environment. • My efforts to take care of the environment are useless if other people don't also take care of it. 	0.270 ^c
Profound beliefs about the environment	Dunlap y Van Liere (1978); Dunlap y Van Liere (2000). Three different sum subscales. Eight items.	
	Subscale weakness of environmental balance [NEP_BAL]. <ul style="list-style-type: none"> • Ecological equilibrium is very delicate. • When people regularly interfere with nature the consequences are disastrous. • People should live in harmony with nature to assure the survival of future generations. • Human beings are abusing the environment. 	0.625 ^a
	Subscale attitude toward economic growth [NEP_GROW] <ul style="list-style-type: none"> • The earth is like a spaceship with a certain number of rooms and limited resources. • To have a healthy economy, economic growth needs to be controlled. 	0.270 ^c
	Subscale of ecocentrism [NEP_ECO] <ul style="list-style-type: none"> • People don't need to adapt to their natural environment because it can be modified to suit their needs (-). • Plants and animals exist fundamentally to be used by people (-). 	0.220 ^c
Socio-demographics	Developed with data about the Spanish population provided by (http://www.ine.es): Age [AGE]; Motherhood [MOT]; Income [INC]; Education [EDU]; Residence [RES]	N.A.
Political Orientation [POLIT]	Spanish Center for Sociological Research (Centro de Investigaciones Sociológicas español, CIS): <ul style="list-style-type: none"> • To discuss politics normally the terms "right," "centre," and "left" are used. If the left is a 1 and the right is a 5, where do you classify yourself on this scale? 	N.A.

a: Cronbach's α . b: Tetra choric correlations. c: Pearson correlation coefficient.

Results

The technique used to delimit and describe segments was the non-hierarchical method K-means clustering. To determine the number of clusters, different criteria were used such as the analysis of hierarchical tree of cases or icicle plot (with a distance between 30% and 40% of the total), and analysis of the evolution of different magnitudes during successive groupings: an indicator from Calinsky and Harabasz (1974), the R^2 and the average of the square of deviations ($RMSSTD^2$) from Timm (2002; 531-532). Along with the previous criteria, that of Mojena (1977) was also considered. All of the criteria indicate that the number of groups needs to be either four or nine. As the identification of nine groups seems excessively complex for the formation of public and private politics and because the results of previous studies have identified four to six groups, we decided to classify four groups.

In the table of means (Table 2), two groups are classified as “green” and the other two are “brown” as they show levels of awareness above and below the average, respectively.

The group classified as “true greens” show a greater level of environmental knowledge and a higher level of behaviour which respects the environment. In contrast, we found another group which may be classified as “sentimental greens” who demonstrate a strong emotional concern for the environment, but have a lower level of knowledge and environmentally friendly behaviour than the previous group.

Both of these groups were similar in affective level (AFFEC) in support of limited economic growth (NEP_GROW) and in the perception of a fragile ecological equilibrium (NEP_BAL). However, there are significant differences between these groups due to lower perceived consumer effectiveness (PCE), on the part of the sentimental greens. This probably reduces their environmentally friendly behaviour, particularly regarding recycling (RECI). Finally, they are characterized in a special way because they show greater **anthropocentrism** and a lesser degree of knowledge regarding the environment (KNOW). Therefore, it seems that their lack of knowledge hinders behaviour which matches their emotional state of concern.

At the opposite end of the scale, the “true browns” develop environmentally friendly behaviour less frequently and they show less worry and effectiveness in their behaviour. Finally, the “sentimental browns”, despite being only slightly affected by the environmental situation, are different from the “true browns” in that they show relatively high levels of knowledge regarding the environment, perceived consumer effectiveness (PCB), and especially seem to reject the dominion of man over the environment (NEP_ECO) much like the “true greens”.

Table 2: Group Means

	True Greens	Sentimental Greens	Sentimental Browns	True Browns	ALL
PARTY	4.04	3.48	3.08	2.35	3.32
INFO	4.47	4.23	3.85	2.59	3.86
RECI	4.30	3.61	3.75	3.08	3.74
PROD	4.20	3.55	3.01	2.15	3.32
KNOW	1.57	0.43	0.83	0.68	0.93
NEP_BAL	4.85	4.82	4.60	4.31	4.67
NEP_ECO	4.42	2.82	4.30	3.60	3.81
NEP_GROW	4.52	4.40	3.16	3.87	4.05
AFFEC	4.61	4.60	4.25	3.49	4.28
PCE	3.72	2.90	3.49	2.80	3.26
Size	215 (31%)	174 (25%)	153 (22%)	152 (22%)	694 (100%)

Cluster description

Once the consumer groups were identified, then their components were analyzed, starting with socio-demographic characteristics (See Table 3.) Using age as a dependent variable of the group to which one belongs, significant differences can be noted ($F=13.31$; $p=0.00$). Post-hoc analysis supports the existence of differences between the sentimental green group and the rest¹, this group having older people than the others. This result corresponds to other studies consulted in relation to age and environmental conscience or behaviour (Uusitalo, 1990; Granzin and Olsen, 1991; Rowlands, 2003).

The political orientation of the members of the four groups shows significant differences ($F=10.17$; $p=0.00$). The more to the left an individual, the more protectionist the attitude towards the environment²; data which corresponds to findings from previous studies (Aragonés and Amérigo, 1991; Bohlen et al., 1993; Scott and Willits, 1994; De Pelsmacker and Roozen, 1998; Rowlands et al., 2003).

The “sentimental green” group is made up of a higher percentage of mothers than any other group, especially with regard to the “sentimental browns” and the “true greens” ($\chi^2=27.29$; $P=0.00$). However, there is no easily identifiable pattern between the different segments, possibly because the relationship is due to age, and not to motherhood, given the existing association between these socio-demographic variables.

Income also shows significant differences, ($\chi^2=36.925$; $p=0.00$), just as was expected after a review of the bibliography (Kinnear et al., 1974; Webster, 1975; Aaker and Bagozzi, 1982; Downs and Freiden, 1983; Granzin and Olsen, 1991; Allen et al., 1993; Roberts, 1996; Garcés et al., 1999; McCarty and Shrum, 2001). The meaning of this relationship is not clear because the “true greens” show a higher income than the rest of the groups, while the opposite occurs with the “sentimental greens”. Of the two brown groups, the “sentimental browns” have higher incomes than the “true browns”.

The socio-demographic variable which shows the greatest statistical difference between the groups is education level ($\chi^2=46.95$; $P=0.00$). The “true greens” have a significantly higher proportion of university educated members. This corresponds to the results of most of the other studies consulted (Uusitalo, 1990; Granzin and Olsen, 1991; Luque, 1998; Rowlands et al., 2003).

Table 3: Socio-demographic characteristics of the groups

Characteristic	Test	Category	True Greens	Sentimental Greens	Sentimental Browns	True Browns	All
AGE	$F=13.311$; $p=0.000$		38.69(-0.15)	46.91 (0.39)	40.13 (-0.06)	38.38 (-0.19)	41.00 (0.00)
POLIT	$F=10.170$; $P=0.000$		2.35(-0.30)	2.81 (0.13)	2.74 (0.07)	2.90 (0.21)	2.66 (0.00)
MOT	$\chi^2=27.291$; $P=0.000$	Yes	98 (-18.30)	120 (25.43)	89 (6.39)	68 (-13.52)	375
		No	116 (18.30)	54 (-25.43)	63 (-6.39)	82 (13.52)	315
INC	$\chi^2=36.923$; $P=0.000$	<781€	22 (-12.60)	39 (13.18)	16 (-9.28)	32 (8.69)	109
		781€-1140€	53 (9.19)	27 (-5.68)	33 (1)	25 (-4.51)	138
		1141€-1560€	43 (-3.6628)	43 (8.18)	39 (4.91)	22 (-9.43)	147
		1561€-2160€	36 (-1.14)	23 (-4.71)	28 (0.87)	30 (4.98)	117
		>2160€	39 (8.21)	12 (-10.97)	25 (2.50)	21 (0.25)	97
EDU	$\chi^2=46.948$; $P=0.000$	None or Primary	23 (-27.03)	60 (19.32)	39 (3.23)	40 (4.47)	162
		Secondary	58 (-4.99)	58 (6.78)	50 (4.96)	38 (-6.74)	204
		University	133 (32.02)	56 (-26.10)	64 (-8.19)	74 (2.27)	327
RES	$\chi^2=1.392$; $P=0.707$	Rural					85
		Urban					603

The value in parenthesis is the variable in the case of ANOVA and the observed-expected frequency of χ^2

¹ Tukey Honest Test results: ($p_{4 \text{ vs. } 1}=0,00$; $p_{4 \text{ vs. } 2}=0,00$; $p_{4 \text{ vs. } 3}=0,00$; $p_{3 \text{ vs. } 1}=0,99$; $p_{3 \text{ vs. } 2}=0,72$; $p_{2 \text{ vs. } 1}=0,78$)

² Tukey Honest Test results: ($p_{4 \text{ vs. } 1}=0,00$; $p_{4 \text{ vs. } 2}=0,94$; $p_{4 \text{ vs. } 3}=0,90$; $p_{3 \text{ vs. } 1}=0,00$; $p_{3 \text{ vs. } 2}=0,61$; $p_{2 \text{ vs. } 1}=0,00$)

Conclusion

This study provides a description of the ecological market through classification of four consumer segments based on cognitive, affective and conative characteristics in relation to environmental protection.

First, this study verifies the existence of “true greens”, a consumer segment that makes up approximately one third of the population, and has a high level of awareness and knowledge about the environment and environmentally friendly products. This is a very attractive group to businesses because they have an above average income. Further, their high level of education allows companies to use written material highlighting the environmental advantages of their products, favouring a powerful written medium over television.

Another quarter of the population, sentimental greens, also show high levels of concern for the environment, but haven't got the knowledge and habits to behave in defence of the environment. Members of this group are older than the average, but have a lower than average income and educational level, and have the lowest level of real knowledge about environmental problems as well as low perceived consumer effectiveness. Of particular importance is the fact that members of this group have higher scores than average related to active searches for information regarding solutions to environmental problems in contrast to their meagre recycling. It seems then, that this group of consumers lacks knowledge which allows them to develop behaviours in equal relation to their concern, but they want to acquire that knowledge. In this case, public powers should develop environmental education campaigns to teach the meaning of “responsible behaviour”, the ways to accomplish it. These campaigns should be directed specifically to older people and should consist of short workshops or courses, as opposed to massive communications.

The “sentimental brown” group is interesting because they seem to have a base upon which to build a concern for the environment. They have an average level of knowledge, and high perceived consumer effectiveness and ecocentric position. Additionally, the members of the group are people who have higher than average abilities in complex behaviours, like recycling. It is necessary to persuade this group to act in the face of environmental deterioration. In this case, massive audio visual resources should be used to convey the message since they have a capacity to transmit affective messages.

Finally, despite the limits of the measurements, we need to conclude that the level of concern for the environment among the general population is high, while the level of knowledge about the environmental situation is low. The latter probably determines the low levels of perceived consumer effectiveness. As the Eurobarometer 2002 (European Commission, 2002) shows, there is a strong relationship between the desire to be informed and the self-confidence to contribute solutions to environmental problems. After an analysis of our data, it can be concluded that a lack of knowledge about the environmental situation, as well as of the existing ways to improve it, is a considerable obstacle in the development of effective behaviour in defence of the environment (Van Dam and Apeldoorn, 1996; Kilbourne et al., 1997). Therefore, it is necessary to increase the amount of information that citizens receive to stimulate suitable habits in order to defend the environment.

REFERENCES

- Aaker, D. A. & Bagozzi, R. P. (1982). Attitudes toward public policy alternatives to reduce air pollution. *Journal of Public Policy & Marketing*, 1, 85-94.
- Allen, J., Davis, D. & Soskin, M. (1993). Using coupon incentives in recycling aluminium: A market approach to energy conservation policy. *Journal of Consumer Affairs*, 27 (2), 300-318.
- Anderson, W. T. & Cunningham W. H. (1972). The socially conscious consumer. *Journal of Marketing*, 36 (July), 23-31.
- Antil, J. H. (1984). Socially responsible consumers: Profile and implications for public policy. *Journal of Macromarketing*, Fall, 18-39.
- Aragónés, J. I. & Américo, M. (1991). Un estudio empírico sobre las actitudes ambientales. *Revista de Psicología Social*, 6 (2), 223-240.
- Bohlen, G. M., Schlegelmich, B. & Diamantopoulos, A (1993). Consumer perceptions of the environmental impact of an industrial service. *Marketing Intelligence & Planning*, 11 (1), 37-48.
- Brooker, G. (1976). The self-actualizing conscious consumer. *Journal of Consumer Research*, 3 (September), 107-112.
- Calinsky, R. B. & Harabasz, J. (1974). A dendrite method for cluster analysis. *Communication in statistics*, 3, 1-27.
- Davies, A., Titterington, A. J. & Clive Cochrane (1995). Who buys organic food? A profile of the purchasers of organic food in Northern Ireland. *British food journal*, 97(10), 17-23.
- De Pelsmacker, P. & Roozen, I. T. M. (1998). A taxonomy of environmentally-conscious consumers and environmentally-friendly behaviour. *27 EMAC Conference. Estocolmo*, 349-368.
- Downs, P. E. & Freiden, J. B. (1983). Investigating Potential Market Segments for Energy Conservation Strategies. *Journal of Public Policy and Marketing*, 2, 136-152.
- Dunlap, R. E., & Van Liere, K. D. (1978). The new environmental paradigm: a proposed measuring instrument and preliminary results. *Journal of Environmental Education*, 9, 10-19.
- Dunlap, Riley E., Van Liere, K. D., Merting, A. G. & Jones, R. E. (2000). Measuring endorsement of the New Environmental Paradigm: A revised NEP scale. *Journal of Social Issues*, 56 (3), 425-442.
- Ellen, P. S., Wiener, J. L. & Cobb-Walgren, C. (1991). The role of perceived consumer effectiveness in motivating environmentally conscious behaviors. *Journal of Public Policy and Marketing*, 10 (2), 102-117.
- European Commission (2002). The attitudes of Europeans towards the environment. *The European Opinion Research Group (EORG)*, December. Available in: http://europea.eu.int/comm/public_opinion/archives/eb/ebs_180_en.pdf.
- European Commission (2004). Flash Eurobarometer 123 Eos Gallup. *Comisión Europea*. Available in: http://europa.eu.int/comm/public_opinion/flash/fl123_fr.pdf
- Fundación Entorno (2001). *Estudio sobre hábitos de consumo y medio ambiente en España, 2001*. Fundación Entorno, Madrid. Available in: <http://www.fundacion-entorno.org>
- Garcés, C., Pedraja, M., Rivera, P. & Berné, C. (1999). Estudio del perfil del consumidor comprometido con el medio ambiente. *Estudios sobre consumo*, 51, 85-94.
- Granzin, K. L. & Olsen, J. E. (1991). Characterizing participants in activities protecting the environment: A focus on donating, recycling and conservation behaviours. *Journal of Public Policy & Marketing*, 10 (2), 1-27.
- Grunert, S. C. (1993). Everybody seems concerned about the environment: but is this concerned reflected in (Danish) consumer food choice?. *European Advances in Consumer Research*, 1, 428-433
- Kassarjian, H. H. (1971). Incorporating ecology into marketing strategy: The case of air pollution. *Journal of Marketing*, 35 (July), 61-65.

- Kilbourne, W. E., McDonagh, P. & Prothero, A (1997). Sustainable consumption and the quality of life: A macromarketing challenge to the dominant social paradigm. *Journal of Macromarketing*, 17 (Spring), 4-24.
- Kinnear, T. C., Taylor, J. R. & Sadrudin A. A. (1974). Ecologically concerned consumers: Who are they?. *Journal of Marketing*, 38 (April), 20-24.
- Kinnear, T. & Taylor, T. (1973). The effect of Ecological Concerns on Brand Perceptions. *Journal of Marketing Research*, 10 (May), 191-197.
- Luque, T. (1998). *Comercio minorista y comportamiento del consumidor granadino*. Granada: Cámara de Comercio Industria y Navegación de Granada.
- Maloney, M. P. & Michael P. W. (1973). Ecology: Let's hear from the people. An objective scale for the measurement of ecological attitudes and knowledge. *American Psychologist*, 28 (July), 583-586.
- Maloney, M. P., Ward, M. P. & Braucht, G. N. (1975). A revised scale for the measurement of ecological attitudes and knowledge. *American Psychologist*, 30 (July), 787-790.
- McCarty, J. A. & Shrum, L. J. (1993). A structural equation analysis of the relationships of personal value attitudes and beliefs about recycling, and the recycling of solid waste. *Advances in Consumer Research*, 20, 641-646.
- Mojena, R (1977). Hierarchical grouping methods and stopping rules: an evaluation. *Computer Journal*, 20, 353-363
- Roberts, J. A. (1996). Will the real socially responsible consumer please step forward?. *Business Horizons*, 39 (1) Jan-Feb, 79-83.
- Roozen, I. T. M. (1997). Who are really purchasing environmentally friendly detergents?. *Journal of Consumer Studies and Home Economics*, 21, 237-245.
- Rowlands, I. H., Scoot, D. & Parker, P. (2003) Consumer and green electricity: profiling potential purchasers. *Business Strategy and the Environment*, 12 (1), 36-48
- Sánchez, M. (2001) Segmentación de la población española según su grado de concienciación ecológica mediante modelos de variables latentes. *Investigaciones europeas de dirección y economía de la empresa*, 7 (3), 173-196.
- Schweper, C. H. & Cornwell, T. B. (1991). An examination of ecologically concerned consumers and their intention to purchase ecologically packaged products. *Journal of Public Policy & Marketing*, 10 (2), 77-101.
- Seoanez, M. & Angulo, I. (1997). *El medio ambiente en la opinión pública*. Mundi-Prensa, Madrid.
- Simon, F. L. (1992). Marketing green products in the Triad. *The Columbia Journal of World Business*. Otoño-Invierno, 268-285.
- Timm, N. H. (2002). *Applied Multivariate Analysis*. Springer-Verlag, New York.
- Uusitalo, L. (1990) Consumer preferences for environmental quality and other social goals. *Journal of Consumer Policy*, 13, 231-251.
- Van Dam, Y. K. y Apeldoorn, P. A. C. (1996). Sustainable marketing. *Journal of Macromarketing*, 16 (2), 45-56.
- Webster, F. E. (1975). Determining the characteristics of the socially conscious consumer. *Journal of Consumer Research*, 2 (December), 188-196.