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Traffic norms between safety and perversity

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Abstract: Perverse norms are believed to be an important factor leading to deviance in traffic (Fernández-Dols & Oceja, 1994; Pérez, et al., 1998; Pérez et al., 2002). From a particular social perspective, norm violation originates in the general perception of norms being irrational or useless for real safety needs (Lucas & Pérez, 2003; Țepordei, Havârneanu & Boncu, 2010). In the current research we examined the degree to which ordinary and professional drivers perceive a set of norms as being mostly rational, irrational (i.e. perverse) or both. In order to assess the anti-normative behaviour, we used 17 traffic scenarios and had participants motivate their decisions in terms of the heteronomous vs. autonomous systems of moral reasoning. The results reveal the importance of past accident involvement, as well as of heteronomy in terms of police control as well as personal experience with the police.

Key-words: perverse norm, moral system, road safety

Introduction

Since the '90s road traffic has experienced a steady growth in Romania. Not surprisingly, in the last 20 years accident statistics have become really threatening. According to the Interministry Council for the Road Safety report from August 2006, the number of crashes, the number of dead victims, and the number of severely injured increased in 2005 compared to the previous year. In 2007, Romania had 2712 road traffic fatalities and 29,832 non-fatal road traffic injuries (World Health Organization, 2009). According to the 2009 WHO report on road safety, Romania is Europe's second country regarding the number of road accidents and deaths. The government is currently dealing with a European strategy aimed at significantly reducing road casualties by the year 2013.

Since 2006 the Romanian Traffic Code has been changed 3 times, each time emphasizing enforcement and introducing more severe punishments for disobedient road users. Besides, the Traffic Police have achieved better and better radar technology with huge improvements in detection range. Unfortunately, neither the changes in the Traffic Code nor the higher police enforcement have been able to reduce the number of casualties or to cause higher conformity with the traffic laws. Furthermore, the main accident-leading causes mentioned by police are closely linked to deviant behaviours such as pedestrians' indiscipline, careless

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driving and over-speeding. On close examination one can perceive an apparently strange connection between a boost of enforcement and the drivers' preference for non-compliance with the traffic rules. This relationship may seem odd but there are certainly some psychological factors that underpin it. Compliance with traffic norms may generally be linked to road safety (Siegrist & Roskova, 2001). However, under particular circumstances, disobedience does not affect safety. There are commonly known situations when drivers can act against the law without perceiving any real threat. This may be one alternative explanation for the massive disobedience we see each day on Romanian roads. In this paper we address this issue and will try to explain some predictable causes of anti-normative behaviours.

Normative and anti-normative behaviour in traffic

For a long time traffic psychology studies have been started from the axiom that a small proportion of drivers are responsible for a large proportion of accidents. From this viewpoint, effort has been put into finding the *accident prone personality* which was solely considered to be responsible for high-risk behaviors (for reviews see McKenna, 1983; Elander, West & French, 1993; Ranney, 1994; Rotthengatter & Carbonell, 1997; Haight, 2004). On the other hand, studies aimed to reveal the most important errors or violations committed by drivers (Reason, Manstead, Stradling, Baxter & Campell, 1990; Parker, Reason, Manstead & Stradling, 1995; Aberg & Rimmo, 1998). The assumptions are as follows. Similarly to other types of behavior, driving behavior can be regarded as normal or aberrant. Aberrant behavior is the one that deviates from normative behaviour. In traffic behaviour, normative is not always "normal", but is most likely a criterion for "violation" (a willful deviation from the norm). Deviation from the norm is by definition the cause of all accidents. Authors use the concept of *aberrant driving behavior* to explain recurrent violations and deviance (e.g., Parker, West, Stradling, Manstead, 1995; Lawton, Parker, Stradling, Manstead, 1997; Lawton, Parker, Manstead, Stradling, 1997). In theory, if everybody respected all laws (i.e. traffic norms) there would be no incidents or casualties. However, in practice, one can witness very common anti-normative behaviors such as driving under the influence of alcohol/drugs, priority violations, inappropriate speed, tail-gating (close following), red-light running, not wearing seatbelts etc. In line with this point of view, we should also observe that we are facing some sort of theoretical paradox. While statistics constantly report huge numbers of crashes, we perceive a very high level of deviance in traffic. However, this deviance is usually considered and analyzed from an individualistic perspective. On the contrary, we think it should be regarded as a social and collective issue. Yet, there is no doubt that deviance leads to accidents and decreases traffic safety. For example, non-compliance with speed limits has been estimated to account for more than 30% of the fatalities and serious injuries (Salusjärvi, 1982, as cited in Siegrist & Roskova, 2001) and if speed limits were respected, fatal accidents would probably decrease.

Particular theoretical ideas have been developed in order to explain why many drivers still violate traffic norms. Tyler (1990) presents a differentiation in regard to instrumental and normative motives for compliance with the law. *Instrumental motives* are related to the gains and losses (e.g. accident risk, police fines) involved in obeying or disobeying the law. *Normative motives* result from the internalization of the law and the perceived legitimacy of the authorities enforcing the law (Tyler, 1990). Kelman (1961, as cited in Yagil, 1998) describes people's reactions to influence and differentiates between compliance, which is initiated by a desire to avoid punishment or to receive positive rewards, and the internalization of an attitude because it is perceived as coherent with reality as well as the individual's general system of values and beliefs. Compliance is achieved through control and is expressed only in the presence of the influencing agent. On the other hand, internalization results in long lasting effects of the attitude which does not depend on the presence of the influencing agent. Furthermore, the normative perspective of obedience to the law focuses on voluntary compliance rather than compliance as a response to external rewards and punishments (Yagil, 1998). Voluntary compliance results either from a belief that the legal authorities have a legitimate right to dictate behavior or from a sense of personal morality and a perception of right and wrong. Accordingly, people might disobey certain laws if this is not perceived as immoral, while obeying other laws (Tyler, 1990).

These theories reveal a basic explanation for the high rate of deviance in traffic. It is noteworthy that some road users respect the norms because they have internalized them and probably because they consider them to be correct or because they feel natural to act morally and responsibly. Compared to them, other road users obey the law just because they want to avoid punishment. For example, if we consider two drivers (say A and B) who are both acting in the same way (e.g. crossing a village at a speed of 50km/h) we may find different incentives behind their behaviour. If A is driving at that speed because he/she is aware of possible risks, B may be travelling at the same speed just because they are afraid of the police control. We believe there is a fundamental psychological difference between these two categories of road users and would like to draw your attention to this difference; besides, this issue can also be an explanation for deviance. If driver B does not perceive any probability of losses (e.g. there is surely no police around) he or she will certainly violate the speed limit and drive faster.

However, we believe that the theoretical approaches previously mentioned are to some extent reduced and additional explanations are needed. It seems reasonable to suppose that deviance has additional causes. Drivers may violate a specific norm (e.g. the 50 km/h speed limit) simply because they do not perceive any risks if they violate this norm. Besides, in some situations this, like other norms, may be regarded as irrational, inefficient for one's own traveling purpose or inefficient for real safety needs. The question then arises, what is the exact internal drive that makes violators justify their behaviour: is it the lack of perceived risk or the lack of

probability to get caught and punished? We suppose the answer can be found by exploring the *perversity* of the norm.

Social perversity and perverse norms

Sirota (2010) has repeatedly argued that the word “perversity” is no longer associated only with psycho-sexuality or with structural psychological theories. There is a *social perversity* as well. It refers to observable behaviours which occur in specific social interactions between individuals, usually in groups or teams. In line with this point of view, we can think of the road users as a group that has to act according to a strict set of rules and regulations.

Fernandez-Dols (1993) proposed a mechanism that may put innocent victims of the normative imperative in jeopardy. He called this mechanism “normas perversas”. Perverse norms are dramatic but perhaps misleading designations. The label does not allude to formal norms that are intrinsically perverse or ethically incorrect; in fact, it alludes to the opposite case. Perverse norms are those formal norms that are seen as legitimate, and whose transgression involves sanctions, but which for some reasons, are transgressed by most of the members of a social group. In other words, perverse norms are “openly accepted” as correct or even necessary by the group, but are not observed (Fernandez-Dols, 1993). With respect to the normative conduct towards speeding, Fernández-Dols & Ocejja (1994) observed that speed limits were systematically violated by more than just a small group of drivers, involving about 90% of them. Such a massive violation led Fernández-Dols et al. to call these traffic norms *perverse*, as they seem to be done more for infringement rather than for respect. As we mentioned above, drivers may have different rationales in order to massively behave as such. Thus, in the realm of traffic, a perverse norm can be defined as a norm whose objective is occasionally not related to road safety but the mere punishment of the drivers who violate it.

Pérez, Lucas, Dasi, & Quiamzade (2002) emphasized on the “massive disobedience” towards the Traffic Code. This made us think that many of the norms from this code of laws may virtually be perverse or at least perceived as such by the majority of road users. Besides, on a social scale the meanings and roles of norms are ambiguous. For example, as Pérez et al. (2002) show, norms related to speed, lead to ambivalence and interpretations in most societies. On one hand, speed is limited and excessive speed penalized; on the other hand, factories keep making cars that double up legal speed limits, better in-car and out-car engineering allow for faster driving, and pairings as old-slow vs. young-fast are promoted.

In a recent study, Țepordei, Havârneanu, & Boncu (2010) had participants evaluate the general rationality of some traffic norms, also requesting from the subjects to report their potential engagement in a violation behavior. They used text scenarios in order put the norms in specific situations, considering that if drivers report a high probability of violating the rule, that specific rule is perceived as less

rational or adequate to the real security needs. In other words, the norm turns perverse in that particular context. The results showed that, irrespective of gender or driving experience, the contextualized evaluations of the rationality of these traffic norms are more negative than the initial ones, thus proving their perverseness.

Concerning this, we should be aware that many of traffic norms, which one can find in the Traffic Code, are perfectly rational in some situations and completely irrational in others. A norm can actually be both rational and irrational depending on the traffic situation. We assume that the double-sided effect of traffic norms is one of the causes for deviance. Thus, norms which can leave room for ambiguity and interpretations may be more severely violated. For example, driving slow or fast shares multiple meanings, interests and social representations of speed which are maintained by society and/or by certain collectives. The question can be addressed as which norms bear a particular influence on the way people drive.

Perversity within a social meta-system of moral reasoning

In a set of studies, Pérez et al. (1998, 2002), and Lucas & Pérez (2003) repeatedly pointed out that a drivers' behaviour is not only ruled by their psychomotor abilities and/or by traffic rules, but also by a more generalized system of social norms, some of which may even conflict with the existing Traffic Code. In their view, this may also explain the lack of efficiency commonly observed in accident prevention campaigns which originates in the application of an individualistic analysis of driving habits and behavior. They argue that driving behavior is ruled by a social metasystem that is primarily anchored, not internally by the individual driver, but in the group and/or in the social category of reference. According to this, interventions upon (dangerous) driving practices aiming to be effective should focus on changing the norms, moral reasoning and social representations constituting the social metasystem that regulates individual behavior. Consequently, instead of being applied individually, focusing on each individual driver, the intervention should focus on the interaction between drivers, the group or the collective (see Lucas & Pérez, 2003).

It seems reasonable to see that the concept of *perverse norm* can be integrated at a higher level of explanation. Once the existence of a social metasystem that regulates driver behavior is accepted, the present implementation of the New Traffic Code comes out as blindly focused on individual enforcement (i.e. functionalist approach), disregarding the diversity of meanings, norms and meta-norms that foster disobedience toward traffic regulations (interactionist approach). From the latter perspective, inspired by Piaget's and Kohlberg's classical moral reasoning studies, Pérez et al. (1998, 2002) proposed an analysis of compliance with Traffic Code norms in terms of two normative and moral reasoning systems. *The heteronomous system*, which predominates today as the system for regulating road users' behaviour, emphasizes on the mere obedience towards traffic norms. In

traffic, heteronomous may be translated as external to the group. In other words a heteronomous system is built up of instrumental norms which are not respected voluntarily but only for instrumental motives as Tyler (1990) would call them. Within this system of moral reasoning, norms are neither able to reach their true purpose nor their primary function which is organizing the interaction between drivers. The result is obvious and easy to see in practice: drivers' observance of norms depends to a great extent on police presence or immediacy. As a consequence, the authority's most common intervention strategy is what we like to call "enforcing the enforcement". Redundant as it may seem, compliance with norms is usually expected to be contingent on the enforcement system. With respect to enforcement, Rothengatter & Huguenin (2004) made it very clear that most of the time, specialists try to determine what system (police visibility, immediate punishment, automated surveillance, increased fines etc.) shows better results in order to control and prevent violations and accidents. For all the reasons above, when it comes to safety, efficiency and compliance, the heteronomous system is doomed to failure because of the very common behavioural adaptations to enforcement. Besides, we think such a system may be considered itself as perverse because, contrary to its intentions, it encourages aberrant behaviours.

Opposite to the heteronomous system stands *the autonomous system*, which currently exists more in theory rather than in the real world. Within an autonomous moral system (i.e. inter-driver system) norms would not be anchored in the police-driver transaction, but in the interaction between drivers. Instead of driving against the police, drivers are aware of the mutual respect between road users, and also their rights. This system should deal only with what Tyler (1990) defined as *normative motives*. These motives result from the internalization of the law and the internalization of a positive attitude because they are perceived as coherent with reality as well as the individual's general system of values and beliefs. As a consequence, norms stand out not even as a tool for preserving drivers' own safety, but for preserving other road users' safety. Two different perspectives arise. The first one includes norms which concern other road users such as speeding, red-light running, driving under the influence of alcohol/drugs, priority violations, close following, zig-zag overtaking etc. Within the inter-driver system of moral reasoning, these norms should not be violated because by doing so the safety of other peers is threatened. The second perspective deals with norms concerning only the road users' own safety (e.g. wearing a seatbelt or helmet, speeding on a totally empty road, having a fire extinguisher in one's car etc.). In this case norms should not be violated for a person's own safety. Whatever the case, one idea becomes clear: within the autonomous system, traffic norms are directly linked to a real hazard that may occur.

The distinction between the two moral reasoning systems has enabled us to come and compare two apparently similar but in fact extremely different situations. In essence, there is a huge difference between a driver that does not speed beyond

70 km/h just because a posted sign indicates it and a driver that complies with this speed limit for safety reasons. At the same time, there is an essential difference between a driver who violates the norm and travels double that speed limit because of the awareness that there is no police enforcement around and a driver who occasionally needs to exceed it (e.g. 90km/h) but is responsible and fully aware of the risks.

The solution to this dilemma is not what the authorities do (i.e. more and more enforcement). What should change is the fundamental representation of the norm. A shift in the system is necessary in order to replace the common driver-police interactions with the driver-driver interactions. Heteronomy should be replaced by autonomy as fear of police control should be replaced with the fear of real hazards.

Objective

The aim of our research is to further explore some of the issues already made clear. First we wanted to extend the list of perverse and non-perverse norms initially developed by Țepordei, Havârneanu, & Boncu (2010) and have them once again validated by a group of highly experienced drivers. One of our initial assumptions is that there might be some differences between male road users depending on whether they are ordinary (amateur) drivers and professional ones. Secondly we wanted to see if actually being anchored in the heteronymous moral system has an impact on the anti-normative behaviour. What comes first in the driver's mind when he violates a specific norm? Is it primarily the fear of a police control (confirming the heteronomous system hypothesis) or is it the fear of a real hazard (danger of the situation, accident probability)? Do drivers justify their deviant behaviour in terms of avoiding police control or in terms of avoiding a real threat to their safety? Finally, we wanted to test if this specific norm-violation justification is a significant predictor for the deviant behavior in specific situations.

Method

Participants

75 drivers (35 ordinary drivers and 40 professional drivers) were asked to participate in this study. Their ages ranged from 24 to 55 ($M=36.21$; $SD=8.54$), and their total mileage ranged from 30000 km to 1440000 km ($M=404933.3$ km; $SD=352170.73$). We controlled for gender, including only men. Almost half of them were ordinary drivers (46.7 %) and the other half professional drivers (53.3 %). Concerning the accident involvement of drivers, they were split in two categories: with no accidents in the last 3 years (57.3 %) and with one or more accidents (42.7 %).

Measures

Perceived rationality of traffic norms. We constructed a 31 item questionnaire measuring the degree in which our respondents perceived the traffic norms as being rational and well adjusted to the real traffic security needs. Out of the 31 norms

selected from the Traffic Code by a group of experts, 13 are considered to be well adjusted to the real security needs (e.g. *The change of driving course must be properly signaled*) and they were labeled as “non-perverse” norms. The other 18 might be considered perverse in certain specific situations (e.g. *Speed limit within urban and rural areas is 50 km/h*) and they were labeled “perverse norms”. In giving their answers, the respondents used a Likert scale from 1=*not at all adjusted* to 5=*perfectly adjusted*. The scale was eventually recoded (the higher the score, the more irrational the traffic norms and the higher their perverseness). For every participant we computed a total score for each set of norms.

Norm-violation behavior in specific perverse traffic situations. Used as dependent variable, a list of 17 scenarios was created in order to assess the degree in which some traffic norms turned out to be perverse in specific situations. This means that there are circumstances in which the traffic norm is no longer perceived as enhancing road safety, but merely as a way to get punished. The group of experts constructed 15 text scenarios corresponding to 15 out of the 18 potentially perverse traffic norms presented in the first instrument. For some of them, a photo taken from the driver’s perspective was used together with the text in order to show a real traffic situation. Below we present one of the items (see Figure 1): “You are crossing a village in which the speed limit is 50 km/h. The road is perfectly straight and there is not a single obstacle which may limit your visibility. You don’t see other road users. In this situation, do you decide to drive faster, breaking the speed limit?”

Figure 1. The photo used in one of the scenarios (taken from the driver’s perspective).



A single norm out of the 31 presented in the *Perceived rationality of traffic norms survey*, referred to the position of pedestrians in traffic (e.g. Pedestrians have priority to cross the street only when they cross through marked areas). For this

norm we described two specific scenarios regarding the pedestrian's condition, both of them being analyzed separately. Participants had to read each scenario and decide how often they would engage in that behavior, using a 5-point Likert scale from 1=*never* to 5=*always* (in order to conduct further statistical analysis, the same Likert scale had to be used as in the first questionnaire). A total score was computed for every participant, a higher score indicating a higher probability to engage in norm-violating behaviors in certain situations when traffic norms appeared to be less rational.

Experience with police. Another independent measure taken into consideration was experience with police, measured through a single dichotomous item. The subjects were asked to share if the past experiences they had with the Traffic Police were either positive or negative. Following the statistical analysis we observed that 61.3 % of participants had a positive experience rather than 38.7% who had negative experience.

Norm-violation justification. This variable was measured through a single item which was introduced after each traffic situation. This item was rated using a 5-point Likert scale from 1= *the fear of police control* to 5= *the fear of real danger*. Thus, the higher the mean, the bigger the fear of a hazard or threat (e.g. an accident). Participants were asked to use the middle point of the scale only if they were equally thinking about both situations.

Procedure

One condition required for our participants was for them to be highly experienced drivers. On one hand, we included ordinary drivers selected from the general population of experienced drivers with a B category license. On the other hand, we approached a special category, specifically professional drivers. This included truck drivers, bus and minibus drivers employed in different organizations, possessing several license categories. After accepting to take part in our investigation, they were handed a set of instruments (presented above) in the following order: a set of items asking them to report their age and total mileage, a questionnaire for perceived rationality of traffic norms, a list of scenarios assessing norm-violation behavior in specific perverse traffic situations together with the violation justification scale, and in the end, items referring to accident involvement, sanctions as well as experience with the police.

Results

Descriptive and exploratory analysis

In order to see if specific variables were configured correctly we used the Chi Square association test. We found two significant associations between the categories of our group. On the first analysis (see Table 1) we observed that the "type of driver" categories are significantly associated with the "total mileage" categories ($\chi^2(1)=60.57$; $p<0.01$), in the way that ordinary drivers are experienced

(between 30,000-300,000 km) and professional drivers are the ones with extreme experience (above 300,000 km).

Table 1. Crosstabulation of type of driver and driving experience

Type of driver	Total mileage		χ^2	Φ
	Experienced (below 300,000 km)	Extremely experienced (above 300,000 km)		
Ordinary drivers	35 (7.8)	0 (7.8)	60.5 7**	0.8 9
Professional drivers	4 (-7.8)	36 (-7.8)		

Note. **= $p < 0.01$. Adjusted standardized residuals appear in parentheses below group frequencies.

On the second analysis, we found that “accident involvement” categories are significantly associated with the “experience with police“ ($\chi^2(1)=13.36$; $p < 0.01$; Adjusted Residuals=3.7), in the way that drivers with one or more accidents in the past three years have a negative experience with police (62.5%) while those with no accidents have a positive one (79.1%).

Using the means from the 31 norms, we ranked them in an attempt to discover which are the most and least adjusted to real traffic situations. The hierarchy which resulted from the participants’ evaluations goes as follows. The rules the least adjusted to real traffic needs (i.e. the most perverse) are: “The driver has to change his driving license every time he changes his residence” ($M=3.00$; $SD=1.43$) and “The speed limit in urban and rural areas is 50 km/h” ($M=2.57$; $SD=1.22$). On the contrary, the norms which were perceived as the most adapted to the real safety needs (i.e. not perverse) are the following: “Driving a vehicle by a driver who has more than 80g/L pure alcohol in his blood constitutes a crime” ($M=1.29$; $SD=0.69$) and “During a night drive the driver must properly use meeting lights” ($M=1.34$; $SD=0.50$). When it comes to real traffic situations the most irrational and transgressed norms are those referring to coming back home from your journey in order to pick up your forgotten documents ($M=3.68$; $SD=1.58$) and renewing your driving license according to your new address ($M=3.62$; $SD=1.46$). The most rational and least transgressed norms were waiting at the red light in the middle of the night although there is no traffic around ($M=1.40$; $SD=0.91$) and not driving on a clear day with your fog lights on ($M=1.52$; $SD=0.94$).

Rationality and behaviour from the pedestrian’s perspective

As we previously said, we separately analyzed the situation for pedestrians. Using the Paired Samples T Test we compared the initial rationality of the norm which regulates pedestrians’ street crossing behaviour with the actual behavior of

pedestrians (i.e. crossing or not crossing the street illegally). We found significant differences ($t(74)=-5.55$; $p=0.00$) between the two measures. Even if the norm was initially perceived as being adapted to real security needs ($M=1.68$; $SD=0.96$), when transposed in a real traffic situation, it became transgressed ($M=2.42$; $SD=1.08$). When conducting this comparison we also took into account pedestrians' norm-violation justification. Specifically, when crossing the street though an unmarked place while the lights are red, pedestrians evoke mostly the fear of real danger rather than the fear of police sanctions ($M=3.78$; $SD=1.07$).

Within-subjects comparisons

First we wanted to check the differences in perceived rationality for the 31 general norms from the first questionnaire. We computed an average score for the 13 non-perverse norms and one for the 18 potentially perverse norms (considering the initial expert division). The Paired Samples T test ($t(74)=-0.18$; $p<0.01$) revealed significant differences between our participants' ratings. Subjects perceived the non-perverse norms ($M=1.67$; $SD=0.53$) as being more rational than the potentially perverse ones ($M=1.95$; $SD=0.66$). This shows once again that the participants confirm the expert point of view.

Secondly we wanted to test the effect of context with respect to 15 of the 18 less rational norms. Using the same procedure, we compared the mean score of the irrational norms (general evaluation), with the mean score of the norm-violation behaviour (in context). When put in context, the norms turn out to be less rational ($M=2.44$; $SD=0.80$) than in the initial evaluation ($M=1.95$; $SD=0.66$) because driving behaviour tends to be significantly more towards the transgression pole ($t(74)=-5.94$; $p<0.01$). To put it another way, norms which are initially considered perverse (i.e. less rational) from a general point of view, are perceived as even more irrational in context as long as they are transgressed more.

Main effects of between-subjects factors

To examine how the group variables (*type of driver, accident involvement, experience with police, and violation justification*) influence deviant behaviour in specific situations, several analysis of variance (ANOVA) were conducted. Because all variables consisted of two groups, we used the Independent-Samples T Test to further analyze the main significant effects upon the anti-normative behaviour. Results can be summarized as follows: drivers who have been involved in accidents in the last 3 years ($M=2.97$; $SD=0.59$) show higher deviance compared to those who have not ($M=2.05$; $SD=0.71$; $t(73)=-5.90$; $p<0.01$). Drivers who had a negative past experience with police ($M=2.85$; $SD=0.69$) show higher deviance compared to those had a positive experience ($M=2.18$; $SD=0.77$; $t(73)=-3.81$; $p<0.01$). Drivers mostly afraid of police control ($M=2.79$; $SD=0.74$) show higher deviance compared to those being mostly afraid of a real hazard ($M=2.32$;

SD=0.79; $t(73)=2.32$; $p=0.023$). The type of driver (ordinary vs. professional) had no effect on the norm violation behaviour ($t(73)=0.47$; $p=0.639$).

Interaction effects of between-subjects factors

We found significant interactions only between accident involvement, type of driver and experience with the police. The 2 (ordinary driver vs. professional drivers) x 2 (no accidents vs. one or more accidents) ANOVA showed a main effect of accident involvement ($F(1)=34.77$, $p<0.01$) and a significant interaction between the two groups ($F(1)=5.1$, $p=0.027$). However, the main effect of the driver category was not significant ($F(1)=0.28$, $p=0.594$). Table 2 displays the means and standard deviations for these groups.

Table 2. Means and standard deviations (in brackets) of the norm violation in context depending on the type of driver and accident involvement

	No accidents	One or more accidents
Ordinary driver	2.27 (0.68)	2.82 (0.59)
Professional driver	1.84 (0.70)	3.09 (0.57)

The error variance of the dependent variable was equal across groups ($F(3)=0.37$; $p=0.76$). Consequently, to further analyze the interaction effect, we separately examined the differences between the two accident groups using the Independent-Samples T Test with the type of driver as grouping variable. We found a significant difference ($t(41)= 2.01$, $p=0.05$) in norm violation behaviour only between ordinary drivers ($M=2.27$, $SD=0.68$) and professional drivers ($M=1.84$, $SD=0.70$) who have had no accidents in the last 3 years. There was no significant difference between these two categories of drivers who were involved in accidents in the last 3 years ($t(30)= -1.25$, $p=0.218$). Interestingly, this suggests that a high deviant group consists of ordinary drivers who have not experienced accidents.

The 2 *experience with police* (positive, negative) x 2 *accident involvement* (no, yes) ANOVA showed once again a main effect of accident involvement ($F(1)=25.30$, $p<0.01$) and a between-groups interaction effect ($F(1)=4.29$, $p=0.042$). Experience with police had no significant effect ($F(1)=3.77$, $p=0.056$). Table 3 displays the means and standard deviations for these groups.

Table 3. Means and standard deviations (in brackets) of the norm violation in context depending on the past experience with the police and accident involvement

	No accidents	One or more accidents
Positive experience	2.05 (0.78)	2.55 (0.64)
Negative experience	2.03 (0.44)	3.23 (0.39)

The error variance of the dependent variable was different across groups ($F(3)=7.66$; $p<0.01$). Therefore, we used the Mann-Whitney nonparametric test in order to separately analyze the differences between the two accident groups. Experience with the police was used as grouping variable. In the group of drivers who were involved in accidents, we found a significant statistical difference ($U=33.50$; $p<0.01$) in norm violation behaviour between drivers with positive experience (mean rank = 9.29) and those with negative experience (mean rank = 20.83). However, in the group of drivers with no accidents, we found no such difference. This means that a high deviant group consists of drivers who have been involved in accidents and had a negative experience with the police and not of drivers with accidents and a positive experience with the police.

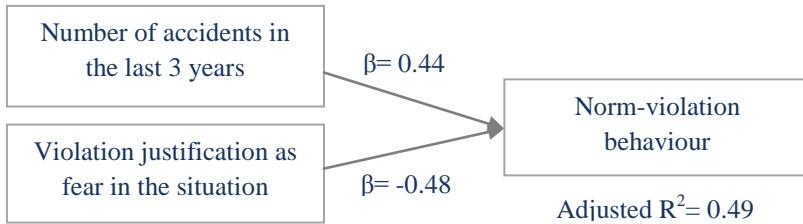
Predictors for norm-violation behavior

So far the results confirmed our assumption that some traffic norms are less adapted to safety needs, and that context may turn an apparently rational norm into a perverse one making drivers act against it. Besides, we revealed some of the high-deviant groups of drivers. The final step in our analysis was to examine which predictors were significant for the norm-violation behavior and if the norm violation justification (fear of police control vs. fear of a real danger) played a key-role in this prediction. Due to the fact that our study group proved to be homogenous in terms of age, experience and driver category, we decided to compute the prediction for all the 75 participants.

First we conducted the Stepwise Linear Regression introducing the following variables (on a continuous scale): total mileage, number of driving license suspensions, number of fines during the last year, number of accidents in the last 3 years, and the norm violation justification. Out of these variables, only two were significant predictors for the non-compliant behaviour: the number of accidents and the violation justification (see Figure 2). The final model (Model 2) is significantly better than the first (Adjusted $R^2=0.49$, $F_{1,71}=27.09$, $p<0.01$) explaining an almost 19% additional variance (R^2 Change=0.188). The model explains a total of 49% of the variance. Cook’s distance maximum value of 0.22 shows that the model has no influent cases. However, the standardized (-2.17; 2.95) and studentized (-2.21; 2.98) residuals for 5% error limit reveal the existence extreme cases which may weaken the model. In short, the model predicts the following: the higher the

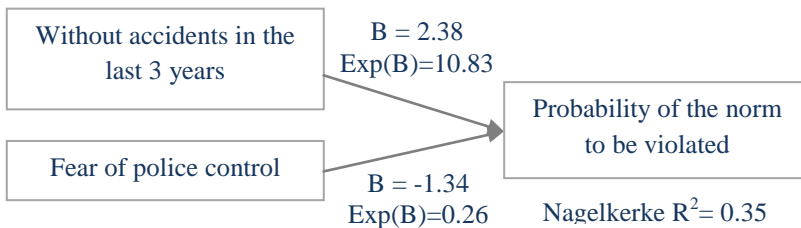
number of accidents and the lower the fear of real hazards, the higher the deviance will be.

Figure 2. Linear prediction model of the norm-violation behaviour in specific traffic situations ruled by perverse norms.



We further decided to compute a Binary Logistic Regression in order to predict the chances of the anti-nominative behaviour to occur. The dependent measure was the norm-violation in context (two categories: yes, no). As covariates we introduced the following categorical variables: type of driver (ordinary, professional), accident involvement (yes, no), experience with the police (positive, negative), violation justification (fear of police control, fear of a real hazard). We used the Forward (Wald) method and let the computer choose the best predictors (see Figure 3). Once again the second model turned out to be the best one explaining a total of 35% of the variance (Nagelkerke $R^2 = 0.35$). The constant was excluded because it was not significant ($p = 0.726$). The Hosmer and Lemeshow test was not significant ($\chi^2(2) = 0.85$; $p = 0.65$) proving the model's goodness of fit. According to the classification table this model better predicts the drivers who have a chance of violating the norms than those who do not, leading to correct predictions in 73% of the cases.

Figure 3. Binary logistic prediction of the probability to violate the norms in situations that make them perverse and the reference categories for the predictors.



The logistic regression predicts the same facts as the linear one: a driver with accidents in the last 3 years is almost 11 times more likely to violate the norms compared to a driver with no accidents. As we know from the previous model, fear of police control and the lack of fear in real hazards is a good predictor for being non-compliant with the norms. The current model emphasizes this idea: provided a

driver changes from *fear of the police* condition to *fear of a hazardous* condition, his/her chances to violate the norm will be reduced by 0.26%. Both regression models are consistent to one another.

Discussion

Țepordei, Havârneanu, & Boncu (2010) expended the concept of *perverse norms* originally developed by Fernández-Dols & Oceja (1994), and Lucas & Pérez (2003), showing that perverseness is strongly linked to a lack of contextual rationality. Moreover, they constantly found a significant main effect of gender, with males being the most reactive to a lack of rationality: men engage in norm-violation behaviors significantly more compared to women. As a consequence, in this study we included only highly experienced male-drivers, both professional and amateur. Results showed no difference between the two categories regarding deviant behaviour in situations regulated by perverse norms. However, other variables seem to matter such as previous accident involvement, previous experience with the police, or a dominant fear in violation justification. Specifically, drivers who have been involved in accidents in the last 3 years show higher deviance compared to those who have not; drivers who had a negative past experience with police show higher deviance compared to those who had a positive experience; and drivers mostly afraid of police control show higher deviance compared to those being mostly afraid of a real hazard.

In general, when it comes to norms, exactly as they are written in the Traffic Code, their evaluation on the whole is positive. However, the norms can still be divided into two categories according to their “perverse” potential: some of them are well adjusted to real safety needs while others are less adapted from this point of view. Besides, the latter category may be considered less adaptable because in specific situations, the norm becomes irrational, inefficient for the situation, thus “perverse”. In other words, when put in contexts that make them lose their rationalities norms seem to lose their importance from the initial evaluation because drivers transgress them.

Interestingly, this is also available for pedestrians. Although the norm, which regulates pedestrians’ street crossing behaviour, was perceived as well adapted, the actual conduct of pedestrians (i.e. crossing or not crossing the street illegally) proved that in real traffic the norm is often transgressed. When violating this norm and crossing the street though an unmarked place while the lights are red, pedestrians evoke mostly the fear of real danger rather than the fear of police sanctions. This means they are somehow aware of their vulnerability.

Coming back to the driver’s condition, among the most perverse norms, we found the one referring to 50km/h speed limit. On the contrary, the norms which were perceived as the most adapted to real safety needs (i.e. not perverse) were the ones referring to drink-driving interdiction and the proper use of meeting lights during a night drive. The top transgressed norms are those dealing with document-

related instrumental violations while the most situational-rational and least transgressed norms were waiting at a red light in the middle of the night although there was no traffic around and not driving on a clear day with your fog lights on. The way people perceive these norms may be extremely important and useful in the training of young drivers who should be aware from the very beginning about the most “problematic traffic situations” and about other road users’ expectations.

The interaction effects that we obtained reveal two highly deviant groups of drivers. The first one consists of ordinary drivers who have not experienced accidents in the last 3 years. They engage in anti-normative behaviors more than ordinary drivers who were involved in accidents or professional drivers. Although this effect may seem odd at a first glance, we believe it is not. The high rate of transgressions among ordinary drivers with no accidents can easily be explained though the unrealistic optimism and illusion of control biases. As long as they had no accidents up to present, they all have subjective reasons to believe that nothing will happen to them from now on as long as they are always in control of the situation. On the other hand, the low rate of deviance in professional drivers may be explained though their job responsibility. We suppose very few of them can afford to constantly violate traffic rules due to the simple fact that they might lose their job and consequently their income. The second high-deviant group includes drivers who have been involved in accidents and had a negative experience with the police. They are violating the norms more than drivers with accidents and had a positive experience with the police. This interaction proves the extraordinary effect of personal experience with the police. It looks like both fear of police control and bad experience with this authority stimulate drivers not to comply with the law. This is the characteristic for the heteronomous system where drivers are virtually driving against the police and police are trying tremendously to punish their aberrant behaviours. This is also the proof that such a system of moral reasoning is itself embedded in “perversity” because it is not able to simulate compliance or create a safe traffic environment. On the contrary, it stimulates non-compliance and deviance. These findings also suggest what might happen if all drivers had nothing but good experiences with the traffic police. This may be one of the basic conditions for their incentive to change bad behaviours.

The interaction effects are also supported by the two regression models. Both models reveal two important predictors for aberrant behaviour. The linear model predicted that a high number of accidents in a driver’s recent past, together with a strong fear of police control as well as a low fear of real risks, predispose that driver to deviate from the norms. In other words, the higher the rate of accident involvement and the mere fear of police enforcement, the higher the deviance will be. The logistic model predicted that a driver with accidents in the last 3 years is almost 11 times more likely to violate the norms compared to a driver with no accidents. At the same time, changing from *fear of the police* condition to *fear of hazardous* conditions, his chances of violation the norm will reduce by 0.26%. So

road users who think only of the possibility of police control have a higher probability to violate the traffic code.

All in all, these results reveal the importance of reconsidering the way road user policy makers deal with the non-conformity issue. Here are some alternative solutions which, in our vision, can easily be put to practice: (1) Regardless of perceiving the rules from the Traffic Code as being well adjusted to real safety needs, in day-by-day traffic, drivers often transgress them. At the same time, deviation from norms is one main cause for accidents. As we previously argued, changing the way police officers interact with road users, making these interactions rather positive than negative may be an effective solution for a drop in deviance. (2) One other solution may be to change the norm status from a mechanical and rigid entity to a flexible one. This means norms should be applied and sanctioned only by considering the whole context. Again, this can be done only with police cooperation which unfortunately may be quite difficult to achieve. (3) Afterwards, norms could be redesigned according to the behaviour which is most often manifested by the majority of drivers. This refers to replacing the formal norms with informal ones and making the group's norms legal. For example, if most drivers use the 70km/h speed limit on a road which is limited to 50km/h, then change the speed limit on that road to 70km/h at least for a short period of time. Such a measure could be implemented at least for a while in order see the effect. If the change proves to be efficient, than make it permanent and legal. If not, come back to the old rule. Despite the apparent risks, we believe such a policy would dramatically reduce deviance as long as the majority of road users already behave as such. (4) Last but not the least, our results reveal the importance of education and training. Ordinary road users should be informed about the true probabilities of real risks, about the invulnerability biases they have, and about the close link between deviance and accidents. Raising awareness among road users is an extremely important solution.

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