The behavior in traffic – relations with socio-demographic variables

Corneliu HAVÂRNEANU[1], Alexandra GHEORGHIU
Alexandru Ioan Cuza University

Abstract: This present study investigates the differences regarding the manifested behavior, degree of guilt and risk implied by aberrant behaviors and sanctions that should be applied for them in function of age and gender. The results show, as expected, that women tend to be more cautious and more drastic when it comes to sanctions than men. They also tend to feel more guilt if they manifest one of the listed behaviors. Surprisingly, we have not found any differences between men and women regarding manifested behavior but we believe that a more analytical analysis will reveal them. We have found that young men tend to be more indulgent with those who break the safety rules, but women, no. Interestingly, the situation reverses after a certain age.

Key words: aberrant behavior, gender, guilt, penalty

The statistics are quite worrying in Europe. Accidents are the main cause of death among adults, and in this category, car crashes are the leading cause (Murray & Lopez, 1994). In Europe, the number of car crashes has diminished by 18% in the period from 2001 – 2006 but even so, it is still higher by 7,500 than the maxim proposed for 2010. In 2005, car crashes were responsible for 0.97% of all deaths in the EU with 40,000 fatal crashes (Report of Organization for economic co-operation and development 2006).

Car accidents place Romania in second place in Europe regarding the number of deaths in car crashes, with 131 people killed out of one million inhabitants. Taking into consideration this information, it becomes important to study all the causes that can explain or lead to the understanding of the factors implied. This article will explore the differences in traffic behavior that exist between men and women as well as between young drivers and older drivers for a better understanding of the profile of the Romanian driver.

The Driver Behavior Questionnaire (Havârneanu, Gheorghiu & Hohn, 2010; Hohn, 1999, 2002) is based on a theoretical taxonomy of aberrant behaviors (Reason, Manstead, Stradling, Baxter & Campbel 1990). This taxonomy is composed of errors, lapses, mistakes and violations.

Slips are the failure of an individual to finish an action as planned. A lapse represents the omission of a sequence or the omission of an entire action as planned due to a memory or retention failure. A mistake consists in the appearance of an

[1]Correspondence concerning this article should be addressed to Corneliu Havârneanu (hcornel@uaic.ro)

error during the planning sequence regardless if the planned action is correctly executed or not. If slips and lapses occur, mainly at the executive level of the actions, errors occur only on the cognitive level of the planning (Stanton & Salmon, 2009).

Violations are a separate category representing deliberate deviations of those practices that are considered to be necessary in order to maintain safety when operating a potentially hazardous system (Reason 1990 p. 195, as cited in Whittingham, 2004).

The Driver Behavior Questionnaire, adapted by Havârneanu et all (2010) to the Romanian population, is a well known and used instrument for investigating the behavior of drivers in traffic (Grass & all 2006; Shi, Bai, Ying & Atchley, 2010).

The researchers obtained stable structures over time, keeping the main difference between errors and violations intact, even if in time some additional scales such as aggressive violation appeared (Gras & all, 2006; Lajunen, Parker, & Summala, 2004; Lawton, Parker, Manstead & Stradling, 1997; Mesken, Lajunen, & Summala, 2002; Sullman, Meadows & Pajo, 2002). The questionnaire proves an adequate resistance to the desirability bias, which assures us of the validity of the data we collected through it (Lajunen, Summala 2003). Havârneanu & all (2010) reported a structure composed of three factors, keeping the difference between errors and violations, and he obtained a satisfying internal consistency for each factor (over 0.80).

With the help of the results obtained with this questionnaire, the researchers had the opportunity to study the differences between women and men. The results of the studies agree that women tend to report more lapses while men tend to report more violations (Westerman & Haigney, 2000; Aberg & Rimmo, 1998; Xie & Parker, 2002). These results are in accord with the literature that places men as being more violent and aggressive in traffic than women (Hennessy & Wiesenthal, 2001).

Young drivers represent a particular category of drivers with the highest risk because they tend to see themselves as good drivers (Taubman - Ben-Ari, O. 2008) even if they are not. They have little experience in driving but still neglect the security norms in traffic and also are very minimally orientated to preventive driving and safety (Laapotti, Keskinen, & Rajalin, 2003, as cited in Møller & Sigurðardóttir, 2009). They tend to get involved in more risky behaviors than the rest of the population (Durkin, 1995, as cited in Scott-Parker, Watson, King 2009) and tend to speed more and to drink and drive (Ozkan, Lajunen & Summala, 2006).

Iversen (2004) showed that the drivers who have had an accident have the tendency of taking unnecessary risks and have negative attitudes towards the safety rules in traffic (negative attitudes toward keeping the speed at a legal limit or negative attitudes toward the traffic rules).

Another important factor which can help explain the behavior of a young driver on the roads is their group of friends. According to Parker (Parker,Manstead,

Stradling & Reason 992 apud OECD 2006) young drivers, especially men, often report situations in which their friends put pressure on them to force them to break the rules. In this case, the norms selected by the group have a greater chance of predicting the behavior if the subject is highly identified with that group. In other cases, the group pressure rests without an echo (Cooper J., 2001).

Elderly drivers constitute another particular group. Obriot – Claudel shows that drivers over 55 years of age tend to commit fewer violations but inattention errors do not decrease with ages of (55 – 81 years). Also, this category of drivers is more sensible to fatal car crashes, with five times the chance of having a fatal crash in the category 80+ than in the category 40 – 50. Women aren't that exposed, fewer of them being hospitalized after a car crash compared to men of the same age. (Bédard, Guyatt, Stones & Hirdes, 2002)

The study analyzed the specific behavior of Romanian drivers based on gender, age and number of years since they possessed driving licenses. More, the study is not limited only to the investigation of the behavior, but explores the different appreciations of the participants regarding the extent to which certain behaviors can become dangerous, the degree of guilt that they would feel if they made those behaviors and the sanctions that should be applied in those cases.

Method

Participants

To complete this study we investigated 3050 participants, 1557 males and 1439 females, all drivers between 18 and 81 years with experience in driving from one year to 58. In Table 1 we present in detail the structure of the sample we analyzed

Table 1. The sample structure in function of age, gender and experience

Age	Males			Females		
	Years on driving					
	0 – 5 years	6 – 15 years	over 15 years	0 – 5 years	6 – 15 years	over 15 years
18 – 25 years	233	263	0	189	251	0
26 – 35 years	88	191	4	108	214	3
36 – 45 years	94	128	59	121	155	98
46 – 55 years	49	58	78	91	113	100
over 55 years	71	118	123	9	15	26

Materials

The research was conducted with the Driver Behavior Questionnaire adapted by Havârneanu, Gheorghiu & Hohn (2010) after the Driver Behaviour Questionnaire's model provided by James Reason et al. (1990) appertaining to the Psychology Department of Manchester University. The questionnaire contains 4 scales, which,

even if they repeat almost the same items, the instructions differ. The first 3 scales contain 5 subscales and the forth has only 3 scales. The first scale has 37 items and it requires the respondent to evaluate the frequency with which they have expressed the listed behaviors and the sub-scales are slips (10 items), lapses (6 items), mistakes (5 items) simple violation (9 items) and aggressive violation (7 items). The second scale also has 37 items but it differs from the first by its instructions. Thus, the participants are asked to estimate to which extent the listed behaviors could produce an accident. The third scale wishes to evaluate the extent to which the participants regret and feel bad if they had expressed any of the listed behaviors. The fourth scale asks to evaluate if they would apply a penalty to a driver that manifests one of those behaviors. This scale contains only 3 sub-scales referring to slips (8 items), simple violations (9 items) and aggressive violations (7 items). The responses were recorded with a Likert scale with values from 0 – never, 1 – almost never, 2 – sometimes, 3 – quite often, 4 – often, 5 – almost always.

After a confirmatory factorial analysis, we obtained a 3 factor solution that explains 41.85% of the total variance.

The first factor is created from the items of subscale slips, lapses and mistakes and it explains almost 28.52%, the largest form out of all the three other factors. Apparently this factor isolates what Reason et all (1990) would name human error that can interfere in any sequence of the complicated action of driving.

The second factor is created from items regarding simple violations, but also aggressive violations and it explains 7.81% of the total variance. According to the degree of danger that those violations imply, this factor includes those that the experts consider as highly risky for the driver himself and also for the other participants in the traffic. More precisely, this factor refers to simple violations such as drinking and driving, highly risky overtakes (item 24) or aggressive violations like racing.

The third factor explains 5.51% of all the variance and it is mostly created by items referring directly to speed. Concerning the danger, these are mostly without risk or moderate risk. This factor comprises almost all the simple violations or aggressive violations regarding speed and it highlights the need to go faster or to pressure the others to keep up or to get out of the way.

Results

The study of differences between participant groups

In the first part we proceeded to the investigation of possible differences for the four dependent variables: frequency of behavior, degree of danger, degree of guilt and penalty that should be applied considering age, gender and years of experience in driving.

We notice important differences between men and women regarding the degree of danger of the behavior, the degree of guilt felt and the applied sanction. Women

tend to consider that the listed behaviors are more dangerous; they would feel more guilt if they had committed them and would impose a bigger sanction to those that would manifest them than men do. Regarding the manifested behavior and the frequency of it, we did not find any particular differences.

Table 2. T-Test Differences between men and women referring to frequency of behavior, the evaluation of the degree of danger, the degree of guilt and applied penalty

	Gender			
	Males	Females	t	df
Frequency of behavior	.98 (.50)	.98 (.54)	.22	3042
Degree of danger	2.42 (.70)	2.47 (.63)	-2.06*	3042
Degree of guilt	2.63 (1.04)	2.74 (.98)	-3.18***	3042
Penalty	3.42 (.77)	3.50 (.71)	-3.21***	3042

Note *= ≤ .05, *** p ≤ .001, Standard Deviations appear in parentheses below means.

We also analyzed the possible differences based on the age of the participants.

Table 3. One Way Anova concerning the four dependent variables: frequency of behavior, degree of danger, degree of guilt and penalty.

	Age						
	18-25	26-35	36-45	46-55	over 55	F	η^2
Frequency of behavior	1.04 (.49)	.99 (.52)	.95 (.52)	.92 (.54)	.91 (.54)	6.77***	.009
Degree of danger	2.40 (.64)	2.48 (.66)	2.46 (.67)	2.45 (.65)	2.52 (.76)	2.40*	.003
Degree of guilt	2.51 (.98)	2.65 (1.01)	2.81 (.97)	2.84 (1.00)	2.75 (1.09)	13.24***	1.017
Penalty	3.38 (.72)	3.41 (.75)	3.48 (.75)	3.55 (.74)	3.44 (.75)	6.31***	.008

Note. * = $p < .05$, *** = $p < .001$. Standard deviations appear in parentheses below means. Means with differing subscripts within rows are significantly different at the $p < .05$ based on Fisher's LSD post hoc paired comparisons.

The Fisher's LSD contrast post hoc paired comparison test distinguishes between the significant differences only for some age categories, which we can find in table 4.

We observe that young drivers, especially those below 25 years, are display behaviors in traffic more frequent than those over 36 years. Also, drivers over 55

tend to consider those behaviors as being dangerous. The feeling of guilt becomes more powerful once the age increases (over 26 years old) and the drivers over 46 years old considers that penalty for those behaviors must be applied.

Table 4. Significant differences for the dependent variables highlighted by the Fisher LSD contrast post hoc paired comparison's test

		Age		Mean difference
Frequency of behavior	LDS	18 - 25 years	36 - 45 years	.08***
			46 - 55 years	.11***
			over 55 years	.13***
		26 - 35 years	46 - 55 years	.07*
			over 55 years	.08*
Degree of danger	LDS	18 - 25 years	over 55 years	-.12*
		26 – 35 years	over 55 years	-.09*
Degree of guilt	LDS	18 - 25 years	26 – 35 years	-.14*
			36 – 45 years	-.30***
			46 – 55 years	-.33***
			over 55 years	-.24***
		26 – 35 years	36 – 45 years	-.16*
			46 – 55 years	-.19*
Penalty	LDS	18 - 25 years	46 – 55 years	-.16*
			over 55 years	-.16*
		26 – 35 years	46 – 55 years	-.13*
			over 55 years	-.16*

Note. * = $p < .05$, *** = $p < .001$

The third analysis studies the existence of certain differences according to the experience of the participants in driving, and the data can be found in table 5.

Table 5. One Way Anova according to the experience in driving for the four dependent variables: frequency of behavior, degree of danger, degree of guilt and penalty.

	Years of driving				
	0 - 5	6-15	over 15	F	η^2
Frequency of behavior	.94 (.49)	1.01 (.53)	.95 (.54)	5.45*	.004
Degree of danger	2.44 (.65)	2.43 (.66)	2.46 (.70)	.28	.001
Degree of guilt	2.68 (.99)	2.66 (1.01)	2.77 (1.05)	2.21	.001
Penalty	3.47 (.73)	3.43 (.74)	3.49 (.79)	1.67	.001

Note. * = $p < .05$, *** = $p < .001$. Standard deviations appear in parentheses below means. Means with differing subscripts within rows are significantly different at the $p < .05$ based on Fisher's LSD post hoc paired comparisons.

We can observe from the analysis of the data we obtained that according to experience in driving, a significant effect appears only for the frequency of behavior. The participants that had an experience between 0 and 5 years commit less traffic violations than those with an experience of 6 to 15 years. Also, the participants with experience over 15 years tend to produce less traffic violations than those with experience of 6 to 15 years.

The study of the interaction effects

a) Frequency of behavior

Table 5. Gender by Age Factor Analysis of Variance for Frequency Behavior

Source	Df	F	η^2	p
A gender	1	.30	.001	.581
B age	4	7.72	.01	.001
A x B(interaction)	4	2.39	.003	.048
Error (within groups)	3034			

We can observe the presence of a significant principal effect of the variable age and also a significant interaction effect of the variables gender and age over the variable frequency of behavior.

Graphic 1.Influence of gender and age over frequency of behaviors

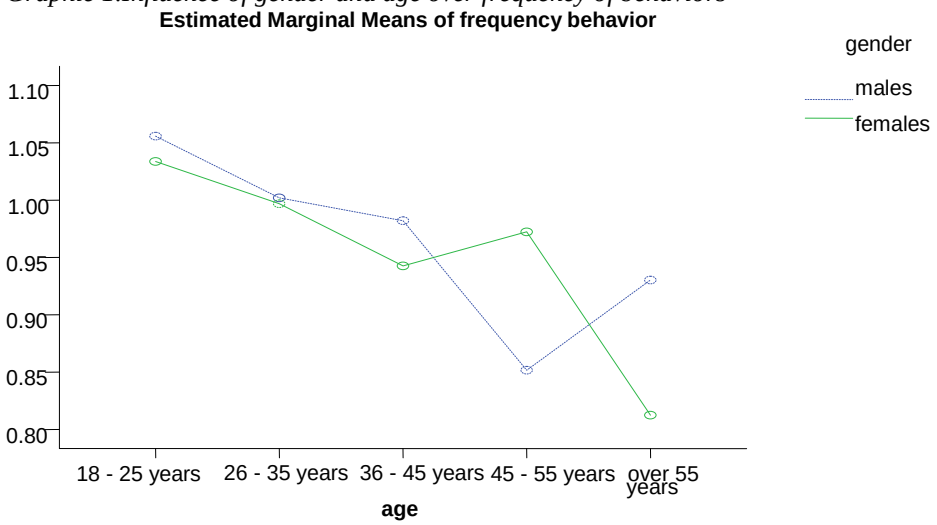

Table 6. Frequency of behavior scores for Experimental Group

	Age					
	18 -25	26 - 35	36 - 45	46- 55	Over 55	Simple effects F
Males	1.05 (.49)	1.00 (.47)	.98 (.51)	.85 (.50)	.93 (.54)	6.62***
Females	1.03 (.50)	.99 (.57)	.94 (.53)	.97 (.56)	.81 (.53)	2.81*
Simple effects F	.45	.01	.89	5.72*	2.05	

Note. *** = $p < .001$, * = $p < .05$. Standard deviations appear in parentheses below means. Means with differing subscripts within rows are significantly different at the $p < .05$ based on Fisher's LSD post hoc paired comparisons.

We can notice that until 45 years, men and women commit frequent errors in traffic. But the situation changes in the interval between the ages of 45 – 55, where women tend to commit more traffic errors than men the same age or younger. After 55, the errors in traffic committed by men increase significantly compared to women.

For the dependent variable degree of danger we did not find any significant effects.

b)Degree of guilt

Table 7. Gender by Age Factor Analysis of Variance for Degree of Guilt

Source	Df	F	η^2	p
A gender	1	2.50	.001	.114
B age	4	12.50	.016	.001
A x B(interaction)	4	2.46	.003	.043
Error (within groups)	3031			

We can observe two principal effects of the variables age and gender and a significant interaction effect of the variables gender and age over the variable degree of guilt.

Graphic 2.Influence of gender and age over the degree of guilt

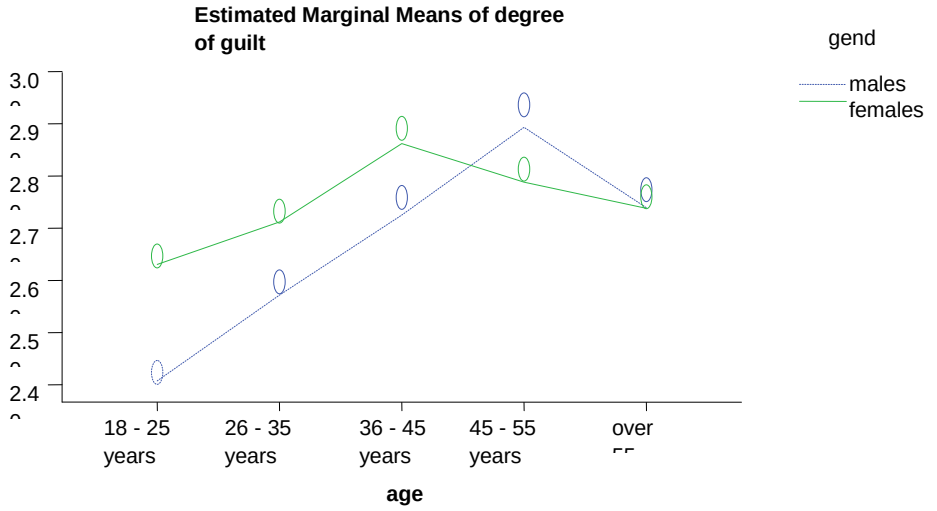

Table 8. Degree of Guilt Scores for Experimental Groups

	Age					Simple effects F
	18 -25	26 - 35	36 - 45	46- 55	Over 55	
Males	2.40 (1.03)	2.58 (1.00)	2.74 (1.02)	2.92 (.96)	2.73 (1.07)	11.62***
Females	2.63 (.91)	2.71 (1.02)	2.84 (.53)	2.79 (1.03)	2.74 (1.21)	3.40*
Simple effects F	11.49***	2.68	.89	1.70	.007	

Note. *** = $p < .001$, * = $p < .05$. Standard deviations appear in parentheses below means. Means with differing subscripts within rows are significantly different at the $p < .05$ based on Fisher's LSD post hoc paired comparisons.

The data highlights that the degree of guilt increases as one gets older, being higher on women than men until the age of 45, when it decreases, the men obtaining higher scores, to become equal after 55 years.

c) Penalty

Table 9. Gender by Age Factor Analysis of Variance for Penalty

Source	Df	F	η^2	p
A gender	1	3.18	.001	.74
B age	4	4.62	.006	.001
A x B(interaction)	4	2.64	.003	.032
Error (within groups)	3031			

We notice the presence of a significant principal effect of the variable age and a significant interaction effect of the variables gender and age over the dependent variable penalty.

If, until 55 years, women tend to be more severe than men when they have to punish traffic errors or violations; after this age they become less severe, even quite moderate after 55. Men are more tolerant toward traffic offences until 45 years, but after, the tolerance decreases progressively and they become highly strict when an aberrant behavior is manifested.

Graphic 3. Influence of gender and age over penalty

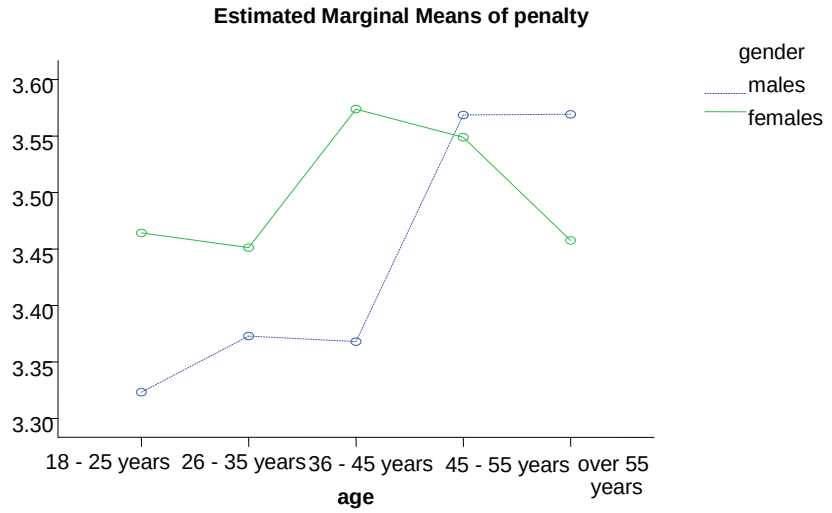

Table 10. Penalty Scores for Experimental Groups

	Age					
	18 -25	26 - 35	36 - 45	46- 55	Over 55	Simple effects F
Males	3.32 (.77)	3.37 (.74)	3.36 (.83)	3.56 (.73)	3.56 (.74)	7.16***
Females	3.46 (.66)	3.45 (.76)	3.57 (.68)	3.54 (.74)	3.45 (.76)	2.03
Simple effects F	8.74*	1.72	12.02***	.08	.95	

Note. *** = $p < .001$, * = $p < .05$. Standard deviations appear in parentheses below means. Means with differing subscripts within rows are significantly different at the $p < .05$ based on Fisher's LSD post hoc paired comparisons.

Discussion

We didn't find any significant differences between men and women in the manifestation of aberrant behaviors assessed by the first scale (errors and simple or aggressive violations). We can explain this finding by the social desirability bias or by the fact that women tend to commit some of the aberrant behaviors and men others but in the same amount. Plus, this analysis must be refined at a factorial level to be sure of the absence of differences. Nevertheless we have to be able to separate the aberrant behaviors of women from those of men. Men tend to commit more often aggressive or simple violations (like going over the speed limit, running through a red light, dangerous over takes, drinking and driving and aggressive behavior against other traffic participants) while women tend to commit more errors as well as have slips and lapses. Women tend to commit, more often, aberrant behaviors like suddenly breaking on a slippery road, not noticing a pedestrian, bicyclist or the signs of a police officer, erroneously estimate the distance between two cars and the distance to a pothole.

The fact women appreciate the existence of a significantly higher degree of risk than men in the manifestation of aberrant behavior in traffic can be explained by the fact, that due to their physical structure, women are more cautious in driving because their fear of accidents is higher, and their trend of protection and conservation is more evident and many of them realize that they have lower level of skills in driving a car. Men tend to appreciate that they have great driving skills so that they can manage any kind of situation that may arise in traffic regardless of the circumstances successfully; they seek the situations more loaded with adrenalin, and they consider that those behaviors aren't that dangerous. They

consider that they can control every situation, and those who can't do that or loose control have poor driving skills.

Regarding feelings of guilt that a driver might experience if he has exhibited that behavior and the punishment that should be applied, the results are the same with those obtained for estimating the degree of risk. It's natural that women feel guiltier, and they consider that those behaviors should be punished because the danger is obvious and the consequences are often dramatic.

The data we obtained are consistent with the literature and highlights that fact that young drivers, up to 25, manifest these aberrant behaviors more often than the other traffic categories. More, the research shows a higher rate of accidents in this category of age. Even though the degree of danger of these behaviors is considered high, only by the drivers over 55 years, the feeling of guilt is increased by age (over 26 years) and those over 46 years consider that these behaviors should be punished.

Machin M. A, Sankey K.S. (2008) quote the studies made by Castella and Perez (2004); Deery and Fildes(1999); McKenna and Horswill (2006) that showed how young drivers, without experience, have the tendency to go over the speed limit and that they underestimate the danger of this type of behavior, but they overestimate their driving abilities.

Young drivers, after getting their license, don't have enough experience and they haven't yet formed those skills to help them deal with every traffic situation. They can't predict the potential dangers and still consider that traffic accidents occur due to the hazard or other driver's fault, not because of them. These attributions are mostly external and the causes of accidents don't depend on them because they consider themselves unable to lose control.

Ajzen (2001) in the theory of planned behavior suggests that the subjective perception of norms can be an important factor for explaining behavioral intentions. Attitudes and a subjective perception of norms represents from one third to one fifth of the variable's variance intention to commit violations and the subjective perception of control can predict the behavioral intention.

Aging influences the capacity of driving because the psycho-motor functions are deteriorating and also because of the different health problems that appear. Older drivers try to counterbalance by being more cautious, by driving slower and by keeping a greater distance from the vehicle in front of them. They also tend to drive less (in numbers of kilometers) and to go on known roads. More, older people are more responsible, more socially mature, have a larger life experience as well as driving experience. They tend to stop seeking for sensations and facts that offer them an advantage towards the young drivers.

In general, it is difficult to separate the age from the driving experience. Age and experience play an important role, but further analysis shows that experience is over rated. Even though the risk of car accident involvement is decreasing in the same time that the experience is growing, this doesn't mean that a large amount of

experience can lead to total safety. It has been noticed that the chances of having a car accident decrease by 6% every year for the first 7 years from the moment of having a license for the young drivers. The accident's number decreases twice as fast for women and also for men (Walner et al. 2001).

The lack of experience and qualification are some of the leading causes of accidents but not the only causes. In the first stages after the license is obtained there is a higher risk of accident involvement but this high possibility cannot be assigned only to the lack of experience and a poor qualification. The personality structure of young drivers can offer more explications to the tendency to manifest aberrant behaviors and to violate safety norms. We notice that impulse and sensation seeking are higher on younger men. Impulse is a personality component tied to risk taking behaviors and attitudes and to aggressive traffic behaviors that can reduce self-control and the possibility of refraining. The sensibility to social factors is another characteristic of young people that can help explain these behaviors. Young men's behavior can be explained, or at least understood, by examining the pressure that significant others, like colleagues, friends the same age and gender, can exert upon them. Young men, especially, love to demonstrate to others that they are the best, that they can face dangerous situations and that they can maintain control, so they become aggressive in traffic, drive over the speed limit and take unnecessary risks. They tend to be less obedient toward legal pressure and legal norms and also, they tend to underestimate the danger and consequences of their behavior.

The interaction effects are mainly those we expected. With age, men tend to be more drastic concerning the penalties that should be applied because they are becoming more aware of the danger that those behaviors impose. Women tend to become gentler, because of the habituation phenomenon. They travel a lot, making only *silly* mistakes without breaking the safety rules and notice that nothing wrong has happened so, they tend to be more indulgent.

Surprisingly, we found that men and women tend to manifest the same behaviors up to 45, where a split happens. Women tend to commit more errors and violations, while men tend to commit less aberrant behaviors. This fact can be explained by the higher exposure of women to traffic situations. In the period of 45 – 55 years, children tend to leave their original home, creating a new family. It's possible, that women travel a lot more to see their child and help them. For doing this they need greater mobility assured by the car. On the other side, men, tend to get more mature, a fact evidenced by the scores obtained at the guilt and penalty scales. They are more cautious after 45 years and tend to limit their aberrant behavior. Nevertheless, we have to investigate further, to see which particular scale is responsible for these differences. Regarding the reversal observed after 55 years, women tend to drive less at that age, while men tend to keep their journeys, but the normal physiological and psychological degeneration can be responsible for the large number of aberrant behaviors recorded.

The measures that we can apply have to endorse each driver category because each of them have particular needs, and the solution that we can apply to young drivers doesn't fit for the elderly ones.

Driving schools should have more preventive hours in their training program and specific training assured by psychologists to help young drivers in the identification of highly risky situations. These trainings should help the divers get acquainted to different types of traffic situations before meeting them in real life. These types of programs can help reduce the frequency of slips and errors that are very common among novice drivers, accelerate the creation of necessary skills and improve the speed reaction. In addition, young motorists should drive, for several months after obtaining their license, in the presence of an adult with enough experience in driving, preferably someone from the family. More, for 2 years the driving license should have probation status, with the possibility of becoming permanent if the driver hasn't had any ticket or accident.

For women, the intervention should focus, like in the case of young drivers, on the habituation with different traffic situations. The training programs should be longer, insisting on the formation of skills. Plus, the programs would have to take into account the possibility of offering emotional training. Women tend to become emotional in stressful situations and therefore, such type of intervention could help.

Elderly drivers should benefit from a periodic assessment of physiological and psychological functions so that it can be possible to highlight the deterioration rhythm. If the rhythm is considered abnormal, intervention has to be immediate and prompt. Also, elderly drivers should benefit from training programs that are centered on the improvement of their capacity to rapidly switch form one task to another and on keeping their skills at an acceptable level. Their experience helps a great deal, but at some point this isn't enough anymore, and so, we have to intervene by offering training programs which adapt to their needs.

Reference List

Aberg, L., & Rimmo, P.-A. (1998). Dimensions of aberrant driver behaviour. *Ergonomics*, *41*, 39 - 56.

Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology*. 52, 27–58.

Bédard M., Guyatt G.H, Stones M. J., Hirdes J. P. (2002). The independent contribution of driver, crash, and vehicle characteristics to driver fatalities. *Accident Analysis & Prevention*, *34* (6), 717 – 727.

Castella, J., Perez, J. (2004). Sensitivity to punishment and sensitivity to reward and traffic violations. *Accident. Analysis and Prevention*, 36, 947–952.

Cooper J., Kelly K.A., Weaver K. (2001). Attitudes, Norms, and Social Groups. In M.A.Hogg, R. S. Tindale (Eds.) *Blackwell Handbook of Social Psychology: Group Processes* Malden USA, Blackwell Publishers (pp. 259 – 283)

Deery, H.A., Fildes, B.N. (1999). Young novice driver subtypes: relationship to high-risk behavior, traffic accident record, and simulator driving performance. *Human Factors* 41 (4), 628–643.

Gras M. E., Sullman M.J.M., Cunill M., Planes M., Aymerich M., Font-Mayolas S. (2006). Spanish drivers and their aberrant driving behaviours. *Transportation Research Part F, 9* (2), 129–137.

Havârneanu, C., Gheorghiu A., Hohn, M. (2010, in press). Theoretical validity of the Driver Behaviour Questionnaire, *Psihologia Socială,* 24.

Hohn, M. (2002). *Traffic and psychology* in Psihologia şi circulaţia rutieră, Timişoara, Ed. MIRTON (pp. 86 – 99)

Hohn, M., (1999), *Decisional behavior and driving (a psychological approach*) in Comportamentul decizional şi conducerea auto (o abordare psihologică), Arad, Ed. MULTIMEDIA (pp. 95 – 110)

Hennessy D. A. & Wiesenthal D. L. (2001). Gender, Driver Aggression, and Driver Violence: An Applied Evaluation. *Sex Roles,* 44 (11/12), 661 – 676.

Iversen, H. (2004). Risk-taking attitudes and risky driving behaviour. *Transportation Research Part F, 7*(3), 135 -150.

Lajunen T., Parker D., & Summala H. (2004). The Manchester driver behavior questionnaire; a cross-cultural study. *Accident Analysis and Prevention, 36,* 231–238.

Lajunen T. & Summala H (2003) Can we trust self reports on driving? Effectsof impression management on driver behaviour questionnaire responses *Transportation Research Part F, 6*(2), 97-107

Lawton, R., Parker, D., Manstead, A. S. R., & Stradling, S. G. (1997). The role of affect in predicting social behaviours: the case of road traffic violations. *Journal of Applied Social Psychology, 27,* 1258–1276.

Machin M.,A,, Sankey K, S. (2008). Relationships between young drivers' personality characteristics, risk perceptions, and driving behaviour. *Accident Analysis and Prevention* 40, 541–547.

Mesken, J., Lajunen, T., & Summala, H. (2002). Interpersonal violations, speeding violations and their relation to accident involvement in Finland. *Ergonomics, 45,* 469–483.

McKenna, F.P., Horswill, M.S. (2006). Risk taking from the participants' perspective: the case of driving and accident risk. *Health Psychology* 25, 163–170.

Murray C.J.L., Lopez A.D. (1994). Global and regional cause-of-death patterns in 1990. *Bulletin World Health Organization, 72* (3), 447–480.

Møller M., Sigurðardóttir S. B. (2009). The relationship between leisure time and driving style in two groups of male drivers. *Transportation Research Part F, 12* (6), 462–469.

Obriot-Claudel F. & Gabaude C. The Driver Behaviour Questionnaire: A French study applied to elderly drivers, http://www.psychology.nottingham.ac.uk/IAAPdiv13/ICTTP2004papers2/Individual%20Differences/Obriot.pdf

Ozkan T., Lajunen T, Summala H (2006) Driver Behavior Questionnaire : A follow up study. *Accident Analysis and Prevention, 38* (2), 386-395.

Organization for economic co-operation and development (2006). The problem of young, novice drivers & General "Nature" and "Nurture" Aspects of Young, Novice Driver Risk. Young drivers, the road to safety report. ECMT Publications, Paris, France.

Reason, J., Manstead, A., Stradling, St., Baxter J., Campbel, K., (1990). Errors and violation on the roads: a real distinction? *Ergonomics*, *33* (10 and 11), 1315-1332.

Scott-Parker B., Watson B., King M J. (2009). Understanding the psychosocial factors influencing the risky behaviour of young drivers. *Transportation Research Part F, 12*(6), 470–482.

Sullman, M. J. M., Meadows, M. L., & Pajo, K. B. (2002). Aberrant driving behaviours amongst New Zealand truck drivers. *Transportation Research Part F 5*, 217–232.

Stanton N. A., Salmon P.M. (2009). Human error taxonomies applied to driving: A generic driver error taxonomy and its implications for intelligent transport systems. *Safety Science*, *47*(2), 227-237.

Shi J., Bai Y., Ying X., Atchley P. (2010). Aberrant driving behaviors: A study of drivers in Beijing. *Accident Analysis and Prevention, 42* (4), 1031 – 1040.

Taubman - Ben-Ari, O. (2008). Motivational sources of driving and their associations to reckless driving cognitions and behavior. *European Review of Applied Psychology*, 58, 51-64.

Waller P.F., Elliott M.R., Shope J.T., Raghunathan T.E., Little R.J.A. (2002). Changes in young adult offence and crash patterns over time. *Accident Analysis and Prevention*, 33, 117-128.

Westerman S.J., Haigney D. (2000). Individual differences in driver stress, error and violation. *Personality and Individual Differences, 29* (5), 981 – 998.

Whittingham R.B. (2004) Errors in practice (pp. 12 - 21) and Latent errors and violations (pp. 26 - 43) in R.B. Whittingham *The Blame Machine: Why human error causes accidents* New York, Elsevier Butterworth-Heinemann Press.

Xie C., Parker D. (2002). A social psychological approach to driving violations in two Chinese cities. *Transportation Research Part F, 5*, 293 – 308