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The Role of Motivation in the Consumers' Recycling Behavior

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ABSTRACT

This paper presents the results of a survey conducted in Thessaloniki Greece, in a probability sample of 375 households, selected with a combination of the two-stage area sampling and the systematic sampling method. The main aim was to understand more deeply which factors motivate consumers to engage into Recycling Behavior. Besides Motivation, selected demographic characteristics, Knowledge about recycling issues, specific Recycling Attitudes were also examined with regard to the Recycling Behavior of the sample. The results, verifying previous research, indicated that consumers holding higher education and higher incomes get more involved in recycling activities than their counterparts do. Knowledge and Recycling Attitudes indicated positive, moderate, statistically significant relationships with Recycling Behavior. However, it was found that the most powerful factor to describe and predict Recycling Behavior is Motivation. Further analysis revealed additional indications that social incentives can be the type of Motivation that affects consumers more strongly.

Keywords: Recycling Behavior, Recycling Attitudes, Recycling Knowledge, Motivation to Recycle.

Introduction

Recycling is the mostly suggested pro-environmental solution to the problem of urban solid waste. Over the past decades the communities faced the imperative need to implement the most effective recycling programs in order to assist the waste management efforts. The main scope of running residential recycling programs is to recover as much as possible from the waste stream. The key element, which determines the success of the lunched recycling programs, is consumers' participation (Howestine, 1993; McCarty and Shrum, 1994; Shrum *et al*. 1994; Peattie, 1995, p. 89). The success is evaluated by the participation rate, as well as by the citizens' recycling behavior in terms of the frequency of participation. Although recycling is becoming the mainstream in the U.S.A. and in the U.K., in Greece the consumers' participation is still far from the desired in the E.U. standards (Tilikidou, 2001, p. 138; Delistavrou, 1999, p. 5).

It is apparent that relevant consumer research is necessary to gain better understanding of consumers' recycling behavior. Research results are useful to public authorities as they assist their effort to design creative recycling strategies (McCarty and Shrum, 1994; Tilikidou, 2001, p. 6). Research is necessary to gain better and deeper knowledge of the factors that enhance participation in recycling programs, so that local authorities' marketers can proceed to segmenting and targeting the marketing effort effectively (Shrum *et al.*, 1994).

The great majority of the research undertaken has been conducted in the U.S.A. and in Western Europe. No broadly accepted profile of recyclers is revealed yet, although during the past three decades interesting results have come into light by several research studies such as those by Webster (1975), Arbuthnot (1977), Vining and Ebreo (1990), Hopper and Nielsen (1991), Ebreo and Vining (1994), Shrum *et*

al. (1994), Shrum and McCarty (1998). Research so far tried to identify the profile of the recyclers or non-recyclers utilizing mainly selected demographic and psychographic characteristics and attitudes. Besides this usual approach, there have been efforts, which tried to answer the question how can consumers be motivated to recycle. The ability of motivation to define recyclers from non-recyclers has been investigated mostly in the U.S.A., as indicated in a number of papers, for example those by De Young, (1986), Hopper and Nielsen (1991), Howestine (1993), Allen *et al*, (1993) and Gamba and Oskamp (1994).

With regard to Greece, research started rather late in comparison with other countries. Most efforts, including our own previous research, examined mainly the relationships between attitudes and recycling behavior as well as selected demographic and psychographic characteristics of recyclers, as indicated, for example, in the works of Sarmaniotis and Tilikidou (1994) and Sarmaniotis, *et al*. (1999). The only effort, which included motivation - among other independent variables - as a possible determinant of recycling behavior in Greece, was made by Delistavrou (1999). However this study confined in reporting a relationship between Recycling Behavior and Motivation but did not examine closely the type of incentives that can better motivate consumers to recycle. Further research is needed to provide expanded knowledge with regard to the role of Motivation, among other selected factors, in describing and predicting Recycling Behavior.

Thus, this paper mainly aims to present a deeper understanding of the relationship between motivation to recycle and recycling behavior. The emphasis is placed upon the exploration of the relative magnitude of each one of the utilized types of motives in predicting recycling behavior. In addition, a number of independent factors, namely selected demographic characteristics, Recycling

Attitudes and Knowledge were also included in the investigation, in order to assist to a more integrated approach of recycling behavior understanding.

Review of the Literature

Previous review papers (Shrum *et al.*, 1994; Schultz *et al*., 1995; Tilikidou and Zotos, 1999) agree that results do not clearly indicate a specific recyclers' segment in terms of *demographics* as indicated in a number of papers such as those by Webster, 1975; Arbuthnot, 1977; McGuinness *et al*., 1977; Jacobs *et al*., 1984; Mohai and Twight, 1987; Balderjahn, 1988; Vining and Ebreo, 1990; Granzin and Olsen, 1991; Oskamp *et a.l*, 1991; Allen *et al.*, 1993; Gamba and Oskamp, 1994; Scott and Willits, 1994; Shrum *et al*., 1994.

Previous research findings in Greece indicate that consumers, who are employees (Tilikidou, 2001, p. 144; Tilikidou and Delistavrou, 2001), who are better educated, (Sarmaniotis and Tilikidou, 1999; Tilikidou, 2001, p. 143; Tilikidou and Delistavrou, 2001) and who hold higher incomes (Delistavrou, 1999, p. 78; Tilikidou, 2001 p. 143; Tilikidou and Delistavrou, 2001) are those who recycle more frequently than their counterparts.

The factor of *knowledge*, as a determinant of recycling, was scantly examined. Although there are studies in which knowledge was found to differentiate recyclers from non-recyclers (Arbuthnot, 1977; De Young, 1989; Vining and Ebreo, 1990; Hopper and Nielsen, 1991; Oskamp *et al*., 1991; Gamba and Oskamp, 1994), the knowledge-attitudes-behavior hierarchy is not still considered well established. Two types of *knowledge* have been suggested by cognitive psychologists in consumer behavior understanding, the 'objective' and the 'subjective' knowledge (Anderson, 1983; Engel *et al*. 1995, p. 338). Objective knowledge refers to the information someone actually stored in memory and subjective knowledge refers to

an individuals' perception of what he/she knows, which does not necessarily correspond to reality (Engel *et al*. 1995, pp. 352 – 354). Schlegelmilch *et al*. (1996) suggested that objective knowledge might be a better predictive factor of pro-environmental behavior. Following this suggestion in the Greek environment, Tilikidou (2001, p. 189) used the objective environmental knowledge scale of Leeming *et al.* (1995) but failed to indicate knowledge as a determinant of any type of pro-environmental behaviors, including recycling behavior. On the other hand subjective knowledge has been found to be positively related to recycling behavior in one study, conducted in the same area of Greece (Delistavou, 1999, p. 83).

In the recycling behavior literature *Recycling Attitudes* is the most researched factor. In most cases attitudes were found to be a rather moderate predictive factor of recycling behavior (McGuiness *et al*., 1977; Kallgren and Wood, 1986; McCarty and Shrum, 1994; Shrum and McCarty, 1998). Shrum *et al.* (1995) wrote that "what people say and what people do, do not always correspond". The picture in Greece seems rather similar to this observation (Tilikidou and Zotos, 1999). It is also noted that the majority of research efforts seem to validate the Fishbein's and Ajzen's (1974) suggestion that attitude-behavior correspondence is highest when attitudes and behavior are measured at the same level of specificity (McGuinness *et al*., 1977; Van Liere and Dunlap, 1980; Hines *et al*., 1987; Oskamp *et al*., 1991; Allen *et al*., 1993; Gamba and Oskamp, 1994; Shrum *et al*., 1995; Schultz *et al*., 1995; Tilikidou, 2001, p. 189).

Last, with regard to *Motivation,* there are authors who have previously suggested that it is one of the factors that have to be investigated, when environmental consumer behavior is in spectrum (Howestine 1993; Ölander and Thøgersen, 1995). Particularly with regard to recycling, Howestine (1993) suggested

that together with knowledge and inconvenience involved in recycling behavior, focus should be placed upon motivation too. Previous research has shown that economic incentives can encourage recycling (De Young, 1986; Allen *et al*, 1993; Gamba and Oskamp, 1994) but the incentives must be ongoing. (De Young, 1985-86). Motivation to recycle might also be altruistic (De Young, 1989; Hopper and Nielsen, 1991; Howestine, 1993). Protecting the environment, reducing air and water pollution, conserving resources, saving energy and delaying closure of community landfills are important reasons that can motivate many consumers (Howestine, 1993; Gamba and Oskamp, 1994; Delistavrou, 1999, pp. 74, 84). Social influence can motivate people to recycle as well. Influence from friends, neighbors and family members have been shown to be predictors of recycling behavior (De Young, 1986; Hopper and Nielsen, 1991; Oskamp *et al*., 1991; Gamba and Oskamp, 1994).

In overall, literature review indicates that it is difficult to hypothesize which demographic variables might have a significant influence on consumers' recycling compliance. However, there is evidence to support the idea that the Greek respondents' income and education might be found statistically significant determinants of recycling behavior. Further, as there is no clear evidence about whether 'objective' Knowledge or 'subjective' Knowledge of recycling issues might be positively correlated to the respondents' Recycling Behavior, it seemed useful to examine them both. With regard to attitudes it is apparent that a specific recycling attitudes construct is appropriate to examine the link between attitudes and behavior. Finally motivation in general is expected to have a positive influence on recycling participation. Further, a question arises as to which types of motives - if any - affect more strongly compliance in recycling.

Methodology

Research objectives

Based on the literature review conclusions and at an effort to accomplish the aims of the study the following research objectives were set:

- To examine whether there are any statistically significant demographic determinants of the Greek recyclers.
- To examine whether Objective and/or Subjective Environmental Knowledge indicates statistically significant relationships with the respondents' Recycling Behavior.
- To examine the link between Recycling Attitudes and Recycling Behavior.
- To examine whether Motivation in general indicates a statistically significant relationship with Recycling Behavior and if yes, to investigate further in depth which type of motives indicate the strongest influence on Recycling Behavior.

Research setting

The research was conducted in the Municipality of Thessaloniki. The city of Thessaloniki according to the National Statistical Service of Greece may be considered to be representative of the urban areas of Greece with regard to household surveys (N.S.S.G, 1997). The Municipal Authorities Organisation (M.A.O.) launched recycling programs in 1988. These early programs included recycling of paper and aluminium cans. The Municipality of Thessaloniki started to run its own recycling programs of paper and aluminium cans in 1994. In 1997 M.A.O. started to run the recycling of plastic bottles and in 1998 the recycling of glass. The Municipality of Thessaloniki provides in total 280 recycling bins for paper of various sizes and 20 recycling bins for aluminium cans and plastic bottles. The exact number of the recycling bins and the vehicles provided to the Municipality of Thessaloniki from M.A.O. is unknown. The participation of Thessaloniki citizens remains low as

30.8% of the total population 'almost never' recycles paper (which is the most recycled material in the area) while, 42.9% declare that recycle 'almost always' the same material (Tilikidou, 2001, p. 270). The participation is even lower in the rest of the recycling programs as 'almost always' only 26.7% of the consumers recycle aluminium cans, 13.1% recycle plastic bottles and 17.7% recycle glass (Tilikidou, 2001, p. 270).

Sample and procedure

Data collection was accomplished by means of a *structured questionnaire* recording data on ten research variables (see variables measurement). The questionnaire was pre-tested in a limited sample of 40 consumers. The final questionnaire was presented in a booklet style with a cover letter that explained the purpose of the study and the interviewers' identity. Eight undergraduate student of the Marketing Department of the Thessaloniki TEI were employed as interviewers. In order to ensure that the questionnaire would be administered in a uniform fashion the interviewers were trained in the specific questionnaire and sampling procedure requirements by two three-hours seminars. More specifically, they were trained in making initial contacts and secure interviews, asking questions, probing, recording responses and terminating interviews. Further, they were trained in following exactly the sampling procedure in order to avoid procedural errors. Two part-time lecturers were assigned as fieldwork managers.

Personal interviews at the respondents' home took place from 15th May to 20th June 2001. The *population* of the area is approximately 348,000 citizens. Following N.S.S.G. (1997) instructions, which require more that one per thousand (1/1000) citizens the appropriate *sample size* should be 348 respondents at least. A 10% was added to this number giving a planned sample of 383 questionnaires and

resulting in a 375 usable questionnaire. The final size is judged to be satisfactory enough as the maximum sampling error can not be more than e=5.16%. The *sampling method* was a combination of the two-stage area sampling and the systematic method (Zikmund 1991, p. 471).

Variables measurement

Recycling Behavior was measured with four items, one for each recyclable material in Greece (paper, glass, aluminium cans and plastic bottles) on a 5-point frequency scale (From1=Never to 5=Always).

Objective Knowledge of recycling issues was measured with three questions. The first question asked the respondents to indicate the recyclable materials out of four materials listed and one of them being non-recyclable, giving a total score four right answers (three checked and one unchecked). The second question was an open one and asked the respondents to define three recycling programs running in their area of living. The third question was an open one as well and asked the respondents to indicate the color of the recycling bins for paper and aluminium. In case the respondents correctly answered all the above three questions they were assigned a total score of 9.

Subjective Knowledge was measured with two questions measuring the respondents' perception of the quality and the quantity of their knowledge about recycling. The relevant question asked the consumers to define the percentage (from 0% to 100%) of their satisfaction of the quality and the quantity of the knowledge they hold about recycling.

Recycling Attitudes were examined with a multi-item measure, containing 15 items, adopted from Tilikidou (2001, pp. 241-242) and measured on a 5-point Likert scale (From 1=Strongly Disagree to 5=Strongly Agree). When the scale was initially

used provided a Cronbach's alpha of 0.8834, which can be evaluated as exemplary evidence of reliability according to Robinson *et al*. (1991, p. 13).

Motivation was measured with 8 items (see Table 5), adopted from a 13-items measure of Gamba and Oskamp (1994). This construct consisted of three sub-measures namely Concern for the Environment (alpha=0.82), Pressure (alpha=0.77) and Financial Motive (alpha=0.46). In this study Motivation was measured on a 5-point frequency scale (From 1=Never to 5=Always). Demographics included sex, age, income, education and occupation and the scales were adopted from the National Statistical Service of Greece (N.S.S.G., 1997).

Reliability of all the multi-item measures was calculated with the help of Cronbach's alpha (Table 1). With the exception of the Objective Knowledge scale all measures provided reliability estimates well between the acceptable limits.

Table 1: Cronbach's alpha

Variables	Alpha
Recycling Behavior	0.7376
Objective Knowledge	0.5070
Subjective Knowledge	0.9226
Recycling Attitudes	0.9635
Motivation	0.7829

Sample characteristics

The sample profile reflected well the population characteristics of the area, with the only exception of the education variable. More specifically, 40.3% of the respondents were men and 59.7% were women, while 64.6% of the respondents were younger than 44 years old. As to education, respondents holding higher education degree are over-represented in the sample as they accounted 41.7% of the sample while in the total population only 16.36% of the citizens hold a higher education degree. The participants declared mostly (52,5%) low level of incomes (less than

4,500,000 drs.) out of 59.4% of the respondents who responded in the relevant question. As to occupation, as expected, most of the respondents were employees (25.1%) (Table 2). All the initial demographic variables were re-grouped into downgraded subgroups (Table 2) in order to assist the analysis of variance technique.

Table 2: Sample descriptives (Subgrouped)

AGE			**EDUCATION**		
	Frequency	***Percent***		***Frequency***	***Percent***
15 – 24 years old	100	26.7	Primary school	59	15.8
25 – 44 years old	139	37.2	High school	157	41.9
45 and older	132	35.0	Graduate	157	41.7
Missing	4	1.1	Missing	2	0.6
Total	375	100.0	Total	375	100.0
INCOME			**OCCUPATION**		
< 1.5 millions	89	23.6	Professional	48	13.0
1.5 – 3.5 millions	84	22.2	Employee	151	40.3
> 3.5 millions	50	13.6	Unemployed	170	45.3
Missing	152	40.6	Missing	6	1.4
Total	375	100.0	Total	375	100.0
SEX					
Male	151	40.3			
Female	224	59.7			
Total	375	100.0			

Results

The descriptive statistics (Table 3) revealed a low participation rate, as the scores obtained in the Recycling Behavior measure were below average (mean 7.51, median 7). As to the consumers' participation in the running recycling programs the results demonstrate that 34.8% of the consumers recycle paper often to very often. At the same frequency 20.6% of the consumers recycle aluminum cans, 6.9% recycle glass and 4.2% recycle plastic bottles. The scores obtained in the questions concerning the respondents' Objective Knowledge about specific recycling issues has shown that the respondents were average knowledgeable of these issues (mean 4.53, median 4). The respondents' Subjective Knowledge scores indicated that they

are not confident enough of the quality and the quantity of their knowledge of recycling issues (mean 55.14, median 50). The scores obtained in specific Recycling Attitudes were high (mean 78.41, median 79), indicating that the respondents do hold positive attitudes towards recycling. With regard to the respondents' Motivation to recycle the results indicated that the respondents are below average motivated to recycle (mean 20.67, median 21).

Table 3: Descriptive statistics

Variables	**Min.**	**Max.**	**Range**	**Median**	**Mean**	**Std. Deviation**
Recycling Behavior	4	20	4 – 20	7	7.51	3.5312
Objective Knowledge	0	9	0 – 9	4	4.53	1.5220
Subjective Knowledge	0	190	0 - 200	50	55.14	37.8118
Recycling Attitudes	42	105	15 - 105	79	78.41	17.1335
Motivation	8	35	8 – 40	21	20.67	5.7169

Analysis

At first, an effort was made to explore whether the demographic characteristics differentiate the consumers, who recycle more frequently than their counterparts. One-way Analysis of Variance was employed. With regard to education, the analysis revealed that the respondents, who hold a higher education degree and higher income, do recycle more than their counterparts (Table 4, Figures 1 and 2).

Table 4: Analysis of Variance of Recycling Behavior across the demographic characteristics

Recycling Behavior across:	**Groups**	**Group Means**	**df**	**F**	**Sig.**
Sex	Male	7.49	1	0.006	0.937
	Female	7.52	356		
	Total	7.51	357		
Age	15 – 24 years	7.31	2	0.536	0.586
	25 – 44 years	7.73	351		
	45 years & more	7.35	353		
	Total	7.48			
Education	Primary school	6.37	2	4.200	0.016
	High school	7.44	353		
	Graduate	7.93	355		
	Total	7.48			
Income	<1.5 million	7.42	2	4.193	0.016
	1.5–3.5 million	7.19	210		
	>3.5 million	8.98	212		
	Total	7.69			
Occupation	Professonal	7.19	2	1.078	0.341
	Employee	7.86	350		
	Unemployed	7.34	352		
	Total	7.54			

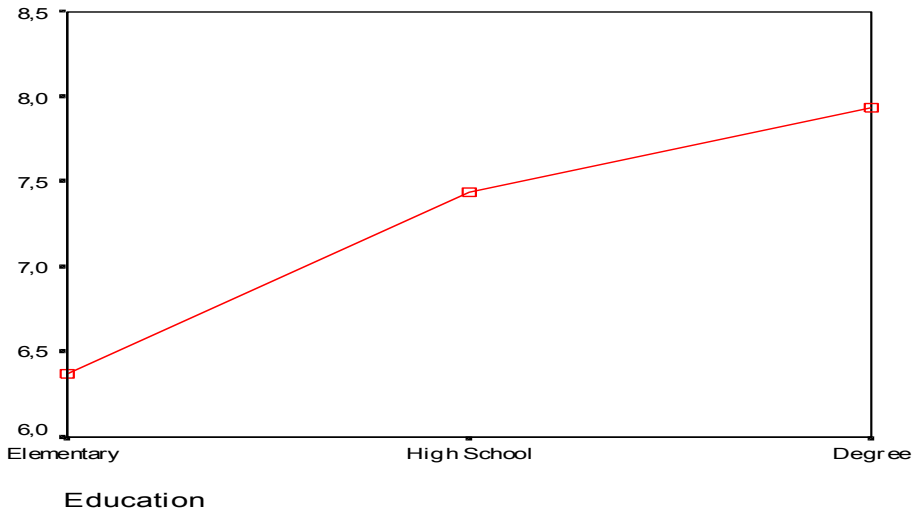

Figure 1: Mean plot of Recycling Behavior across Education

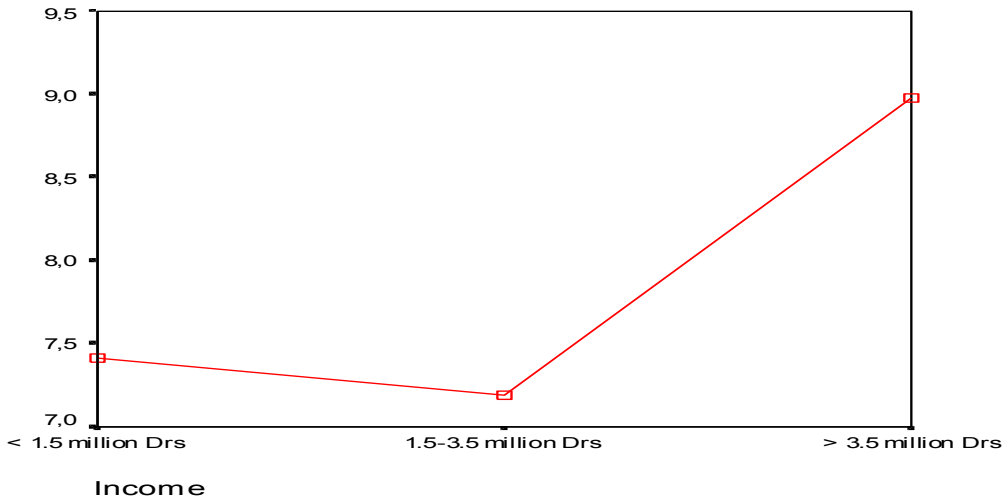

Figure 2: Mean plot of Recycling Behavior across Income

Then, the relationships between each one of Objective Knowledge, Subjective Knowledge, Recycling Attitudes, Motivation to recycle and the dependent variable, Recycling Behavior were investigated through Pearson's correlation. Statistically significant relationships were found between all independent variables and the respondents' Recycling Behavior (Table 5). More specifically, there is a positive, moderate ($r=0.302$, $p\leq0.01$) relationship between Recycling Behavior and Objective Knowledge of recycling issues indicating that the more the respondents know about recycling the more they engage in recycling activities (Table 5). It is noted that the respondents' Subjective Knowledge demonstrated a somewhat weaker relationship ($r=0.279$, $p\leq0.01$) to their Recycling Behavior. As to the respondents' attitudes, the relevant coefficient indicated a positive, moderate relationship between Recycling Behavior and Recycling Attitudes ($r=0.369$, $p\leq0.01$) (Table 5). The strongest relationship, however still moderate, was found between Recycling Behavior and Motivation to recycle ($r=0.446$, $p\leq0.01$) (Table 5).

Table 5: Pearson's correlation coefficients (r) between all independent and Recycling Behavior

	Recycling Behavior	***Objective Knowledge***	***Subjective Knowledge***	***Recycling Attitudes***	***Motivation***
Recycling Behavior	1.000				
Objective Knowledge	0.302**	1.000			
Subjective Knowledge	0.279**	0.299**	1.000		
Recycling Attitudes	0.369**	0.158*	0.166**	1.000	
Motivation	0.446**	0.213**	0.218**	0.167*	1.000

* $p \leq 0.05$, ** $p \leq 0.01$

The multiple regression (stepwise method) employed, revealed that only Motivation to recycle and Recycling Attitudes can predict the respondents' Recycling Behavior. The resulting equation was:

Recycling Behavior =0.0081+0.386 Motivation to Recycle+0.287 Recycling Attitudes

The adjusted R square was 0.261 indicating that 26.1% of the variance in Recycling Behavior is explained by the interaction of the respondents' Motivation and Recycling Attitudes.

At an effort to explore further the relative influence of each one of the types of incentives, used in the measure of Motivation, Principal Component Analysis (PCA) was conducted aiming to identify the sub-measures of Motivation. The results indicated three factors that explain the 71.058% of the total variance (Table 6). The intrinsic environmental protection motives obtained above 0.70 coefficients in the first factor formulating the sub-measure of *Environmental Motivation*, the two monetary incentives items obtained above 0.60 coefficients in the second factor formulating the *Financial Motivation* sub-measure and the two items of social influence obtained above 0.60 coefficients in the third factor formulating the *Social Motivation* sub-measure (Table 6).

Table 6: Factor (PCA) analysis of Motivation measure

	FACTOR ANALYSIS					
	Factor Loadings			Initial Eigenvlues		
Items	1	2	3	Total	% of Variance	Cumulative %
Contribute to the energy conservation	.765	-.309	-.373	3.259	40.738	40.738
Contribute to resources conservation	.735	-.334	-.387	1.305	16.314	57.052
Help the minimization of landfill use	.777	-.269	.158	1.121	14.007	71.058
Help the minimization of litter	.707	-.222	.240	.900	11.246	82.304
My friends started to recycle	.422	.245	.616	.566	7.073	89.378
My family started to recycle	.469	.144	.609	.441	5.512	94.889
Get reduction coupons for merchandise	.487	.676	-.272	.243	3.035	97.925
Raise money for charity	.494	.662	-.275	.166	2.075	100.000
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.						.689
Bartlett's Test of Sphericity			Approx. Chi-Square			737.154
					df	28
					Sig.	.000

The regression analysis, employed to investigate the ability of all sub-measures to predict Recycling Behavior, revealed that only Social Motivation and Environmental Motivation could predict Recycling Behavior. The equation was:

Recycling Behavior = 4.219 + 0.324 Social Motivation + 0.230 Environmental Motivation

The adjusted R square was 0.207 indicating that 20.7% of the variance in Recycling Behavior is explained by the combined effect of the respondents' Social Motivation and Environmental Motivation.

Discussion

The results indicated that respondents who hold a higher education degree, higher incomes, who are more knowledgeable and more confident of this knowledge, who hold more positive attitudes towards recycling and mainly those who are more motivated by social factors, are those consumers who engage in Recycling Behavior more than their counterparts do. with regard to education, The result found with regard to education is consistent with previous research in the same geographical area, the main body of which indicated that consumers with higher education are

more involved in recycling (e.g. Sarmaniotis and Tilikidou, 1994; Delistavrou, 1999, p. 84; Sarmaniotis *et al*., 1999; Tilikidou, 2001, p. 143; Tilikidou and Delistavrou, 2001). With regard to income, as expected, the result found is consistent to the previous research results in the same area (Delistavrou, 1999, p. 78; Tilikidou, 2001 p. 143; Tilikidou and Delistavrou, 2001).

With regard to Objective Knowledge the results found are consistent with previous research results (Arbuthnot, 1977; De Young, 1989; Vining and Ebreo, 1990; Hopper and Nielsen, 1991; Oskamp *et al*., 1991; Gamba and Oskamp, 1994; Delistavrou, 1999, p. 82). Subjective Knowledge demonstrated a lower than Objective Knowledge correlation coefficient with Recycling Behavior, validating the Schlegelmilh's *et al* (1996) suggestion that objective knowledge is a better determinant of pro-environmental behaviors and being consistent with previous research results in the same area (Delistavrou, 1999, p. 83).

With regard to attitudes, the result found confirms the great majority of the previous research findings, which indicated that specific recycling attitudes are positively correlated, at a rather moderate level with Recycling Behavior, as mentioned in the literature review.

The most interesting finding of this study is obtained by the revealed relationship between Recycling Behavior and Motivation, which appears to be stronger than any other relationship found. The results obtained by further analysis are in general consistent with previous research that Environmental Motivation (Howestine, 1993; Gamba and Oskamp, 1994; Delistavrou, 1999, pp. 74, 84), Social Motivation (De Young, 1986; Hopper and Nielsen, 1991; Oskamp *et al*., 1991; Gamba and Oskamp, 1994) and Financial Motivation (De Young, 1986; Allen *et al*, 1993; Gamba and Oskamp, 1994) influence Recycling Behavior. However, it seems

that, in the Greek environment, the interactive effect of Social Motivation and Environmental Motivation indicates the types of motives that can better predict Recycling Behavior. The exclusion of the Financial Motivation can be attributed to the fact that there are very few cases in which a recycler can have a reward for his/her compliance in recycling activities.

Conclusions

Recycling in Thessaloniki is not a wide spread activity and only a few citizens of this city are frequently engaged in recycling activities. Although recycling programs are running since 1988 in the area, the consumers' participation remains still very low.

In contrast with the fact that foreign literature insists at claiming that no commonly accepted demographic profile of recyclers exists, the results of this study verified a number of previous research effort in the same area with regard to the demographic determinants of recycling behavior. This piece of research found again that education and income differentiate recyclers form non-recyclers.

Although the correlation coefficients of the relationships found between both Objective and Subjective Knowledge and Recycling Behavior are the lowest found in this study, it may be still claimed that the more the consumers know about recycling and the more they feel confident of that knowledge, the more they enhance their recycling behavior. Further, it is apparent that the more positive the attitudes towards recycling the respondents' hold the more frequently they recycle.

With regard to the main scope of this study, it is noted that the results found did not only verified Delistavrou's (1999) claim that Motivation can be a significant determinant of Recycling Behavior in the area. It was also indicated that Motivation is the factor that better differentiate the respondents, who recycle more frequently in

comparison to the other factors examined. Moreover, further analysis provided evidence as to which types of motives can better predict Recycling Behavior. Although the relevant relationships are not very well established yet, there is already enough evidence to claim that the social motives, followed by the environmental protection motives are those, which influence consumers more strongly than the financial motives do. This conclusion should be viewed as a hint of certain revealing trends mostly, which need further research in order to be established and generalized.

However, the findings indicate that other recyclers such as their family or their friends influence recyclers. This conclusion might be proved of much importance as the social role of recyclers is revealed. The local authorities might use the power of the recyclers to interfere in other consumers' decision to recycle. In addition, as Environmental Motivation is the second predictor of recycling, it seems that consumers' are encouraged to get more involved into the recycling activities by acknowledging the significance of recycling to the environmental protection.

Financial Motivation was not found to be one of the variables that can predict Recycling Behavior. The above conclusion becomes very important considering that economic incentives are very difficult to be utilized, as they need to be ongoing (De Young, 1985-86). In fact a great amount of economic sources need to be invested in the effort to increase individual participation. However, it seems that local authorities do not urgently need to utilize monetary incentives to increase consumers' participation in recycling program. They certainly can benefit from the recyclers' influence on other's decision to recycle by encouraging them to use their power on others. In practice consumers need to be persuaded by appropriate communication campaigns that other people around them participate in recycling. The benefits of recycling should be also effectively promoted to the public. People need to be

constantly informed that recycling is the only way to minimize litter and landfills when at the same time contributes to energy and resources conservation.

The above suggestions do not mean that other factors such as inconvenience to recycle and the pro-environmental importance of recycling, revealed by the findings concerning Recycling Attitudes and Knowledge, should be neglected by academic implications to the bodies in charge. Local authorities' actions should aim to: reduce inconvenience by placing more recycling bins in the neighborhoods and inform consumers about the programs, the recyclable materials.

Future research efforts need to include improved constructs of the Motivation scale at an effort to get deeper to the insights of consumer' motives. It is also noted that, although progress has been made with regard to the demographic and the attitudinal profile of the Greeks recyclers', the psychographic and the cognitive aspects remain rather unclear and should be further investigated.

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