The effect of severity and type of traffic penalties on car drivers' emotions, perceptions of fairness, and behavioural intentions

Dr. Charles Goldenbeld, dr. Jolieke Mesken & Ingrid van Schagen

D-2013-12

INSTITUTE FOR
ROAD SAFETY RESEARCH

The effect of severity and type of traffic penalties on car drivers' emotions, perceptions of fairness, and behavioural intentions

D-2013-12
Dr. Charles Goldenbeld, dr. Jolieke Mesken & Ingrid van Schagen
The Hague, 2013
SWOV Institute for Road Safety Research, The Netherlands

Report documentation

Number:	D-2013-12
Title:	The effect of severity and type of traffic penalties on car drivers' emotions, perceptions of fairness, and behavioural intentions
Author(s):	Dr. Charles Goldenbeld, dr. Jolieke Mesken & Ingrid van Schagen
Project leader:	Dr. Jolieke Mesken
Project number SWOV:	C04.04
Number of pages:	27
Published by:	SWOV, The Hague, 2013

SWOV Institute for Road Safety Research
P.O. Box 93113
2509 AC Den Haag
The Netherlands
Telephone +31 70 317 33 33
Telefax +31 70 320 12 61
E-mail info@swov.nl
Internet www.swov.nl

Summary

The present study explores the emotional, cognitive and behavioural responses of car drivers to various traffic penalty scenarios. A representative sample of 1237 car drivers was asked to report their probable emotions, perceived fairness and behavioural intentions in reaction to various traffic penalty scenarios. Respondents were asked to imagine being stopped for speeding, red light negation or handheld phone use, and receiving relatively high or low traffic fines, or receiving other sanctions than just fines. The analysis supported theoretical predictions that car drivers consider higher fines as less fair and that these evoke stronger emotions of anger, shame and tension. This was the case for all three violations studied: speeding, red light negation, and handheld phone use while driving. In accordance with theoretical predictions, the study found that the stronger the emotion, the higher the perceived general fairness of the sanction system and the higher the perceived specific penalty fairness, the stronger the intention to drive more carefully. For each of the three different violations, penalty severity and sanction type affected emotions and perceived fairness in the theorized direction. Contrary to theoretical expectation, no effect was found on behavioural intention, although both emotions and fairness were found to predict behavioural intention. Thus, the study confirmed previous research by showing the importance of perceived fairness in regulating intentions to improve behaviour upon rule violations. Of the three sanction types, a recorded warning resulted in weaker emotions and more perceived penalty fairness, but it did not influence behavioural intention. This leads to the question how the relationship between these variables should be understood, and, more specifically, why emotions and fairness were influenced while behavioural intention remained constant. The discussion offers further theoretical explanations.

Contents

1. Introduction

Traffic law enforcement is an essential element of a safe road traffic system, intended to increase road user compliance with traffic regulations. Traffic offenders can be penalized in various ways: traffic fine, (temporary) driving licence suspension, confiscation of their vehicle, penalty points, mandatory participation in a rehabilitation programme, prison sentence or community service. The aims of traffic penalties are to punish offenders, to protect society, and, last but not least, to influence the behaviour of offenders (specific prevention) and all citizens (general prevention).

A recurring question in penalty reform is how road users react to traffic penalties and how their reactions are affected by the severity or the type of penalty. To explore this question, this study investigated self-reported emotional, cognitive and behavioural responses of road users to different levels and types of punishment. An online questionnaire presented different traffic penalty scenarios to car drivers who were asked to state their emotional reaction, their cognitive evaluation, and their intention to change driving behaviour. Penalty scenarios differed in terms of type of penalty (monetary fine, additional penalty points, or a 'recorded warning') and severity of penalty (three levels of fines). The offences considered in this study are speeding, red light running and handheld mobile phone use while driving.

1.1. Reactions to traffic penalties: Emotion and fairness

Previous research shows that road users react with different emotions, e.g. shame, frustration, anger, when receiving a traffic penalty (Corbett, 1995; Campbell & Stradling, 2002). According to Baumeister et al. (2007) an important function of emotions is to provide feedback and stimulate retrospective appraisal of actions. These researchers found that especially negative emotions lead to future behaviour change. Or, as they put it : 'Negative emotions signal that one's behaviour was not successful, and hence they suggest that the if-then rules need to be revised. The emotional state may stimulate counterfactual thinking and other ruminations about how better results could have been obtained had one followed a different if-then rule. The affective residue provides the push to support future behaviour change'. Therefore, we expect that stronger emotions, i.e. stronger feelings of anger, shame, tension, towards receiving a traffic penalty is associated with stronger intentions to drive more carefully in the future (Hypothesis 1)

As indicated by, for example, Corbett (1995), emotional reactions to traffic penalties are stronger if the penalty itself or the method of detection, is considered to be unfair. Related to this, McKenna (2007) reported that compliance with traffic rules is more likely if the enforcement and its methods are perceived as legitimate. Several other studies have highlighted the role of the perceived legitimacy or fairness of police intervention. For example, Paternoster et al. (1997) found that the perceived fairness of an encounter with the police was a more important preventive influence on recidivism than either the severity or type of penalty. Yagil (1998) also found that, especially for young drivers, the perceived fairness of punishment is one of the important determinants of traffic law compliance. Concerning drinking and

driving, Mazerolle et al. (2012) showed that police officers who communicated fairness principles during random breath testing actions (i.e. expressing neutrality, trustworthy motives, positive feedback, and engaging citizens in the policing approach) positively affected citizens' perception of the police as well as their commitment to safer behaviour. Watling & Leal (2012) found that the likelihood of engaging in illegal traffic behaviour was greater when the perceived legitimacy of enforcement of this behaviour was less. The importance of procedural justice in improving compliance has also been shown in other areas such as tax compliance (Verboon & van Dijke, 2011)

In summary, several studies have shown the importance of perceived fairness of traffic enforcement in general and the penalty in particular when considering its effect. The current study measured both the general perceived fairness of traffic sanctions, and the fairness of a sanction in specific penalty scenarios. Drivers were expected to have stronger intentions to drive more carefully in future, if they perceive the general system of traffic sanctions as legitimate (Hypothesis 2) and if they rate the sanction in a particular penalty scenario as fair (Hypothesis 3).

1.2. Effects of penalty severity

Changes in penalty severity have been examined in a limited number of studies in relation with drinking and driving, speeding, and other violations such as seat belt use and red light negation. These before-after studies do not generally find an effect of penalty severity on behaviour or recidivism. For example, evidence obtained on three continents in the field of drink-driving suggests that penalty severity does not influence re-offending behaviour. In the Australian state of New South Wales, doubling the penalties for drinking and driving in 1998 did not reduce the incidences of drink-driving nor the number of crashes (Briscoe, 2004). In this study, the harsher penalties included doubling the maximum imprisonment terms for mid-range (BAC 0.08 g/100 ml to <0.15 g/100 ml) and high-range (BAC 0.15 g/100 ml and higher) drink-driving offences, as well as doubling the minimum and maximum licence disqualification periods and the maximum monetary fines for all drink-driving offences. Also in the Netherlands, the much stricter penalties introduced in 1992 for drinking and driving (higher fines and faster suspension of driving licences) were not associated with a decrease in drinking and driving (Mathijssen, 1994). Similarly, the laws in various US states that lay down prison sentences for first-time drink-driving offenders were found to have little or no effect on drink-driving (Wagenaar et al., 2007).

A longer term Australian evaluation study looked at the effects of higher fine levels and longer driver licence suspension periods on the chance of re-offending for various driving offences (speeding, drink-driving, driving while being disqualified, other offences) (Moffat & Poynton, 2007). This study did not find an effect of either aspect on the likelihood of reoffending with the exception of a significant effect of penalty severity in relation with speeding offences. In this case longer licence disqualification periods appeared to increase the risk of subsequent offending; a finding that runs contrary to the formulated deterrence hypothesis.
Concerning seat belt use, there are some indications that penalty severity affects violation behaviour. A Norwegian study showed that an increase of

fine levels for non-wearing of seat belts - a 50% increase over a 10 year period – was associated with improved seat belt wearing, but not all influencing factors could be controlled for (Elvik & Christensen, 2007). In the United States, an increase in fine levels was connected with increased wearing rates; with an increase of fines from 25 to 60 dollars wearing rates increased with 3 to 4 percentage points and with an increase from 25 to 100 dollars wearing rates increased with 6 to 7 percentage points (Nichols et al., 2010).

Another way of studying the effect of penalty severity is to consider the elasticity of fines, i.e. the relative change in the number of fines as a result of a relative change in fine levels. A few studies investigated the elasticity of fines for speeding and red light negation and did find an effect of the height of traffic fines and (re)offending. Based on both American and Israeli before-after data of violation levels, Bar-Ilan and Sacerdote (2001) estimated the elasticity of fines for red light negation to be -0.20, i.e. each per cent increase in fine level was associated with a one-fifth per cent reduction of red light offences. In Dutch research, before-after violation data was used to assess the elasticity of speed fines at section or average speed control. This study found a similar elasticity of 0.23, i.e. a 1% raise in fine level was associated with 0.23% reduction in speed offences (Moolenaar et al., 2011).

Recently, a few studies used stated preferences to investigate the effect of, among other things, the levels of fines and enforcement on self-reported speeding behaviour. Ryeng (2012) reported that the speeds driven by other drivers and enforcement levels were more powerful determinants of self-reported speed behaviour on 80 km/h rural roads than the level of fines. For example, for car drivers who indicated to prefer driving 85 km/h on an 80 km/h road, a doubling of the fine led to an average speed reduction of less than 1 km/h, whereas quadrupling the enforcement hours, or a majority of drivers who reduced speed from 85 to 75 km/h, led to nearly 2.5 km/h average speed reduction. It must be noted, however, that Ryeng only varied the level of fines by a factor of 2, whereas enforcement levels were quadrupled. In another stated preference study, Hössinger & Berger (2012) found that the levels of enforcement and fines determined frequency of speeding to the same extent when the relative increase factor was kept constant. An increase of enforcement density with a factor of 8.3 was associated with a self-reported reduction in speeding frequency of 61%; an increase in the height of the fine by the same factor (from 36 to 300 Euros) was associated with a similar reduction (59%).

In summary, research has found different effects of penalty severity on (intended) behaviour dependent upon the type of violation. In particular in the area of drinking and driving the available evidence indicates that penalty severity has no effect on (re-)offending behaviour. However, research in relation with other violations (seatbelts, speeding, red light negation) suggests that higher fines may lead to fewer (re)offences. Possibly this is due to the fact that for drinking and driving initial penalties are already fairly severe and that drivers who commit drink-driving offences may experience more difficulty in changing their behaviour than drivers who commit other types of violations; they may be alcohol-dependent and have no alternative transport available. In view of the foregoing and the fact that the current study focused on other than drink-driving offences, it was expected that

higher fines would lead to stronger intentions to change driving behaviour (Hypothesis 4).

We found no empirical research which directly related penalty severity to intensity of emotional reaction, or to perceived fairness. Based on the general assumption that people are sensitive to the height of the fine and perceive a higher fine as a more negative outcome, we expected that higher fines would generate stronger emotions (i.e. more anger, shame, and tension) (Hypothesis 5). As indicated earlier, strong emotional reactions to traffic penalties are especially likely if either the penalty itself or the enforcement method is considered not to be fair (e.g. Corbett, 1995; Campbell & Stradling, 2002). Applying the cognitive dissonance theory (Stone & Cooper, 2000) to the situation of receiving a traffic penalty, it can be argued that receiving a fine for traffic behaviour is likely to be inconsistent with internalised self-standards of being a competent, responsible, safe driver. One way for drivers to resolve this dilemma would be to criticise the procedure or the motives behind the penalty. In view of this we expected that higher fines which would supposedly lead to stronger emotions would at the same time also lead to lesser perceived fairness (Hypothesis 6).

1.3. Alternative penalties

The studies discussed in the previous section focused on monetary fines. However, other than only a fine, there are several other penalty options that may affect the outcome. One option is adding penalty points or demerit points to traffic fines. Many countries use a demerit points system (DPS) with the aim to increase the effectiveness of penalties and prevent recidivism. In a DPS an offender generally receives a number of demerit points in addition to the regular fine, and having reached a specific number of demerit points the offender's licence is (temporarily) suspended and he/she must follow a rehabilitation course or retake the driving test. A European review concluded that penalty points systems had a substantial effect on the number of casualties, but only for a limited period of between 6 and 12 months after its introduction (Goldenbeld, van Schagen & Vlakveld, 2012). A recent meta-analysis confirmed this and indicated that the strong initial positive impact - 15 to 20% reductions in crashes, fatalities and injuries - wears off in under eighteen months (Castillo-Manzano & Castro-Nunõ, 2012).

A second alternative to standard fines are what we will call warning tickets or recorded warnings which can be used for less severe categories of offences. The Dutch police came up with the idea of a recorded warning: a warning for a traffic violation that will be post facto transformed into a real fine if the violation is repeated within a certain period of time. This results in the driver actually receiving two fines after the second offence (Laan, 2010). So far it has not yet been put into practice. The Dutch police expect that recorded warnings have three advantages over fines or warnings without consequences. First, police officers are expected to be more motivated to take action against relatively minor traffic violations when they have the option to choose a recorded warning rather than a warning without further consequences or a fine. Second, recorded warnings are expected to be considered fairer by road users and a stronger motivator for subsequent behavioural change. Finally, it is believed that credibility of traffic enforcement may benefit from the use of this type of provisional sanction.

The present study compares emotions, perceived fairness and behavioural intention, in reaction to fines alone, to fines combined with penalty points, and in reaction to recorded warnings. It is likely that recorded warnings will result in fewer emotions of anger, shame and tension since an expected negative outcome is avoided (Hypothesis 7), and that for the same reasons it is likely that a recorded warning is considered to be more fair than a fine or a fine with penalty points (Hypothesis 8). Warning letters may provide extra motivation to avoid re-offending since repeating the violation would result in receiving two fines at the same time. Concerning penalty points there is some evidence that people perceive the general principle of demerit points systems to be fair (Goldenbeld et al., 2012), but it is difficult to predict how drivers feel or rate fairness when they themselves receive penalty points. What they consider to be fair for others, may be considered as unfair for themselves. It can be assumed that, similar to recorded warnings, penalty points provide extra psychological motivation for avoiding re-offending, as they inform the driver about receiving extra sanctions when violations are repeated and points accumulate. Both recorded warnings and penalty points were expected to result in stronger behavioural intentions to drive more carefully than a standard fine (Hypothesis 9).

2. Method

2.1. Respondents

A total number of 1,436 Dutch driving license holders were selected by an internet panel agency. The sample was randomly selected within stratified age and gender groups and was representative of Dutch driving license holders on these characteristics. A selection criterion was that respondents drove a minimum of 1,000 km per year. This selection criterion led to a dropout of 199 respondents, resulting in a total of 1,237 respondents who were used in the analyses. The average age was 47.9 years (SD = 16.1; range 18-89 years). Of these respondents, 52.8% was male and 47.2% was female. Respondents drove on average 13,626 km/year. The average period for which respondents had held a driving license was 27.2 years. Respondents received an e-mail with a hyperlink to an online questionnaire.

2.2. Presentation of the materials

The traffic scenarios to which respondents had to react were part of the questionnaire (see Section 2.3). To prevent respondents from experiencing a high workload or boredom which might lead to unreliable results, each respondent received a random selection of 7 from a total of 21 scenarios. These 7 scenarios were also presented to the respondent in random order to avoid sequence effects.

2.3. Measures

The questionnaire consisted of two parts. The first part contained questions on background variables, questions about crash and fines history, and general questions on opinions about the legitimacy of Dutch traffic sanctions. The second part of the questionnaire consisted of the traffic penalty scenarios. Respondents were asked to imagine they had committed a traffic violation (either a speeding violation, a red light violation, or using a handheld mobile phone), for which they received a punishment.

The responses to the 15 scenarios that contained the main variables were analysed for this paper: each scenario involving one of three violations for which one is being stopped by a police officer; one of three levels of penalty severity (fine level) and one of three types of sanction (Table 2.1).

Violation	Penalty severity			Alternative sanction types	
	Half fine	Current fine	Double of current fine	Recorded warning	Current fine + penalty point
Exceeding the speed limit with 10km/h on a 50 km/h road	SC.1 € 32	SC.2 € 65	SC.3 € 130	SC.4 2 x current fine if violation repeated	SC.5 € 65 + point
Handheld mobile phone use while driving	SC.6 € 90	SC.7 € 180	SC.8 € 360	SC.9 2 x current fine if violation repeated	SC.10 € 180 + point
Red light negation	SC.11 € 110	SC.12 € 220	SC.13 € 440	SC.14 2 x current fine if violation repeated	SC.15 € 220 + point

Tabel 2.1. *The 15 scenarios (SC.) concerning severity of penalties and sanction type used in this study.*

As can be seen in Table 2.1, the severity of fines were varied according to three levels: twice current fine, current fine, and halve of current fine. For explorative reasons six extra scenarios for speeding and red light negation were added to the above 15 (half, current and double fine) which specifically involved camera detection of the violation (instead of being stopped by police). For brevity's sake, the analyses concerning these scenarios were omitted in this paper.

An example of a scenario formulation (SC.1 speeding, half fine): "You are driving 60 km/h on a road with a speed limit of 50 km/h within an urban area. You are stopped by the police. The officer gives you a traffic fine, which is 32 euro."

After the scenario was presented, three questions were asked about the emotions of the respondents ("how would you feel?"), three about the perceived fairness of the punishment ("how do you assess this approach?"), and two about the probability of behaviour change after the punishment ("how likely are you to drive more carefully in the next few weeks?"). All items were to be answered on a 7-point Likert scale and are presented in Table 2.2.

How would you feel?								
Ashamed	1	2	3	4	5	6	7	Not Ashamed*
Angry	1	2	3	4	5	6	7	Not Angry*
Tense	1	2	3	4	5	6	7	Relaxed *
How do you assess this approach?								
Inadequate severity of punishment	1	2	3	4	5	6	7	Adequate severity of punishment
Unjustified	1	2	3	4	5	6	7	Justified
Unfair	1	2	3	4	5	6	7	Fair
How likely are you to drive more carefully in the next few weeks, at the location of the punishment?								
Very unlikely	1	2	3	4	5	6	7	Very likely
How likely are you to drive more carefully in the next few weeks, in general?	1	2	3	4	5	6	7	
Very unlikely	1	2	3	4	5	6	7	Very likely

* For the analyses (and for figures 1 and 2) these scale scores were recoded so that higher scores reflect stronger emotions (i.e. more ashamed, more angry, more tense). This re-coding was carried out to make results easier to understand and report.

Tabel 2.2. *Questions (dependent variables) connected to each scenario*.

The perceived general legitimacy of traffic sanctions was measured by six items: 'I consider the police capable of supervising traffic violations in a fair manner', 'Government has a legitimate right to administer traffic sanctions', 'The severity of current traffic sanctions is adequate', 'Government justly determines the severity of the traffic penalties', 'The police impose traffic fines to improve traffic safety'. Respondents could respond to these items on a 7-point scale ranging from strongly disagree to strongly agree. The coefficient alpha for this scale was 0.80, indicating a good internal homogeneity.

2.4. Analyses

As a first step, factor analyses were performed on the dependent variables in the scenarios. As indicated, each of the presented scenarios was followed by eight evaluation questions (Table 2). Three of these were related to emotional responses, three were related to the perceived fairness of the punishment, and two were related to behaviour change intention. Separate factor analyses were carried out on these eight items for each of the 15

scenarios. Varimax rotation was applied and three factors were forced into the solution, representing the three aspects of the responses.

To test hypotheses 1 to 9, two main analysis methods were used: linear regression analysis and analysis of variance. We carried out an exploration into age and gender effects. Table 3 presents an overview of the hypotheses and associated methods.

Hypothesis	Analysis method
H1. Stronger emotions (of shame, anger, tension) are associated with stronger intentions to drive more carefully	Linear regression
H2. The higher the perceived general legitimacy of sanctions, the stronger the intention to drive more carefully	Linear regression
H3. The higher the perceived penalty fairness, the stronger the intention to drive more carefully	Linear regression
H4. More severe penalties result in stronger intentions to drive more carefully	Analysis of variance
H5. More severe penalties result in stronger emotions (of anger, shame, tension).	Analysis of variance
H6. More severe penalties result in lesser perceived penalty fairness	Analysis of variance
H7. Recorded warnings lead to weaker emotions (of anger, shame, tension) than standard fines or fines combined with penalty points	Analysis of variance
H8. Recorded warnings are perceived as being more fair than standard fines or fines combined with penalty points	Analysis of variance
H9. Penalty points and warning letters result in stronger intentions to drive more carefully than standard fines	Analysis of variance

Tabel 2.3. *Overview of the hypotheses and analysis methods.*

Regression analyses were used to study the effects of several predictor variables on behavioural intention. In each of them, behavioural intention was the dependent variable, and the set of independent variables consisted of emotion, perceived fairness, age, gender, three dummy variables representing four levels of education, and the score on the 6-item scale measuring general legitimacy of traffic sanctions. The variables were used in a forced entry model. In order to limit the number of regression analyses, these analyses were restricted to the three scenarios that were most realistic and relevant for the present traffic situation, i.e. the 3 scenarios that described current sanction types and current fine levels for each of the three violations (i.e. scenarios 2, 7, 12).

Analyses of variance (ANOVA) were carried out to test effects of penalty severity. For each violation, 3 x 2 x 4 between subjects ANOVAs were performed with penalty severity (3), gender (2), age group (4) and interaction

between these factors as independent variables, and with emotion, fairness and intention as dependent variables. The effects of sanction type (H7) were tested in the same way, with three levels of sanction type (current fine, recorded warning, fine plus penalty points) as independent variable instead of penalty severity. The ANOVA analyses were corrected for doubles in order to ensure that the requirements for a true between subjects design were fulfilled. For example, when the effect of the severity of punishment was calculated (e.g. SC. 1, 2 and 3), only respondents were included who evaluated SC. 1 (but not 2 or 3), SC. 2, (but not 1 or 3), and SC. 3 (but not 1 or 2). For ANOVA a significance level of alpha = 0.01 was chosen. For significant ANOVA results partial η^2 is reported as effect size. According to Cohen's rule of thumb, this effect size can be interpreted as 0.01 = small, 0.06 = medium, 0.14 = large (Cohen, 1988).

3. Results

3.1. Factor analyses

The factor analyses consistently showed that the three emotion items loaded on the first factor, the perceived fairness items loaded on the second factor and the behavioural intention items loaded on the third. In almost all scenarios, the three factors all had eigenvalues over 1. Even though in some cases the emotion item “anger” also loaded on the perceived fairness factor, the overall results justified the construction of three new variables per scenario: emotion, perceived fairness and behavioural intention. In Table 4 the means and standard deviations of these three variables are displayed for each of the 15 scenarios.

Violation	Penalty severity			Alternative sanction types	
	Half of current fine	Current fine	Double of current fine	Recorded warning	Current fine + penalty point
Speeding	SC.1	SC.2	SC.3	SC.4	SC.5
	E: 3.9 (1.4) F: 5.2 (1.5) I: 3.5 (1.0)	E: 4.1 (1.4) F: 4.7 (1.6) I: 3.5 (1.1)	E: 4.7 (1.3) F: 3.8 (1.8) I: 3.6 (1.1)	E: 3.8 (1.3) F: 5.2 (1.5) I: 3.8 (0.9)	E: 4.5 (1.3) F: 4.1 (1.7) I: 3.6 (1.1)
Handheld mobile phone use	SC.6	SC.7	SC.8	SC.9	SC.10
	E: 4.1 (1.4) F: 5.3 (1.4) I: 3.5 (1.1)	E: 4.5 (1.3) F: 5.0 (1.7) I: 3.5 (1.1)	E: 5.1 (1.3) F: 3.9 (1.9) I: 3.5 (1.2)	E: 3.9 (1.4) F: 5.4 (1.6) I: 3.7 (1.1)	E: 4.6 (1.3) F: 4.7 (1.8) I: 3.6 (1.1)
Red light negation	SC11	SC12	SC.13	SC.14	SC.15
	E: 4.4 (1.3) F: 5.3 (1.4) I: 3.7 (1.0)	E: 4.8 (1.3) F: 4.8 (1.7) I: 3.8 (1.0)	E: 5.2 (1.3) F: 3.7 (1.9) I: 3.8 (1.0)	E: 4.1 (1.3) F: 5.3 (1.5) I: 3.8 (0.9)	E: 4.9 (1.3) F: 4.3 (1.9) I: 3.7 (1.0)

Tabel 3.1. *Means of the combined variables emotion (E: weak 1-7 strong), perceived fairness (F: low 1-7 high) and behavioural intention (I: low 1-7 high) for the 15 scenarios. Standard deviations are indicated in brackets.*

3.2. Predictors of intention to change behaviour

Linear regression analyses were used to study whether the behavioural intention could be predicted by emotion, perceived fairness, or by some background characteristics. Table 5 presents the regression results for intentions to drive more carefully after having been fined (current fine level) for speeding, handheld phone use or red light negation.

Predictor variable	Scenario 2 Speeding, current fine N = 393; R^2= .26	Scenario 7 Handheld phone use, current fine N = 403; R^2= .26	Scenario 12 Red light negation, current fine N = 447; R^2= .14
Age	Ns	Ns	Ns
Gender	Ns	Ns	Ns
Emotion	β = .233; t = 5.2; p = .000	β = .263; t = 5.9, p = .000	β = .156; t = 3.4, p = .001
Fairness	β = .374; t = 7.9; p = .000	β = .347; t = 7.2, p = .000	β = .275; t = 5.6, p = .000
Dummy 1 Education	Ns	Ns	Ns
Dummy 2 Education	Ns	Ns	Ns
Dummy 3 Education	Ns	Ns	Ns
Being ticketed in past 12 months	Ns	Ns	Ns
Perceived general legitimacy traffic sanctions	β = .171; t = 3.6; p = .000	β = .198; t =4.1, p = .000	β = .186; t =3.8, p = .000

Tabel 3.2. *Outcomes regression analyses for scenarios concerning speeding, handheld phone use and red light negation at current fine level (NS = Not significant, p ≥ 0,01; β = standardized beta coefficient).*

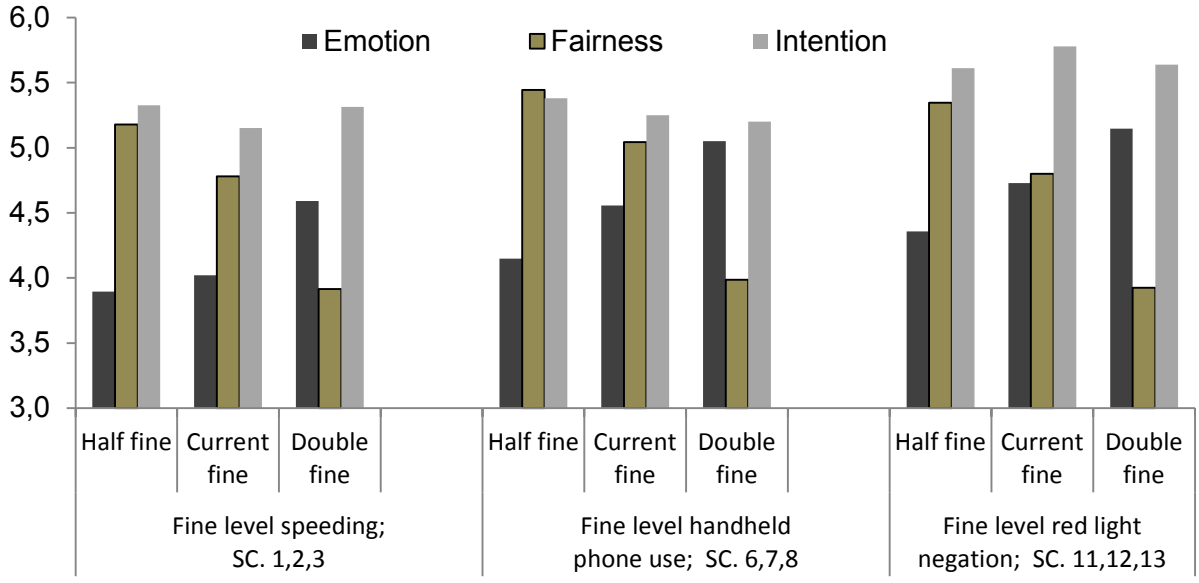
As can be seen, intentions to drive more carefully after having been fined for speeding are predicted by emotion, perceived fairness, and perceived general legitimacy of traffic sanctions. In support of H1, H2 and H3, stronger emotions, higher perceived general legitimacy of traffic sanctions, and higher perceived fairness of the particular penalty used in the scenario, were all associated with stronger intentions to drive more carefully after having been fined for speeding (SC.2). Age, gender, education and having been fined in the past 12 months were not significant predictors. Similar results were found for intentions to drive more carefully after having been fined for handheld phone use (SC. 7) and red light negation (SC. 12).

3.3. **Effects of penalty severity**

Table 3.3 presents the p-values for ANOVAs to test the effects of penalty severity. This table shows that for all three violations significant effects were found for penalty severity on emotion and fairness, but not on intention. Significant effects of either gender or age were few. Results are described in more detail below. Figure 1 presents these results graphically.

Violation and scenario's used for the comparison	Tested effects	Dependent variables		
		Emotion	Fairness	Intention
Speeding SC. 1, 2, 3	Fine level (FL)	p = .000	p = .000	Ns
	Gender(G)	Ns	Ns	Ns
	Age (A)	Ns	Ns	Ns
	2-way interactions	Ns	Ns	Ns
	FL x G x A	Ns	p = .010	Ns
Handheld phone use SC. 6, 7, 8	Fine level (FL)	p = .000	p = .000	Ns
	Gender(G)	p = .003	Ns	Ns
	Age (A)	Ns	Ns	Ns
	2-way interactions	Ns	Ns	Ns
	FL x G x A	Ns	Ns	Ns
	Fine level (FL)	p = .000	p = .000	Ns
	Gender(G)	Ns	Ns	Ns
	Age (A)	Ns	Ns	Ns
	G x A	p = .002	Ns	Ns
	Other 2-way interactions	Ns	Ns	Ns
	FL x G x A	Ns	Ns	Ns

Tabel 3.3. *Overview of ANOVA results assessing the effects of levels of fines and person demographics on responses to traffic penalty situations (Ns = Not significant, i.e. p ≥ 0.01).*



Tabel 3.4. *Emotion, perceived fairness and intention scores for penalty severity and violation (note: higher scores on emotion, fairness, and intention, represent more emotion, higher perceived fairness, and stronger intention to behave more carefully).*

The results for speeding showed that the penalty severity had no effect on the intention to drive more carefully in the future (no support H4). In support of H5, the result was the higher the fine, the stronger the emotional reaction ($F(2, 554) = 13.9$; $p < .001$, partial $\square^2 = .048$). In agree higher the fine, the lower the perceived fairness ($F(2, 554) = 28.2$; $p < .001$, partial $\square^2 = .093$).

The effects of penalty severity for handheld mobile phone use were similar to those for speeding. The behavioural intention was not affected by penalty severity, so once more no support was found for H4. In support of H5 and H6, the higher the fine, the stronger the emotions ($F(2, 565) = 18.1$; $p < .001$; partial $\square^2 = .060$), and the lower the perceived fairness ($F(2, 565) = 32.0$; $p < .001$; partial $\square^2 = .102$).

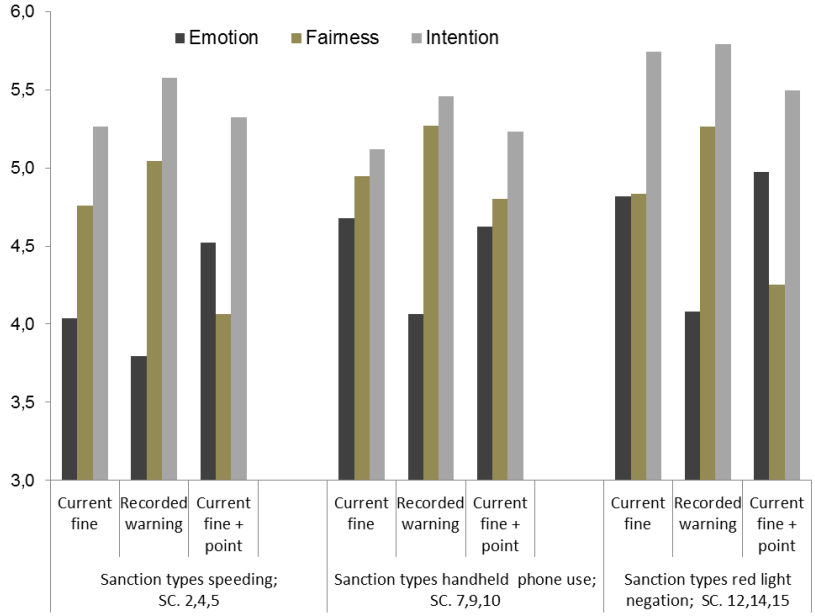
For red light negation, again, no effect was found of the level of fines on behavioural intention (no support H4). For this violation, in agreement with H5 and H6, higher fines were associated with stronger emotions ($F(2, 575) = 14.6$; $p < .001$; partial $\square^2 = .048$), and a $= 31.0$; $p < .001$; partial $\square^2 = .097$).

3.4. **Effects of sanction type**

Table 7 presents the results of the ANOVAs testing for the effects of sanction types. The table shows that there were significant effects of sanction type on emotion and fairness, but not on intention. This applies to all three violation types; Figure 2 illustrates this.

Violation and scenario's used for comparison	Tested effects	Dependent variables		
		Emotion	Fairness	Intention
Speeding	Sanction type (ST)	p = .000	p = .000	Ns
	Gender(G)	Ns	Ns	Ns
SC. 2, 4, 5	Age (A)	Ns	Ns	Ns
	2-way interactions	Ns	Ns	Ns
	ST x G x A	Ns	Ns	Ns
Handheld phone use	Sanction type (ST)	p = .000	Ns,	Ns
	Gender(G)	Ns	Ns	Ns
	Age (A)	Ns	Ns	Ns.
SC. 7, 9, 10	G x A	Ns	Ns	p = .004
	Other 2-way interactions	Ns	Ns	Ns
	ST x G x A	p = .007	Ns	Ns
Red light negation	Sanction type (ST)	p = .000	p = .000	Ns
	Gender(G)	Ns	Ns	Ns
	Age (A)	Ns	Ns	Ns.
	G x A	Ns	Ns	Ns
SC. 12, 14, 15	Other 2-way interactions	Ns	Ns	Ns
	ST x G x A	Ns	Ns	Ns

Tabel 3.5. *Overview of ANOVA results assessing the effects of sanction type and person demographics on responses to traffic penalty situations (Ns = Not significant, i.e. p ≥ 0.01).*



Tabel 3.6. *Emotion, perceived fairness and intention scores per violation and sanction type (note: higher scores on emotion, fairness, and intention, represent more emotion, higher perceived fairness, and stronger intention to behave more carefully).*

The results show that for speeding no empirical support was found for H9: behavioural intention was not influenced by the type of sanction. However, sanction type did affect emotion and fairness. Figure 2 shows that, in support of H7, a recorded warning was associated with weaker emotions than a fine with penalty points or a standard fine ($F(2, 565) = 13.4$; $p < .001$; partial $\square^2 = .045$). In supp
perceived to be more fair than just a speed fine with penalty points or just a fine ($F(2, 565) = 17.7$; $p < .001$; partial $\square^2 = .059$).

Similarly, for handheld phone use and red light negation the intention to change behaviour was not affected by type of sanction (no support H9). In further support of H7, a registered warning for handheld phone use led to weaker emotions than a fine or a fine combined with a penalty point ($F(2, 575) = 18.7$; $p < .001$; partial $\square^2 = .038$). Also,
light negation a registered warning led to weaker emotions than a fine or a fine combined with a penalty point ($F(2, 572) = 22.0$; $p < .001$; partial $\square^2 = .072$) and, in further support of H8, was considered fairer than the other two sanction types ($F(2, 572) = 15.7$; $p < .001$; partial $\square^2 = .052$).

3.5. **Age and gender effects**

For brevity's sake we offer a brief description of age and gender effects, without showing all results in detail. No significant main effect of age was found. Main effects of gender were only found for scenarios concerning handheld phone use. Responding to three fine level scenarios about handheld phone use (SC. 6, 7, 8), female car drivers reacted with stronger emotions than male drivers ($F(2, 565) = 8,7$; $p = .003$; partial $\square^2 = .015$).

Significant interactions between gender and age were found for emotional responses to being fined for red light negation ($F(3, 575) = 4.9$; $p = .002$; partial $\square^2 = .025$ for SC.11, receiving different sanctions for handheld phone use (($F(3, 575) = 4.4$; $p = .004$; partial $\square^2 = .023$ for S female drivers show similar emotion when responding to fines for red light negation and similar intentions to behave more carefully when being fined for handheld phone use, with the exception of the age group 30-44 yrs. In this age group female drivers showed stronger emotions to red light negation fines (M = 5.2) than male drivers (M = 4.5) and also showed stronger intentions to drive more carefully after being fined for handheld phone use (M = 5.7) than male drivers (M = 4.9).

Significant 3-way interactions were found for perceived fairness of fines for speeding ($F(6, 554) = 2.8$; $p = .010$; partial $\square^2 = .030$ for SC emotions for fines for handheld phone use ($F(6, 575) = 3.0$; $p = .007$; partial $\square^2 = .030$ for SC. 7, 9, 10). In short, concerning both fairness of speed fines and emotional reactions to fines for handheld phone use, the youngest male age group perceived considerably less fairness and showed stronger emotions compared to the other male age groups, but such an age effect was not apparent among female drivers.

3.6. **Summary of main findings**

- In support of Hypotheses 1, 2, and 3, emotions and perceived fairness of traffic sanctions (both general legitimacy and penalty fairness) were significant, independent predictors of the behavioural intention in penalty scenarios concerning speeding, handheld phone use and red light negation.
- Contrary to Hypothesis 4, higher severity of traffic penalties had no effect on the intention to change behaviour in relation to speeding, red light negation or handheld phone use.
- In support of Hypotheses 5 and 6, higher traffic fines led to stronger emotional reactions and lower perceived fairness. This finding was consistent over the three studied traffic violations.
- In (partial) support of expectations, recorded warnings led to weaker emotions (Hypothesis 7) and higher perceived fairness (Hypothesis 8) than fines combined with penalty points, or – to a lesser extent - standard fines.
- Contrary to Hypothesis 9, for none of the three traffic violations support was found for effects of sanction type on the intention to drive more carefully.
- There were few age or gender effects. The youngest male age group (18-29) perceived lesser fairness of speeding fines and showed stronger emotions to the sanctions for handheld phone use than the other male age groups, whereas these age effects were not present for female drivers.

4. Discussion

The present study explored the emotional, cognitive and behavioural responses of car drivers to various traffic penalty scenarios. Based on earlier research, it was hypothesized that in situations where drivers receive traffic penalties, strong emotional reactions, and high perceived general and specific fairness, is positively associated with strong intentions to change behaviour and drive more carefully (Hypotheses 1, 2, and 3). Furthermore it was expected that more severe penalties result in stronger emotions, lower perceived fairness and stronger behavioural intentions (Hypotheses 4, 5, 6); that recorded warnings would lead to weaker emotions (Hypothesis 7) and more fairness (Hypothesis 8), and that both recorded warning and fines plus penalty points lead to stronger behavioural intention to drive more carefully (Hypothesis 9).

The results show that car drivers consider higher fines as less fair and that these evoked stronger emotions of anger, shame and tension. This was true for all three violations studied here. The study found that both the perceived general legitimacy of the sanction system and the specific penalty fairness predicted the intention to drive more carefully. Thus the study also confirmed earlier research (e.g. Mazerolle et al.,2012; Paternoster et al., 1997; Watling & Leal, 2012; Yagil, 1998) in showing the importance of perceived fairness in regulating intentions to improve behaviour upon rule violations.

The importance of both general and specific fairness of penalties for regulating behaviour or behavioural motivation, demonstrated in this and other studies, represents a positive challenge for public authorities to pay attention to this issue in preparing, implementing or enforcing traffic laws. In general, perceived fairness may be influenced by clear and credible communication about motives and benefits of traffic law enforcement. Also, as has been shown by Mazerolle et al., (2012) the police may play an active role in supporting fairness perceptions by following and expressing principles of neutrality, positive feedback, trustworthy motives, and inviting citizen involvement (‘giving voice’) in police-citizen interactions. Also, as will be discussed below, the use of specific sanction types may result in higher perceived fairness.

Previous traffic penalty research has found no effects of increasing penalty severity on intention or behaviour when traffic penalties are already severe such as for drinking and driving. But effects have been found when penalties are increased for violations with less severe sanctions such as seat belt use, speeding, or red light negation, of which the last two were included in the current study. This research did not confirm these earlier results; contrary to expectation, larger penalty severity had no effect on intention to change traffic behaviour, more specifically to drive more carefully. Also, contrary to expectation, different sanction types, i.e. standard fines, fine plus penalty points, or a recorded warning, did not affect the intention to behave more carefully in the future. We will discuss potential explanations for these aberrant results below. For the different sanction types as well as for different penalty severity a similar pattern of results was found concerning emotion and perceived fairness. The sanction type with the least immediate

negative results, a recorded warning, led to weaker emotions and more perceived fairness compared to the other sanctions, whereas for the sanction with the most negative outcomes, i.e., the fine with penalty points, the results were the other way around: stronger emotions and lower perceived fairness compared to the other sanctions types.

To repeat the major finding of this study: for three different violations, penalty severity and sanction type affected emotions and perceived fairness in the theorized direction but no effect was found on behavioural intention, although both emotions and fairness were found to predict behavioural intention. This leads to the question how the relationship between these variables should be understood, and, more specifically, why emotions and perceived fairness have been influenced whereas behavioural intention has remained constant. The absence of significant findings for behavioural intention cannot be attributed to a general low impact of the experimental manipulations since strong significant effects of fine level and sanction type were found for both emotions and perceived fairness. Nor is a ceiling effect likely as scores on the intention scale centred around 5 whereas the scale goes up to 7. Hence, more fundamental theoretical explanations are likely of the finding that scenario manipulations did effect emotions and fairness, but not the intentions to drive more carefully.

First, based on present results it is likely that the effects of emotions and fairness counteracted one another. Although both were related to behavioural intention, each was therefore found in an opposite direction. Higher fine levels and specific sanction types resulted in more negative emotions (more ashamed, angry and tense) which are expected to increase the intention to change behaviour. At the same time lower perceived fairness is expected to decrease the intention to change behaviour. Thus, there seem to be two psychological forces acting in opposite directions; stronger emotions stimulate the motivation or intention to avoid similar aversive situations and lower perceived fairness reduces motivation to comply with authorities or rules. In terms of cognitive dissonance, respondents in this study may have resolved the conflict of receiving a severe traffic penalty by questioning its fairness rather than by questioning their own motivation and behaviour. If this is valid reasoning, the challenge for authorities is to increase the perceived fairness of penalties even when the first emotional responses may remain strong. This may be especially relevant for young male drivers since the analysis indicated that in relation with speeding young male drivers perceived considerably lower fairness of a speed ticket than older male age groups, whereas such an age contrast was not found among female drivers.

A second theoretical explanation may be that the scenarios missed certain key information that was necessary for respondents to explicitly decide whether or not to change their behaviour. Both traffic penalty scenario studies mentioned in the introduction (Hössinger & Berger, 2012; Ryen, 2012), for example, used information on enforcement levels in the scenarios. Besides the likelihood of violation detection, the perception of being at fault, or the perception of endangering others through a violation, are all potentially relevant psychological factors that were not included in the current scenario's. There was some doubt whether introducing personal informational cues may stretch the credibility of the scenarios. For example, providing respondents with information that they deliberately violated a traffic

rule and that there was actual danger in the specific situation could have led to psychological resistance. However, it is possible that respondents need more external cues (do police check regularly at this location?) or more personal information or more personal clues (was it my fault?, did I actually endanger others?) than merely fine level or penalty sanction information in order to develop intentions to behaviour change. It would be interesting for future studies to extend and vary the number of factors in scenarios and to apply further psychological theory (e.g. cognitive dissonance theory, e.g. see Cooper (2007)) to the relationship between attitudinal beliefs, personal and social norms, and behavioural intentions.

This study had several strengths, but also some limitations. The scenario approach that was used allowed us to elicit emotional, cognitive and motivational responses of car drivers to various traffic penalty situations, and to compare different fine levels and sanction types. Pretesting of scenarios showed that respondents perceived the scenarios as credible.

A limitation of the study concerns the uncertainty of whether self-reported responses to scenarios correspond to actual responses in real-life situations. It can be assumed that respondents use their past reactions to similar situations and their general traffic attitudes and behavioural predisposition in order to imagine their reaction. In cannot be excluded that respondents were incorrect in their imagined responses if their experience with past situations is scarce, if their self-knowledge is low or if they differ in how they interpret the scenarios. Another limitation is that the scenarios were rather minimalistic. No information was provided about the specific motivation underlying their violation - deliberate versus unintentional - , about whether other car drivers also committed the violation, and about the risk of detection. For a number of respondents this additional information could have been of relevance for how they interpreted the scenario, their own behaviour, and their motivation to change their behaviour. Thus, for future research in this line of enquiry, the challenge is to provide respondents with more complex scenarios that capture more fully the influence of psychological and situational variables without stretching credibility or leading to resistance.

References

Bar-Ilan, A. & Sacerdote, B. (2001). *The response to fines and probability of detection in a series of experiments*. Working Paper 8638. National Bureau of Economic Research NBER, Cambridge, Massachusetts.

Baumeister, R.F., Vohs, K.D., Dewall, C.N. & Zhang, L. (2007). *How emotion shapes behaviour: Feedback, anticipation and reflection rather than direct causation*. In: Personality and Social Psychology Review, vol. 11, p. 167-203.

Briscoe, S. (2004). *Raising the bar: can increased statutory penalties deter drink-drivers*. In: Accident Analysis & Prevention, vol. 36, p. 919-929.

Campbell, M. & Stradling, S.G. (2002). *The impact of speeding tickets on speeding behaviour*. In: Behavioural Research in Road Safety. Twelfth Seminar. Department for Transport, London, p. 86-93.

Castillo-Manzano, J.I. & Castro-Nunõ, M. (2012). *Driving licenses based on points systems: Efficient road safety strategy or latest fashion in global transport policy? A worldwide meta-analysis*. In: Transport Policy, vol. 21, p. 191-201.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. (2nd ed.). Lawrence Erlbaum, Mahwah, NJ.

Cooper, J. (2007). *Cognitive dissonance: 50 years of a classic theory*. Sage publications, London.

Corbett, C. (1995). *Road traffic offending and the introduction of speed cameras in England: the first self-report survey*. In: Accident Analysis and Prevention, vol. 27, p. 345-354.

Elvik, R. & Christensen, P. (2007). *The deterrent effect of increasing fixed penalties for traffic offences: The Norwegian experience*. In: Journal of Safety Research, vol. 38, p. 689–695.

Goldenbeld, C., Schagen I.N.L.G. & Vlakveld, W.P. (eds.) (2012). *Identification of the essential features for an effective Demerit Point System*. Project No. MOVE/SUB/2010/D3/300-1/S12.569987-BestPoint. Austrian Road Safety Board KFV, Bern.

Hössinger, R. & Berger, W.J. (2012). *Stated response to increased enforcement density and penalty size for speeding and driving unbelted*. In: Accident Analysis & Prevention, vol. 49, p. 501-511.

Laan, F. (2010). *Geregistreerde waarschuwing mét gevolgen- de onderbouwing van een visie op handhaven. Internal bachelor study* (in Dutch). Police Noord-Holland-Noord, Alkmaar, Netherlands.

Mathijssen, M.P.M. (1994). *Rijden onder invloed in Nederland, 1992-1993; Ontwikkeling van het alcoholgebruik van automobilisten in weekendnachten*. R-94-21. SWOV Institute for Road Safety Research, Leidschendam.

Mazerolle, L., Bennett, S., Antrobus, E. & Eggins, E. (2012). *Procedural justice, routine encounters and citizen perceptions of police: main findings from the Queensland Community Engagement Trial (QCET)*. In: Journal Experimental Criminology, p. 1-25.

McKenna, F.P. (2007). *The perceived legitimacy of intervention: A key feature for road safety*. In: AAA Foundation, Improving Traffic Safety Culture in the United States: The Journey Forward. AAA Foundation for Traffic Safety, Washington, DC, p. 77-91.

Moffat, S. & Poynton,S. (2007). *The deterrent effect of higher fines on recidivism: Driving offences.* In: New South Wales Crime and Justice Bulletin 2007, No. 106. New South Wales Bureau of Crime Statistics and Research, Sydney.

Moolenaar, D.EW.G., Zuidema, T. & Boer, J. de (2011). *De afname van het aantal boetes en transacties voor verkeersovertredingen nader verklaard*. Cahier 2011-9. WODC, Den Haag.

Nichols, J.L., Tippetts, A.S., Fell, J.C., Auld-Owens, A., et al. (2010). *Strategies to increase seat belt use: An analysis of levels of fines and the type of law*. DOT HS 811 413. NHTSA, Washington.

Paternoster, R., Brame, R., Bachman, R. & Sherman, L. (1997). *Do fair procedures matter?* In: Law & Society Review, vol. 31, p. 163-204.

Ryen, E.O. (2012). *The effect of sanctions and police enforcement on drivers' choice of speed*. In: Accident Analysis and Prevention, vol. 45, p. 446-454.

Stone, J. & Cooper, J. (2000). *A self-standards model of cognitive dissonance*. In: Journal of Experimental Social Psychology, vol. 37, p. 228-243.

Yagil, D. (1998). *Instrumental and normative motives for compliance with traffic laws among young and older drivers*. In: Accident Analysis & Prevention, vol. 30, p. 417-424.

Verboon, P. & Dijke, M.H. van (2011). *When do severe sanctions enhance compliance? The role of procedural fairness*. In: Journal of Economic Psychology, vol. 32, p. 120-130.

Wagenaar, A.C., Maldonado-Molina, M.M., Erickson, D.J., Ma, L., et al. (2007). *General deterrence effects of U.S. statutory DUI fine and jail penalties: Long-term Follow-up in 32 states*. In: Accident Analysis and Prevention, vol. 39, p. 982-994.

Watling, C. N. & Leal, N.L. (2012). *Exploring perceived legitimacy of traffic law enforcement*. In: Proceedings of ACRS 2012 National Conference, 9-10 August 2012, Menzies Sydney Hotel, Sydney, NSW. Retrieved at: http://acrs.org.au/wp-content/uploads/34_Watling-PR.pdf