CAR DEPENDENCE OR APPETENCE? EXAMINATION OF ATTITUDES TOWARDS SUSTAINABLE MOBILITY IN THE GREEK CASE

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ABSTRACT

In this paper we tried to investigate the causes of delay in promoting sustainable mobility policies in Greece. The main question raised is whether these are due to lag in terms of political will or a clear conscious preference of Greek citizens to use their car. For this purpose, we applied methods of social psychology and in particular the Theory of Planned Behaviour in a medium-sized city of Greece, which is expected to build one of the first bicycle networks. According to the results, a strong intention to use the new cycle network was found in the case of Volos. The results comply with the pro-environment attitude, the realization of car related problems and the positive attitudes towards alternative means. On the contrary the symbolic and emotional attitudes towards car were found to be relatively lower, indicating that Greek society tends to be more progressive, regarding the use of alternative means, than the politicians' will. Through the application of TPB, we found that intention is strongly correlated with Perceived Behavioural Control, and less strongly with the attitude. The subjective norm was not a statistically significant factor of influence. It is also noteworthy that habit of car or bicycle use was not found to be a significant parameter of intention explanation.

Keywords: Sustainable mobility policies in Greece, intention of Greeks to use alternative means, Theory of Planned Behaviour

INTRODUCTION

Greece shows a significant delay in implementing sustainable mobility policies, comparing to other European countries. This has a major impact on the efforts towards the achievement of Kyoto targets. The GHGs emissions projections for 2010 show that Greece will marginally meet the +25% target (+23.9%) (EEA, 2008), while there is still considerable doubt on the reliability of the measurement system. Road transport still remains the main GHGs contributor. The increases of GHGs emissions in this sector were 26% for EU-15 during the period 1990-2006, while for Greece reached 80%.

Which are the underlying causes of this delay? Lagging in terms of political will or a clear conscious preference of Greek citizens to use their car? This research aims to explore the intention of Greeks to use alternative means and in particular bicycle, investigating in parallel the deeper causes that have led them to excessive car use. To this end, we employed social psychology methods.

Over the last two decades, the need to study human behaviour in order to promote sustainable mobility policies has been realized by those who formulate and implement relevant policies. Main reason for this awareness is the ineffectiveness of costly and ambitious policies and measures for sustainable mobility. In other cases such as Greece, it is assumed that the relationship between citizens and car is strong and rigid, which discourages the promotion of such policies. It is noteworthy that the recent funding of 7,4 billion Euros, Greece has received from the European Structural Funds for the transport sector (2007-2013 period), were allocated mainly to road works (59%) and only 19% to rail. Very little money regards projects of sustainable mobility in urban areas.

Researchers attribute this failure to insufficient knowledge of the human behaviour and to simplistic policies, programs and measures aimed at changing it. The implementation of soft measures, such as advertising campaigns promoting specific behaviours may have the opposite of the expected results, when based on incomplete knowledge of human behaviour (Project MAX, 2007).

Social psychology can help in realizing sustainable mobility policies, both at the stage of problem definition, and planning, implementation and evaluation of the measures. First of all it is necessary to understand the user's motivation. For many years the effort to understand the motives for specific travel behaviour has been limited to examining the functional benefits of cars such as autonomy, speed and convenience. Nevertheless the car is much more than a transportation mean of people and goods from A to B. Car use is related with deep psychological issues like primacy, the need for isolation, the need to maintain personal space etc. These components vary widely from person to person and from society to society and are difficult to identify and isolate causal relationships. Research has found that it is very difficult for people to admit their psychological dependence on the car. Nevertheless, in recent years has become understandable that the successful implementation of strategies and interventions to reduce car use is directly dependent on the understanding of such dependence. Travel behaviour researchers propose the separation of car use motives in

three categories: instrumental, symbolic and emotional (Steg et al., 2001; Steg, 2005; Jakobsson, 2007; Gatersleben, 2007).

Instrumental motives may be defined as the sum of the characteristics, which facilitate travel. The ease, speed and flexibility are indisputable advantages of the car. The symbolic motives are linked to the fact that people use the car as a means of expressing their identity and social status. Emotional motives are related to feelings caused by the possession and use of the car (Steg, 2005).

It is true that instrumental motives have become the main investigation issue of travel behaviour research, today. It is also clear that they have succeeded to explain many aspects of travel choices. However, Steg et al. (2001) provide an explanation why most research on travel behaviour concludes that these motives are more important. The first reason regards the research methods used, which hardly contain symbolic and emotional parameters. The second reason regards the refusal of participants to admit their psychological dependence on car, which is rationalized by functional arguments. However, recent surveys have revealed additional factors of dependency on car, which are connected to the positive impact that it has to the psychological and overall health of its users. Ellaway et al. (2003) identify the paradoxical relationship between car and health. The survey, in full contradiction with the established notions, shows that car ownership and use are associated with positive psychological effects and consequently positive impacts on human health. More specifically, people who own cars enjoy more security, autonomy, prestige, esteem and leadership than people who use public transportation. Hiscock (et al., 2002) refer to the sense of ontological security offered by car. Ontological security, the human tendency to believe that things are reliable and safe and not threatening, is reinforced by feelings of protection, autonomy and prestige.

Two additional factors constitute modal shift quite difficult. The unquestionable advantages of the car, make its use a strong habit that is difficult to stop and more difficult to replace it with alternative means. Also, efforts aiming to inform about the effects of excessive car use on the environment and society have no results because the real problem is a social trap. The reduction of car use for the good of society is a sacrifice that most people are willing to do only if everyone else does it first.

Therefore if we aim to promote more effective sustainable mobility policies, we should explore the factors shaping human behaviour. Social psychology has introduced many human behaviour models. One of the most successful is the Theory of Planned Behaviour (TPB), which we have employed in this research to explore the socio-psychological factors shaping the intent of a Greek city inhabitants to use one of the first bicycle networks under construction.

RESEARCH DESIGN

Methodology

The scope of the research

The aim of this study is the investigation of the socio-psychological factors shaping travel preferences in a Greek city by applying the TPB. The study area is the municipality of Volos, where a 10 km cycle network is going to be constructed. This area offered us an excellent opportunity to explore the intention of Greeks to use a cycle network and to investigate the correctness of the notion that the relationship between Greeks and car is very strong and therefore, any effort to promote sustainable mobility policies are doomed to failure before they are even applied. Having set out the main research questions, we proceeded to the selection of the reference population and the sample, and the development of a draft questionnaire, which was submitted for testing by 22 people. 416 questionnaires were randomly distributed and 328 were finally collected (general sample 2%). The responses were statistically analyzed, giving the results and conclusions which are presented at the next chapter.

The Theory of Planned Behaviour

One of the most successful tools in the effort to understand human behaviour in general, and travel behaviour in particular, is the TPB. This is a model to explain and predict human behaviour with sufficient research documentation that supports its effectiveness (Hunecke et al., 2007). In Greece, TPB is being applied from the early 90s to the fields of health and sport (Theodorakis, 1992; 1994), but not in transportation issues.

TPB is an expectancy-value model (Aijen, 1991). The theory argues that people behave rationally, relying on available information and assessment of the impact of an action. According to the theory the behaviour depends on the intention and the perception of control to perform the behaviour. The intention is shaped by three factors: the attitude towards the behaviour, the subjective norms and the perceived behavioural control (PBC). The model also takes into account the reasons why people have developed the above characteristics. These are beliefs (behavioural, normative and control) that people have developed through experience, knowledge, prejudices and abilities. Numerous other factors that influence the development of these beliefs, such as age, gender, ethnicity, education, etc., play an indirect role in the development of behaviour.

Researchers have recently begun to apply TPB in the field of transport. Although the theory cannot suggest ways to affect factors shaping the behaviour, its contribution in planning and promoting sustainable mobility policies is considered as quite important. TPB seems remarkably promising as a theoretical basis for the development of social influence tools, such as social marketing.

It should be stressed that one of the main conflicts between socio-psychologists is the role of habit in TPB. Some argue that habit follows a parallel route with TPB factors and affects behaviour directly (Bagozzi & Kimmel, 1995; Quelette & Wood, 1998). Aijen argues that habit is associated with the main TPB factors and particularly with the PBC.

Study area and sample

The municipality of Volos is situated in the eastern part of central Greece. It is one of the major urban and industrial centers with a population of 124,639 people. Due to its flat terrain, the relatively short distances between land uses and the mild climate is an ideal case to promote measures encouraging bicycle use.

However, in the last two decades Volos experienced a rapid growth in car and motorcycle ownership. The average annual increase was 5,7% for the period 1993-2008, while the corresponding increase in population was only 0,4%. 50% of the total trips in Volos are local, 40% have one end outside the city and 10% are through traffic. The internal trips are made mainly by car and walk (34.1% and 31.1% respectively) (see Table I for the complete modal split). The high rate of walk is justified by the small scale of the city, the gentle slopes and the high residential density especially near the city centre.

Commuting trips are made mainly by car, while public transport and walk are used mainly for educational purposes. 94% of the trips last less than a half hour and 87% of them less than 20 minutes. The average travel time is 16,7 minutes. Car trips last up to 30 minutes at a rate of 84,4% and walk trips at a rate of 96% respectively. The new bicycle network of the city will comprise two-way lanes (2m width) separated from the rest of the traffic by a verge.

Table I – Modal split in the city of Volos
Source: (Papavasileiou & Bistis, 1999)

Mode	**Private car**	**Motorcycle**	**Walk**	**Bicycle**	**Bus**	**Taxi**	**Other**
Percentage of trips	36,8	12,7	31,1	7,4	8,8	2,4	0,8

The questionnaire survey lasted about two months (mid June to mid-August 2009). We distributed 416 questionnaires and 328 were returned (14 invalid). The response rate was quite high (78.8%). The sample consisted of 314 individuals of whom 43.9% (N = 138) were male and 54.8% (N = 172) female, while there was a 1.3% (N = 4) which did not declare gender (see figure I). The age distribution of the sample was as follows: ages 18-30: 19.7%, ages 31-45: 51.3%, ages 46-60: 27.7% and older than 60: 1%. Regarding the individual monthly income 23.9% were less than or equal to 1000€, 51,6% between 1000-2000€ and 8.6% more than 2000 €. 79.6% of the sample has a private car and 51% a bicycle. 70% of the respondents were informed on the intention of the municipality to construct a bicycle network, mostly from newspapers (28,7%) and from relatives and friends (15%).

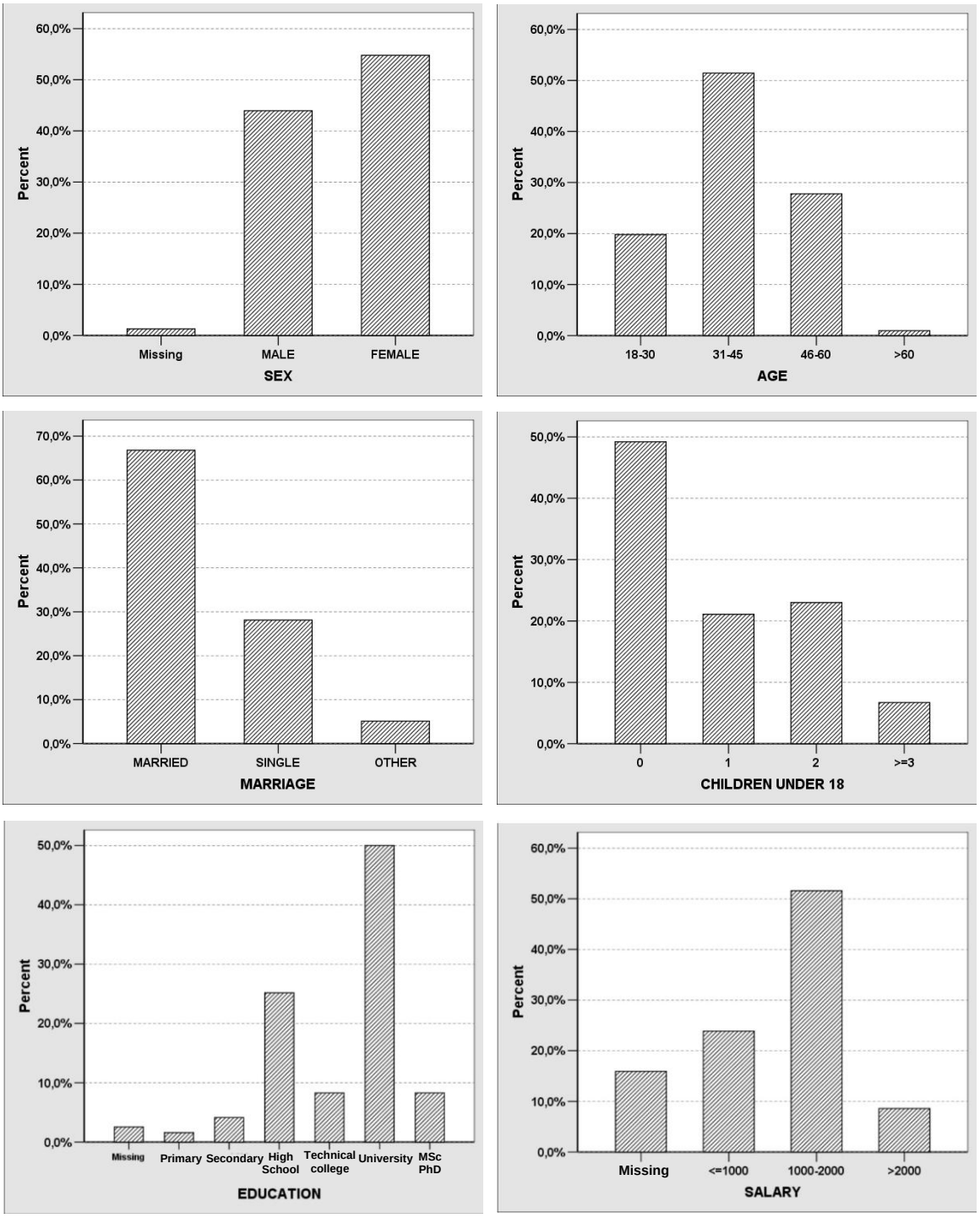

Figure 1 – Characteristics of respondents

Questionnaire structure

We attempted, through our questionnaire, to explore both the intention of Volos inhabitants to use the new bicycle network, and the direct (attitude, subjective norm, PBC) and indirect factors (background) that shape it. In addition, a separate section concerning the role of habit on mode choice was added (see figure 2).

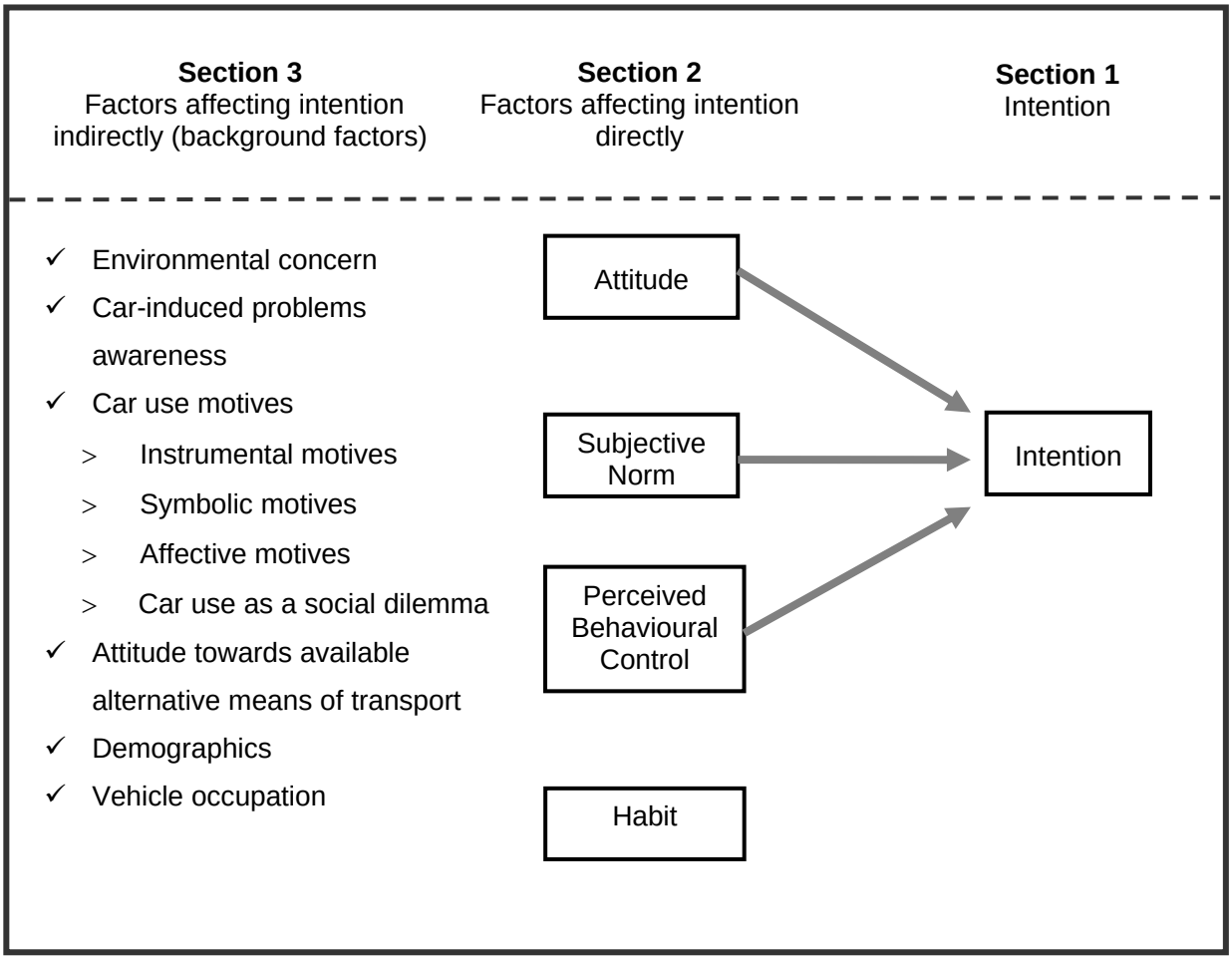

Figure 2 – The structure of the questionnaire.

Section 1: Intention

We formed three questions in order to explore the intention of Volos inhabitants to use the new bicycle network (Table II). The questions are based on the Ajzen's instructions (http://people.umass.edu/), the work of Karash et al. (2004) and their adjustments to the Greek population according to Theodorakis (1992:1994) and Karkaletsi et al. (2008), Natsis et al. (2004). The responses were measured on a seven-point scale (Left represents total disagreement and right absolute agreement).

Table II – Questions regarding intention of the inhabitants to use the new bicycle network

INT_1. I intend to use the on construction bicycle network in Volos to cover many of my usual mobility needs. *1 (Extremely Unlikely) to 7 (Extremely Likely)* **INT_2.** I am determined to use the on construction bicycle network in Volos to cover many of my usual mobility needs. *1 (Strongly Disagree) to 7 (Strongly Agree)* **INT_3.** I will try to use the on construction bicycle network in Volos to cover many of my usual mobility needs. *1 (Definitely false) to 7 (Definitely true)*

Section 2: Factors affecting intention directly

The factors affecting intention directly (attitude, subjective norm, PBC) were explored by the questions outlined in Table III, which were based in the sources referred in the previous paragraph. The responses were measured on a seven-point scale (Left represents total disagreement and right absolute agreement).

The role of the habit was explored by using the Response Frequency (RF) model, which has been employed in many studies related to travel choices (Verplanen et al. 1997, 1998; Garling et al., 2001; Fuji & Kitamura, 2003; Thogersen & Moller, 2004). According to the RF model, mode choice habit can be measured when participants are asked to respond quickly and without much thought, which means would choose to move to different usual destinations (shopping, visiting friends, etc.). According to Fujii & Garling (2007) this model has shown an acceptable confidence level. The RF model used in this work is shown in Table IV.

Table III - Questions regarding factors affecting intention directly

Attitude	For me to use the on construction bicycle network in Volos to cover many of my usual mobility needs will be: **ATT_1:** *1 (Bad) to 7 (Good)* **ATT_2:** *1 (Silly) to 7 (Smart)* **ATT_3:** *1 (Worthless) to 7 (Valuable)* **ATT_4:** *1 (Unpleasant) to 7(Pleasant)* **ATT_5:** *1 (Unenjoyable) to 7 (Enjoyable)*

Subjective Norms	**SN_1.** Many people who are important to me think that it would be for my good to use the on construction bicycle network in Volos to cover many of my usual mobility needs. *1(definitely false) to 7(definitely true)* **SN_2.** Many people who are important to me will use the on construction bicycle network in Volos to cover many of their usual mobility needs. *1(definitely false) to 7(definitely true)*
Perceived Behavioural Control	**PBC_1.** For me to use the on construction bicycle network in Volos to cover many of my usual mobility needs will be: *1(Extremely Difficult) to 7(Extremely Easy)* **PBC_2.** I am definitely sure that I will use the on construction bicycle network in Volos to cover many of my usual mobility needs. *1(Strongly Disagree) to 7(Strongly Agree)* **PBC_3.** If I wanted to I could use the on construction bicycle network in Volos to cover many of my usual mobility needs. *1(Definitely False) to 7(Definitely True)*

Table IV - Questions regarding mode choice habit

Please select travel mode from alternatives. Respond quickly to each by selecting the first mode that comes to mind.			
Going to work	Car Bus	Motorbike Bicycle	Taxi Walk
Going to supermarket	Car Bus	Motorbike Bicycle	Taxi Walk
Visiting friends or relatives	Car Bus	Motorbike Bicycle	Taxi Walk
Going out for dinner, to pub or cinema.	Car Bus	Motorbike Bicycle	Taxi Walk
Going downtown for shopping	Car Bus	Motorbike Bicycle	Taxi Walk

Section 3: Factors affecting intention indirectly

1. Environmental concern

Environmental concern was explored by using the New Ecological Paradigm (NEP) scale (Dunlap et al., 2000). From the list of the 15 NEP questions, we selected six for assessing the environmental concern of our sample (see Table V). The degree of agreement or disagreement with these questions reflected on a five-point scale with the left side representing total disagreement and the left absolute agreement. Agreement with the odd questions indicates anti-environmental attitudes.

Table V – Questions regarding environmental concern

For each statement, please indicate if you STRONGLY DISAGREE, MILDLY DISAGREE, are UNSURE, MILDLY AGREE or STRONGLY DISAGREE with it.
NEP_1: Humans have the right to modify the natural environment to suit their needs.
NEP_2: When humans interfere with nature it often produces disastrous consequences.
NEP_3: The so-called "ecological crisis" facing humankind has been greatly exaggerated.
NEP_4: The balance of nature is very delicate and easily upset.
NEP_5: Humans were meant to rule over the rest of nature.
NEP_6: If things continue on their present course, we will soon experience a major ecological catastrophe.

2. Attitude towards the effects of car use

The attitude towards the effects of car use in the city of Volos was assessed by three questions related to pollution, congestion and parking. The questions are presented in table VI. Participants were asked to express their attitude in a five-point scale.

Table VI – Questions regarding the attitude towards the effects of car use

PA_1. Car usage consists one of the major cause of environmental pollution in Volos.
1 (Strongly Disagree) to 5 (Strongly Agree)
PA_2. Traffic congestion is a major problem in Volos.
1 (Strongly Disagree) to 5 (Strongly Agree)
PA_3. Unlawful car parking is against pedestrians' rights for free, safe and unobscured mobility.
1 (Strongly Disagree) to 5 (Strongly Agree)

3. Attitude towards car

The attitude towards car was assessed by 11 questions divided into four categories: instrumental, symbolic, emotional motives and car use as a social dilemma (Table VII). The questions are based on the work of Steg et al. (2001), Ellaway et al. (2003), Steg (2005), Anable (2005), Hunecke et al. (2007), Gatersleben (2007) and Jakobsson (2007) and follows a five-point scale.

Table VII – Questions regarding the attitude towards car

Instrumental motives	**CARI_1.** Driving saves a lot of time. *1 (Strongly Disagree) to 5 (Strongly Agree)* **CARI_2.** Car's carrying capacity is of great importance to me. *1 (Strongly Disagree) to 5 (Strongly Agree)* **CARI_3.** Car-use and car-maintenance expenses are not important to me. *1 (Strongly Disagree) to 5 (Strongly Agree)*
Symbolic motives	**CARS_1.** I feel free and safe in my car. *1 (Strongly Disagree) to 5 (Strongly Agree)* **CARS_2.** It is very important that when in my car I choose the people I will travel with. *1 (Strongly Disagree) to 5 (Strongly Agree)* **CARS_3.** Someone's car shows who and what he is. *1 (Strongly Disagree) to 5 (Strongly Agree)*
Affective motives	**CARE_1.** Driving is fun. *1 (Strongly Disagree) to 5 (Strongly Agree)* **CARE_2.** I love getting around the city by car. *1 (Strongly Disagree) to 5 (Strongly Agree)* **CARE_3**. I know of a dream car that I would love to possess. *1 (Strongly Disagree) to 5 (Strongly Agree)*
Social dilemma	**SD_1.** Even if I dramatically reduce driving it will be worthless since no one else is willing to do the same. *1 (Strongly Disagree) to 5 (Strongly Agree)* **SD_2.** I am trying to reduce driving no matter what all others do. *1 (Strongly Disagree) to 5 (Strongly Agree)*

4. Attitude towards alternative means of transport

The attitude towards alternative means of transport (bus, bicycle, walk) was assessed by seven questions presented on table VIII. The responses were measured on a five-point scale.

Table VIII - Questions regarding the attitude towards alternative means of transport

AL_1. Using alternative means of transport (bus, bicycle, walk) is stress-free.
1 (Strongly Disagree) to 5 (Strongly Agree)
AL_2. Using alternative means of transport (bus, bicycle, walk) saves a lot of money.
1 (Strongly Disagree) to 5 (Strongly Agree)
AL_3. I would dramatically reduce driving if there was a faster and more reliable bus service in Volos.
1 (Strongly Disagree) to 5 (Strongly Agree)
AL_4. I don't use bus because it doesn't suit me.
1 (Strongly Disagree) to 5 (Strongly Agree)
AL_5. Busses and bicycles obstruct free car mobility.
1 (Strongly Disagree) to 5 (Strongly Agree)
AL_6. Traffic free areas at the center of Volos cause more problems than they solve.
1 (Strongly Disagree) to 5 (Strongly Agree)
AL_7. Cycling in Volos is dangerous.
1 (Strongly Disagree) to 5 (Strongly Agree)

RESULTS

Intention of Volos inhabitants to use the new bicycle network

The average value of the intention of Volos inhabitants to use the new cycle network is high: 5,52 (maximum 7, average 4 and minimum 1). We were able to distinguish two groups. The first one was defined as a subset of the sample reported low, neutral or negative intention (between 1 and 4,99) (26,8% of the total sample), while the second one as a subset of positive or high intention (between 5 and 7) (73,2% of the total sample). It is quite impressive that 30,3% of the total sample stated the highest intention.

The high intension is also supported by the following data indicating the generally positive relationship between the respondents and the bicycle:

- 51,3% of the sample owns a bicycle.
- From the remaining 48,7% of the sample, which does not have bicycle, 15% stated that it plans to buy one over the next six months.

Factors affecting intention

The application of TPB in our study showed that the intention of using the new bicycle network is strongly correlated with PBC, and less strongly with the attitude. The subjective norm is not a statistically significant factor of influence.

First, we examined the relationship between the factors of TPB and the intention and then we explored the contribution of habit. The internal reliability of the four TPB factors was tested by Cronbach alpha-coefficient (intention: 0,932, attitude: 0,895 PBC: 0,960 and subjective norm: 0,826). We chose to apply binomial logistic regressions (with intention serving as dependent variable), as none of the variables used in this study follow normal distribution. The only statistically significant factor distinguishing the two categories of intention was 'PBC' at 1% ($p < 0,001$) and 'attitude' at 7% ($p = 0,067$). The final model explains 75.6% of the intention variability (pseudo R^2, Nagelkerke $R^2 = 0,756$). The effect of PBC is very high. One point increase of PBC increases the likelihood of a person to belong in the group of high intention by 5 times (ExpB = 5.06, CI95% = 3.25 to 7.88). The effect of 'attitude' is less important. One point increase on the scale of attitude (1 to 7) increases the likelihood of a person to belong in the group of high intention by 1.8 times (ExpB = 1.81, CI95% = 0.95 to 3.43).

The effect of 'subjective norm' is not statistically significant ($p = 0,417$) and the model rejected it. This result is consistent with those from several other studies that used TPB as main theoretical tool. It is true that the role of subjective norm in the TPB model has challenged, due to the relatively small or negligible contribution to the interpretation of intention. Besides, the creator of TPB states that this theory does not provide that any one factor shaping intention will certainly have a significant impact. It is quite possible that the relative importance of TPB factors will (a) vary from survey to survey and (b) depend on the behaviour that is explored and the reference population.

Consequently, the intention of Volos inhabitants Volos to use the new bicycle network is affected mainly from the sense that they possess the means, ability and opportunity to use the bicycle (PBC) and to a lesser extent on their evaluation on the benefits and advantages of cycling (attitude). Any social pressure that a person deemed to have accepted does not affect his intention to use the network (subjective norm).

Finally, the effect of habit to cycle or use the car was examined by introducing an additional independent variable in the model. Both variables showed low statistical significance $p>0,1$, and therefore cannot be regarded as variables that improve the explanatory power of the model.

Correlations between significant TPB and background factors

Correlations between PBC and background factors

The relationships between PBC and background factors were tested by applying binomial logistic regression. A correlation analysis gave us the statistically significant factors that finally introduced as independent variables in the model. We divide two categories of PBC: (a) category 0 for values from 1 to 4,99, which refers to people with low, neutral and negative PBC and (b) category 1 for values from 5,00 to 7,00, which refers to people with high and very high PBC.

The statistically significant factors distinguishing the two categories of PBC are presented in table IX. The final model explains 48.9% of the PBC variability (pseudo R^2, Nagelkerke R^2 = 0,489). The model rejected all the other background factors, even if they showed statistically significant correlation in preliminary tests.

Finally, it was found that PBC is correlated with six background factors. Five of them showed a positive correlation: the bicycle ownership (10,88) and the intention to purchase a bicycle (3,21), the attitude towards alternative means of transport (bus, bicycle and walk), both in terms of relief from high costs (1,72) and of belief that their use is not associated with any adverse social symbolism (1,60), the belief that ecological balance is fragile (1,67). The possibility to transfer things easily anywhere by car was negatively correlated with PBC (-0.43).

Table IX – The statistically significant background factors distinguishing the two categories of PBC.

Independent Variable	Code Name	Exp B	p	Interpretation
Bicycle possession	BICYCLE	10,88	0,000	People possessing a bicycle are 10,88 times more likely to belong to the high PBC group (or the probability is increased by 988%[1])
Intention of buying a bicycle in the next 6 months	BICYCLE TO BUY	3,21	0,040	People intending to buy a bicycle are 3,21 times more likely to belong to the high PBC group (or the probability is increased by 221%)
Attitude towards available alternative means of travel	AL_2	1,72	0,001	Increase of one unit at the 7-point scale of attitude towards alternative means of transport results to a 1,72 increase of the likelihood a person to belong to the high PBC group (or the probability is increased by 72%).
Environmental concern	NEP_4	1,67	0,019	Increase of one unit at the 5-point scale of environmental concern results to a 1,67 increase of the likelihood a person to belong to the high PBC group (or the probability is increased by 67%).
Attitude towards available alternative means of travel	AL_4	1,60	0,005	Increase of one unit at the 5-point scale of attitude towards available alternative means of transport results to a 1,60 increase of the likelihood a person to belong to the high PBC group (or the probability is increased by 60%).
Car motives	CARI_2	0,43	0,000	Increase of one unit at the 5-point scale of car motives results to a 0,43 decrease of the likelihood a person to belong to the high PBC group (or the probability is decreased by 57%).

[1] Probability= (ExpB-1)*100%

Correlations between attitude and background factors

The correlations of attitude towards the use of the bicycle network with the background factors were tested by applying binomial logistic regression. To that end two categories of attitude were created: (a) category 0 for values from 1 to 4,99, which refers to low, neutral and negative attitude and (b) category 1 for values from 5,00 to 7,00, which refers to people with high and very high attitude. Preliminary correlation tests were performed between attitude and background factors and finally only statistically significant factors were introduced as independent variables in the binomial regression model.

The statistically significant factors distinguishing the two categories of attitude are presented in table X. The final model explains 51,0% of the attitude variability (pseudo R^2, Nagelkerke R square = 0,510). The model rejected all the other background factors, even if they showed statistically significant correlation in preliminary tests.

Finally, it was found that attitude is correlated with seven background factors. Six of them showed a positive correlation: the bicycle ownership (11,95) and the intention to purchase a bicycle (11,55), the attitude towards alternative means both in terms of reducing car use if Volos offered a fast and reliable public transport system (1,94) and in terms of relief from high costs (1,52), the belief that car use is a major source of pollution in the city of Volos (1,91) and the habit of walking (1,60). The background factor that showed a negative correlation with attitude was the perception that car saves time (-0,67).

The results of statistical analysis are summarized in figure 3. Only factors related to each other at 5%-level are presented. All other factors did not contribute to the improvement of binomial logistic regression models.

Table X - The statistically significant background factors distinguishing the two categories of attitude towards the bicycle network.

Independent Variable	Code Name	Exp B	p	Interpretation
Intention of buying a bicycle in the next 6 months	BICYCLE TO BUY	11,95	0,039	Subjects intending to buy a bicycle are 11,95 times more prone to belong to the high ATT group (or the probability is increased by 1095%).
Bicycle possession	BICYCLE	11,55	0,000	Subjects possessing a bicycle are 11,55 times more prone to belong to the high ATT group (or the probability is increased by 1055%).
Attitude towards available alternative means of travel	AL_3	1,94	0,009	Increase of one unit at the 5-point scale of attitude towards available alternative means of transport results to a 1,94 increase of the likelihood a person to belong to the high ATT group (or the probability is increased by 94%).
Car-induced problems awareness	PA_1	1,91	0,010	Increase of one unit at the 5-point scale of car-induced problems awareness results to a 1,91 increase of the likelihood a person to belong to the high ATT group (or the probability is increased by 81%).
Walking habit	WALKING HABIT	1,60	0,021	Increase of one unit at the 5-point walking habit scale results to a 1,60 increase of the likelihood a person to belong to the high ATT group (or the probability is increased by 60%).
Attitude towards available alternative means of travel	AL_2	1,52	0,022	Increase of one unit at the 5-point scale of attitude towards available alternative means of transport results to a 1,52 increase of the likelihood a person to belong to the high ATT group (or the probability is increased by 52%).
Car motives	CARI_1	0,67	0,011	Increase of one unit at the 5-point scale of car motives results to a 0,67 decrease of the likelihood a person to belong to the high ATT group (or the probability is decreased by 43%).

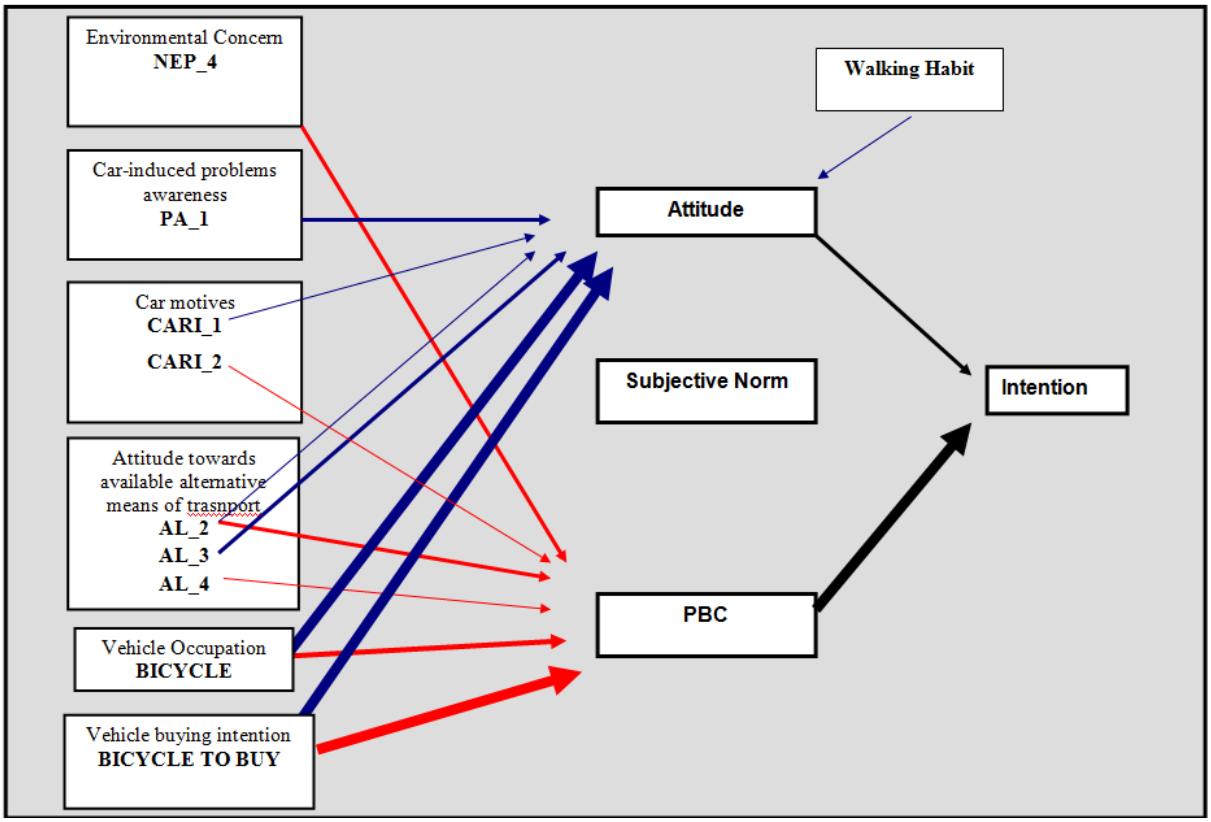

Figure 3 – Summary of the results
Note: Line width represents the ExpB's magnitude of each independent variable

CONCLUSIONS

The intention of Volos inhabitants to use the new bicycle network

The intention of Volos inhabitants to use the new bicycle network is high. This result complies with the pro-environment attitude, the realization of car related problems and the positive attitudes towards alternative means. On the contrary the symbolic and emotional attitudes towards car were found to be relatively lower, indicating that Greek society tends to be more progressive, regarding the use of alternative means, than the politicians' will.

This means that delays in the promotion of sustainable mobility policies in Greece are mainly due to a "wrong estimation" of politicians on the preferences of citizens and not in the alleged strong relationship between Greeks and the car. This misconception leads to the promotion of policies and implementation of infrastructure primarily to facilitate traffic flow. The lack of infrastructure for alternative means maintains a vicious circle between development of road infrastructure and car use. We think that the emergence of a new generation of politicians is necessary, in order to disengage from this vicious cycle and penetrate deeper to the real needs and preferences of citizens. The recent economic crisis in Greece is perhaps a golden opportunity to do so.

In the case of Volos, knowing the high intention of citizens before the start of construction of such project is crucial, as the decision of municipal authorities to develop the new network seems to have a wide support. This may lead the municipality to more 'aggressive' policies before beginning of this project, such as the publication of this research results, the implementation of an advertising campaign and the cooperation with groups that are more likely to support the attempted intervention (environmental organizations, cyclists and disabled associations, elderly, etc). In this way it would be widely known that the project enjoys general acceptance and reactions to that work from individuals opposed against the will of the majority of Volos inhabitants and not against the municipal authority.

The role of PBC and attitude

Intention is shaped by PBC and attitude. These factors are associated primarily with the possession, use and intention to buy a bike. The improvement of existing infrastructure, measures to facilitate the movement and safety of cyclists, incentives for the purchase of bicycles or even free bicycles available to the general public is quite possible to strengthen the sense of citizens that they have the means, ability and opportunity to use their bikes (PBC). They would also improve their internal assessment of the benefits and advantages of bicycle use (attitude). The increase of PBC and attitude would probably lead to a further increase of the intention to use the bicycle network.

The social dilemma

The problem of the promotion sustainable mobility policies (the development of a bicycle network in our case) is a social dilemma, where personal interests conflict with the collective. Solving the problem can only be achieved by fostering cooperation among all persons or groups, who are involved and the strengthening of trust among citizens and between citizens and the public administration.

The cooperation and trust can be strengthened by carrying out social consultations prior to the construction of the project. The ex post invocations for cooperation can be interpreted only as a concession to pressure put by groups or individuals.

The possibility of cognitive dissonance

The inability of an individual to adopt a behaviour for which he has initially developed positive attitude leads to reassessment of that attitude and usually to a negative conversion (cognitive dissonance). Some people may go one step further and turn against the policies (and those who support them), as they believe that they will reduce or threaten to reduce, their freedom (psychological reactance). In other words, wrong decisions, as the exclusion of inhabitants from the decision making process, the lack of cooperation and the avowed "lack of trust" in people by the politicians, may lead to disappearance of the advantage of high intention that citizens show in using the new bicycle network or any other sustainable mobility policies.

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