International Journal of Business, Human and Social Sciences
ISSN: 2517-9411
Vol:6, No:6, 2012

The role of Motivations for eco-driving and Social Norms on behavioural Intentions Regarding Speed Limits and Time Headway

M. Cristea, F. Paran, P. Delhomme

***Abstract*—**Eco-driving allows the driver to optimize his/her behaviour in order to achieve several types of benefits: reducing pollution emissions, increasing road safety, and fuel saving. One of the main rules for adopting eco-driving is to anticipate the traffic events by avoiding strong acceleration or braking and maintaining a steady speed when possible. Therefore, drivers have to comply with speed limits and time headway.

The present study explored the role of three types of motivation and social norms in predicting French drivers' intentions to comply with speed limits and time headway as eco-driving practices as well as examine the variations according to gender and age.

1234 drivers with ages between 18 and 75 years old filled in a questionnaire which was presented as part of an online survey aiming to better understand the drivers' road habits. It included items assessing: a) *behavioural intentions* to comply with speed limits and time headway according to three types of motivation: reducing pollution emissions, increasing road safety, and fuel saving, b) *subjective and descriptive social norms* regarding the intention to comply with speed limits and time headway, and c) *socio-demographical* variables.

Drivers expressed their intention to frequently comply with speed limits and time headway in the following 6 months; however, they showed more intention to comply with speed limits as compared to time headway regardless of the type of motivation. The subjective injunctive norms were significantly more important in predicting drivers' intentions to comply with speed limits and time headway as compared to the descriptive norms. In addition, the most frequently reported type of motivation for complying with speed limits and time headway was increasing road safety followed by fuel saving and reducing pollution emissions, hence underlining a low motivation to practice eco-driving. Practical implications of the results are discussed.

***Keywords*—**eco-driving, social norms, speed limits, time headway.

I. Introduction

THE need for sustainable development has become a major issue in most of the industrialized countries in the world. One of the main areas impacting on the environment is the transportation sector. Eco-driving represents one important action that allows the driver to optimize his/her driving behaviour in order to reduce pollution emissions and save fuel. Eco-driving is mainly based on the drivers' capacity to anticipate traffic events and signals by avoiding strong acceleration or braking and maintaining a steady speed when possible [1].

M. Cristea is with the French Institute of Science and Technology for Transportation Development and Networks, Versailles, 78000, France (phone: +33-130-843958; e-mail: mioara.cristea@ ifsttar.fr).

F. Paran is with the French Institute of Science and Technology for Transportation Development and Networks, Versailles, 78000, France (e-mail: francoise.paran@ifsstar.fr).

P. Delhomme is with the French Institute of Science and Technology for Transportation Development and Networks, Versailles, 78000, France (e-mail: patricia.delhomme@ifsttar.fr).

In this line, numerous studies have underlined the substantial ecological, economic but, also, road safety benefits that may derive from adopting eco-driving behaviours [2], [3]. For example, Waters and Lakers [4] obtained a 50% difference in fuel consumption when asking participants to drive normally or economically in a specific driving scenario. After applying certain corrections required by the differences in speed driving, the authors found that practicing eco-driving behaviours would still determine a 10-15% reduction in fuel consumption. Van der Voort, Dougherty, and Van Maarseveen [5] conducted a study on 88 drivers divided in four groups (control, existing group, advice group and extended advice group) and obtained similar results. According to the International Commission for Driver Testing (CIECA) [6] the introduction of programs to initiate drivers to eco-driving has determined a 5-20% reduction in fuel consumption.

In order to practice eco-driving drivers have to develop specific abilities [7]. Several studies have shown that certain characteristics of the driving behaviour such as appropriate use of the gears, block changing gears when possible, and maintaining a steady speed correlated significantly with fuel economy [8], [9], [10], [11], [12]. These practices imply two major eco-driving behaviours: complying with speed limits and time headway. The scientific literatures mentions several socio-psychological factors influencing drivers' to comply with speed limits among which, motives, social norms, age, and gender are the most investigated.

Dogan, Steg, and Delhomme [13] found that eco-driving behaviours are related to time saving and safety goals, therefore, can be easily inhibited in demanding traffic environments or in time pressure situations. Similar results regarding time saving goals support their findings [14].

Social norms play an important role in the depicting people's behaviour on the roads especially, since driving represents a socially interactive activity. Both subjective injunctive (perceived beliefs about significant others' expectations regarding one's behaviour) and descriptive norms (perceived beliefs regarding significant others' behaviour) may influence the drivers' behaviour in the sense of determining them to drive faster [15], [16], [17] or slower [18] and to maintain closer headways in high density traffic [19], [20].

Recent studies suggest the existence of certain differences regarding the environmental issues according to age and gender [21], [22], [23], [24]. Schieβl et al. [25] found that young drivers evaluated their possibilities to adopt eco-driving behaviours less than middle-aged and older drivers; however, they reported a higher ecological orientation as compared to the latter. Similarly, female drivers expressed more availability to adopt eco-driving behaviours than men. These results confirm previous findings suggesting that women express stronger pro-environmental attitudes [26] and higher concerns for the environmental protection [27], [28], [29].

The general objective of this paper was to examine the drivers' intentions to comply with speed limits and time headway as eco-driving practices according to three types of motivation: reducing pollution emissions, increasing road safety, and fuel saving. Moreover, we analyzed the importance of social norms (subjective injunctive norm and descriptive norms) in predicting drivers' intentions to comply with speed limits and time headway. In addition, we were interested in observing the variations according to gender and age.

II. Method

A. Participants

1243 drivers (566 men) responded to an online questionnaire concerning drivers' road habits. Among them, 33.7% were aged between 18 and 29 years (N=419), 28.7% between 30 and 44 years (N=357), 26.4% between 45 to 59 years (N=328), and 11.2% were between 60 and 75 years (N=139). Almost 25% of them (N=303) declared having being sanctioned due to excessive speed at least once during the last 3 years; 3.3% were students, 10% were unemployed, 11% were retired, and 75.7% were employed in different fields of activity (workers, teachers, commercial agents, etc.). They all came from different geographical regions of France.

B. Procedure

The web-link was sent by mail to panellists from an "access panel". The surveyed participants were invited to carefully read the questions before answering and received points which could help them win incentives. The general instructions mentioned that the study was assessing various aspects of the driving behaviour in order to better understand the drivers' road habits.

C. Measures

The general questionnaire included items concerning drivers' eco-driving styles and the frequency of practicing. The questions concerning this study were divided in several sections: a) behavioural intention to comply with speed limits and time headway on highways and on downtown roads concerning three types of motivation (increasing road safety and decreasing pollution emissions and fuel saving), b) social subjective injunctive and descriptive norms regarding the intention to comply with speed limits and time headway, and c) socio-demographical variables. Their answers ranged from 1 (*very rare*) to 5 (*very often*) on a Likert scale, except for the socio-demographical variables.

Behavioural intention. Twelve items measured drivers' intentions to comply with speed limits and time headway on highways and downtown roads in the following six months.

Subjective injunctive norms. Subjective injunctive norms were assessed by twelve items concerning drivers' perceptions about significant others' beliefs related to their intentions to comply with speed limits and time headway on highways and downtown roads in the following six months.

Descriptive norms. Descriptive norms were measured by twelve items related to the drivers' perceptions about significant others' intentions to comply with speed limits and time headway on highways and downtown roads in the following six months.

Table I presents detailed data pertaining the Alpha Cronbach coefficients, means and standard deviations for each of the measures.

TABLE I
General Descriptive Statistics Regarding The Type Of Behaviour Investigated, The Type Of Motivation And The Type Of Social Norm

Description of variables		N	β	M	SD
Behavioural intentions					
a) Intention to comply with speed limits	To reduce pollution emissions	2	.94	3.81	1.22
	To increase road safety	2	.90	4.35	0.92
	To save fuel	2	.90	4.37	0.95
b) Intention to comply with time headway	To reduce pollution emissions	2	.97	4.58	0.77
	To increase road safety	2	.91	3.6	1.37
	To save fuel	2	.96	4.02	1.22
Subjective injunctive norms					
a) Intention to comply with speed limits	To reduce pollution emissions	2	.96	3.57	1.35
	To increase road safety	2	.96	4.52	0.86
	To save fuel	2	.95	4.04	1.16
b) Intention to comply with time headway	To reduce pollution emissions	2	.97	3.44	1.41
	To increase road safety	2	.98	4.54	0.86
	To save fuel	2	.95	3.87	1.28
Descriptive injunctive norms					
a) Intention to comply with speed limits	To reduce pollution emissions	2	.97	3.80	1.26
	To increase road safety	2	.97	4.38	0.94
	To save fuel	2	.96	3.35	1.38
b) Intention to comply with time headway	To reduce pollution emissions	2	.96	3.44	1.36
	To increase road safety	2	.98	4.40	0.93
	To save fuel	2	.97	3.98	1.16

Socio-demographic characteristics. The last section included identification questions related to age [18-29 years, 29-44 years, 44-59 years, 60 years +], gender, social class, geographical region, and number of sanctions due to excessive speed in the last 3 years.

D. Statistical analysis

Behavioural intentions. We conducted a variance analysis with repeated measures [*<Age4*Gender2>*Type of behaviour2* Type of motivation3]* on two within-subjects factors: *type of behaviour* (speeding and time headway) and *type of motivation* (reducing pollution emissions, increasing road safety, and fuel saving) by three between-subject factors: *age* (18-29 years, 29-44 years, 44-59 years, 60 years +) and *gender* (men and women).

Social norms. We conducted a similar variance analysis with repeated measures [*<Age4*Gender2>*Type of behaviour2* Type of norm2* Type of motivation3*] on three within-subjects factors: *type of behaviour* (speeding and time headway), *type of norm* (subjective injunctive and subjective descriptive norm), and *type of motivation* (reducing pollution emissions, increasing road safety, and fuel saving) and two between-subjects factors *age* (18-29 years, 29-44 years, 44-59 years, 60 years +) and *gender* (men and women).

We examined the influence of social norms on drivers' intentions to comply with speed limits and time headway.

Two-step hierarchical regression analyses were conducted in order to determine the variance introduced by different factor groups (stepwise method). For each of the models we included the following factors: *1st step* (socio-demographic characteristics: age and gender) and *2nd step* (social norms: subjective injunctive and descriptive norms). The variance inflation factor (colinearity test) was between acceptable limits [30].

III. Results

A. Behavioural intentions

The data analysis underlined a main effect of the *type of behaviour* on drivers' behavioural intentions [F(1,1235)=27.996, $p<.001$, $R^2 = .06$]: the drivers showed more intention to comply with speed limits (M=4.23) as compared to time headway (M=4.13). There was, also, a *gender* effect [F(1,1235)=14,666, $p=,00013$, $R^2=.01$] and *type of motivation* [F(2, 2470)=313.02, $p<.001$, $R^2=.25$]. Drivers were more interested in complying with speed limits and time headway in order to increase road safety (M=4.51) and to save fuel (M=4.24) rather than to reduce the pollution emissions (M=3.81). Moreover, drivers expressed more intention to comply with speed limits and time headway in order to increase road safety rather than to save fuel ($p<.01$). Female drivers expressed more intention to comply with speed limits and time headway (M=4.28) as compared to male drivers (M=4.09, $p<.01$).

There was, also, an interaction effect between the *type of behaviour* and *type of motivation* [F(2,2470)=125.82, $p=.0001$, $R^2=.1$] as can be seen in Figure 1. Drivers expressed more intention to comply with speed limits in order to reduce pollution emissions and save fuel and to comply with time headway in order to increase their road safety. This effect was more significant for young drivers (18-29 years) as data analysis showed an interaction effect between *age*, *type of behaviour* and *type of motivation* [F(6,2470)=2.80, p=.01, R^2 =.005].

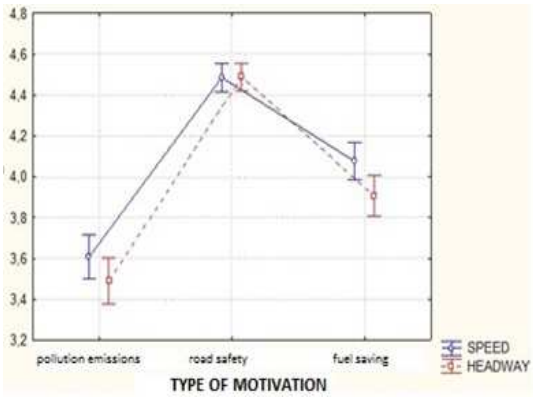

Fig. 1 Behavioural intention to comply with speed limits and time headway according to type of motivation and behaviour

As hypothesized, a significant effect of *age* [F(3,1235)=33.301, $p<.001$, $R^2=.06$] was observed: drivers with ages between 45 and 59 years (M=4.34) and over 60 years (M=4.41) declared being more inclined to comply with speed limits and time headway as compared to younger drivers (18-29 years and 30-44 years).

The 30-44 years old drivers (M=4.17) expressed more intention to comply with speed limits and time headway as compared to 18 to 29 years old drivers (M=3.81) ($p<.01$). There was an interaction effect between *age* and *type of behaviour* [F(3,1235)=2.99, $p<.001$, $R^2=.005$]. Drivers between 18 and 29 years and between 30 and 44 years expressed more intention to comply with speed limits as compared to time headway whereas data analyses showed no significant difference between the two groups of older drivers.

B. Subjective injunctive norms

The *type of social norm* had an influence on drivers intention to adopt the aforementioned eco-driving behaviours [F(1,1235)=36.48, $p<.001$, $R^2 =.03$]. Drivers believed that significant others thought more that other drivers should comply with speed limits and time headway (M=4.07) as compared to themselves (M=3.97). There was, also, an effect of the *type of behaviour* [F(1,1235)=53.98, $p=<.001$, $R^2=.05$] in the sense that norms were evaluated as more strict in regard to speed limits (M=4.06) as compared to time headway (M=3.98). In fact, drivers believed that significant others complied more with speed limits than time headway; they also believed that they themselves should comply more with speed limits as compared to time headway.

1. Descriptive norms

The *type of motivation* influenced drivers intentions to adopt eco-driving behaviours [F(2,2470)=457.06, $p<.001$, $R^2=.30$]. Drivers estimated that significant others complied with speed limits and time headway and that they themselves should adopt these behaviours more frequently for increasing their road safety (M=4.49) rather than for fuel saving (M = 4.01) or for reducing pollution emissions (M=3.58). In addition, there is an interaction effect between *type of behaviour* and *type of motivation* [F(2,2470)=36.22, p<.001, $R^2=.05$] as can be seen in Figure 2. Drivers believed that significant others complied more with speed limits as compared to time headway, regardless of the type of motivation. Moreover, they declared that they themselves should comply more with speed limits rather than time headway in order to save fuel. Similarly, drivers estimated that significant others complied more with speed limits rather than time headway regardless of the type of motivation, and that they themselves should comply more with speed limits as compared to time headway in order to reduce pollution emissions.

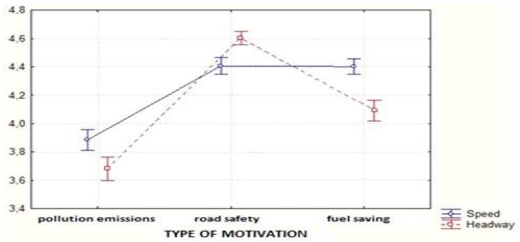

Fig. 2 Social norms regarding speed limits and time headway according to the type of motivation and behaviour

Finally, *age* had an interesting main effect on drivers' behavioural intentions in regard to speed limits and time headway [F(3,1235)=25.43, $p<.001$, $R^2=.06$], but also an interaction effect with the *type of motivation* [F(6, 2470)=6.405, $p<.001$, $R^2=.02$]. The older the drivers were, the stronger they believed that significant others complied with speed limits and time headway. They, also, believed that significant others thought that they themselves should comply with speed limits and time headway [$M_{(18\text{-}29\ years)}=3.69 < M_{(30\text{-}44\ years)}=3.92 < M_{(45\text{-}59\ years)}=4.17 < M_{(+60\ years)}=4.26$, p<.05]. Similarly, the older the drivers were, the more they declared that significant others complied with speed limits and time headway and believed that they themselves should respect more these rules in order to reduce pollution emissions and save fuel.

C. The impact of the social norms on behavioural intention

1. Intention to comply with speed limits

Table II presents detailed data pertaining to the hierarchical regression analysis conducted for predicting the intention to comply with speed limits in order to *reduce pollution emissions* ($R^2=.43$, p<.01), *increase road safety* ($R^2=.30$, p<.01) and *save fuel* ($R^2=.30$, p<.01). For each of the three models, *gender* and *age* were introduced in the first step but no significant contribution was observed from either one of them. The intention to comply with speed limits was mainly predicted by the subjective injunctive norm which had a significant contribution for *reducing pollution emissions* (β=.42, p<.01), *increasing road safety* (β=.31, p<.01), and *fuel saving* (β=.33, p<.01) and by the descriptive norm for *reducing pollution emissions* (β=.25, p<.01), *increasing road safety* (β=.28, p<.01), and *fuel saving* (β=.26, p<.01).

TABLE II
HIERARCHICAL MULTIPLE REGRESSION ANALYSES PREDICTING DRIVERS' INTENTION TO RESPECT SPEED LIMITS

	Type of motivation					
	Pollution		Safety		Fuel savings	
Predictors	ΔR^2	ß	ΔR^2	ß	ΔR^2	ß
Step 1	.05		.04		.03	
Age		.11		.08		.18
Gender		.02		.02		.03
Step 2	.38*		.27*		.27*	
Subjective norm		.42*		.31*		.33*
Descriptive norm		.25*		.28*		.26*
Total R^2	.43*		.30*		.30*	

Note: * p<.01.

2. Intention to comply with time headway

Table III presents the hierarchical regression analysis for predicting the behavioural intention to comply with time headway in order to *reduce pollution emissions* ($R^2=.43$, p<.01), to *increase road safety* ($R^2=.30$, p<.01), and to *save fuel* ($R^2=.36$, p<.01). For each of the models, *gender* and *age* were introduced in the first step of the model, but no significant contribution was observed. The intention to comply with time headway was mainly predicted by the subjective injunctive norm for *reducing pollution emissions* (β=.47, p<.01), *increasing road safety* (β=.31, p<.01), and *fuel saving* (β=.41, p<.01) and by the descriptive norm for *reducing pollution emissions* (β=.21, p<.01), *increasing road safety* (β=.29, p<.01), and *fuel saving* (β=.22, p<.01).

TABLE III
HIERARCHICAL MULTIPLE REGRESSION ANALYSES PREDICTING DRIVERS' INTENTION TO COMPLY WITH TIME HEADWAY

	Type of motivation					
	Pollution emissions		Safety		Fuel saving	
Predictors	ΔR^2	ß	ΔR^2	ß	ΔR^2	ß
Step 1	.06		.05		.05	
Age		.10		.07		.12
Gender		.02		.02		.03
Step 2	.37*		.24*		.31*	
Subjective norms		.47*		.31*		.41*
Descriptive norms		.21*		.29*		.22*
Total R^2	.43*		.30*		.36*	

Note: * p<.01.

3. Predicting the intention to maintain a steady speed

Table IV presents data pertaining to the hierarchical regression analysis predicting the intention to maintain a steady speed according to the three types of motivation: *reducing pollution emissions* ($R^2=.50$, p<.01), *increasing road safety* ($R^2=.32$, p<.01), and *fuel saving* ($R^2=.37$, p<.01). Gender and age were introduced in the first step of the model, but no significant contribution was observed. The intention to maintain a steady speed was mainly predicted by subjective injunctive norm for *reducing pollution emissions* (β=.5, p<.01) as well as for *increasing road safety* (β=.35, p<.01), and *fuel saving* (β=.35, p<.01) and by the descriptive norm for *reducing pollution emissions* (β=.20, p< .01), *increasing road safety* (β=.25, p<.01), and *fuel saving* (β=.18, p< .01).

TABLE IV
HIERARCHICAL MULTIPLE REGRESSION ANALYSES PREDICTING DRIVERS' INTENTION TO MAINTAIN A STEADY SPEED

	Type of motivation					
	Pollution emissions		Safety		Fuel saving	
Predictors	ΔR^2	ß	ΔR^2	ß	ΔR^2	ß
Step 1	.06		.05		.05	
Age		.13		.04		.11
Gender		.07		.02		.03
Step 2	.43*		.27*		.31*	
Subjective norms		.50*		.35*		.35*
Descriptive norms		.20*		.25*		.18*
Total R^2	.50*		.32*		.37*	

Note: * p<.01.

IV. DISCUSSION

Eco-driving represents an assembly of practices allowing the driver to reduce pollution emissions, to increase road safety, and to save fuel. One of the main rules of the eco-driving style is the anticipation of the traffic events and signals by avoiding strong acceleration or braking and maintaining a steady speed when possible. Thus, the driver would be required to comply with speed limits and time headway. The present study explored the role of three types of motivation: reducing pollution emissions, increasing road safety, and fuel saving in predicting French drivers' intentions to comply with

speed limits and time headway as eco-driving practices. We were interested in knowing which type of motivation would determine drivers to comply with speed limits and time headway, hence adopt eco-driving. In addition, we were interested in observing the role of the social norms as defined in the theory of planned behaviour [31], [32] in predicting the intentions to comply with speed limits and headway and the types of motivation underlying these behaviours. In general, drivers expressed strong intentions to comply with speed limits and time headway on the highways or on downtown roads. However, they were more motivated to comply with speed limits as compared to time headway. The perceived advantages of complying with speed limits seemed to be more important as compared to the ones associated with time headway which represents a problem giving the fact that both behaviours are very important in anticipating traffic events. Time headway represents the mean to maintain a steady speed when possible in the situations where drivers are also complying with speed limits therefore, it is as important as complying with speed limits when adopting eco-driving.Moreover, the most important type of motivation determining the drivers to comply with speed limits and time headway concerned increasing road safety followed by fuel saving and in the end reducing pollution emissions. Social norms played an important role in predicting the intention to comply with speed limits and time headway as eco-driving practices. Results suggested a strong social pressure concerning the compliance with speed limits and time headway. However, the importance of each norm differed according to the type of behaviour: the social pressure was significantly stronger in relation to the compliance with speed limits as compared to time headway. Whatever their motivation may be, the subjective injunctive norm seemed to be stronger than the descriptive one in terms of predicting the intention to comply with speed limits and time headway. In addition, social norms had a stronger influence on drivers' intentions in the case of reducing pollution emissions as compared to fuel saving or increasing road safety, suggesting a high social pressure towards the ecological aspects of complying speed limits and time headway. In total, drivers seemed to have poor knowledge about eco-driving practices and manifested low motivations to contribute to the reducing pollution emissions.

Finally, age had an interesting effect on drivers' intentions to comply with speed limits and time headway. Older drivers expressed more intention to comply with speed limits and time headway as compared to younger drivers and, thus confirming previous findings [idem 19]. In addition, younger drivers (16-25 years) were keener to complying with speed limits as compared to time headway. No significant differences between the two groups of older drivers (45-59 years and 60 years +) were found.

In terms of practical interventions, social subjective injunctive norms could provide support in the sense of reinforcing drivers' intentions to comply with speed limits and time headway and thus, adopt ecological behaviours. In this vein, prevention campaigns and eco-driving training (initial and post-driving for students and more experienced drivers) would be recommended in order to convince drivers of the importance of eco-driving and to help them develop the required abilities to practice eco-driving.

REFERENCES

[1] J.N. Barkenbus, "Eco-driving: an overlooked climate change initiative", Energy Policy, vol. 38, 2010, pp. 762-769.
[2] R. Mundke, S. Malewar, and K. Arya, "Use of data recorder for driver rating", SAE Technical Paper , 2006-01-0304, 2006.
[3] E. Ericsson, H. Larsson, and K. Brundell-Freij, "Optimizing route choice for lowest fuel consumption-potential effects of a new driver support tool", Transportation Research Part C, vol. 14, 2006, pp. 369-383.
[4] M.H.L. Waters and I.B. Laker, "Research on fuel conservation for cars". Transport and Road Research Laboratory-Report 921, Crowthorne: England, 1980.
[5] M. Van der Voort, M.S. Dougherty, and M. Van Maarseveen, "A prototype fuel efficiency support tool", Transportation Research Part C, vol. 9, pp 279-296, 2001.
[6] CIECA, Internal project on "Eco-driving" in category B driver training and the driving test - final report, 2007, Brussels.
[7] J. Tulusan, L.Soi, J. Paefgen, M. Brogle, and T. Staake, "Eco-efficient feedback technologies? Which eco-feedback types prefer drivers most?" WOWMOM, IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks, 2011, pp.1-8.
[8] Y. Ding and H. Rakha, H., "Trip-based explanatory variables for estimating vehicle fuel consumption and emission rates", Water, Air and Soil Pollution: Focus, vol 2, Kluwer: Dordecht, 2002, pp. 61-77.
[9] H. Johansson, J. Farnlund, and C. Engstrom. "Impact of eco-driving on emissions and fuel consumption. A pre-study", Swedish Road Administration Publication 165E, 1999.
[10] H. Johansson, P. Gustafsson, M. Henke, and M. Rosengren, "Impact of eco-driving on emissions", In:Proceeding from the 12th Symposium, Transport and Air Pollution Conference, Avignon, 2003.
[11] H. Larsson and E. Ericsson, "The effects of an acceleration advisory tool in vehicles for reduced fuel consumption and emissions", Transportation Research Part D, vol. 14, 2009, pp. 141-146.
[12] A.E. af Wahlberg, "Short-term effects of training in economical driving: Passenger comfort and driver acceleration behaviour", International Journal of Industrial Ergonomics, vol. 36, 2006, pp. 151-163.
[13] E. Dogan, L. Steg, and P. Delhomme, "The influence of multiple goals on driving behavior: the case of safety, time saving, and fuel saving", Accident Analysis and Prevention, vol. 43, 2011, pp. 1635-1643.
[14] N. Fricke and C. Schießl, "Encouraging environmentally friendly driving through driver assistance: the Ecomove project", Proceedings of the 6th International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design, pp. 394-400.
[15] M. Connor, N. Smith, and B. McMillan, "Examining Normative Pressure in the Theory of Planned Behaviour:Impact of Gender and Passengers on Intentions to Break the Speed Limits", Current Psychology: Developmental, Learning, Personality, Social, vol 22 no 3, 2003, pp. 252-263.
[16] M. L. Lin, and K.T. Fearn, "The provisional license: night-time and passenger restrictions", Journal of Safety Research, vol. 34, no.1, 2003, pp. 49-51.
[17] B.G. Simons-Morton, N. Lerne, and J. Singer, "The observed effects of teenage passengers on the risky driving behavior of teenage drivers", Accident Analysis and Prevention, vol 37, 2005, pp. 973-982.
[18] P. Delhomme and S. Delgery, "Quelques facteurs explicatifs du comportement de transgression de la limitsation de vitesse des jeunes automobilistes", In: M. A. Dekkers (Ed.) Séminaire vitesse. Apports récents de la recherche en matière de vitesse. Les collections de l'Inrets, 2006, pp. 89-112.
[19] H. Ohta, H., "Individual Differences in Driving Distance Headway", Vision in vehicles: IV, North-Holland, Amsterdam, 1993, pp. 91-101.
[20] Y. T. Zhang and D. B. Kaber, "An Empirical Assessment of Driver Motivation, Emotional Response and Driving Conditions on Driver Risk Decisions", In: G. Salvendy (ed.), Advances in Human Factors, Ergonomics, and Safety in Manufacturing and Service Industries, CRC Press, 2010, pp. 646–655.
[21] D. Davidson and W. Freudenburg, "Gender and environmental risk concerns: a review of available research", Environment and Behaviour, vol. 28, 1996, pp. 302-339.

[22] T. Dietz, L. Kalof, and P.C. Stern, "Gender, values and environmentalism", Social Science Quarterly, vol. 83, 2002, pp. 353-364.
[23] A.D. Eisler, H. Eisler, and M. Yoshida, "Perception of human ecology: cross-cultural and gender comparisons", Journal of Environmental Psychology, vol. 23, 2003, 89-101.
[24] L. Whitmarsh and S. O'Neil, "Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours", Journal of Environmental Psychology, vol. 30, 2010, pp. 305-314.
[25] C. Schießl, N. Fricke, and M. Staubach, "Identification and analysis of motivators for eco-friendly driving within the Ecomove project", 8th European ITS Congress Intelligent Mobility. Lyon: Frankreich, 2011, pp. 1-10.
[26] M. L. Feloneau, "Pro-environmental attitudes and behavior: revealing, perceived social desirability", Revue Internationale de Psychologie Sociale, vol. 21, 2008, pp. 25-53.
[27] M. Polk, "Are women potentially more accommodating to a sustainable transportation system in Sweden?" Transportation Research Part D, vol. 8, 2003, pp. 75-95.
[28] L. Hunter, A. Hatch, and A. Johnson, "Cross-national gender variation in environmental behaviours", Social Science Quarterly, vol. 85, 2004, pp. 147-170.
[29] P. Delhomme, K. Chappe, M. Pinto, and C. Martha, "Reducing air-pollution: A new argument for getting drivers to abide by the speed limits?" Accident Analysis and Prevention, vol. 42, 2010, pp. 327-338.
[30] J. Neter, W. Wasserman and M.H. Kutner, Applied Linear Statistical Models, 2nd edition, Homewood: R. D. Irwin, Inc., 1985.
[31] I. Ajzen, „From intentions to actions: A theory of planned behavior", in Action control, J. Kuhl and J. Beckmann, Eds., Berlin: Springer-Verlag, 1985, pp.11-39.
[32] I. Ajzen, "The theory of planned behaviour", Organizational Behavior and Human Decision Processes, vol. 50, 1991, pp.179-211.