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Modelling the factors related to the seatbelt use by the young drivers of Athens

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Abstract

Road traffic accidents in Greece are one of the major problems of the public health sector and the first cause of death in the ages 18–24. However, there are no records available for defining the determinants of road accidents and seatbelt wearing rates. The main objective of this study is to determine and clarify the relationship between young drivers' intentions (motivation to use/non use seatbelt) and their behaviour (self-reported use). Additionally, the purpose of this study is to evaluate the seatbelt wearing rates among young drivers in relation to their trip-type. The sample consisted of 200 young Greek drivers of both sexes. The statistical analysis included factor analysis and multiple regression analysis. The seatbelt use was measured in relation with seven trip-types. Through factor analysis, a seven factor scale of seatbelt use and a four factor scale of seatbelt non use were created which included Greek young drivers' basic motivations for wearing or not wearing a seatbelt. A model, constructed by the multiple regression analysis, revealed the factors related with the seatbelt use. The factors positively related were 'imitation', 'self-protection', and 'legality'. The factor of 'discomfort' is negatively associated with the seatbelt use. Furthermore, mileage was negatively related with seatbelt use. Finally, some preliminary suggestions on how prevention strategies should be implemented in Greece are discussed.

Keywords: Young drivers; Seatbelt use; Behaviour and motivations

1. Introduction

Nowadays and in particular over the past 30 years, air bags and seatbelts (SB) are the most popular devices designed and developed to improve driving safety. Within the last 15 years, international research has strongly supported the effective impact of SB use on reducing or avoiding traffic injuries and traffic fatalities (e.g. Harterman et al., 1984; Green et al., 1987; Cohen et al., 1989; Hunter et al., 1993; Evans, 1996). Numerous factors have been described to be related to SB use. Statistical differences have been also reported by considering how some factors actually affect the level of wearing rates. These factors concern socio-demographic characteristics such as: gender (e.g. Preusser et al., 1991; Miller et al., 1998); age and social status (e.g. National Highway Traffic Safety Administration, 1987; Clark, 1993; Liu et al., 1998); behavioural patterns such as: alcohol consumption; high risk driving (e.g. Foss et al., 1994; Robertson, 1996; Liu et al., 1998); obedience to circulation regulations and State rules and the perceived benefits and barriers of safety belt usage (e.g. Preusser et al., 1988; Riccio-Howe, 1991; Mortimer, 1992; Crandon et al., 1996). There are also studies of travelling conditions and driving time (McCarthy, 1986; Liu et al., 1998; Miller et al., 1998). Additionally, emphasis has been given on the absence of a common methodology in the assessment of the wearing rates. Techniques using accurate measures are suggested in order to eliminate the possible gap between the figures of the self-reported and observed SB use (e.g. Morbidity and Mortality Weekly Report, 1991; Robertson, 1992; McKnight and Dawson, 1996); Streff and Wagenaar (1989) have found that self-report measures over-

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estimate observed belt use by 8.9–19.4 percentage points.

In EU countries, the design and use of occupant restraints are covered by Council Directives. Despite legislation, usage rates vary considerably between Member States with low front SB wearing rates in some countries and low rear restraint wearing rates in general. Reported front seat wearing rates vary between 52 and 92%. Rear seat wearing rates vary between 9 and 80%. Moreover, several countries do not carry out surveys, and it is possible that wearing rates in those countries are even below the lowest end of the range (European Transport Safety Council, 1996).

It is worth mentioning that the Greeks are among the healthiest people in the world. This is expressed by the low rate of C/V diseases, most neo-plasmatic diseases and other sicknesses that characterise the industrially developed countries. Deaths from road traffic accidents (RTAs) consist a tragic exception, being one of the major problems of the Greek public health and the first cause of death in the ages 18–24 (Research Committee of the Greek Parliament, 1996). Despite these facts, there are no available Greek records that can scientifically account for the RTAs and the SB use determinants. According to the national law, which follows the EU Directives, all car passengers must be properly buckled up with SB approved for their construction by the EU.

In Greece, driving is permitted from the age of 18. Unfortunately, the state control is neither continuous nor effective. It is characterised by lack of interest by the police, cancellation of the penalty, etc. This way of dealing with the aforementioned problem results in increased wearing rates only during specific periods of police inspections in order to avoid penalties. Once these periods terminate, they are followed by periods of 'vertically' decreased usage. Additionally, the Greek authorities are not in position to give reliable statistically analysed figures of wearing rates. There are some fragmental reports which examine the relationship or the eventual correlation between SB use and other factors that concern only cases in which the individuals were involved in RTAs. For example, according to an official review in 1997, only two out of ten drivers were using SB or helmet at the moment of an accident.

Recently, an interesting study was published in Greece regarding the evaluation of fatalities due to non-use of SB. This study estimated the odds ratios for death rather than injury in a motor vehicle accident, as a result of SB non-use by car occupants in Greece. According to the findings of this study, the proportion of all deaths that could have been avoided if all car occupants used SB was estimated to 27% (Petridou et al., 1998).

1.1. Objectives

Taking into account the aforementioned studies and the fact that in Greece the specific research field is still virgin, the Department of Social Work, in collaboration with the Laboratory of Methodology Research in Health Topics of the Department of Health Visiting, undertook a research project aiming at assessing the reported SB use at two levels: (a) separately for each trip-type (seven trip-types have been studied); and (b) by accumulating the reported score of these seven trip-types. Above all, an attempt was made to construct a model of the factors promoting or restraining the SB use, after controlling for socio-demographic characteristics. The results of this model could be applied by the authorities by focusing on the modification of the Greek young driving behaviour.

2. Methods

2.1. Participants

Using information from and being under the regulations of the Greek National Statistical Service (GNSS), a parent population of 2500 potential participants was recorded. The study sample was selected from this parent population taking into account its recorded characteristics. It consisted of 200 participants aged 18–24 who were residents of Athens. The sample was stratified into ten municipalities in the area of Athens which were randomly selected. Within each municipality, interviews were conducted in randomly selected blocks using age, gender and driving licence quotas. The sample of this study consisted of 127 men and 73 women. While designing the study, the main concern was to ensure that the sample was representative of the population studied, at least in the aforementioned areas of Athens.

Specifically, the design and selection of the sample was carried out according to the maps and catalogues of the GNSS.

The maps clearly portray the blocks and the street names and, the catalogues, the size and composition of the households (sex, age, socio-professional category, etc.) in accordance with the census of 1991 from the GNSS by blocks.

Using this material and specific methods and techniques that are used for similar studies (Pantazidis and Kassimati, 1984), the overall extent of the municipalities of Athens which were studied was divided into about ten homogeneous strata whose population size fluctuates from about 5000 to 10 000 households. Moreover, from each one of the above strata — separately — were chosen at random samples 3 or 4 surface units (each unit consists of one or more neighbourhood

blocks, maintaining the proportion as to the size of each stratum). The process of the random sampling was such so that each of the surface units which compose the stratum could have the probability to be chosen in the sample proportionally according to its size by household.

The number of individuals aged 18–24 with a driver's license was not known (GNSS does not dispose this information), therefore we recorded 2500 households with potential participants.

Finally, 200 households were selected from which only one person was questioned, the one who fulfilled all of the aforementioned criteria (sex, age, driver's license). If in any one household, there were more than one person with these criteria (e.g. two brothers), one would be randomly selected to be included in the sample.

2.2. Procedures

It is worth mentioning that this study is the first one conducted in Greece and its main concern was to model the factors related to the SB use/non use. We, certainly, could not refrain from attempting to measure its SB use. We decided to apply the personal interview (as a self–report method) and not the observational method as many researchers have (Waller and Barry, 1969; Stulginskas et al., 1985; Streff and Wagenaar, 1989) due to the difficulty in confirming the accuracy of the direct observation method.

Most of the surveys implement the direct observation method. A common way, as presented in the Streff and Wagenaar (1989) literature review includes the selection of observation sites on main roads or highways with specific traffic signals to allow sufficient time for accurate observation of use/non use of SB.

The idea to ask the Traffic Police to help us use roadside interview and observation was rejected because in the case of Greece, there is a peculiar 'solidarity' between Greek drivers in highways where there are traffic signals which inform the drivers of the existence of the traffic police. The drivers who realise the existence of police traffic signals, invent their own signals (by constantly flashing their bright lights) to the drivers of the opposite side of the road in order to warn them that there is a police traffic control nearby.

Thus, the direct observation method does not appear to be always accurate. Furthermore, the direct observation method on some main roads of Athens, as an optional method, is considered to be very difficult due to the traffic congestion during which all drivers are unbuckled.

Therefore, unlike the general debate that self-reported usage overestimates actual SB use (given that the main concern of the current study is the factors of ease/obstruction of use), we chose this method as more accurate than the direct observation with the assistance of the Traffic Police.

The data were collected through personal interviews conducted in randomly selected households by health visitors who: had a driver's licence, had received appropriate training, and were supervised by the researchers. Both, the interviewers and the researchers, remained with the subjects during the entire time they were completing the questionnaire in order to clarify any questions. The subjects were given general instructions how to complete the questionnaire. Subjects' rights to anonymity and confidentiality were protected. Consent was requested and received from all subjects prior to the completion of the questionnaire and after the assimilation of the essential information about the study. An information pamphlet from the Ministry of Traffic was also distributed to the participants with the request that it should be studied carefully. The data collection took place in the Athens area for two reasons. First, the incidence of RTAs (and generally traffic problems) was higher in this region than elsewhere in the country. Second, the variety of different types of young drivers in the Athens region is wider than elsewhere in Greece.

2.3. Questionnaire and measures

A pilot study was conducted before the present study. For the purposes of the pilot study, some 20 young drivers were interviewed by the researchers with an open-ended questionnaire which included several sections about motivational and behavioural principles concerning SB use/non use. The questionnaire, used in the study, was the result of a combination of an already formed questionnaire and the conclusions of the pilot study. The questionnaire, which was used for a former study (Gregersen and Berg, 1994; Chliaoutakis et al., 1999) concerning the life style and the RTAs, constituted the basis for the development of the questionnaire used in the present study. The pilot study results helped in the construction of the final questionnaire. Therefore, a new modified questionnaire was developed. There were some 115 different variables included in the questionnaire which was divided in four sections:

- The first section referred to the socio-demographic background of the sample including gender, age, place of origin, marital status, educational level and profession.
- The second section was divided into five parts. The first and the second parts referred to young drivers' experience. The third referred to the frequency with which a young driver drives to different trip-type, e.g. to go to a bar, for professional reasons, etc. The fourth part of the second section referred to the frequency with which the young drivers of the sample drive during different days and hours. The final fifth part referred to the alcohol consumption, every

day, several times a week, a few times a month, rarely and never.

- Following in the third section, 30 items were used to measure the motivations (intentions) for using SB. Each item appeared in statement form. Examples of statements were: 'I wear SB to avoid being injured' or '… to avoid penalties' or because of: '… obedience to the state rules', '… education and information about the benefits' or '… former injure', '… weather or road conditions'. Respondents were asked to rate statement on a five point Likert-type scale that ranged from 0 (never) to 5 (always) 'affects my intention of using SB'.
- Thirty-six items, that were used to measure the SB non-use motivations, were ranked in the same manner as in the previous part. These included statements such as 'I don't wear SB because I drive slowly' or '… because I forget to do so' or '… I am afraid of being trapped or drowned in an accident', 'I don't wear seatbelt because of diminished driving pleasure' or '… because nothing will happen to me'. As previously, each statement of barrier was rated from 0 (never) to 5 (always) 'affected my intention of not using SB'.
- The fourth and final section applied the self-reported SB use method similarly to one of Hamed and Easa (1998) via interviews for collecting data in order to develop an ordered probability approach. The SB wearing rates were measured in relation with seven trip-types: during working/school; to or from work/school; going to a bar, disco, party, dancing or something else similar; returning from a bar, disco, party, dancing or something else similar; just driving around; to or from a club, an association or something similar; and to or from another event.

In the pilot study, the young drivers mentioned driving during the school hours, e.g. from class to library, or towards gymnasium, or towards another department to attend class, etc. (the majority of the schools in Athens are not in a single campus, which explains these movements). Moreover, they mentioned driving during working hours, e.g. to provide services, to deliver merchandise, or even for their own personal errands (post office, bank, other civil services, places that are open only during working hours). It was decided to include this item as a trip-type.

The SB use concerning the trip-type of bars, clubs, etc. (which, according to the bibliography, may include alcohol consumption) was assessed with two different variables (going to and returning from), so that a better understanding of a possible differentiation could emerge. The variable measuring SB use while returning from an entertainment place referred to the home destination.

Given that SB use was self-reported, it was decided that the face to face interview would be more personal than a telephone interview. The measuring scale included all the possible answers to provide a greater number of responses, asking the respondent to consider and evaluate the different choices before answering. As it has been supported, the ordered probability models, unlike the traditional binary choice account for the fact that they imply a greater distribution, which provides decision makers with more insights to help generate strategies for increasing wearing rates (McElvey and Zavoina, 1975; Greene, 1993; Hamed and Easa, 1998). Furthermore, the 'always-never' scale is more accurate than other scales, e.g. SB use in the last ten trips, etc., as found by Streff and Wagenaar (1989).

Finally, observed studies (including cases in which only the frequency is observed), have many difficulties and require enormous funds, when the criterion of age is included.

2.4. Statistical analysis

The statistical analysis was undertaken by principal components analysis (PCA) and the data modelling was constructed through multiple linear regression. PCA with varimax rotation is used in two initial runs, one for the 30 items measuring the SB use and one for the 36 items measuring the SB non-use. The PCA was chosen due to two main reasons; first, in order to 'find' the 'latent' variables (factors) and second, in an effort to reduce the large number of the variables. Through the PCA the 30 SB use variables and the 36 SB non-use variables were reduced in two relatively small groups of variables which accounted for a fairly large proportion of the variance. These 'new' variables (factors) resulted from the combination of several other ('overt') variables which shared a common underline base. In other words, the aim of the PCA is, on the one hand, to combine the variables which have a common background into a new variable and, on the other hand, to limit the number of the new variables as far as possible. Thus, seven factors were extracted from the analysis of the SB use and four from the analysis of the SB non-use. All factors, for both analyses, were internally consistent and well defined by the relevant items.

Furthermore, a multiple regression model was developed to assess the relationship among several independent/predictor variables and the outcome/dependent variable (a summing score of the seatbelt wearing rates). This method was selected because the outcome variable was continuous (Draper and Smith, 1966), and therefore an ordinary linear regression equation might end up to meaningful results (Bland, 1995). The outcome/dependent variable was a composite score derived by summing up the frequencies of the self-reported wearing rates (ranged from 0 (never) to 5 (always)), according to the seven trip-types (e.g. a respondent who reported that he 'always' wore seatbelt obtained a score

Table 1
Distribution of study subjects by socio-demographic variables

Variables	*N*	%
Gender		
Men	127	64.1
Women	71	35.9
Age	21[a]	2.03[b]
Place of origin		
Greater area of Athens	133	67.2
Other city	65	32.8
Occupation		
Students	82	41.4
Others	116	58.6
Years of education	13.2[a]	2.5[b]
Months since a driver had obtained the driving license	24.6[a]	19.1[b]
Total mileage since a driver had obtained the driving license	37 182[a]	79 286[b]

[a] Mean value.
[b] Standard deviation.

of 35). The independent variables were the factors extracted by two PCAs, as well as, a set of socio-demographic characteristics and driving aspects of the respondents: age (in years); gender; education (in years of education); place of origin (greater area of Athens, other city); occupation (student, other); driving experience (in months since a driver had obtained the driving license); mileage (in km since a driver had obtained a driving license); frequency of day or night driving (separately for weekdays and weekends) and alcohol consumption.

3. Results

3.1. Socio-demographic characteristics

Details about the socio-demographic characteristics of the sample could be found in Table 1. The average age (mean) was 21 years (range 18–24 years). The educational level of the sample (as it was measured in years of education) had a mean of 13.2 years. The time, since a young driver had obtained the driving license, was measured (in months) as an indication of his/her driving experience; the average time was 24.6 months. However, having a driving license for a long period of time does not necessarily mean great driving experience, e.g. a young driver without a car may have driven only few kilometres. Here, the mileage variable could be more elucidating about driver's experience. The respondents reported that they have driven an average 37 182 km per driver since obtaining the driving license.

3.2. Self-reported behaviour of seatbelt use

Table 2 presents the frequency of the self-reported SB use. It appears that wearing rates are low (mean value below 3, 'often' use). All the mean values shown are within 0.7 points. In the category 'never' of the work/school-related items there are high percentages of SB non-use (36.9 and 27.3, respectively). These two items (during work/school, to and from work/school) assemble high percentage of wearing rates in the category 'always' (14.6 and 15.7, respectively). The cumulative score of SB use to the seven types of trip varies from 0 to 35 with a mean value of 17 points.

3.3. Young drivers' basic motivations to use seatbelt

The results of the two PCAs following the varimax rotation are reported in Tables 3 and 4. The final factor solutions for both analyses met the following criteria: (a) each one was based on factors with an eigenvalue >1.0; (b) each individual item was correlated with the factor concerned at the 0.40 level or above; (c) each item included had no significant correlation with another factor; and (d) only items with a communality of >0.50 were selected.

Seven factors emerged for the identification of the motivations to use SB, which accounted for 64% of the total variance (Table 3). Labels for the seven factors

Table 2
Seatbelt wearing rates according to trip-type (%)

Trip-Type	Never (0)	Rarely (1)	Sometimes (2)	Often (3)	Very often (4)	Always (5)	Mean value
During work/school	36.9	8.6	9.6	17.2	13.1	14.6	2.0
To or from work/school	27.3	9.6	15.7	18.2	13.6	15.6	2.3
To a bar, disco, or something else similar	15.7	9.6	20.2	24.2	17.7	12.6	2.6
From a bar, disco, or something else similar	13.6	10.6	19.7	24.2	18.7	13.2	2.6
Just driving around	11.6	10.6	20.2	25.3	19.2	13.1	2.7
To or from a club, an association etc.	17.8	16.2	23.4	19.8	13.7	9.1	2.2
To or from another event	16.3	15.8	18.9	23.0	16.8	9.2	2.4

Table 3
Principal components analysis of the thirty items of SB use following varimax rotation

	Factor						
	1	2	3	4	5	6	7
Environment							
Bad weather conditions	0.71						
Unknown area	0.86						
Bad road surface	0.83						
Narrow roads	0.78						
Heavy traffic	0.70						
Imitation							
Set an example to others		0.65					
Education		0.70					
Imitate his/her family		0.65					
Imitate his/her friends		0.69					
To wipe off the hesitations of the co-driver		0.66					
Confidence/consistency		0.45					
Self-protection							
Avoidance of injury			0.77				
Feeling of security			0.72				
Driver's stabilisation			0.56				
Protection in high speed			0.70				
Avoidance of fatal accident			0.72				
Fear							
Lack of trust in the driver				0.48			
Fear in general				0.41			
Fear due to inexperience				0.81			
Feeling less stressed				0.68			
Experience							
Personal accident in the past					0.82		
Accident as co-driver					0.60		
Accident of a relative/friend					0.73		
Witness of an accident					0.63		
Financial issues							
Loss of working hours						0.72	
Being uninsured						0.80	
His/her car plates will be taken away						0.69	
Legality							
Avoidance of law penalties							0.68
Compliance with traffic regulations							0.81
Compliance with state rules							0.80

have been derived by concerning salient factor loadings. The first factor accounted for 29% of the variance consisted of five items related to environmental conditions so it was labelled as a motivation invoking 'environment' matters (e.g. 'bad weather conditions', 'unknown area', 'bad road surface', 'narrow roads'). The second factor which accounted for 8% of the variance was named 'imitation' because it appears to most closely reflect a subject's imitation (e.g. 'set an example to others', 'imitate one's family', 'imitate one's friends'). The third (6.2%) and fourth (6%) factors received salient loadings on items respectively related to 'self protection' and 'fear' (e.g. 'avoidance of injury', 'feeling of security', 'lack of trust in the driver', 'fear because of inexperience', 'feeling less stressed'). The fifth factor (5.6%) included four items associated with 'experience' (e.g. 'personal accident in the past', 'accident as co-driver') while the next two factors included items related to 'financial issues' (5%) and 'legality' (4.2%).

3.4. Young drivers' basic motivations not to use seatbelt

Concerning the identification of the motivations not to use SB, four factors emerged with eigenvalues greater than 1.00. The extracted factors from the four-factor solution, collectively, accounted for 49.3% of the common variance. Table 4 shows the rotated factor loadings for each item participating in the four-factor

solution. The first rotated factor accounted for 30% of the total variance which contains twelve items suggesting a motivation of 'risky behaviour' (e.g. 'not always compliant with the regulations', 'not being afraid of death', 'being a man of action', 'risky personality'). The second rotated factor accounted for 7.8% of the variance containing eight items. These eight items were related to 'discomfort' (e.g. 'seatbelt restricts movements', 'feeling pressure', 'it's tiring'). The third factor (6.4%) received salient loadings on ten items concerning the 'underestimation of danger' (e.g. 'sitting in the back seat', 'being a co-driver', 'having a safe car', 'availability of airbags'). Finally, the fourth factor (5.3%) was composed of five items identified as relevant to 'waste of time' (e.g. 'frequent stops', 'being in a hurry').

Table 4
Principal components analysis of the thirty six items of SB non use following varimax rotation

	Factor			
	1	2	3	4
Risky behaviour				
Not always compliant with the regulations	0.50			
Going against the mainstream	0.55			
Not being the well-behaved type	0.57			
Risky personality	0.62			
Being a man of action	0.63			
Not being afraid of death	0.66			
Losing prestige	0.66			
Incompatible with high speed	0.65			
Incompatible with a smart behaviour	0.71			
Free to jump in case of accident	0.48			
Belt cannot protect	0.46			
Does not apply in my case	0.44			
Discomfort				
Claustrophobia		0.75		
It's tiring		0.80		
Restricts movements		0.78		
Feeling pressure		0.79		
Tiresome experience		0.68		
Potential risk of being trapped		0.40		
Not being accustomed to wearing		0.77		
Negligence		0.65		
Underestimation of danger				
Driving slowly			0.46	
Having a safe car			0.55	
Being a good driver			0.47	
Availability of airbags			0.48	
Sitting in the back seat			0.60	
Being a co-driver			0.62	
Belt is useless			0.56	
Wrinkles and dirt on clothes			0.50	
Keeps somebody warm			0.41	
Cannot happen to me			0.48	
Waste of time				
Frequent stops				0.74
Being in a hurry				0.71
Driving short distances				0.52
Dislike of delays				0.49
Unconventional for one's job				0.42

Table 5
Multiple linear regression-derived regression coefficients and P-values of composite SB use-frequency score[a]

Variables	B	SE	P-value
Constant term	−2.50	9.7	0.80
Socio-demographic variables			
Age	−0.43	0.48	0.37
Gender			
Men	−0.30	1.56	0.85
Women (reference category)			
Years of education	0.17	0.30	0.57
Place of origin			
Greater area of Athens	0.91	1.39	0.52
Other city (reference category)			
Occupation			
Students	1.03	1.52	0.50
Others (reference category)			
Driving experience (in months)	0.038	0.05	0.46
Mileage (per 10 000 km)	−0.25	0.09	0.01
Day driving during week-days	0.85	0.58	0.15
Day driving during week-ends	−0.39	0.56	0.49
Night driving during week-days	1.21	0.66	0.07
Night driving during week-ends	−0.17	0.61	0.78
Alcohol consumption			
Every day	−4.87	4.86	0.32
Several times a week	−1.70	2.83	0.55
A few times a month	1.84	2.10	0.38
Rarely	−0.38	1.56	0.81
Never (reference category)			
Principal factors			
Environment	0.95	0.69	0.17
Imitation	1.20	0.66	0.07
Self-protection	1.39	0.68	0.04
Fear	0.53	0.70	0.45
Experience	0.36	0.73	0.62
Financial issues	0.94	0.73	0.19
Legality	1.60	0.68	0.02
Risky behaviour	−1.14	0.78	0.15
Discomfort	−1.55	0.73	0.03
Underestimation of danger	−0.86	0.72	0.23
Waste of time	−0.52	0.70	0.46

[a] $R^2 = 0.25$, Durbin–Watson = 1.67.

3.5. The model of multiple regression analysis

Table 5 provides multiple linear regression-derived regression coefficients and their standard errors of composite SB use-frequency score on a series of socio-demographic variables and the factors extracted from the PCAs. Results from this model suggest that the total mileage (since a driver had obtained a driving licence) is a highly significant negative predictor of the SB use ($P = 0.01$). In addition, there is marginally significant

evidence that increased wearing rates increase frequency of SB use during weekday night driving ($P = 0.07$). With respect to socio-demographic variables included in the model, two factors extracted from the PCAs, 'self-protection' and 'legality', are significantly positively associated with increasing wearing rates. The P values for respective associations are 0.04 and 0.02. Among other principal factors, 'imitation' is also positively associated with increasing frequency of SB use — however with a borderline significance ($P = 0.07$) — while there is evidence for an inverse significant association between 'discomfort' and frequency of the use ($P = 0.03$).

4. Discussion

Two instructive aspects have been pointed out from the empirical findings relevant to the wearing SB rates. The first aspect concerns the use of the self-report ordered scale to assess the wearing rates. The category 'never' of the item 'during work/school' is selected by over one third of respondents. We can hypothesise that some of the interviewees have responded 'never', meaning they do not do this type of driving instead of meaning that they never wear their safety belt doing this type of trip. Further investigation in Greece should take seriously into account this problem as well as other methods, e.g. observations that could permit comparisons. The second aspect concerns the finding that the average use of SB by the Greek young drivers is below 'often' and this does not entail any significant differentiation per trip-type (Table 2). Considering the actual SB use, in our case, we cannot apply the suggestion of Streff and Wagenaar (1989), that self-report seatbelt usage estimates should be discounted 12 percentage points to approximate actual use. Assessing the categories 'rarely' and 'always', the work/school-related types show more frequent use than other types. The wearing rates of the present study are much lower than those of other similar studies in abroad (Streff and Wagenaar, 1989; Hamed and Easa, 1998). Further assessment could reveal possible overestimation of the wearing rates in Greece, but at the moment, because of lack of previous data, comparisons are not possible.

This finding could have broader implications for designing community-wide interventions or promoting prevention strategies based on the SB use measure, since it is argued that one major strategy aiming at increasing road safety is to increase the level of seatbelt usage.

The regression results (Table 5), which revealed that there is a negative relationship between the self-reported SB use and the total mileage driven, proved the assumption that experience via a higher mileage per 10 000 km is not of major importance. Through the circumstances that drivers face during driving, mileage experience does not always help them to handle the large number of tasks involved in driving, neither to familiarise themselves with the usefulness of SB. We are in accordance to several studies, which showed that young drivers choose to behave more dangerously (Johah, 1986; Gregersen and Bjupulg, 1996), by driving faster and using SB less often (Lacko and Nilsson, 1988).

The night driving during weekdays is another variable with a marginally positively significant relationship to SB use. This result is also in contrast with the public perception in Greece that the 'fun-loving type' young drivers are considered to be high risk behaviour groups who are not aware of wearing SB. Results of a former study in Greece supported that these young drivers, whose lifestyle included mainly alcohol consumption or drug usage, tended to have a higher risk behaviour, in comparison with young drivers whose lifestyle was characterised as 'fun-loving' (Chliaoutakis et al., 1999). Actually, there are a lot of studies which describe the relationship of leisure activities with young drivers' accidents and especially 'disco accidents' (Klemenjak and Hutter, 1988; Marthiens and Schultze, 1989). Regarding solely SB use, the present study does not confirm this perception.

Unlike to various studies (already mentioned in the introduction of the present study), the alcohol consumption (when it is examined as a simple frequency), and the restraint usage were found to be without any significant association. In a previous study, it was found that only when young drivers' lifestyle is related to alcohol consumption do they have high accident risk on the road. The everyday (or even the frequent) alcohol consumption, the use of illicit drugs, the consumption of alcohol before going out, are lifestyle aspects related to high accident risk (Chliaoutakis et al., 1999). These results could easily be subject to misinterpretations. It could be supported that generally young drivers who drink have high accident risk on the road or do not wear seatbelts. In our case, such conclusion is groundless since there is no evidence that generally alcohol consumption has any relationship with high risk behaviour (accident or restraint usage). Therefore, there should be a distinction between young drivers who consider alcohol (or other drugs) as a dominant part of their life and lifestyle and those who do not consider alcohol (or other drugs) as a dominant part and alcohol consumption as an end in itself.

Furthermore, from the descriptive statistical analysis, the findings of the PCA showed that any study concerning the young drivers' motivations to use or not SB should investigate multiple factors regarding the inten-

tions/pretexts and the causes/restraints of using/not using SB. The analysis indicates that the powerful factors which characterised the young drivers' motivations to use SB are those of 'environment' and 'imitation' (Table 3) and the powerful factors which characterised their intentions of using SB are those of 'risky behaviour' and 'discomfort' (Table 4). However, the statistical evaluation of these powerful factors in relation to SB use did not prove the association between all these four powerful factors and the self-reported frequency of the SB use (Table 5). In other words, there is a divergence between strong motivations (intentions) and behaviour (reported frequency), or as noted by the European Transport Safety Council (1996), 'the relationship between what people say they believe and what they actually do is weak in the case of SB use'.

The results of the regression model, it is worth mentioning, underline the absence of any relation between the strong factors: (a) of 'environment' (bad weather conditions, heavy traffic, bad road surface etc.); and (b) of 'Risky behaviour' (not compliant with the regulations, not being afraid of death, risky personality, SB use incompatible with high speed, etc.) and the frequency of SB use (Table 5). A study conducted by Guria (1999) emphasises that road crashes are weakly related to the level of traffic, road and weather conditions and improvements due to road maintenance, which is similar to our study. Guria (1999), also, found that the risk-taking behaviour factor is the major cause of crashes. For Evans and Graham (1991), whose study resulted in similar controversial findings, a compensatory increase in risk-taking and risky behaviour by drivers reduced relevant law benefits concerning SB use. Further analysis of these patterns may give important information for policy makers interested in designing policy interventions.

However, according to the regression analysis results, there is a relationship between other secondary factors of motivations to use/not use SB and the self-reported behaviour (wearing rates) of SB. The notable factors, related with SB use, include 'imitation', 'self-protection', 'discomfort ' and mainly the 'legality' factor.

Based on the positive influence of 'imitation' on wearing SB, this result supports the perception that the driver is accustomed to wearing SB so that the car occupants will imitate his/her behaviour. The young drivers themselves buckle-up because they imitate friends, parents, etc., Lehto and James (1997) also suggested that 'passengers imitate the behaviour of the driver, either unconsciously or because the driver is perceived to be in a position of authority'. Besides, the driver is responsible for protecting oneself and the other occupants in the vehicle. Extended research, in Greece, could reveal the process of how the young are influenced by peers or powerful others while driving.

The 'self protection' factor which positively supports the SB use is another obvious result. According to Lehto and James (1997), this behaviour is '… consistent with the theory that the need for using SB is well-known to most drivers and occupants'. This result confirms the concept that most drivers know that SB exists and should be used for self-protection. This finding, also, implies that when young drivers themselves do not buckle-up, in fact, they know that they should use the SB, but they 'forget' or they choose not to wear it. This concept reconfirms the findings of some studies which show that there is a pronounced trend for people to ignore or to fail to notice warning labels concerning SB use (Dorris and Purswell, 1977; Goldhaber and deTurk, 1988).

Still, the 'legality' is another significant factor positively related with SB use, as the regression model showed. According to Dee (1998), who examined how SB laws and enforcement affect the levels and patterns of use, there are two important explanations for this evidence: the first one refers to the fact that this approach may overestimate the law effect by confounding the advent of the law with other independent time-varying dimensions of SB use. The second one explains mainly why pre- and past-law use does not give an accurate picture, and this occurs because the law effect may not be homogenous.

The effect of 'legality' and of 'law enforcement' factor on the increase of SB wearing rates has been investigated by a lot of researchers and almost all of them have proved its positive relationship with SB use.

Greek mentality is characterised by some 'unofficial' rules regarding driving activity. If we look into the application of Greek legal system, we can see that there are specific official rules which are applied during the exams to acquire a driver's licence. The candidates need to satisfy specific driving behaviour standards to receive the licence. However, the majority of the young drivers as soon as they receive a driver's license, they are initiated into an 'informal' driving code which is not as strict as the one they were obliged to follow in order to pass the driver's license exam. This behaviour is explained by the fact that drivers believe that they will not be penalised by the police if they disregard the official driving code. The origin of this perception is related to the mentality of the Greek Police towards Greek drivers' unlawful behaviour. The Greek policemen deal with drivers' illegal behaviour, mainly, with a friendly discussion or with a strong warning.

Besides, when the punishment includes paying a fine, Greek drivers, usually, use their personal contacts with the police authorities to cancel the imposed fine. The Greek Police is characterised by a system of 'patronage relations'. Further research on the role of the Greek Police concerning the imposition of penalties on the illegal drivers may disclose a new consideration for the 'legality' factor.

There are, certainly, circumstances of routine application of the law (e.g. for SB and the helmet use) that have a clearly profit earning characteristic. Each time, for example, the government need incomes, they tighten the inspections for a few days (usually for cars and two-wheeled vehicles such as mopeds and motorcycles).

Another factor negatively related with SB use is the 'discomfort' factor. This result supports the conclusions of numerous studies that wearing a SB results in unacceptable loss of comfort and freedom of movements (Mannering and Winston, 1987; Lehto and James, 1997). In particular, young drivers may report similar views due to the increased activity level of their age and because they are not accustomed to such restrictions.

These results have important implications for designing further public action for promoting safe driving by applying specific educational processes about the usefulness of SB to experienced young drivers.

5. Conclusion

This study seems to satisfy its aims. First, it found that Greek young drivers themselves tend to buckle up in a lower than 'often' level. Second, although young drivers' motivations to wear or not SB are various, only a limited number of them are related with their self-reported behaviour. Moreover, it was found that there is not uniformity among young drivers concerning SB use and that a model comprising the main factors related to the use/non use of SB can be revealed.

The final conclusion is that both the motivations to use and the frequency of SB use are extremely complex. Trying to study their potential interaction is an a priori difficult task. It would have been unrealistic to affirm that a single study could illuminate all the facets of such a multidimensional subject. Thus, the present study could only provide some useful information about several aspects of the interaction between motivations and behaviour regarding SB use.

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