

## Psychological Drivers of Consumer'S Preferences for Green Transportation: an Empirical Analysis of Bikes' Rental System at the University of Granada

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**Abstract:** We conducted a survey ( $n = 436$ ) regarding consumer's choice of sustainable transportation, toward a A survey was conducted at the University of Granada (Spain) from May through August 2011, related to a system of bikes' rental that has been recently introduced in the university community and whose expectations include its extension to the rest of the city of Granada. The questionnaire included items concerning attitude related to the behavior, individual's perceived control, subjective norms and personal moral norms, variables used in the Theory of Reasoned Action from Fishbein and Ajzen (1975), the Theory of Planned Behavior (Ajzen & Madden, 1986) and the Norm-Activation Theory (Schwartz, 1977). The main objective of this study was to examine those factors that could affect the transport choice behavior of consumers toward more sustainable energy consumption patterns, meaning the decision to use (or not to use) the bikes' rental system by the university community. The results corroborate the hypothesis tested, and positive correlations between the variables and the behavioral intention.

**Key Words:** Theory of Reasoned Action, Theory of Planned Behavior, Norm-Activation Theory, psychological variables, sustainable behavior.

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### 1. Introduction

Nowadays, Global Climate Change is a reality that affects the entire planet. One of the main causes is humans' behavior, contributing to its increase by the emission of greenhouse gases. It has been highlighted that action is needed from policy-makers, but also from individuals' perspective. Reducing greenhouse gas emissions requires both the development of new forms of energy not based on fossil fuel burning, and the decrease of individuals' energy consumption. Energy efficiency is, in the short and medium term, the most effective way to reduce pollution.

The data are unequivocal: the air and water average temperature is rising globally (IPPC, 2007), but even more in the northern latitudes. The sea level is increasing while ice sheets are shrinking. IPPC (2007) confirms that the annual average ice in the Arctic Ocean has decreased about 2.7% per decade since 1978, and even more in summer periods (7.4% per decade).

There is scientific evidence (EUROSTAT, 2008) that the emission of greenhouse gases caused by human activities like burning coal, oil and gas, are causing global warming, and that climate change is a consequence of such activities.

The EU Decision 280/2004/EC and Kyoto Protocol (2002/358/EC) discussed about how to control the emission of greenhouse gases. In the period from 2008 to 2012, the countries taking part in those two agreements expressed their commitment to reduce EU emissions by around 8% compared to those achieved in 1990.

From citizens' perspective, there is a growing awareness concerning energy efficiency issues (FBBVA, 2007), which should lead to the adoption of energy saving habits by consumers. Despite this, consumers' knowledge toward energy problems is still moderate by consumers. In order to deal with the energy problem, the savings and energy efficiency measures are essential to ensure the success of governments' policies.

To make a real change in consumer's behavior we should focus on their motivations. While environmental matter is influencing in a behavioral change in all European countries (Logica CMG, 2007), the rising cost of energy resources is an important reason to reduce consumption. It has major implications for policy-makers, institutions, energy producers and other stakeholders.

In addition to household energy saving behavior, one of the key sectors to facilitate the energy efficiency improvement is the transport. Specifically, among the instruments of information are the awareness campaigns that directly affect the

final consumer and can positively influence in the quality of the environment (IPCC, 2007), helping to choose with knowledge and reason, and possibly contribute to changes in behavior.

This paper's main objective is to examine factors affecting the transport choice consumers' behavior toward more sustainable energy consumption patterns (meaning the adoption of bikes' sharing system). In the following section we explore the existing literature regarding the topic under study, which will lead to the approach of our research hypothesis. Then in the third section we describe the methodology and results found in the development of the empirical work. Finally, we present some conclusions and recommendations which may be relevant for environmental communication policies.

## 2. Literature review

### 2.1. Social marketing

Social Marketing is not a recent discipline. It has been applied through years to solve social problems. Kotler and Zaltman (1971) are the first authors who describe social marketing as the design, implementation and control of the programs developed to influence in the acceptance of social ideas, and which implies product, price, communication and distribution planning in the marketing context.

Social marketing campaigns aims to persuade a target audience to accept, modify or leave some ideas, attitudes, practices or behavior (Mushat, 1980; Gómez & Quintanilla, 1988; Kotler & Roberto, 1989; Martín Armario, 1993; Santasmases, 1996). The use of this concept has dramatically increased in the last years (Gordon *et al.*, 2006), being employed in public wealth researches (Satcher & Higginbotham, 2008) concerning tobacco and alcohol consumption (Berridge & Loughlin, 2005; Hassan *et al.*, 2007; Hackley, 2008) as well as other drugs (Palmgreen *et al.*, 2007), but also in environmental studies (Taylor *et al.*, 1992; McGovern, 2007; Rose *et al.*, 2008).

Policy-makers, consumers and researchers have a very important role in those issues that affects the society, but the results of social campaigns will be influenced by the communication channels we use (Hackley, 2008), and those will differ depending on the social matter. In some cases, when we focus on environmental social marketing, it may be hard to get the message to the target audience, as the audience sometimes ignore the problem and do not collaborate with the cause (Rose *et al.*, 2008).

For this reason, the marketing strategy should be based on adding value to the consumer's experience, improving individual and society's wellness.

### 2.2. Green consumer's behavior

Ecological behavior has been defined by Shrum *et al.* (1995) as those pro-environmental consumers' actions. Regarding the variables that influence the environmental awareness, some authors state that personality seems to predict better than socio-demographic variables (Kinneer *et al.*, 1974; Shamdasani *et al.*, 1993; Laroche *et al.*, 2002; Diamantopoulos *et al.*, 2003).

A second group of studies addresses the relationship between environmental concern and consumer behavior (Kinneer & Taylor, 1973, Shrum *et al.*, 1995; Chan, 2001; Kim & Choi, 2004), including variables such as attitude toward the environment for explain this relationship (Laroche *et al.*, 2002; Mostafa, 2007).

Third, there are some studies that consider consumer behavior as determined by individual values (Banerjee & McKeague, 1994; Gilg *et al.*, 2005; Chan *et al.*, 2008), perceived effectiveness of consumer's behavior (Ellen *et al.*, 1991; Kilbourne & Carlson, 2008), the level of pro-environmental behavior attributed to others (Pieters *et al.*, 1998) and social norms (Verhoef, 2005).

Finally, in the line of the present research, there are a few studies on energy conservation behavior (Durand & Sharma, 1982) and relate to individual preferences towards renewable energy resources (Zachariadis, 2005; Nyborg *et al.*, 2006), indicating that consumers would be willing to pay more for some products if it has less impact on the environment which would reduce the level of public intervention needed (Eriksson, 2004).

With reference to the psychological variables that may influence on consumer's green behavior, *attitude* is used as a determinant of intention by social psychology theories among other variables: the Theory of Reasoned Action of Fishbein and Ajzen (1975), the Theory of Planned Behavior (Ajzen & Madden, 1986) and the Norm-Activation Theory (Schwartz, 1977).

Attitudes, social norms and perceived control are reflected in those theories as some of the variables that determine behavioral intention and eventually, the behavior itself. Fishbein and Ajzen (1975) were interested in the understanding of human behavior and intention predictors. With this aim they developed the Theory of Reasoned Action (TRA) concerning the antecedents of intentional or voluntary behavior.

According to TRA, human behavior has its own reasons, which means that individuals consider the information they have and the consequences of their actions. Therefore, behavior is determined by the intentions, as the result of *subjective norms* and individuals' *attitude*.

Furthermore, these two variables (*attitude* and *norms*) do not influence in the same way in behavioral intention (Ajzen, 1988), but there may be conflicts and interactions between them.

This theory concerns rational and voluntary behavior (Fishbein & Ajzen, 1975, and Chang, 1998). Its robustness and predictive utility has been tested before (Harrison *et al.*, 1985) and also its external validity (Ryan & Bonfield, 1980). However, it also has been criticized (Sheppard *et al.*, 1988) as it is designed to predict simple behavior, and based on individuals' actions subject to their will, which is not true in many cases because the consumer does not always control the target behavior.

The last idea is introduced by the Theory of Planned Behavior (Ajzen & Madden, 1986) that presents a third variable, named *perceived control*, as the subjective belief toward the existence of difficulties to perform a behavior (Phostuma & Dworkin, 2000).

The third theory (Norm-Activation) was developed by Schwartz (1977) to explain altruistic behavior, so it could explain the environmental performance. It assumes that green behavior is influenced by the intensity of individuals' moral obligation. Behavior is determined by the cognitive structure, and the individual feels compelled to act considering others' wellness when he has specific beliefs toward a behavior (Vining & Ebreo, 1992).

In the present study, we consider these three theories in order to examine individuals' behavior in their choices of transportation. Our purpose will be to analyze whether attitude, subjective norms, personal moral norms and perceived control determine the behavioral intention.

### 3. Methodology

A survey was conducted in the University of Granada (Spain) from May through August 2011, related to a system of bikes' sharing that has been recently introduced in the university community and whose expectations include its extension to the rest of the city of Granada.

The university community is almost a third of the whole population in the city of Granada, hence the relevance in terms of consumption patterns and behavior of this group. We include, however, not only the university students in the sample but also the administrative and service staff (PAS) as well as teaching and research staff (PDI).

The participants were contacted by corporative email, as an easier way to access them, so they could decide when to fill the questionnaire, increasing its flexibility. They were first classified according to the group they belong (PDI, PAS or students). All responses have been generated online using an opt-in e-mail response methodology. The surveys were anonymous and self-administered. They were asked questions concerning their attitude, control perceived, subjective and personal moral norms, but also their behavior toward the environment and their intentions related to the bike's sharing system.

#### 3.1. Hypothesis

With regard to the TRA, *behavior* is explained as a result of individual's *intention* toward it, and it is influenced by *attitude* and *subjective norms* (Fishbein & Ajzen, 1975). It means that if there is a positive attitude toward green behavior and/or subjective norms approve it, the individual will tend to behave in a pro-environmental way. Given this, we propose the following hypothesis:

*H1a: Behavioral intention toward the environment is determined by individual's attitude.*

*H1b: Behavioral intention toward the environment is determined by individual's subjective norms.*

The TPB development includes a new variable in the explanation of behavior as well as the *attitudes* and *subjective norms*. This new factor is the *control perceived* by the individual toward a specific behavior (Ajzen & Madden, 1986). Our prediction is that individuals with higher *perceived behavioral control* concerning the defense of the environment will tend to perform more frequently such behavior.

H2: Behavioral intention toward the environment is determined by individual’s perceived control.

Finally, the theory of Schwartz’s Norm-Activation (1977), states that the individual feels a moral obligation to act in benefit of others, which is justified by the degree of commitment that this person takes over their own actions and the beliefs that he has for the specific behavior, so that if the individual feels a moral obligation towards pro-environmental behavior, he will tend to perform that behavior. Therefore we propose:

H3: Behavioral intention toward the environment is determined by individual’s moral norm.

3.2. Results

With the purpose to test the previous hypothesis concerning the pro-environmental behavioral intention, we used a sample of 436 participants within the community of the University of Granada (Spain). The variables measured to test the hypothesis are presented below (Table1), with some of the questions included in the survey and the Likert scales.

Tables 2-5 show the results for the ANOVA analysis, a dependence technique used to measure the significance of the influence that one or more independent variables have on another dependent variable. It also shows the correlations between the attitudes and the behavioral intentions.

Table 1: Bike’s sharing survey measures

Measures	Questions	Name	Scale
Attitude toward the behavior	“Using the bike’s sharing system is”: - Good idea vs. Bad idea - Harmful-Beneficial - Unpleasant-Pleasant - Something I dislike-Something I like - Useless-Useful	- Attitude 1 - Attitude 2 - Attitude 3 - Attitude 4 - Attitude 5	Likert (1-6)
Subjective norms	“People, whose opinions I value, would approve my defense of the environment to use the bike’s sharing system to move through the city”. “I am expected to defend the environment using the bike’s sharing system, instead of a private vehicle”.	- Subjective norm 1 - Subjective norm 2	Likert (1-6)
Personal moral norms	“It is a moral subject for me”.	- Personal norm	Likert (1-6)
Perceived control	“I can look after the environment using the bike’s sharing system every day if I want”.	- Perc. control	Likert (1-6)

Table 2: ANOVA analysis and Correlations for Attitudes vs. Behavioral Intentions

Attitudes “Using the bike’s sharing system is”:		I will try to look after the environment using the bike’s sharing system.	I want to look after the environment using the bike’s sharing system.	I hope to look after the environment using the bike’s sharing system.
Attitude 1	Pearson Correlation	.498**	.507**	.512**
A bad idea / A good idea	Sig.	.000	.000	.000
	ANOVA (F)	25.581	25.973	26.938
	Sig.	.000	.000	0.000

Attitude 2 Harmful / Beneficial	Pearson Correlation	.372**	.383**	.358**
	Sig.	.000	.000	.000
	ANOVA (F)	22.085	25.746	21.542
	Sig.	.000	.000	.000
Attitude 3 Unpleasant / Pleasant	Pearson Correlation	.473**	.416**	.455**
	Sig.	.000	.000	.000
	ANOVA (F)	22.553	17.135	20.398
	Sig.	.000	.000	.000
Attitude 4 Unpleasant / Pleasant	Pearson Correlation	.531**	.494**	.522**
	Sig.	.000	.000	.000
	ANOVA (F)	35.642	30.839	34.494
	Sig.	.000	.000	.000
Attitude 5 Unpleasant / Pleasant	Pearson Correlation	.470**	.413**	.502**
	Sig.	.000	.000	.000
	ANOVA (F)	28.996	25.160	33.326
	Sig.	.000	.000	.000

\*\* . Correlation is significant at the 0.01 level.

Tables 2-5 show the results for the ANOVA analysis, a dependence technique used to measure the significance of the influence that one or more independent variables have on another dependent variable. It also shows the correlations between the *attitudes* and the *behavioral intentions*.

We can observe that there exists a relationship between the *Attitudes* and the *Behavioral Intentions* toward the bike's sharing system ( $p = 0.0000$ ). Therefore, we can reject the null hypothesis, and we confirm that *Attitudes (1-5)* toward the behavior seem to determine individual's *Behavioral Intentions (1-3)* in this particular case. Moreover, all the variables are positively correlated between them ( $p = 0.000$ ).

Table 3 shows the same test for Subjective norms, and we find positive correlations between the variables. The ANOVA test let us reject the null hypothesis, so we can verify that *Subjective norms* determine *Behavioral Intentions* for the bike's sharing system ( $p = 0.000$ ).

**Table 3:** ANOVA analysis and Correlations for Subjective norms vs. Behavioral Intentions

Subjective norm		I will try to look after the environment using the bike's sharing system.	I want to look after the environment using the bike's sharing system.	I hope to look after the environment using the bike's sharing system.
Subjective norm 1	Pearson Correlation	.259**	.253**	.280**
	Sig.	.000	.000	.000
	ANOVA (F)	6.854	6.656	8.680
	Sig.	.000	.000	0.000
Subjective norm 2	Pearson Correlation	.381**	.418**	.386**
	Sig.	.000	.000	.000
	ANOVA (F)	12.987	16.266	13.624
	Sig.	.000	.000	.000

\*\* . Correlation is significant at the 0.01 level.

*Personal moral norms* are also positively correlated with *Behavioral Intentions* as we can notice in the Table 4. With reference to the null hypothesis, all the p-values are 0.000, therefore we can reject the null hypothesis, the relationship between *Personal moral norms* and *Behavioral Intentions* is verified.

**Table 4:** ANOVA analysis and Correlations for Personal moral norms vs. Behavioral Intentions

Personal moral norms		I will try to look after the environment using the bike's sharing system.	I want to look after the environment using the bike's sharing system.	I hope to look after the environment using the bike's sharing system.
Pers onal moral norm	Pearson Correlation Sig.	.352** .000	.364** .000	.308** .000
	ANOVA (F) Sig.	14.040 .000	14.697 .000	10.376 0.000

\*\* . Correlation is significant at the 0.01 level.

Finally, we find that Perceived control seems to determine Behavioral Intentions, as shown it Table 5 ( $p = 0.000$ ). The variables are also positively correlated between them.

**Table 5:** ANOVA analysis and Correlations for Perceived control vs. Behavioral Intentions

Perceived control		I will try to look after the environment using the bike's sharing system.	I want to look after the environment using the bike's sharing system.	I hope to look after the environment using the bike's sharing system.
Perceived control 1	Pearson Correlation Sig.	.259** .000	.253** .000	.280** .000
	ANOVA (F) Sig.	22.365 .000	15.097 .000	19.610 0.000
Perceived control 2	Pearson Correlation Sig.	.381** .000	.418** .000	.386** .000
	ANOVA (F) Sig.	12.987 .000	16.266 .000	13.624 .000

\*\* . Correlation is significant at the 0.01 level.

#### 4. Conclusion

In the present research, we set out to examine the relationship between *intention* toward the behavior of using a bike's sharing system in the University of Granada (Spain) and other behavioral variables, meaning *attitude*, *subjective norms*, *personal moral norms* and *perceived control*.

The previous results show that, under the observed data, *behavioral intention* is determined by the variables presented in the study. Both the ANOVA test and the correlations verify these findings. Therefore, the data analyzed confirm the statement of the Theory of Reasoned Action of Fishbein and Ajzen (1975): attitude toward the behavior and subjective norms are related with behavioral intention. The same can be applied to individual's perceived control, which affects the green behavioral intention, as indicated in the Theory of Planned Behavior (Ajzen and Madden, 1986), and likewise confirms the relationship with the moral obligation felt by the individual toward that behavioral intention (Schwartz, 1977).

These results have some implications for public policies in engagement and informative campaigns to improve citizens' concern; as well as for private products and services with environmental content, since they would help to

decide the target audience based on the previous information. The individual will tend to behave according to their pro-environmental attitude toward the behavior, subjective norms, perceived control and moral obligation that he feels towards it.

Based on the above, public authorities seeking to promote a positive intention toward the behavior of using the bike's sharing system should focus on consumer's moral obligation, trying to improve consumer feelings. They should also consider how to involve consumer's social environment, meaning their families and friends, as they seem to be an important factor determining future intention.

For future research we propose the possibility of expanding the number of participants, including not only the university population, which could have very specific characteristics, but a representative sample of the whole population from the city of Granada (Spain).

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