Instrumental and normative pathways to compliance: results from field research on moped drivers

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1 General introduction and overview

1.1 Introduction

Laws regulate the behaviour of citizens. Governments and legal institutions interpret and enforce these laws and, for a society to function properly, citizens must comply with the rules and obey the decisions of legal authorities (Tyler & Darley, 2000). However, human beings do not always comply with the regulatory laws by which the legislator has set restrictions on their behaviour. This makes it important for those interested in the rule of law, particularly authorities interested in obtaining compliance with the law, to identify how governance can stimulate compliance. The goal of this dissertation is to add to the knowledge on this relationship. I do that by looking at an authority that holds a crucial role in governing compliance with everyday laws; the police. To add to the knowledge on the impact of police governance on compliance, I present results from field research conducted with the help of the Dutch National Police between January 19, 2017 and August 2, 2017. During this period data was collected at routine traffic control check-points for mopeds, two-wheeled motorized vehicles that can be operated by persons over 16 years of age with a valid driving license.

1.2 Pathways to compliance

Research on pathways to compliance with the law is dominated by two perspectives (Piliavin et al., 1986). The first is contemporary deterrence theory, or the instrumental view. According to this view, the threat of punishment may discourage non-compliance (Nagin, 2013). The idea is that potential offenders will only engage in non-compliant behaviour when the expected returns, discounted by the expected costs of this behaviour, exceed the expected net returns from law-abiding alternatives such as legitimate employment (Becker, 1968). Through sanction risk, the expected costs of non-compliant behaviour can be increased and potential offenders can be deterred to engage in non-compliant behaviour. Sanction risk consists of the severity, certainty and celerity of

punishment (Beccaria, 1766; Bentham, 1879). Severity refers to the onerousness of the legal consequences if a sanction is imposed. Certainty refers to the probability of legal sanction, given commission of a crime. In order for a sanction to be imposed, the offender must first be apprehended, charged, successfully prosecuted, and finally sentenced by the judge. Celerity refers to the time between the commission of the crime and its punishment (Nagin, 2017).

The deterrent effect of criminal policy relies on the positive correlation between the individuals' perceived sanction risk and the actual risk as a result of criminal policy (Nagin, 1998). Deterrence theory predicts that the certainty, severity and celerity of punishment have a negative impact on the level of crime. The pathway from criminal policy to compliance from the instrumental perspective can graphically be depicted as shown in figure 1.1.

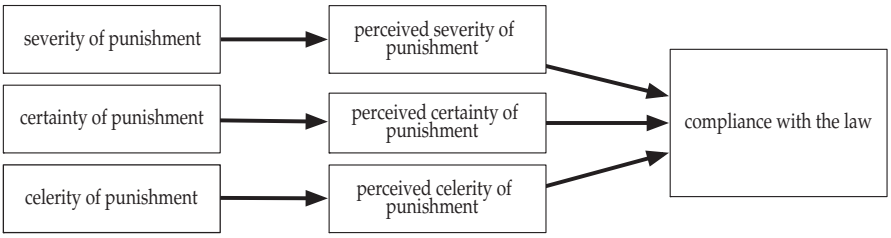

Figure 1.1: Instrumental pathways to compliance

The second perspective concerns normative explanations for compliance. These explanations are concerned with intrinsic motivations such as personal morality and perceptions about the legitimacy of authorities. According to this perspective, people view compliance with the law as appropriate, because of their attitudes about how they should behave (Eisner & Nivette, 2013). There are two types of personal normative motivations: morality and legitimacy. Normative commitment through personal morality means obeying a law because one feels a law is just. Normative commitment through legitimacy means obeying a law because one feels that the authority enforcing the law has the right to dictate behaviour. (Tyler, 2006, 1990). Based on the idea that people comply with the law because they believe it is the right thing to do, the normative perspective posits that authorities can secure compliance through policies that generate perceptions of legitimacy (Tyler, 1990; Tyler & Huo, 2002). If citizens perceive that authorities act in a procedurally just manner – by treating people with dignity and respect,

and by being fair and neutral in their actions – then the legitimacy of these authorities is enhanced (Reisig et al., 2007; Reisig & Lloyd, 2009; Sunshine & Tyler, 2003; Tyler, 1990, 2004). According to Lind and Tyler (1988) a procedurally just treatment emphasizes the perception of a shared group membership; and how authorities communicate with members of a group conveys information about the status of those members (Smith et al., 1998; Tyler & Lind, 1992). Here, a procedurally just treatment sends the message that people are valued by society (Lind & Tyler, 1988), strengthening the justification for obedience to an authority. Other influences on perceptions of legitimacy, such as distributive justice and effectiveness of the criminal justice system, are routinely found to be less important in predicting legitimacy evaluations (Reisig et al., 2007; Tyler, 1990; Tyler & Huo, 2002). Figure 1.2 shows a graphic representation of these normative pathways to compliance.

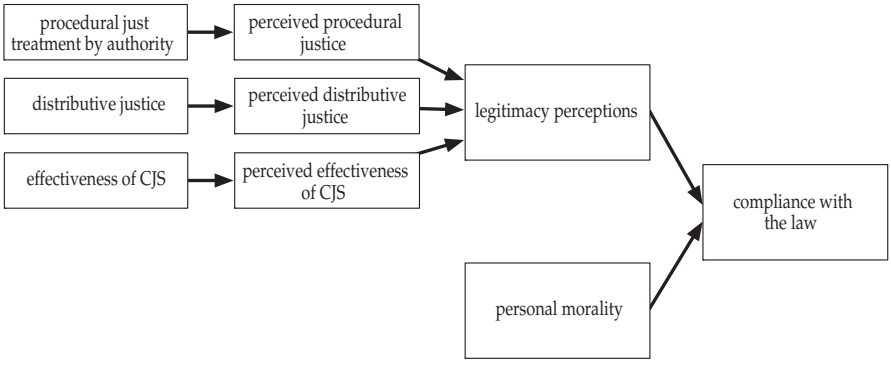

Figure 1.2: Normative pathways to compliance

For authorities, such as the police, interested in obtaining compliance with the law, the instrumental and normative perspectives are important because they have direct implications for police crime control policy. Other explanations set forward in previous literature, such as explanations based on habit or obstruction are in a sense secondary, since they imply that something led to offending at such a level or rate that either imprisonment was needed, or created the habit of (non)compliance with the law (Hough et al., 2013).

1.3 Instrumental and normative pathways to compliance

Both the instrumental and normative perspective on compliance have been influential in guiding policing research. There is an extensive body of work on both perspectives. Reviews of the deterrence literature by Apel and Nagin (2015), Durlauf and Nagin (2010), Chalfin and McCrary (2017), Kleck and Sever (2018) and Nagin (2013, 2017) show that the strongest deterrent effect comes from the certainty of punishment, or more specifically, the certainty of apprehension. The most important set of actors affecting certainty is the police; When detection and apprehension are absent, there is no possibility of conviction or punishment (Nagin, 2013). Evidence of the effect of the severity of punishment is much less convincing and consistent. Empirical evidence on the effect of the celerity of punishment has been given far less attention in the literature and results are ambiguous.

Some studies even indicate that the use of threat of punishment can also produce non-compliant behaviour, in particular when perceived as unreasonable (Bardach & Kagan, 1982; Murphy, 2004; Unnever et al., 2004). These results have stimulated the large body of research based on the pioneering work by Tyler (1990) in which he presented empirical evidence for the incorporation of normative, or intrinsic motivations into crime control. Since Tyler's work based on survey-research on low-level crimes amongst Chicago residents, many studies have consistently found that higher procedural justice perceptions lead to higher legitimacy perceptions (Hinds & Murphy, 2007; Sunshine & Tyler, 2003; Tyler, 1990; Tyler & Fagan, 2008; Tyler & Huo, 2002; Tyler & Wakslak, 2004). And more positive perceptions of legitimacy are associated with reduced self-reported offending, even when adjusting for perceptions of the risk of getting caught (Jackson, 2018; Nagin & Telep, 2017). This has led Tyler and others (Sunshine & Tyler, 2003; Tyler, 1990; Tyler & Huo, 2002; Tyler & Wakslak, 2004) to conclude that people primarily comply with the law because they believe in respecting legitimate authority. The suggestion is that lawmakers and enforcers such as the police would do much better to make legal systems worthy of respect than to try to promote compliance through deterrence.

However, reviews on instrumental and normative pathways to compliance have shown that the extensive body of research also has gaps and limitations that call for prudence when drawing inferences on how to best design crime control-policy (Apel, 2013; Apel & Nagin, 2015;

Chalfin & McCrary, 2017; Durlauf & Nagin, 2010; Eisner & Nivette, 2013; Jackson, 2018; Kleck & Sever, 2018; Nagin, 2013, 2017; Nagin & Telep, 2017). I discuss these gaps and limitations and their potential solutions in the next section.

1.4 Gaps and limitations in a large body of knowledge

The gaps and limitations in the extensive body of research on instrumental and normative pathways to compliance are divers. In this section I discuss the main methodological and theoretical problems brought forward in reviews of the literature that cause for prudence when drawing conclusions on the empirical findings on instrumental and normative pathways to compliance. I start with a discussion of the limited evidence on actual police action, followed by a discussion on omissions of potentially relevant motivations. Thirdly, I discuss the limitations of settings in which evidence has been found for the pathways to compliance

The diversity in concepts used in the body of research, which makes it difficult to compare results is discussed in the fourth section. This is followed by a discussion of the limited results on actual offending behaviour. I close the section with a discussion on difficulties in determining causal order in the research on instrumental and normative pathways to compliance.

1.4.1 Limited evidence on actual police action

The first limitation in the body of work on crime control through instrumental and normative pathways concerns the link between police action and perceptions of these actions by citizens.

To establish if police action is effective in stimulating compliance, the link between what the police do and how this is perceived by citizens is imperative. As the pathways in figure 1.1 and 1.2 show, if it is unclear how police action influences perceptions, then it is difficult to determine how criminal policy stimulates compliance. For both the instrumental and the normative pathway, the evidence on this crucial relationship is limited.

Research on instrumental pathways to compliance as yet has not been able to find conclusive evidence of the crucial link between (changes in)

actual criminal policy and (changes in) individuals' perceived sanction risks (Apel, 2013). Most of the research is based on cross-section differences in objective sanction risks between jurisdictions and cross-section differences in punishment experiences between individual respondents. None of these studies however, with the single exception of Hjalmarsson (2009a), directly pertained to a *change* in actual criminal policy. In addition, none of the studies on the effect of actual criminal policy measures had an experimental design, making it difficult to exclude other factors that may have caused a change in the perceived probability of apprehension.

The current body of research on the normative pathway between police treatment and decision-making and perceptions of this behaviour is also very limited and, in the studies that exist, the results are not consistent (Jonathan-Zamir et al., 2015; MacQueen & Bradford, 2015; Mazerolle et al., 2012; Sahin et al., 2017; Worden & McLean, 2017). Also, little attention has been given to the individual contributions of respectful treatment, voice, trustworthiness, and neutrality; the four main ingredients of procedural justice (Nagin & Telep, 2017), making it difficult to determine how specific treatment and decision-making affects perceptions of procedural justice.

Advancements in the research on the link between police action and perceptions of these actions by citizens involves developing empirical tests of this contention (Nagin, 2013). Experimental designs can be very helpful in investigating the link between changes in actual criminal policy and changes in individuals' perceived sanction risks. Experiments can also add to the knowledge on the relationship between how people are treated and perceptions of procedural justice. However, for this last relationship, experiments are desirable but not necessary (Nagin & Telep, 2017). In settings where options to conduct classic experiments are limited, other methods such as systematic social observation (SSO) can provide useful insights.

1.4.2 Omissions of potentially relevant motivations

A second limitation concerns the restricted extent to which research has adequately incorporated both instrumental and normative motivations for compliance. As discussed, there are multiple studies that have presented empirical evidence for both instrumental and normative motivations for compliance. These conclusions however are possibly

biased as a consequence of the omission of potentially relevant variables (Eisner & Nivette, 2013; Jackson, 2018).

For instance, many previous studies on motivations for compliance do not include perceived severity or celerity of punishment. Other examples of potentially relevant omissions include personal morality and perceptions of informal sanctions in the form of peer approval that addresses social norms. Grasmick and Bursik (1990) argued that shame emotions imposed by significant others can contribute to the effectiveness of deterrence measures. There are good examples of studies that have incorporated a more comprehensive set of motivations for compliance (Gao & Zhao, 2018; Hertogh, 2015), however, this research is scarce.

It is essential, that future research on instrumental and normative motivations for compliance follows recent insights by using motivations for compliance based on the latest research, especially when conclusions are drawn about the relative importance of different motivations for compliance.

1.4.3 Limitations in research settings

A third limitation of the body of work concerns the restrictions of settings in which instrumental and normative perspectives on compliance have been investigated. For example, much of the extensive body of research is conducted in the United States and the United Kingdom (Eisner & Nivette, 2013; Nagin, 2017). However, there are indications that motivations for compliance are culturally variable (Lee & Cho, 2019; Tankebe, 2009a; Tankebe et al., 2015) and that motivations vary depending on the types of offending behaviour (Gao & Zhao, 2018; Jackson, Bradford, Hough, & Murray, 2012). These results indicate that it is necessary to be careful in making general statements on the effectiveness of either normative or instrumental pathways to compliance. What works in one situation, does not necessarily work in another. The differences in results also underline the importance of research on the circumstances under which instrumental and normative motives translate into greater legal compliance (Beetham, 1991; Chalfin & McCrary, 2017; Nagin & Telep, 2017). Notwithstanding the growing body of research performed in different circumstances, many opportunities remain for further investigation. Studies that focus on different types of offending behaviour, different cultures and groups or neighbourhoods can help further the knowledge of the circumstances

under which instrumental and normative motivations translate into greater legal compliance.

1.4.4 Diversity in concepts used

A fourth limitation in existing research on instrumental and normative pathways to compliance is the diversity in how concepts are defined and operationalized. For a robust body of comparable evidence on police-citizen relations, methodological equivalence and uniformity of concepts is essential (Jackson, 2018). Different operationalizations might lead to different conclusions about the pathways to compliance with the law (Eisner & Nivette, 2013).

The fourth limitation is well illustrated by the considerable variation in how legitimacy has been defined and operationalized empirically. In the work by Tyler (1990), legitimacy was based on two dimensions, the obligation to obey the law (e.g. 'all laws should strictly be obeyed') and trust in authorities (e.g. 'police are generally honest'). Many studies have followed Tyler's work by viewing legitimacy as a single construct measured by questionnaire-items based on the two dimensions. (Jackson, 2018). Authors as Murphy, Tyler and Curtis (2009) and Bottoms and Tankebe (2012) on the other hand, argue that legitimacy goes beyond obligation to obey and trust in authorities. They also include concepts such as lawfulness and shared values in the definition of legitimacy. Studies by Jackson et al. (2012), Hertogh (2015), Tyler and Jackson (2014) and Tyler, Jackson and Mentovitch (2015) follow this line of reasoning by extending the construct of legitimacy by adding moral (or normative) alignment with the law (e.g. 'My own feelings about what is right and wrong usually agree with the laws that are enforced by the police'). Fagan and Tyler (2005), in contrast, operationalize legitimacy through items that measure the perceived fairness and equity of legal actors. This small literature selection shows the diversity in how legitimacy, one of the key normative motivations, is defined and operationalized. Although it is possible that the different approaches measure the same underlying construct, it is unlikely (Kaina, 2008; Reisig et al., 2007, 2011; Tankebe, 2009a, 2013).

To foster the uniformity of concepts used in research on the pathways to compliance, it is important to operationalize and define the instrumental and normative concepts based on insights acquired in recent research. In addition, analyses on the convergent and discriminant validity

of constructs should be incorporated in future compliance research. Currently, the use of essential techniques as exploratory and confirmatory factor analysis is scarce.

1.4.5 Limited results on actual offending behaviour

Another limitation that troubles mostly micro-level research, concerns the way compliance or offending behaviour is measured. There are examples of studies that have incorporated actual offending behaviour in their research (Hertogh, 2015; Paternoster et al., 1997; Tyler et al., 2007), but most research on the link between police treatment, perceptions and compliance is based on self-report data. Comparisons between self-report and other methods have indicated that self-report can be a reliable and valid means to establish frequency of criminal activity, especially concerning minor violations (Hindelang et al., 1981; Thornberry & Krohn, 2000). Self-report data on less serious infractions, make it more likely that people engage in the behaviour studied and are more likely to honestly report in an interviews situation (Jackson, 2018). Moreover, self-report data are superior to police or victim data when it concerns victimless deviant behaviour (Junger-Tas & Marshall, 1999). However, self-report crime measures raise a number of important methodological issues including response rate concerns and issues related to respondent characteristics and memory effects (Baumeister et al., 2007; Junger-Tas & Marshall, 1999).

Self-report data in research on pathways to compliance is helpful when it regards questions of motivation, perceptions and criminal behaviour that goes undetected. This makes self-report data an important part of the field of research. However, there is a lot to gain by including direct observation of behaviour whenever possible and in at least a healthy minority of research projects. Devising field research that is capable of combining perceptions with actual offending behaviour is an important factor in this regard. In situations where actual behaviour cannot be observed, it is imperative to diminish the problems that face self-report offending measures by for example increasing response rates and minimizing memory decay.

1.4.6 Difficulties in determining causal order

A sixth limitation that concerns many studies in the field is the impossibility to discern cause from correlation. Causal order is often assumed rather than demonstrated, and the observed relations could also stem from causal mechanisms in the opposite direction. For example, work by Sykes and Matza (1957) and Bandura (1990) suggests that people who break moral rules develop inner excuses and justifications that make their mischief look more favourable. These justifications may develop before and/or after deviant activity in an attempt of people to rationalize their behaviour. For example, it is easier to self-excuse past harmful behaviour if one morally justifies it (e.g. speeding is only harmful if you're a bad driver) or condemns the condemner (e.g. the police only hand out speeding tickets to make money). However, as shown in figure 1.2, the assumption is that perceptions of legitimacy influence compliance and not the other way around. This is an illustration of a potential problem in research regarding the normative pathway to compliance, but the problem in determining causality also applies to the instrumental pathway. For example, empirically acquired negative correlations between perceived sanction risk and compliance may only reflect the fact that people who commit illegal acts and get away with it (as most do) tend to lower their perceptions of the risks involved (Saltzman et al., 1982).

In the current literature, there are two main reasons that hamper the possibility to discern cause from correlation. The first is that many studies on the associations between perceptions and compliance arise from cross-sectional data (Chalfin & McCrary, 2017; Nagin & Telep, 2017). This kind of data is not equipped to uncover the above-described examples of reciprocal effects, where perceptions may not only influence behaviour, but behaviour may also influence perceptions. In addition, the use of cross-sectional data also introduces the problem of third common causes (Nagin & Telep, 2017). This problem concerns elements that influence both the independent and the dependent variable. For example, it is possible that both perceptions of police action and compliance behaviour are influenced by past experiences, opinions of peers or personal characteristics (Murphy, 2008; Piquero et al., 2004; Wolfe, 2011). In this case, plausible alternative interpretations of the association between police action and compliance behaviour cannot be ruled out.

The second main reason for problems with distinguishing between cause and correlation is already discussed in the paragraph on studying

actual police action. Establishing the link between police action and perceptions is imperative to credibly establish causal relationships between the effect of police policy on compliance.

To gain additional insights on the causality of the relationships between police action and compliance, it is important to use methods that are able to deal with the dynamic process where motivations and legal compliance mutually affect each other (Hsiao, 2003). The use of longitudinal panel data is valuable, although this does not eliminate the enduring impact of third common causes (Maguire & Johnson, 2010). To also control for this effect, person and time fixed effects models can be very helpful. Even more promising is the use of experimental settings.

1.5 Design of this study

The gaps and limitations presented in the previous paragraph show that it is difficult to formulate general conclusions on how police governance can stimulate compliance. Nevertheless, multiple authors have suggested that lawmakers and enforcers such as the police would do much better to make legal systems worthy of respect than to try to promote compliance through deterrence (Hertogh, 2015; Sunshine & Tyler, 2003; Tyler, 1990; Tyler & Huo, 2002; Tyler & Wakslak, 2004). It is this line of statements and conclusions that warrants a critical examination of the extensive body of research on instrumental and normative pathways to compliance. It is important to be prudent and precise when formulating such strong conclusions, not only for their contribution to the academic debate on governance, but especially, since the results in this research play an important role in the current design of crime control-policy.

With this dissertation I want to add to the body of research on instrumental and normative pathways to compliance through field research on traffic controls of mopeds and their drivers. Mopeds are two-wheeled motorized vehicles that can be operated by persons over 16 years of age with a valid driving license. In the Netherlands, it is a regular routine that the National Police sets up traffic control check-points for mopeds where they check for a number of traffic law violations: driving a vehicle with a higher top speed than allowed, driving without a valid driving license or insurance, driving under the influence of alcohol, driving

without proper lighting, using a mobile phone while driving, and driving without a helmet when required.

1.5.1 Set-up

For the field research two different locations were selected: Wassenaarseweg in Leiden and 1ste Stationsstraat in Zoetermeer. The cities Leiden and Zoetermeer are part of the urban agglomeration in the western part of The Netherlands, halfway between Amsterdam and Rotterdam. The two locations were selected because of their comparable nature with regard to the population of interest (people driving mopeds), the number of moped drivers passing the location and the average number of traffic violations per driver stopped by the police. The two locations are only 14 kilometres apart from each other. However, Leiden and Zoetermeer have their own area of coverage and are separated by an agricultural zone.

The research was conducted from January 19, 2017 until August 2, 2017. During this period, traffic control checkpoints were set up between 2.30 pm and 5.30 pm on weekdays. At each checkpoint, passing moped drivers were stopped. On average 3 or 4 police officers were present at a traffic control check point, and 1 or 2 additional officers driving around the checkpoint in approximately a 2-mile radius to bring up moped drivers trying to elude the traffic control. After being stopped or pulled over, drivers were asked for their license and insurance papers. All mopeds were checked for defects. After visual inspection, all mopeds were placed on a roller test bench to determine the top speed. In the case of detection of a traffic law violation, drivers received an ordinance.

1.5.2 Data

The field-data used in this dissertation was collected through the use of three different methods; surveys, structural social observation (SSO) and an experimental intervention.

Survey data

After the traffic control check procedure was finished, drivers were informed by the police that researchers of Leiden University were present at the location, inviting them to participate in a survey. To ensure that participants were able to disclose all information, the

surveys, which were administered through face-to-face interviews, were conducted approximately 50 meters from the traffic control check. The survey took on average 7 minutes to complete. It covered a wide range of topics in the field of instrumental and normative pathways to compliance, using questions derived from previous research (Gau, 2013; Sunshine & Tyler, 2003; Tyler, 1990), related both to the traffic control that had just taken place as well as to previous encounters with the police (see *Appendix A*). The survey was tested and slightly modified after two pilot traffic controls in November 2016. The survey was conducted by a pool of 8 trained interviewers, student-assistants studying criminology or law at Leiden Law School, three or four interviewers per control. All interviewers received 4 hours of training on how to conduct the survey and how to interpret the questions.

Structured Social Observation (SSO)

In addition to face-to-face interviews, police behaviour during the traffic control check was observed using a systematic social observation protocol (SSO) derived from previous research (Jonathan-Zamir et al., 2015; McCluskey, 2003; Worden & McLean, 2017). The observations were conducted by the same group of student-assistants who also conducted the surveys. To allow observers to overhear conversations without influencing them, for each check, two to three observers were placed at a distance of at least 5 meters, on average 7 meters. All observers received 6 hours of training on how to score the systematic observation-protocol. To reduce the potential problem of different scoring methods, inter-observer differences were intensively studied and discussed during this training. These differences were tested during the pilot traffic controls in November 2016 and found to be negligible. This was confirmed during the main phase of the field research, in which some situations were randomly selected to be observed by multiple observers.

Experimental intervention

Thirdly, data was gathered based on an experimental intervention. The general interval with which moped traffic controls are carried out depends on the targets the National Police commits to in the beginning of the year. However, local units have the freedom to vary the intensity and location of the controls. Prior to the field research, the frequency of the moped traffic controls on both locations was once every two months

on average. For this study, the police increased the frequency of moped traffic controls to once every two weeks in Leiden while remaining once every two months in Zoetermeer during the entire period of the field research. With this intervention, an experimental setup was created. The frequency of the traffic controls on both locations was not communicated via mass and social media. After the field research, the frequency of moped traffic controls in both locations was reverted back to the regular frequency of once every two months on average.

1.6 Overview

The research design based on moped traffic control checks makes it possible to investigate multiple gaps and counter limitations in the body of work on the normative and instrumental pathways to compliance. In this dissertation I try to answer three different questions.

With the first question I want to add to the limited evidence on actual police action and extend insight into the causal order of the relationship between police action and perceptions by asking 'if and how citizens update perceived sanction risk in response to changes in police activity'. With the second question I also want to add to the evidence and the understanding of the essential link between what the police do and how this is perceived, but this time the focus is on the normative perspective. I do this by asking 'whether police behaviour that signals higher quality of treatment or decision-making leads to higher perceived procedural justice'. The third question in this dissertation adds to the knowledge on the differences in pathways to compliance in different settings. The question I try to answer is 'how instrumental and normative motivations translate into greater legal compliance by looking at motivations for compliance of six specific traffic violations.'

The three different research questions will be thoroughly discussed in the following three chapters[1]. Below I give a short overview of the research presented in these chapters.

1 The different chapters that cover these questions have been written as independent research articles, so there is some overlap between the chapters. Chapter two is based on Terpstra, B. L., van Velthoven, B. C. J., & van Wijck, P. W. (2020). Do Intensified Police Controls Change Perceptions of Apprehension Probability: A Field Experiment. *Crime & Delinquency*, *66(8)*, 1115–1136. Chapter three is based on Terpstra, B. L., & van Wijck, P. W. (2021). The Influence of Police Treatment and Decision-making on Perceptions of Procedural Justice: A Field Study. *Journal of Research in Crime and Delinquency*.

1.6.1 Do Intensified Police Controls Change Perceptions of Apprehension Probability?

In chapter two, the reader finds results and conclusions on an essential first step in the instrumental pathway to compliance. As shown in figure 1.1, the deterrent effect of criminal policy relies on the positive relation between the individuals' perceived sanction risk and the actual risk as a result of criminal policy. Without this link, it is hard to see how changes in criminal policy can result in changes in the level of crime in another way than through incapacitation. However, previous research has not made clear how or even if individuals update their perceived sanction risk in response to changes in actual criminal policy. The study covered in this chapter is the first field experiment on the updating of the perceived probability of apprehension. The experimental set-up combined with survey data makes it possible to test whether the change in the objective sanction risk as a result of intensified police activity does indeed affect the perceived sanction risk of the moped drivers, and by how much.

The results indicate that intensified police control, as expected, has a positive influence on the perceived probability of apprehension for certain types of offences. For frequently committed and easily detectable offenses that are regularly checked the increase in control intensity caused an upward revision of the perceived probability of apprehension. This refers to driving under the influence of alcohol, operating a mobile phone while driving and, albeit to a lesser degree, driving with a higher top speed than allowed.

1.6.2 The Influence of Police Treatment and Decision-making on Perceptions of Procedural Justice

Chapter three also reports on the essential relationship between police behaviour and citizen perceptions of this behaviour, but in this chapter the focus is on the normative pathway to compliance. By combining survey data with systematically observed police behaviour I add to the very scarce empirical evidence on the idea that more procedurally just treatment and decision making by authorities leads to an increase in perceived procedural justice.

In a real-life setting in which the full range of procedural justice ingredients of police-behaviour and decision-making was observed, with a high response rate and the absence of an offender-bias, I find no

evidence that higher quality of police treatment and decision-making leads to higher levels of perceived procedural justice.

The results can probably be attributed to the high ratings of perceived procedural justice, even when officers' behaviour represents low-to-moderate levels of quality of treatment and decision-making. This implies that once a certain level of perceived procedural justice is reached, better quality of treatment or decision-making cannot improve citizens' subjective assessments very much, and other factors become more important in further enhancing the perception of procedural justice.

1.6.3 Instrumental and Normative Motivations for Compliance with Traffic Laws

Chapter four covers findings on how instrumental and normative motivations translate into greater legal compliance by investigating six specific violations. Incorporated motivations are based on recent research and psychometric analyses. The results based on survey data show that motivations for compliance differ depending on the traffic violation. Both normative and instrumental motivations play a role in compliance with everyday traffic laws, but more general conclusions on compliance with traffic laws should be treated with caution. The findings show that personal morality is inversely related to compliance for most violations. However, this relationship is absent for driving without proper lighting and driving with a higher top speed than allowed. The obligation to obey the law, a dimension of legitimacy, is related to driving with a higher top speed than allowed and operating a mobile phone while driving. Perceived probability of apprehension in this setting is related to driving under the influence of alcohol.

The findings implicate that routine traffic controls can be a successful instrument in obtaining compliance with traffic laws when they succeed in influencing the perceived probability of apprehension, but also personal morality and the obligation to obey the law. There is no indication that methods used to influence these perceptions will have an adverse negative effect on other motivations.

1.7 Contributions

1.7.1 Academic contributions

The work in this dissertation contributes to the investigation of multiple gaps in the literature on instrumental and normative pathways to compliance and counters some of the limitations in previous research. Firstly, all results presented are acquired in the setting of moped traffic control checks in the Netherlands. This specific context adds to the literature on minor traffic violations and to the body of work on pathways to compliance tested in Continental Europe. Studies in different settings and from different parts of the world contribute to the understanding of the circumstances under which instrumental and normative motivations translate into greater legal compliance.

The findings in chapter two and three add to research on actual police action and extends insight into the causal order of the relationship between police action and perceptions. The work in chapter three also contributes to insight into the concepts used in the field. These insights can help establish more uniformity in concepts used in future research. Chapter four adds to the knowledge on the contextual differences between motivations for compliance by looking at six different violations. In addition, by using a comprehensive set of motivations based on recent research and psychometric analyses, the study in chapter four is less likely to suffer from omission bias and also helps in creating uniformity in the concepts used in the field.

These additions to the body of work contribute to a better understanding of the pathways to compliance and help foster the academic debate on instrumental and normative pathways to compliance.

1.7.2 Contributions to crime control policy

The results presented in this dissertation also contribute to the design of crime control policy, although it is important to note that the specific setting of moped traffic control checks makes it difficult to extrapolate the outcomes to formulate more general conclusions on the normative and instrumental pathways to compliance. This specific setting was selected due to the possibility to investigate multiple elements of the pathways to compliance. And while this setting provided a high response-rate and a sample including both offenders and non-offenders, the external validity of the results is restricted. Moped traffic control

checks are a specific setting in which the police check for mostly minor violations. It is not possible to extend the conclusions of this research to more serious offences or to other minor violations.

Given this restriction, the findings in this dissertation put forward multiple implications for crime control policy. The findings in chapter four show that if the Dutch traffic police want to increase compliance, then routine traffic controls can be a successful instrument when they succeed in influencing both normative and instrumental motivations for compliance. Driving under the influence of alcohol can be reduced by increasing the perceived probability of apprehension, while driving with a higher top speed than allowed or operating a mobile phone while driving can be reduced if the police succeed in increasing the perceived obligation to obey. In addition, if the police succeed in influencing personal moral judgements about traffic violations, this could also influence multiple violations.

These implications pertain to the right side of the pathways depicted in figures 1.1 and 1.2. For police action to be effective in stimulating compliance, it is imperative to combine the results on these final stages of the pathways to compliance with information on the link between what the police does and how this is perceived. The findings in chapter two show that intensified police control checks have a positive influence on the perceived probability of apprehension for frequently committed and easily detectable violations such as driving under the influence of alcohol, operating a mobile phone while driving and, albeit to a lesser degree, driving with a higher top speed than allowed. Combined with the results in chapter four, this implies that alcohol violations by moped drivers can be reduced by intensifying traffic control checks. There is no indication that such an instrumental measure will have an adverse negative effect on other motivations, which implies that it can safely be combined with measures based on the normative pathway to compliance.

Promoting compliance through normative motivations however, is more difficult in the setting of traffic control checks. The results in chapter three show that higher quality of police treatment and decision-making in a single encounter does not lead to higher levels of perceived procedural justice. This implies that more procedural just treatment and decision making by the police does not make it more likely that citizens view the police as a legitimate institution, and in turn, more likely to comply with traffic laws. This does not imply that police officers should not be concerned with respectful treatment, voice, trustworthiness or

neutrality. It does however show the limits to the options police officers have to influence legitimacy perceptions through treatment and decision-making, although it is possible that an accumulation of experiences with the police does influence perceptions of procedural justice.

1.8 Discussion

This dissertation aims to contribute to the knowledge on both the instrumental and the normative pathways to compliance by filling gaps and countering limitations in previous research. However, a critical examination of the research practices used in the present study is warranted. In the different chapters the methodological limitations of the research will be discussed. In addition to those specific limitations, there are two more general issues that deserve attention.

The first issue is that the answers presented in this dissertation do not counter all limitations, nor fill all the gaps in a large body of work. This is well illustrated by the fact that the original research design included actual offending behaviour through the use of follow-up data. And although this data also is not without potential flaws, it would have been an interesting step in acquiring data on actual offending behaviour. Unfortunately, due to rules and regulations, the data necessary for a proper analysis of this behaviour turned out to be impossible to acquire. Another illustration of the first issue is shown in chapter four.

In that chapter, cross-sectional data is used, limiting the causal claims that can be made based on the results. These two illustrations do not imply that the results of this dissertation do not contribute to a better understanding of the normative and instrumental pathways to compliance. They do however show the difficulty in devising research that counters all limitations in previous research.

A second issue that deserves attention, is the scope of the current research. The focus of this dissertation is on normative and instrumental pathways to compliance, because both perspectives on compliance have been influential in guiding policing research. One of the main reasons for this is their direct implications for crime control policy (Hough et al., 2013). Following in the line of the large body of previous research on normative and instrumental pathways to compliance enables the use of previously validated concepts and methods to advance the knowledge

on specific topics. A good example of this is the study in chapter two that presents results of the first field experiment on the updating of the perceived probability of apprehension. However, pathways with more secondary implications for crime control policy are not covered in this dissertation. Pathways that evolve around habit for example. In that case, people only see one causally effective action alternative, and automatically form an intention to carry out that action (Wikström et al., 2012). It would be interesting to investigate how these pathways interact with the pathways investigated in this dissertation.

The two issues offer many interesting options for future research on crime control policy. Methodological challenges in this research lie in studying actual offending behaviour, setting up experiments and devising studies based on panel data. This kind of research would add to the knowledge on the causality between police action, perceptions and offending behaviour. Theoretical challenges for future research lie in the incorporation of multiple pathways to compliance. The objective of this research should not be to give preference to one theory over the other; the objective is to determine how the combination of different pathways leads to compliance behaviour. The research in this dissertation is a small step in that direction.

2 Do Intensified Police Controls Change Perceptions of Apprehension Probability: A Field Experiment■

Abstract

Objectives: This study examines if and how citizens update perceived sanction risk in response to changes in police activity.

Methods: A field experiment was conducted in which the police intensified moped traffic controls on one location during a period of six months, while the control intensity on a comparable location remained unchanged.

Linear regression with difference-in-difference estimates was used with perceived probability of apprehension of different offenses as dependent variables.

Results: We find that the increased police activity caused an upward revision of the perceived probability of apprehension of offenses such as operating a mobile phone while driving or driving under the influence of alcohol.

Conclusions: The perceived sanction risk is an essential element in the theory of deterrence to link criminal policy and criminal behaviour. Prior research did not find conclusive evidence of a relationship between police control and the perceived probability of apprehension. In our case, the findings testify to the existence of such a link. Follow-up research with the use of a true panel would be an interesting next step to gain insight in this process.

■ This chapter is based on: Terpstra, B. L., van Velthoven, B. C. J., & van Wijck, P. W. (2020). Do Intensified Police Controls Change Perceptions of Apprehension Probability: A Field Experiment. *Crime & Delinquency*, *66(8)*, 1115-1136.

2.1 Introduction

Contemporary deterrence theory of crime is based on two key assumptions. The first assumption holds that potential offenders will only engage in crime when the expected returns, discounted by the expected costs of illegal behaviour, exceed the expected net returns from law-abiding alternatives such as legitimate employment (Becker, 1968). According to the second assumption, there is a positive correlation between the individuals' perceived sanction risk and the actual risk as a result of criminal policy (Nagin, 1998). In combination the two assumptions predict that the certainty, severity and celerity of punishment have a negative impact on the level of crime.

A large body of research has studied the empirics of the relationship between criminal justice policy and crime; see, for instance, the reviews by Nagin (2013) and Kleck and Sever (2018). Most attention has gone to macro-studies analysing the effect of police activity and punishment levels on measured crime rates, and to individual-level survey studies analysing the effect of perceived sanction risks on self-reported criminal behaviour.

Much less attention has been paid to the link between criminal justice policy and individual perceptions of sanction risks. Several cross-section studies in this field did not find a significant robust association between the survey respondents' perceptions of sanction risks and the actual level of the certainty, severity and celerity of punishment in their home area, thus raising doubts about the actual relevance of deterrence theory (Kleck et al., 2005; Kleck & Barnes, 2013, 2014; Lochner, 2007). Panel studies of survey data, on the other hand, much better equipped to find out what drives the development of the individual perceptions of sanction risks over time, presented evidence that risk perceptions can change in reaction to personal and vicarious experiences with crime and punishment (Anwar & Loughran, 2011; Lochner, 2007; Matsueda et al., 2006; Pogarsky et al., 2004; Wilson et al., 2017). From the available results, however, "it is not clear how or even if individuals update their subjective probabilities in response to changes in objective sanction risk" (Apel, 2013, p. 86).

To establish the relevance of that kind of updating in a methodologically sound manner asks for a quite different, experimental, set-up. The present study is a first attempt in that direction. We report on a field experiment in Leiden, The Netherlands, in which police traffic controls of moped drivers were intensified during a period of six months, while

controls on a comparable location in the same region were kept at the regular interval. Throughout the period of six months, data on the perceived probability of apprehension were acquired by questionnaires. This set-up enables us to test whether the change in the objective sanction risk as a result of intensified police activity does indeed affect the perceived sanction risk of the moped drivers, and by how much.

In the next section we start with a short review of the prior research on the determinants of the perceived probability of apprehension. We then present the set-up of our field experiment in more detail, followed by a description of the data and the plan of analysis. After the presentation of our results we conclude with a discussion of their implications and limitations.

2.2 Prior research

Following Waldo and Chiricos (1972) and more recently Nagin (1998), an important body of literature has emerged that studies the determining factors behind potential offenders' individual perceptions of their sanction risk. This perceived punishment risk is an essential element in the theory of deterrence to link criminal policy and criminal behaviour. Without this link, it is hard to see how changes in criminal policy can result in changes in the level of crime in another way than through incapacitation.

For our purpose, two broad lines of inquiry can be distinguished within this literature. The first examines the correlation between the actual sanction risk at the relevant time and place and the perceived sanction risk of individual respondents. The second discusses the process by which individuals update their perceived sanction risks in reaction to experiences with crime and punishment.

As to the first line of inquiry, the evidence points out (Apel, 2013) that the average citizen may have a reasonable knowledge of the criminal penalties that are statutorily applicable for specific offenses. But survey respondents do a poor job of estimating the probability and magnitude of the actual penalties.

This is most clearly borne out by Kleck et al. (2005), who interviewed 1,500 residents of 54 large urban counties in the U.S. to measure their individual perceptions of the prevailing certainty, severity and celerity

of punishment risks in their community for four serious crime types (homicide, robbery, burglary, and aggravated assault). To begin with, 15-20% of the respondents were not knowledgeable enough to provide the subjective estimates asked for. For the respondents that did provide estimates, they related the perceived sanction risks to actual county-level measures of punishment risks obtained from official criminal justice statistics. Only 4 out of 20 correlation coefficients were statistically significant. The relationship further weakened, when individual-level control variables such as age, sex, race and education were added to the regressions. The results were corroborated by Kleck and Barnes (2013), who looked for any 'collective wisdom' among the perceptions within each county and found none, and by Kleck and Barnes (2014), who found no relationship between the county-level rates of police per capita and the individual perceptions of arrest risk. In a similar vein, Lochner (2007) analysed the correlation between the actual county arrest rate for auto theft and the perceived probability of apprehension in a sample of young males. Initially, the relationship appeared to be positive, but it became statistically insignificant upon the inclusion of control variables. Moreover, in all these studies of perceived sanction risks explained variance was low, with an R^2 generally below 0.05. Hence, one might be tempted to conclude that there is no detectable impact of the actual criminal policy on individual perceptions of the sanction risk.

That conclusion, however, has not gone unchallenged in the literature (Apel, 2013; Braga & Apel, 2016; Pogarsky & Loughran, 2016). Firstly, it has been pointed out that most respondents in the samples by Kleck c.s. were 'committed law abiders' with respect to the serious criminal offenses under study. This group of citizens is in no need to obtain accurate information about the actual sanction risks. Secondly, as information on the true likelihood of detection is not available, the studies use official arrest rates as proxy measures. However, jurisdictions differ in the degree to which criminal offenses are reported and recorded. Moreover, the arrest rate is a consequence rather than a cause of crime. Thirdly, the arrest rate can at best represent the average probability of apprehension in a given area, at a high level of aggregation. But individuals have private information, personal characteristics and a specific location that make that the official arrest rate is only an indirect and imperfect measure of each individual's actual probability of apprehension. Together, these three points are responsible for a series of measurement errors that would prevent any significant relationship,

assuming that it exists, to come to the fore. The approach by Kleck c.s. is simply inappropriate to detect any impact of actual criminal policy on individual sanction risk perceptions.

Another issue is that Kleck c.s. look for an absolute relationship between the objective and perceived sanction risks, while for policy purposes it suffices if *changes* in criminal policy bring along *changes* in perceptions.

Both points are tackled by Hjalmarsson (2009), who studies the perceived chance of jail conditional on arrest around the age of criminal majority, using the same dataset as Lochner (2007). In a difference-in-difference approach she looks at a change in perceived punishment severity as a result of a change in the prevailing legal rule. Moreover, this change in the prevailing legal rule can be observed without measurement error. Interestingly enough, Hjalmarsson reports a discontinuous increase in the perceived chance of jail when individuals reach the age of majority, providing evidence that actual criminal policy does affect individuals' perceived sanction risk. At the same time, the observed change in perceptions appears to be substantially smaller than the objective change. Whether this is a result from measurement errors at the side of perceptions is open to debate.

The second line of inquiry addresses the impact on the individuals' sanction risk perceptions that emanates from personal and vicarious experiences with crime, punishment and punishment avoidance (Stafford & Warr, 1993). More recently, this impact has been modelled in terms of Bayesian updating (Anwar & Loughran, 2011; Lochner, 2007; Matsueda et al., 2006; Pogarsky et al., 2004; Wilson et al., 2017). In his review, Apel (2013) concludes that these recent studies provide support for the Bayesian updating model. Non-offenders generally possess unusually high subjective estimates of the probability of apprehension compared to experienced offenders. However, when they start a criminal career, they learn that the actual probability of apprehension is lower than initially expected, providing a signal to update their subjective estimate downwards. Being arrested, on the other hand, leads to an upward adjustment in the individuals' perceived probability of apprehension.[1]

1 The Bayesian updating process is also the central theme of the experimental study by Pickett, Loughran and Bushway (2016). Directly informing individuals about the objective probability of apprehension for white collar crime proved to be a signal to adapt the prior beliefs downward.

It may be tempting to read these conclusions as evidence that actual policy does affect perceived sanction risks. But that would be premature. In a systematic summary of research findings Kleck and Sever (2018) show that the evidence for downward updating as a result of crime that is not punished (punishment avoidance) is strong enough. But that does not hold for upward updating in reaction to an arrest, as a clear majority of relevant test results either found no significant association between prior punishment experience and risk perceptions or a significant negative association. And the studies that did find significant support for upward updating are subject to criticism. Most importantly, the experienced arrest ratio, which was used to correct for the differential impact between novice and experienced offenders, might have introduced a spurious positive correlation, as both the experienced arrest ratio (by definition) and the perceived probability of apprehension (through downward updating) tend to decline at a larger number of offenses. The results are, furthermore, entirely based on self-report data with respect to crimes and arrests, which might suffer from various kinds of measurement error. The relationship with actual criminal policy is still unaddressed.

Summarizing our short review, we conclude that previous research as yet has not been able to find conclusive evidence of the crucial link between (changes in) actual criminal policy and (changes in) individuals' perceived sanction risks. The two lines of inquiry distinguished above are subject to debate because they cope with some serious methodological and measurement problems.

Firstly, research until now was based on cross-section differences in objective sanction risks between jurisdictions and cross-section differences in punishment experiences between individual respondents. None of these studies however, with the single exception of Hjalmarsson (2009b), directly pertained to a *change* in actual criminal policy. Secondly, individuals are likely to be most receptive to the sanction risk in their immediate surroundings. Alas, a proper and objective measure of the *local* risk of apprehension (Apel, 2013, p. 80) is not readily available. Thirdly, the various results give evidence that sanction risk perceptions vary largely between individuals. One important reason behind that finding is that most studies thus far referred to serious criminal offenses that are outside the scope of interest of most survey respondents. Committed law abiders, in contrast to experienced offenders, have no internal drive to stay up to date with respect to actual sanction risks.

Presumably, more reliable results can be obtained from studying *minor* offenses for which a large(r) subset of the population is effectively on the margin (Apel, 2013, p. 94). Fourthly, none of the studies on the effect of actual criminal policy measures had an experimental design, making it difficult to exclude other factors that may have caused a change in the perceived probability of apprehension.

2.3 The current study

Our current study is an attempt to counter the four problems mentioned above. With the help of the Dutch National Police, we conducted a field experiment in Leiden, The Netherlands, in which the intensity of routine traffic controls of moped drivers was increased relative to the nearby city of Zoetermeer. Through this set-up we directly changed the objective local probability of apprehension of the moped drivers on one location vis-à-vis the other. Hence, the policy change needs no further interpretation or separate measurement. Moreover, the offenses at stake are of a minor nature and well within the awareness space of any moped driver. Finally, the experimental set-up allows for a difference-in-difference approach that mitigates the effects of extraneous factors. We add to previous research by further investigating the relationship between the objective and the perceived probability of apprehension.

2.3.1 Set-up of the experiment

Our field experiment has been set up in collaboration with the Traffic department of the unit The Hague of the Dutch National Police. It focuses on traffic controls of mopeds and their drivers. Mopeds are two-wheeled motorized vehicles that can be operated by persons over 16 years of age with a valid driving license. Dutch traffic law distinguishes two kinds of mopeds: mopeds with a top speed of 25 km per hour that can be operated without wearing a helmet and mopeds with a top speed of 45 km per hour for which wearing a helmet is compulsory.

In the Netherlands, it is a regular routine that the National Police sets up traffic control check-points for mopeds where they check for a number of traffic law violations: driving a vehicle with a higher top speed than allowed, driving without a valid driving license or insurance, driving under the influence of alcohol, driving without proper lighting, using a mobile phone while driving, and driving without a

helmet when required. The general interval with which moped traffic controls are carried out depends on the targets the National Police commits to in the beginning of the year. However, local units have the freedom to vary the intensity and location of the controls.

For the experiment two different locations were selected: Wassenaarseweg in Leiden and 1ste Stationsstraat in Zoetermeer. The cities Leiden and Zoetermeer are part of the urban agglomeration in the western part of The Netherlands, halfway between Amsterdam and Rotterdam. The two locations were selected because of their comparable nature with regard to the population of interest (people driving mopeds), the number of moped drivers passing the location and the average number of traffic violations per driver stopped by the police. The two locations are only 14 kilometres apart from each other. However, Leiden and Zoetermeer have their own area of coverage, are separated by an agricultural zone, and interurban traffic from both cities is mostly directed towards The Hague. Hence, given the limited range of operation of mopeds, any change in traffic control intensity is limited to the local awareness space of the potential offenders in Leiden or Zoetermeer. It is highly unlikely that drivers will be observed in both populations or that a change in the objective probability of apprehension in one location will alter the perceived probability of apprehension in the other.

Prior to the experiment the frequency of the moped traffic controls on both locations was once every two months on average. To see if, and to what extent, a change in the intensity of traffic controls affects the subjective probability of apprehension, the frequency of moped traffic controls was increased to once every two weeks in Leiden (the experimental location), while remaining once every two months in Zoetermeer (the control location).

The frequency of the traffic controls on both locations was not communicated via mass and social media. Results from a study by Pickett, Loughran and Bushway (2016) show that such information can have an impact of its own, and possibly in a counterproductive direction.

The experiment was conducted from January 19, 2017 until August 2, 2017. This period of six and a half months was chosen because it was in between the major winter and summer holidays, and still potentially long enough for the increase in frequencies on one of the locations to be noticed.

During the period of the experiment, traffic control checkpoints were set up between 2.30 pm and 5.30 pm on weekdays, just like before. At each checkpoint, passing moped drivers were stopped. Each traffic control was accompanied by police officers on motorcycles who drove

around the checkpoint in a radius of 2 km to bring up moped drivers trying to elude the traffic control. After being stopped or pulled over, drivers were asked for their license and insurance papers. All mopeds were checked for defects. After visual inspection, all mopeds were placed on a roller test bench to determine the top speed. In the case of detection of a traffic law violation, drivers received an ordinance.

After the above standard procedure was finished, the drivers were informed by the police that researchers of Leiden University were present at the location, inviting them to participate in a survey.

2.3.2 Survey instrument

The survey covered a wide range of topics in the field of procedural justice and deterrence. The questions were derived from previous research (Gau, 2013; Sunshine & Tyler, 2003; Tyler, 1990) and related both to the traffic control that had just taken place as well as to previous encounters with the police. Most responses were measured using a 7-point Likert scale. The time needed to conduct an interview was 7 minutes on average. The survey was tested and slightly modified after two pilot traffic controls in November 2016.

For the purpose of the present paper, we only use a small number of the survey data. Levels of perceived probability of apprehension were measured by six items. Participants were asked to estimate the likelihood of being apprehended in case they would (1) drive a vehicle with a higher top speed than allowed, (2) drive without a valid license or insurance, (3) drive under the influence of alcohol, (4) drive without proper lighting, (5) operate a mobile phone while driving, and (6) drive without a helmet when required. The perceived probability of apprehension had to be rated on a scale ranging from 1 (very low) to 7 (very high).

To check for any differences in group composition between the two locations, a series of demographic and socio-economic characteristics were assessed: age, sex, membership of an ethnic minority group, household income and level of education.

In the survey we further asked the participants whether, in the 12 months before, they had committed any of the six traffic law violations under scrutiny, whether they had experienced any traffic controls and whether they were sanctioned by the police for one or other offense. That information can be relevant as prior research has shown that individual perceptions of sanction risks may vary with previous personal experiences with crime and punishment.

2.4 Description of the data

Table 2.1 gives a detailed overview of the traffic controls during the experiment, with their respective date, location and number of participants. The overall number of moped drivers stopped at the two checkpoints was 687. Of the stopped drivers, 43.5% filled out the questionnaire, yielding a total of 299 respondents, 179 in Leiden (the experimental location) and 120 in Zoetermeer (the control location).

Table 2.1: Dates, locations and number of participants per traffic control

Date	Location of traffic control	Number of participants
January 19, 2017	Leiden	13
January 24, 2017	Zoetermeer	31
February 9, 2017	Leiden	9
March 1, 2017	Leiden	16
March 14, 2017	Leiden	14
March 30, 2017	Leiden	19
April 4, 2017	Zoetermeer	37
April 13, 2017	Leiden	17
April 26, 2017	Leiden	13
May 11, 2017	Leiden	11
May 23, 2017	Leiden	11
May 30, 2017	Zoetermeer	25
June 14, 2017	Leiden	9
June 30, 2017	Leiden	22
July 13, 2017	Leiden	11
July 26, 2017	Zoetermeer	27
August 2, 2017	Leiden	14

Table 2.2 presents descriptive statistics for the variables that were observed in the course of our experiment. As noted before, the perceived probability of apprehension was measured on a scale ranging from 1 (very low) to 7 (very high). The results show a broad dispersion of scores, in line with previous studies on the accuracy of people's perceptions of the probability of apprehension. Averages vary between the six traffic law violations and between the two locations, from 3.50 to 5.11. They are generally centred in the middle of the 1 to 7 scale and never (very) low nor (very) high. The items that cover the more visible violations (driving under the influence of alcohol, driving without proper lighting, operating a mobile phone while driving, and driving without a helmet when required) score higher than the less directly visible violations (driving with a higher top speed than allowed, and driving

without a valid license or insurance). The two locations were selected because they were comparable a priori with regard to the population of interest and the intensity of traffic violations. Due to the nature of the field experiment, however, the participants are not chosen at random, so there is no ex ante guarantee that the experimental and control groups are equal in all relevant aspects. Hence, we tested for differences in the group composition between the experimental and the control location. There appears to be a significant difference in the mean age ($t(295) = 4.116$, $p = .000$), in the share of males ($\chi^2(1,299) = 9.018$, $p = .003$), and in household incomes ($\chi^2(1,299) = 20,948$, $p = .001$). In the experimental location, participants were on average somewhat younger, more females among them, and from lower income families. The level of education, on the other hand, did not significantly differ between the two locations, nor did the membership of a minority group.

Table 2.2: Descriptive statistics of the variables

Variable	Zoetermeer	Leiden	Total
Perceived probability of apprehension: mean (SD)			
– driving with a higher top speed than allowed	3.50 (1.76)	3.90 (1.59)	3.74 (1.67)
– driving without a valid license or insurance	3.58 (1.77)	3.67 (1.78)	3.64 (1.77)
– driving under the influence of alcohol	4.03 (1.82)	4.67 (1.58)	4.41 (1.71)
– driving without proper lighting	4.61 (1.80)	4.70 (1.81)	4.66 (1.80)
– operating a mobile phone while driving	4.09 (1.87)	4.36 (1.68)	4.25 (1.76)
– driving without a helmet when required	4.94 (1.61)	5.22 (1.43)	5.11 (1.51)
Age in years: mean (SD)	37.6 (16.3)	30.0 (15.0)	33.1 (16.0)
Sex: % male	68.3	50.8	57.9
Member of ethnic minority group: %[a]	18.3	16.2	17.1
Household income: median class [b]	€ 20,000-30,000	€ 0-10,000	€ 10,000-20,000
Education: median class [c]	High school 2	High school 2	High school 2
Committed offense in past 12 months: % yes			
– driving with a higher top speed than allowed	45.0	53.1	49.8
– driving without a valid license or insurance	6.7	14.0	11.0
– driving under the influence of alcohol	16.7	25.1	21.7
– driving without proper lighting	17.5	19.0	18.4
– operating a mobile phone while driving	13.3	30.7	23.7
– driving without a helmet when required	7.5	7.8	7.7
Experienced traffic control in past 12 months: % yes	43.3	54.7	50.2
Sanctioned by police in past 12 months: % yes	15.0	25.7	21.4

a. In The Netherlands, someone is considered to be a member of an ethnic minority group when (at least) one of the parents has been born abroad.
b. Income was measured by asking respondents to classify their gross household income in 2016: € 0-10,000, € 10,000-20,000, € 20,000-30,000, € 30,000-50,000, € 50,000+ and unknown.
c. With respect to their education respondents were asked about the highest achieved level of schooling, which was then classified as: elementary, vocational, high school levels 1, 2 and 3, college/university and unknown.

No less than 211 out of the 299 respondents, that is 70.6%, admitted to have offended at least once in the previous 12 months against any one of the six traffic rules that were surveyed. This confirms that the offenses at stake are well within the awareness space of our moped drivers. Most common among the offenses was speeding (49.8%), followed by driving while makinga telephone call (23.7%), driving under the influence (21.7%) and driving without proper lighting (18.4%).

It was further found that 50.2% of the participants had been stopped for one or more traffic controls in the 12 months before, which shows that traffic controls are a regular and well-known aspect of Dutch policing. Indeed, 21.4% of the respondents stated that they were apprehended for some violation or other and received a police sanction over that period.

A comparison between Leiden and Zoetermeer shows that the respondents at the experimental location on average committed somewhat more offenses, experienced somewhat more traffic controls and were sanctioned somewhat more frequently than the respondents at the control location. Most of these differences are significant at the 5% level. Possibly, the differences can be explained by a more frequent moped use by our participants in Leiden.

2.5 Plan of analysis

We want to test whether the increase in the objective sanction risk has affected the perceived probability of apprehension (henceforth, PPA). As the change in traffic control intensity in our experiment was not announced through mass and social media, moped drivers will not have picked up the increased intensity right from the start. In the course of time, they will have gradually found out about the intensified controls at the experimental location, either by personal experience or through their social network. As a consequence, adaptation of the PPA, if any, will have been a gradual process.

To analyse that process, we divide the experimental period of six months into three subperiods of (roughly) two months: from 19 January to 14 March (subperiod 1), from 30 March to 23 May (subperiod 2), and from 30 May to 2 August (subperiod 3). The number of observations for these three subperiods is respectively 52, 71 and 56 at the experimental location and 31, 37 and 52 at the control location (cf. Table 2.1).

Table 2.3 presents, for the six types of moped traffic offenses separately, the average PPA's in these three subperiods at the two locations. We notice, first of all, that the average PPA values at the start of the experiment, in subperiod 1, are not significantly different between Leiden and Zoetermeer. Apparently, the observed differences in the composition of the two groups of respondents are, for our purpose, inconsequential. Over time, the average PPA's follow in general a downward trend at the control location, for reasons that are not entirely clear. A possible reason is the shift from winter to summer conditions, which could have made moped drivers more cheerful and optimistic, or have changed the composition of the group of drivers. There also may have been a downward shift in the overall confidence in the efficiency of police activities, as a result from public discussions at the time on the substandard performance of the newly formed National Police in The Netherlands. We did not further investigate these possible reasons, as they are likely to have affected the average PPA's at the experimental location in a similar manner. For our purpose, it suffices to focus on the difference-in-difference effect as a result of the change in the traffic control intensity. By how much did the development of the average PPA's at the experimental location between the beginning and end of our experiment differ from the development at the control location? Here, Table 2.3 shows that in five out of the six offense types the difference-in-difference effect is positive, and quite substantially so for driving under the influence of alcohol (+1.25), operating a mobile phone while driving (+.95), driving witha higher top speed than allowed (+.83) and driving without a helmet when required (+.66). We might interpret these findings as a preliminary indication that an increase in police activity can affect PPA's in the direction that the policy change is aimed at.

Table 2.3: Average perceived probabilities of apprehension

	Subperiod 1	Subperiod 2	Subperiod 3	Difference between subperiods 1 and 3
1. Driving with a higher top speed than allowed				
Experimental location	4.00 (1.572)	3.82 (1.486)	3.91 (1.761)	–.09
Control location	4.13 (1.893)	3.38 (1.673)	3.21 (1.684)	–.92
Difference between experimental and control location	–.13	+.44	+.70	+.83
2. Driving without a valid license or insurance				
Experimental location	4.00 (1.673)	3.63 (1.822)	3.43 (1.818)	–.57
Control location	3.55 (1.929)	3.70 (1.714)	3.52 (1.732)	–.03
Difference between experimental and control location	+.45	–.07	–.09	–.54
3. Driving under the influence of alcohol				
Experimental location	4.81 (1.522)	4.73 (1.630)	4.46 (1.584)	–.35
Control location	5.10 (1.832)	3.89 (1.696)	3.50 (1.663)	–1.60
Difference between experimental and control location	–.29	+.84	+.96	+1.25
4. Driving without proper lighting				
Experimental location	4.88 (1.927)	4.73 (1.698)	4.47 (1.834)	–.41
Control location	5.19 (1.682)	4.32 (1.944)	4.46 (1.709)	–.73
Difference between experimental and control location	–.31	+.41	+.01	+.32
5. Operating a mobile phone while driving				
Experimental location	4.25 (1.877)	4.49 (1.501)	4.30 (1.726)	+.05
Control location	4.84 (1.899)	3.68 (1.765)	3.94 (1.819)	–.90
Difference between experimental and control location	–.59	+.81	+.36	+.95
6. Driving without a helmet when required				
Experimental location	5.44 (1.335)	5.17 (1.521)	5.09 (1.392)	–.35
Control location	5.55 (1.404)	5.03 (1.424)	4.54 (1.743)	–1.01
Difference between experimental and control location	–.11	+.14	+.55	+.66

However, to produce statistically sound results, we have to take account of two important factors that may have biased the findings in Table 2.3. First, our total group of participants is not a true panel, but consists of sets of moped drivers that vary from traffic control to traffic control. Second, the composition of the experimental and control groups is not uniform in all potentially relevant aspects (cf. Table 2.2). At the experimental location, participants, on average, were found to be somewhat younger, from lower income families and the proportion of females was slightly higher. They also had, on average, committed somewhat more

offenses, experienced somewhat more traffic controls and were sanctioned somewhat more frequently in the previous 12 months. Regression analysis can help to control for these differences.

More specifically, we estimate the following equation:

$$PPA_i = b_0 + b_1 location_i + b_2 subperiod2_i + b_3 subperiod3_i + b_4 location_i * subperiod2_i + b_5 location_i * subperiod3_i + b_x X_i + \varepsilon_i. \quad (1)$$

Here, the dummy variable *location* distinguishes the experimental from the control condition, while the dummies *subperiod2* and *subperiod3* distinguish the second and third subperiod from the first. The next two variables *location*subperiod2* and *location*subperiod3* are interaction terms, *X* stands for the set of control variables, and ε is the error term. The parameter b_0 is a constant, while b_1 through b_5 are coefficients that express how the average PPA differs from that in the control condition in subperiod 1. Notice that parameters *b4* and *b5* are key to answering our central question (Lechner, 2011). If either or both turn out to be significantly positive, we have evidence that the PPA in the experimental condition has increased relative to that in the control condition.[2]

In the next section we discuss the results of the regressions for the six offense types. After that, we perform a robustness check to see what happens if we change our somewhat arbitrary partitioning of the experimental period.

2 Leaving the control variables apart, the difference-in-difference effect between subperiods 1 and 3 is given by [PPA(Leiden, subperiod 3) – PPA(Leiden, subperiod 1)] – [PPA(Zoetermeer, subperiod 3) – PPA(Zoetermeer, subperiod 1)] = [($b_0 + b_1 + b_3 + b_5$) – ($b_0 + b_1$)] – [($b_0 + b_3$) – b_0] = b_5. In an analogous way, the difference-in-difference effect between subperiods 1 and 2 is given by b_4.

2.6 Results

The first six columns of Table 2.4 present the results of the regressions without control variables[3]. Significant coefficients are denoted by two asterisks on a 5% level, and by one asterisk on a 10% level. Focusing on the interaction terms, we note that the results of the difference-in-difference effects are in line with deterrence theory; they are positive for five out of six offense types and statistically significant for driving under the influence and for operating a mobile phone while driving.

The next six columns of Table 2.4 present the results of the regressions with the full set of control variables.[4] Adding the control variables considerably enlarges the explained variance, but does not in any relevant manner affect the estimates of the difference-in-difference effect. The coefficients of the interaction terms are, once again, positive for five out of six offense types, and statistically significant for driving under the influence and for operating a mobile phone while driving.

Even so, notice that the estimates for the control variables in Table 2.4 are of interest in their own right, as they are fully in line with prior findings on the updating of perceived sanction risks. Having committed a particular type of offense in the previous 12 months starts off downward updating (all coefficients are negative, three of them significantly), as offenders apparently learn that the apprehension risk for that type of offense is lower than initially expected. Actually being sanctioned, on the other hand, leads to upward updating, but less convincingly (all coefficients are positive, but only one is significant).

Overall, our difference-in-difference estimates support the idea that intensified police activity can help to increase perceived probability of apprehension among potential offenders.

3 All regression results presented in this section satisfy the assumptions of OLS, hence the procedure generates unbiased coefficient estimates.

4 To save space we omitted in Table 2.4 the estimates for the demographic and socio-economic characteristics, which were mostly insignificant, and followed a rather erratic pattern as far as they were significant.

Table 2.4: OLS regression, dependent variable: perceived probability of apprehension (PPA)

Offense type	Speeding	License	Alcohol	Lighting	Phone	Helmet	Speeding	License	Alcohol	Lighting	Phone	Helmet
Constant	4.129**	3.548**	5.097**	5.194**	4.839**	5.552**	4.715**	3.835**	5.991**	6.172**	5.024**	6.413**
	.298	.320	.294	.323	.313	.276	.569	.615	.535	.582	.603	.499
Location	–.129	.452	–.289	–.309	–.589	–.109	–.125	.542	–.687*	.503	–.799*	–.388
	.376	.405	.372	.408	.396	.344	.388	.425	.375	.406	.414	.351
Subperiod2	–.751*	.154	–1.205**	–.869**	–1.163**	–.525	–.844**	.262	–1.329**	–.582	–1.273**	–.651*
	.403	.433	.399	.438	.424	.368	.422	.459	.407	.441	.454	.378
Subperiod3	–.917**	–.029	–1.597**	–.732*	–.896**	–1.013**	–.971**	.076	–1.617**	–.385	–.949**	–.998**
	.376	.404	.372	.408	.396	.344	.405	.441	.390	.423	.432	.363
Location* subperiod2	.568	–.521	1.130**	.717	1.406**	.251	.442	–.482	1.243**	.544	1.575**	.414
	.504	.543	.499	.547	.530	.458	.511	.558	.493	.535	.547	.456
Location* subperiod3	.828*	–.542	1.253**	.320	.950*	.660	.756	–.582	1.502**	.058	1.075**	.656
	.493	.531	.488	.536	.519	.448	.506	.553	.489	.530	.541	.451
Demographic and socio-economic characteristics							...	...	...	...	...	...
Committed offense in past 12 months							–.377*	–.581	–.582**	–.079	–.231	–.804**
							.213	.355	.240	.273	.268	.328
Experienced control in past 12 months							.178	.074	–.047	–.384*	–.302	–.163
							.212	.231	.206	.221	.227	.187
Was sanctioned in past 12 months							.095	.184	.117	.575**	.339	.194
							.269	.290	.257	.279	.286	.233
R^2	.036	.011	.096	.021	.035	.043	.127	.082	.222	.178	.102	.170
Obs.	299	298	299	298	299	297	299	298	299	298	299	297

* p < .10, ** p < .05

However, the estimates deserve closer scrutiny as they are not uniform across all offense types. Most convincing are the results for *driving under the influence of alcohol*, for *operating a mobile phone while driving* and, albeit to a lesser degree, for *driving with a higher top speed than allowed*. Notice that these are the three offense types that are most common among our respondents, which makes the sanction risk more salient for them. This salience is reinforced by the relatively high official fines for these types of offences. Moreover, these types are the main focus of the traffic controls and can be easily detected, making it less likely that violations will go undetected

The other offense types apparently gave respondents relatively less cause for concern. As to *driving without proper lighting* it should be noted that all traffic controls were performed in daylight. Improper functioning of the moped lighting was not always checked; and if the traffic law violation was detected most respondents got away with a warning. This will have weakened the impact of the intensified traffic controls since, for many drivers, the actual probability of apprehension for driving without proper lighting had not increased.

For *driving without a helmet when required* we also found an upward effect of the policy change that was not statistically significant. Of course, not wearing a helmet is most easily detectable by the police. But it should be noted that many of our respondents drove a moped with a top speed of only 25 km per hour that does not necessitate wearing a helmet. Hence, for these respondents it was difficult to relate to the question.

Finally, as to *driving without a valid license or insurance*, most people obey the rule, which is moreover of an administrative nature and of minor relevance. For these reasons it is quite understandable that moped drivers are not really interested in having an up-to-date estimate of their individual sanction risk. Indeed, for this traffic rule the difference-in-difference effect is quite different from the other offense types.

2.6.1 Robustness check

We performed a robustness check to determine whether the results change if we alter the basic assumption of our test to partition the experimental period into three subperiods of two months. See Table 2.5 for the results.

In the first additional regression we merged the last four months of the experimental period, because the regression results in Table 2.4 suggested that the difference-in-difference effect between the second and

third subperiod of two months did not differ much after all. Indeed, the results generally carry over, and the explained variance declines only marginally (with F-test values ranging from .3 to .7, indicating an insignificant difference).This suggests that the first period of two months has been long enough for the moped drivers in Leiden to find out, either by personal experience or from hearsay, that the traffic controls were intensified and to adapt their xperceived probability of apprehension accordingly.

To test this tentative conclusion, we ran a second additional regression where the experimental period was partitioned in two equal subperiods of three months. The results in the second part of Table 2.5 make clear that this alternative partitioning does not fit the data nearly as well as the partitioning in the first part of the table. The difference-in-difference effects lose their statistical significance, and the explained variance decreases. A very similar finding is obtained if the discontinuous partitioning of the experimental period is replaced by a continuous variable representing the duration of time since the start of the policy change.[5]

Apparently, the updating of the PPA's is a gradual process that is centered within the first two months, and does not prolong afterwards. Hence, we conclude from our data that a two month period has been sufficient for the policy change to become common knowledge and to affect the perceived probability of apprehension.

5 For reasons of space, the regression results are not reported here in detail.

Table 2.5: OLS regression, dependent variable: perceived probability of apprehension (PPA), alternative partitioning of the experimental period

	Subperiod 1: two months, subperiod 2: four months						Subperiod 1: three months, subperiod 2: three months					
Offense type	Speeding	License	Alcohol	Lighting	Phone	Helmet	Speeding	License	Alcohol	Lighting	Phone	Helmet
Constant	4.704**	3.862**	6.008**	6.180**	5.013**	6.434**	4.135**	4.060**	5.167**	5.838**	4.195**	6.005**
	.566	.613	.533	.581	.601	.498	.495	.530	.468	.505	.524	.427
Location	–.125	.543	–.685*	.505	–.801*	–.385	.244	.428	.200	.108	.063	.007
	.387	.424	.374	.405	.414	.350	.282	.305	.273	.292	.304	.248
Subperiod2	–.911**	.155	–1.489**	–.477	–1.095**	–.843**	–.473	–.070	–.845**	–.043	–.214	–.604**
	.370	.403	.356	.386	.396	.333	.322	.347	.312	.334	.346	.282
Location* subperiod2	.597	–.511	1.388**	.305	1.316**	.556	.247	–.458	.448	–.313	.213	.192
	.449	.491	.433	.470	.481	.403	.408	.440	.396	.424	.439	.357
Demographic and socio-economic characteristics	...	...	...	...	...	...	...	...	...	...	...	...
Committed offense in past 12 months	–.364*	–.589*	–.583**	–.086	–.224	–.800**	–.330	–.601*	–.547**	–.093	–.146	–.797**
	.211	.354	.238	.272	.266	.327	.212	.352	.242	.272	.270	.326
Experienced control in past 12 months	.178	.073	–.048	–.384*	–.302	–.164	.162	.061	–.104	–.414*	–.348	–.188
	.211	.230	.205	.221	.226	.186	.213	.229	.208	.221	.230	.186
Was sanctioned in past 12 months	.112	.178	.133	.547**	.307	.208	.110	.198	.153	.586**	.333	.217
	.267	.288	.254	.277	.284	.231	.271	.289	.259	.278	.290	.233
R^2	.125	.079	.220	.175	.099	.166	.113	.086	.199	.175	.072	.168
Obs.	299	298	299	298	299	297	299	298	299	298	299	297

* p < .10, ** p < .05

2.7 Discussion and conclusion

The current study used a field experiment to test whether intensified police control positively affects the perceived probability of apprehension. Our experimental set-up has a number of merits. Firstly, through the cooperation of the police we were able to study an actual change in enforcement policy. Secondly, the intensity of traffic controls was varied in a structured way so that the objective local probability of apprehension increased on one location vis-à-vis the other. There were no measurement problems and ambiguities involved as with the concept of the arrest risk used in other studies. Thirdly, the offenses at stake were shown to be well within the awareness space of our moped drivers. Finally, by using two comparable locations, we were able to study the difference in the development of the subjective probability of apprehension over time as a result of the difference in the intensity of the moped traffic controls. This difference-in-difference approach has the merit that it automatically controls for biases that may result from permanent and stable differences between the experimental and control groups as well as from trends over time that are due to other factors. Indeed, adding a series of control variables to our regression equations did not materially affect the difference-in-difference estimates.

Our findings indicate that intensified police control, as expected, has a positive influence on the perceived probability of apprehension for certain types of offences. For frequently committed and easily detectable offenses that are regularly checked the increase in control intensity caused an upward revision of the perceived probability of apprehension. This refers to driving under the influence of alcohol, operating a mobile phone while driving and, albeit to a lesser degree, driving with a higher top speed than allowed. For offenses that only few drivers commit such as driving without a valid license or insurance or driving without a helmet (since for a large group of drivers this requirement does not apply), the results show no significant effect of the increase in intensity. For driving without proper lighting, an offense for which the control intensity was not actually increased (as all controls took place in daylight), the results also show no effect.

Our results are relevant, since prior research did not find conclusive evidence of a relationship between police control and the perceived probability of apprehension. In our case, the findings testify to the

existence of such a link. The effect, moreover, is quite substantial as the perceived probability of apprehension for speeding, operating a mobile phone and alcohol abuse while driving a moped increases by 0.8 till 1.5 point on a 7 point-scale, within a period of two months after the onset of the increase of the enforcement efforts.

The fact that we, in contrast to previous studies, find a positive relation between policy control and the perceived probability of apprehension may be explained by a number of factors. Firstly, our field experiment may have enabled us to more specifically determine cause and effect in the relationship between objective and perceived sanction risks by excluding other possible influences. Secondly, as potential offenders are likely to be most receptive to police activities in their immediate surroundings, this study focused on the local probability of apprehension. Thirdly, as the large majority of moped drivers is susceptible to minor violations of the traffic rules, it is in their personal interest to update their perceived sanction risk upon signals of changes in police enforcement efforts.

Although our approach yields relevant insights, our study has some limitations. First of all, our study regards minor offences. The findings cannot be directly transformed to more serious crimes. Setting up the field experiment required substantial deliberation and coordination, both on the part of the police and the researchers, to get the field work underway. It is not easily imagined how a comparable field experiment could be organized around more serious crime. Another limitation of our approach that deserves attention is the fact that our set of participants is not a true panel. As a consequence, it is not possible to follow the perception updating of each individual moped driver over time. Hence, we also cannot study in some depth what sets the updating process in motion: personal experience or hearsay from friends or digital media. Follow-up research with the use of a true panel would be an interesting next step to gain insight in this process.

3 The Influence of Police Treatment and Decision-making on Perceptions of Procedural Justice: A Field Study■

Abstract

Objectives: This study examines whether police behaviour that signals higher uality of treatment or decision-making leads to higher perceived procedural justice.

Methods: Analyses are based on data collected during police traffic controls of moped drivers in two Dutch cities over a period of six months. Police behaviour was measured through systematic social observation (SSO), and data on perceived procedural justice were collected through face-to-face interviews immediately after the encounters.

Linear regression analysis with bootstrap estimates was used (n=218), with an overall perceived procedural justice scale as the dependent variable in all regressions. Independent variables included an overall observed procedural justice index and four separate scales of police treatment and decision-making.

Results: We find no evidence that police behaviour that signals fairer treatment or decision-making leads to higher perceived procedural justice.

Conclusions: Our findings add to the currently very limited empirical evidence on an important question, and raise questions about a central idea, that more procedurally just treatment and decision making by authorities leads to an increase in perceived procedural justice and enhanced compliance. The first of these requires more research.

■ This chapter is based on: Terpstra, B. L., & van Wijck, P. W. (2021). The Influence of Police Treatment and Decision-making on Perceptions of Procedural Justice: A Field Study. *Journal of Research in Crime and Delinquency*.

3.1 Introduction

In recent years, an increasing number of studies have been published on the fairness of procedures used by the police and other authorities. Overall these studies find that if citizens feel that they are treated more fairly by legal authorities, they ascribe more legitimacy to justice institutions and tend to be more inclined to abide by the law and to cooperate (Murphy, 2005; Tyler, 1990; Winter & May, 2001). The research on this relationship and the fairness of these procedures, termed 'procedural justice' (Cropanzano & Ambrose, 2001), suggests that perceptions are based on two related components: quality of treatment and quality of decision making (Blader & Tyler, 2003; Gau, 2013; Reisig et al., 2007; Reisig & Lloyd, 2009; Sunshine & Tyler, 2003; Tankebe, 2009b; Tyler, 1990, 2003). The research seems to imply that an improvement in the quality of treatment and decision-making by police officers leads citizens more likely to view the police as a legitimate institution, and in turn, are more likely to comply with the law and cooperate with police.

However, studies on procedural justice and compliance are generally based on survey data, so refer to perceived procedural justice rather than to actual treatment and decision-making by the police, thus essentially being about what individuals say about how they were treated rather than being about how they were actually treated, so this conclusion cannot be clearly drawn. Although one would expect that higher quality of treatment and decision-making results in higher perceived procedural justice, research on the relationship of actual behaviour to perceptions of it is limited (Nagin & Telep, 2017). Establishing whether actual police treatment and decision-making influence perceived procedural justice, requires study of the relationship between data on police behaviour and data on citizen perceptions. Due to the labour-intensity of the field-research necessary for this, the current body of research on this relationship is very limited and, in the studies that exist, the results are not consistent (Nagin & Telep, 2017). This inconsistency leads to fundamentally different conclusions. Mazerolle et al. (2013), for example, conclude that short police-citizen interactions in traffic stops can be highly influential on perceptions of procedural justice, while Worden and McLean (2017) conclude that it would be surprising if one single interaction such as a traffic stop materially altered perceptions of procedural justice.

The main purpose of the present study is to extend the research on the relationship between police behaviour and perceptions of procedural justice by answering the following research question: to what extent does police behaviour that signals higher quality of treatment or decision-making lead to higher perceived procedural justice? To answer this, we investigated interactions between police officers and citizens at police traffic controls of moped drivers in two Dutch cities over a period of six months, using instruments derived from previous studies to collect data on both perceived procedural justice and on treatment and decision-making by police officers. Data on perceived procedural justice were collected using questionnaires taken from the literature (Gau, 2013; Jackson, Bradford, Hough, Myhill, et al., 2012; Sunshine & Tyler, 2003; Tyler, 1990), and data on actual treatment and decision-making were collected using a systematic observation protocol taken from the literature (Jonathan-Zamir et al., 2015).

In the next section, we present a short review of previous research on perceived procedural justice and the relationship of these perceptions with the quality of treatment and decision-making by the police. Following that, we present a more detailed description of the current study, a description of the data and the plan of analysis, the results, and conclude with a discussion of the implications and limitations.

3.2 Prior research

This section presents an overview of prior research regarding the relation between variations in the quality of treatment and decision-making and perceived procedural justice. Generally, a distinction is made between four ingredients of procedural justice: (1) participation, (2) neutrality, (3) dignity and respect and (4) trust in the motives of the police.

First, we discuss two studies that systematically observed the four ingredients and constructed a procedural justice index (Dai et al. (2011), Jonathan-Zamir et al. (2015)). The strength of these studies is that an observation protocol is used and that a validated instrument is developed. The weakness is the lack of a subjective assessment of procedural justice.

Second, we discuss three experimental studies investigating the relation between police behaviour and perceptions of procedural justice (Mazerolle et al. (2012), MacQueen and Bradford (2015), Sahin et al. (2017)). These studies compare an explicitly procedural just treatment with a business-as-usual treatment. For the procedural just treatment, police officers use a concise script. The strength of the studies is the explicit experimental design. An important weakness is the use of a short script, implying that there was limited capacity to capture the full range of a procedurally just encounter.

Third, a study that combines observational data and data on perceptions of procedural justice (Worden and McLean (2017)) is discussed. The combination of these types of data is the strength of this study. The main weakness is that data on perceptions of procedural justice are based on a survey administered after 2 to 5 weeks. This led to a low response rate and potentially a less accurate reproduction of the encounter.

This study aims to build on the strengths of previous studies while avoiding the weaknesses.

3.2.1 The role of procedural justice

Demonstrating that people are more willing to defer to unfavourable court decisions when they feel that the court procedures used to arrive at these outcomes are perceived as fair, Thibaut and Walker (1975) discussed the meaning of procedural justice in terms of control over the outcome. In their instrumental model, people seek maximal attainment of favourable outcomes and prefer fair procedures because these procedures are most likely to provide favourable (economic) outcomes in the long run (Cropanzano & Ambrose, 2001).

Lind and Tyler (1988) proposed a different view on the role of procedural justice. In their group-value model, a procedurally just treatment emphasizes the perception of a shared group membership; and how authorities communicate with members of a group conveys information about the status of those members (Smith et al., 1998; Tyler & Lind, 1992). Here, a procedurally just treatment sends the message that people are valued by society (Lind & Tyler, 1988), strengthening the justification for obedience to an authority. The acceptance of an authority, or more specifically, the 'belief that legal authorities are entitled to be obeyed and that the individual ought to defer to their judgments', is known as legitimacy (Tyler & Huo, 2002, p. xiv). Legitimacy, in turn, leads to more

respect for laws, rules and regulations issued by the authority, and the obligation to comply with these laws and cooperate with authorities (Blader & Tyler, 2003; Jackson, Bradford, Hough, & Murray, 2012; Sunshine & Tyler, 2003; Tyler & Fagan, 2006).

Many studies confirm the importance of procedural justice, that people are more inclined to cooperate with the police and abide by the law when they feel treated in a fair, respectful and impartial manner (Hertogh, 2015; Hough et al., 2013; McCluskey, 2003; Murphy et al., 2008; Sunshine & Tyler, 2003; Tankebe, 2009a; Tyler, 2004; Tyler & Wakslak, 2004).

3.2.2 Procedural justice ingredients

Procedural justice is generally thought to be based on information on the quality of treatment and on the quality of decision-making. Quality of treatment involves people's assessments about whether, and to what extent, they believe police treat citizens with dignity and respect, while quality of decision making refers to people's perceptions of police as reaching decisions based on objective indicators such as facts, law, and reason rather than on personal beliefs (Gau, 2011).

Tyler (2004), Schulhofer et al. (2012) and Mazerolle et al. (2014) propose that four essential ingredients make up the quality dimensions of procedural justice. The first is citizen participation in the proceedings prior to an authority reaching a decision. According to Goodman-Delahunty (2010), decision-making processes are viewed as fairer when citizens are given the opportunity to voice their views and opinions. This opportunity is generally characterized as 'participation' or 'voice'.

The second is perceived neutrality of the authority in his/her decision-making, with neutral behaviour signalling that police are playing by the rules set forth in the law, so indicating unbiased decisions and a fair decision-making process (Huq et al., 2011; Tyler, 2004). The third ingredient is whether or not the authority showed dignity and respect throughout the interaction. According to Tyler and Lind (1992), 'dignity and respect' is the core ingredient to procedural justice. The underlying hypothesis is that when people are treated with respect, politeness and dignity, evaluations of fair treatment, so of procedural justice, improve. The fourth ingredient is whether or not the authority conveyed trustworthy motives. Tyler (2004, 2008) proposes that citizens infer the fairness of police treatment from the motives they are able to understand from what they observe. In this reasoning, when an authority shows

care for the wellbeing of a citizen and society at large, its treatment is likely to be viewed as fairer.

3.2.3 Police behaviour and perceived procedural justice

As the field-studies necessary to study the relationship between police behaviour and perceptions of procedural justice are labour-intensive, studies investigating police behaviour in terms of the four procedural justice ingredients are scarce.[1] There are, however, a few. The first, a study by Dai et al. (2011), found that, in terms of police demeanour and citizen voice, the impact of procedurally fair behaviour of the police was to significantly increase citizen behaviours of respect and compliance towards the police (though the impact of other procedurally just behaviour by police had a less consistent effect on citizen behaviour). The second study, conducted by Jonathan-Zamir et al. (2015), of 233 police-citizens encounters between June and December 2011in Everdene, a small suburban American city, used an observation protocol to systematically observe the four ingredients of procedural justice, (1) participation, (2) neutrality, (3) dignity and respect and (4) trust in the motives of the police. Based on the scores on these categories, the authors develop an "overall procedural justice index". As they found this index correlates significantly with observed satisfaction with the police handling of the situation, they argue it supports the validity of their measurement approach.

The results from Dai et al. (2011) and Jonathan-Zamir et al. (2015), that procedural justice increases satisfaction and cooperation with the police, are similar to the studies based on survey instruments. Both studies, however, lack subjective survey assessments on procedural justice, making it impossible to investigate to what extent higher quality in treatment and decision making by the police leads to higher perceived procedural justice.

The relation between police behaviour and perceptions of procedural justice has also been investigated in a number of experimental studies. The first is the Queensland Community Engagement Trial (QCET) by Mazerolle et al. (2012). The second is a replication of the QCET study performed by MacQueen and Bradford (2015), the Scotland Community Engagement Trial. The third was an experiment conducted by Sahin et al. (2017) with the help of Turkish police.

1 For a good overview, see Jonathan-Zamir *et al.* (2015).

The studies focus on police behaviour during traffic controls. The setting in the three studies is slightly different: Drivers at Random Breath Test stationary operations (a routine-alcohol check), drivers stopped at routine vehicle stops, and drivers stopped by traffic officers for speeding violations.

The three studies are characterized by an experimental design. The experiment group received a "procedurally just" treatment based on a concise script, and the control group received a "business-as-usual" treatment. To investigate differences in perceived procedural justice, surveys were used. In the first two studies the survey was distributed to all drivers at the end of the encounter and the drivers were also provided with a stamped address envelope and asked to return the survey. In the last study drivers were interviewed after completion of the traffic stop.

The studies lead to contrasting results on the relation between police behaviour and perceptions. Mazerolle et al. (2012) and Sahin et al. (2017) find that drivers in the procedural justice treatment condition scored significantly higher on perceived procedural justice than the drivers in the business-as-usual condition.[2] MacQueen and Bradford (2015) however, find that procedurally-just police vehicle stops decreased citizen trust in police officers and reduced satisfaction with police conduct compared to routine police vehicle stops. One potential explanation for the difference in the findings, is the that in the first two studies drivers were stopped at routine checks, whereas in the last study drivers were stopped by traffic officers for speeding violations. The contrasting results can also be explained by a difference in policing context between the different countries.

But it also draws attention to some important lessons for research. Traffic controls, such as alcohol checks, generally lead to short encounters between drivers and police officers. It appears to be very difficult to incorporate the full range of the key procedural justice ingredients into a short experimental script. To use of extensive scripts incorporating variations in the ingredients, would lead to encounters that take substantially longer than business-as-usual. Even with concise scripts, the duration of the fair treatment tends to be longer than the duration under BAU conditions, hence (small) differences in perceived proce-

2 Different articles based on the same data of the Queensland Community Engagement Trial show comparable results (Mazerolle et al., 2013; Murphy et al., 2014; Sargeant et al., 2016).

dural justice between the groups may be caused by the duration factor rather than the procedural justice elements from the script. Another lesson from these studies is that the use of paper surveys leads to a low response rate and tends be biased towards no-offenders. Furthermore, if there is a time-interval between the event and the survey, that may affect the answers in the survey.

Overall, the experimental studies do not appear to be very successful in combining data on the full range of the key ingredients of procedural justice and data on perception of procedural justice.

There appears to be only one study that successfully combines data on the key procedural justice ingredients and data on perceived procedural justice. This is a study by Worden and McLean (2017).[3] During police patrols in Schenectady, New York, survey data acquired from 411 citizens combined with observational data made with in-car cameras, revealed a significant relation between scales that represent the officers' procedural (in)justice behaviour and perceptions of procedural justice, although the variation in police behaviour only accounted for 12% percent of the variations in procedural justice perceptions. When further controls are added for the nature of the situation and officers' exercise of authority, the estimated effects of the relationship between procedural justice behaviour and perceptions of procedural justice disappear, though procedural injustice still has a small effect.

That study also has some limitations. An important limitation is that the low response rate (10.3%) may lead to sampling bias. Furthermore, the surveys were administered two to five weeks after the encounter with the police, making it difficult to determine if the survey scores are an accurate reproduction of the details of the encounter. It is problematic to determine if the variations in perceptions found were caused by the recent encounter with the police or were more representative of other influences, such as opinions from peers when talking about the encounter or pre-existing attitudes and beliefs formed on the basis of previous encounters with the police, (social) media, friends and family, or other more recent events.

3 A study by Willits et al. (2019) also combines procedural justice behaviour data with survey data on procedural justice but lacks statistical power due to the limited number of respondents.

3.3 The current study

As discussed above, there is little evidence that higher quality of police treatment and decision-making leads to higher levels of perceived procedural justice. By combining data on the essential ingredients of procedural justice of police behaviour with data on citizen perceptions of procedural justice, our study investigated the relation between treatment and decision-making by police officers on the one hand, and perceived procedural justice on the other. Following Mazerolle et al. (2012), we focused on police-citizens encounters at routine traffic controls. In consultation with the Traffic department of The Hague unit of the Dutch National Police, the options to set up a field study were assessed. The option of conducting a classic experiment with the full range of the key procedural justice ingredients were limited because it would involve either longer or more varied scripts, both of which would increase the chance of within group variation in the delivery of the treatment. Since we wanted to observe the full range of procedural justice ingredients of police behaviour, we used the systematic social observation (SSO) method used by Jonathan-Zamir et al. (2015) to observe treatment and decision-making. In other words, rather than systematically varying the treatment of moped drivers, we systematically observed actual variations in police behaviour. We did this by using four previously validated scales of police treatment and decision-making extracted from earlier work. Because our observations took place in a setting with encounters substantially longer in duration than random breath tests studied by Mazerolle et al. (2012), we were able to study the full range of procedural justice ingredients.

Information on perceived procedural justice was gathered through questionnaires, administered directly after the traffic controls.

In summary, our study builds on the scarce empirical research where procedural justice is studied in the context of traffic controls. Specifically, we focus on moped traffic control checks. This enables us to observe the full range of procedural justice ingredients using validated scales. It is, of course, an open question whether the results we find in the context of moped traffic controls can be generalized to traffic controls in general or broader contexts.

3.3.1 Set-up

Our field research focuses on traffic controls of mopeds and their drivers. Mopeds are two-wheeled motorized vehicles that can be operated by persons over 16 years of age with a valid driving license. Dutch traffic law distinguishes two kinds of mopeds: mopeds with a top speed of 25 km per hour that can be operated without a helmet and mopeds with a top speed of 45 km per hour for which wearing a helmet is compulsory.

In the Netherlands, the National Police regularly set up traffic control check-points for mopeds where they check for a number of traffic law violations: driving a vehicle with a higher top speed than allowed, driving without a valid driving license or insurance, driving under the influence of alcohol, driving without proper lighting, using a mobile phone while driving, and driving without a helmet when required. The nature of these routine checks makes them an appropriate setting for SSO-research because they take approximately 5 minutes, thus relatively short but substantially longer than, for example, random breath tests. In addition, the drivers stopped include both compliant and non-compliant drivers, and variation in the length of the encounters is limited due to the fact that all mopeds are thoroughly inspected.

Two different locations were selected for our research: 'Wassenaarseweg' in Leiden and '1ste Stationsstraat' in Zoetermeer. Both these cities are part of the urban agglomeration in the west of the Netherlands, halfway between Amsterdam and Rotterdam. They were selected because of they are comparable in terms of the population of interest (people driving mopeds), the number of moped drivers passing the location, and the average number of traffic violations per driver stopped by the police.

The research was conducted from January 19, 2017 until August 2, 2017. On average 3 or 4 police officers were present at a traffic control check point, and 1 or 2 additional officers driving around the checkpoint in approximately a 2-mile radius. After being stopped or pulled over, drivers were asked for their license and insurance papers. All mopeds were checked for defects. After visual inspection, all mopeds were placed on a roller test bench to determine the top speed. In the case of detection of a traffic law violation, drivers received a sanction.

During the above standard procedure, the interaction between police officers and drivers was observed by researchers of Leiden University. After the above procedure finished, the drivers were informed by the

police that researchers of Leiden University were present at the location, inviting them to participate in a survey.

3.3.2 Perceived procedural justice

Perceived procedural justice was measured directly after the traffic control check, using a survey conducted by a pool of 8 trained interviewers, student-assistants studying criminology or law at Leiden Law School, three or four interviewers per control. All interviewers received 4 hours of training on how to conduct the survey and how to interpret the questions.

To ensure that participants were able to disclose all information, the survey, which were administered through verbal interviews on average 7 minutes long, were conducted approximately 50 meters from the traffic control check. The survey covered a wide range of topics in the field of procedural justice, using questions derived from previous research (Gau, 2013; Sunshine & Tyler, 2003; Tyler, 1990), related both to the traffic control that had just taken place as well as to previous encounters with the police. Most responses were measured using a 7-point Likert scale (answers ranging from 1 to 7, where 1 is 'totally disagree' and 7 'totally agree'). The survey was tested and slightly modified after two pilot traffic controls in November 2016. The main reasons for the modifications were that two items were not representative of the situation of moped checks, one item was difficult to interpret for drivers, and two items were highly correlated with other items ($r > .95$, $p < .001$) so, due to time restrictions, were omitted.

To construct an overall perceived procedural justice scale, we calculated the average of the following six (Likert scale) items: (1) "The officer treated me with respect", (2) "The officer treated me fairly", (3) "The officer took the time to listen to what I had to say", (4) "The officer treated me the same as other people", (5) "The officer made decisions on the basis of the facts of the situation, and not on her/his personal opinions", and (6) "The officer explained her/his actions and decisions to me".

3.3.3 Police treatment and decision-making

The observations of treatment and decision-making by the police were performed using a systematic social observation protocol (SSO) by student-assistants who also conducted the surveys. To allow observers

to overhear conversations without influencing them, for each check, two to three observers were placed at a distance of at least 5 meters, on average 7 meters. All observers received 6 hours of training on how to score the systematic observation-protocol. To reduce the potential problem of different scoring methods, inter-observer differences were intensively studied and discussed during this training. These differences were tested during the pilot traffic controls in November 2016 and found to be negligible. This was confirmed during the main phase of the field research, in which some drivers were randomly selected to be observed by multiple observers. Due to the nature of the checks, all interactions between police and drivers lasted longer than one minute.

The observation protocols are derived from Jonathan-Zamir et al. (2015), and bear similarities to protocols used by Worden and McLean (2017) and McCluskey et al. (2003) applied to traffic encounters as well as to a broader range of police-citizen encounters. Based on decades of SSO research, Jonathan-Zamir et al. (2015) developed a systematic observation protocol that assesses items that aim to capture police behaviours that make citizens feel that they have been treated fairly.[4] Based on these items, they constructed four scales of police treatment and decision-making, based on the four essential ingredients that, according to previous research, constitute the quality dimensions of procedural justice: (1) participation, (2) neutrality, (3) dignity and respect and (4) trust in the motives of the police. In the following sub-sections, we discuss these four scales in more detail.

Participation

Jonathan-Zamir et al. (2015) based their construct of participation on observable choices made by police-officers. Following their definition and observation-items, our observers recorded whether citizens were asked for information or viewpoints, and whether they provided information or viewpoints. The 'interest' the officer showed in the information provided was also recorded by looking at confirmatory

4 By following the method by Jonathan-Zamir et al. (2015), we recognize that the focus is on behaviours that indicate procedurally just treatment. Although previous research has shown that negative experiences have a greater impact on judgements of encounters with the police (Skogan, 2006), our study is not aimed at procedural injustice, rather we investigate, using previously validated instruments, the extent to which police behaviour that signals higher quality of treatment or decision-making leads to higher perceived procedural justice.

and non-confirmatory behaviours such as nodding, humming, summarizing, carrying out other activities during the interaction and ignoring information provided. The items were coded and grouped as follows:

> *Participation = The officer asked for information/viewpoint (0 = no; 1 = yes) + The citizen provided information/viewpoint (0 = no; 1 = yes) × The officer expressed interest in the information/viewpoint (on a scale ranging from 0 to 3, where 0 = dismissive listener; 1 = inattentive listener; 2 = passive listener; 3 = active listener, as defined in the coding protocols).*

This formula resulted in a participation scale ranging from 0 (very low) to 4 (very high).

Neutrality

To construct a measure of neutrality, Jonathan-Zamir et al. (2015) used three types of items: the desire for a balanced information-gathering process, the absence of any obvious indication of decision-making bias based upon personal characteristics, and transparency of decision-making by articulating the reasons for the officer's choices. In our study, we used the same observation-items. For example, if an officer explains to a citizen why the traffic control is being conducted, or explicit statements are made that stress the neutrality of the officers in question. We constructed the neutrality measure as follows:

> *Neutrality = Officer indicated s/he would seek all viewpoints about the matter at hand (0 = no; 1 = yes) + Officer indicated s/he would not make a decision about what to do until s/he had gathered all the necessary information (0 = no; 1 = yes) + Officer did not indicate that his/her decisions in this situation were influenced by the personal characteristics (race, age, sex) of anyone present (0 = no; 1 = yes) + Officer explained why the police became involved in the situation 0 = no; 1 = yes) + Officer explained why s/he chose to resolve the situation as s/he did (0 = no; 1 = yes).*

This formula resulted in a neutrality scale ranging from 0 (very low) to 5 (very high).

Dignity and respect

The scale measuring dignity and respect was originally constructed by Jonathan-Zamir et al. (2015) with independent measures of respect and disrespect. Due to the lack of observations in the disrespect category, they created a single dignity measure of respect. We extended this by observing speech and gestures indicating (dis)respect, such as using a loud voice, interruptions and belittling remarks as indications of disrespect and greetings, compliments, jovial gestures, saying 'thank you', good-humoured and friendly remarks as indications of respect. The duration or frequency of such actions during the encounter (brief/intermittent/dominant) was also noted, resulting in the following scale:

> *Dignity = To what extent did the officer behave respectfully toward the citizen? (on a scale ranging from 0 to 4, where 0 = Officer showed disrespect; 1 = Officer showed neither respect nor disrespect –'business-like' behaviour–; 2 = Officer showed brief respect; 3 = Officer showed intermittent respect; 4 = Officer showed dominant respect).*

The scale ranges from 0 (disrespect) to 4 (dominant respect), with higher scores indicating higher levels of dignity and respectful behaviours by police officers.

Trustworthy motives: showing care and concern

To construct a concept reflecting trustworthy motives, Jonathan-Zamir et al. (2015) used observation items that note when police officers provide something to citizens that they requested or would unambiguously perceive as beneficial. These behaviours indicate care and concern, reflecting higher levels of trustworthy motives. Police can exhibit such care and concern in several ways: an officer can comfort a citizen, can promise to give the citizen's situation special attention, tell or ask the citizen to call if the citizen's problem recurs, or – at the officer's initiative – provide information or physical assistance, or contact an agency for assistance on the citizen's behalf. The concept is constructed as follows:

> *Trust in the motives of the decision-maker: Showing care and concern = The officer asked the citizen about his/her well-being or asked others in a way that the citizen observed it (0 = no; 1 = yes) + The officer offered comfort or reassurance to the citizen (0 = no; 1 = yes) + The officer provided or promised to*

exert control or influence over another person for the citizen (0 = no; 1 = yes) + The officer filed a report or promised to file a report for the citizen (0 = no; 1 = yes) + The officer acted or promised to act on behalf of the citizen with a government agency or private organization (0 = no; 1 = yes) + The officer provided/arranged or promised to provide/arrange physical assistance to the citizen (0 = no; 1 = yes) + The officer provided or promised to provide advice on how the citizen could handle the situation or deal with the problem (0 = no; 1 = yes).

The scale depicting trustworthy motives ranges from 0 (very low) to 7 (very high).

Overall observed procedural justice behaviour index

Following Jonathan-Zamir et al. (2015), we also developed a composite index based on the four separate indices of police treatment and decision-making described above. This composite index is intended to be a broad assessment of the officer's behaviour, its antecedents and its outcomes. The four separate scales were averaged into an overall observed procedural justice index.

3.4 Description of the data

In the period between January 19, 2017 and August 2, 2017, 687 moped drivers were stopped at traffic control checks, 299 of whom participated in the survey (43.5% response rate). Of the 687 drivers stopped, 590 were observed. Not all drivers who participated were also observed as, on several occasions, the number of drivers stopped exceeded the number of observers present. Ultimately, 218 of the collected surveys could be matched to an observation and were included in our sample. Of these matches, 210 drivers were observed once, and four drivers were observed twice. Not all respondents who completed the interview answered every question. More specifically, with only four exceptions, the missing data relates to the questionnaire item about the police officer taking the time to listen, which was unanswered in 25 of 218 questionnaires. According to Little's multivariate-test, ($\chi^2(26) = 12.740$, $p = .986$), for all missing data, the likelihood of missingness depends neither on the observed data nor on the missing data. Consequently, due to the reduced sample size, ignoring missing data will increases the SE of the

sample estimates rather than introducing bias (Dong & Peng, 2013). To respond to this, missing data was substituted using the expectation maximization algorithm (Dempster et al., 1977), based on all questionnaire-items on procedural justice and 50 iterations. This algorithm provides unbiased parameter estimates and improves statistical power of analyses when only a very small part of that data is missing (in this case 2.2%) (Enders, 2001; Scheffer, 2002).[5]

The details of the observed population who participated in the survey are presented in Table 3.1. Interestingly, the descriptives of the total observed population (N=590) are similar to the descriptives of the sample that was observed and participated in the survey (N=218). For example, in the total observed sample, the ratio of offenders to non-offenders was 18.1%, compared to 21.1% in the sample of observed drivers who also participated in the survey ($\chi^2(1) = .192$, $p = .340$); and the ratio of males to females in the total observed sample was 58 %, compared to 56.4% in the sample that also participated in the survey ($\chi^2(1) = .155$, $p = .693$). Kruskal-Wallis Tests were also conducted to examine whether observed police behaviour differed in the total observed population compared to the sample with drivers that were observed and participated in the survey. No significant differences in participation ($\chi^2(1) = 2.171$, $p = .141$), neutrality, ($\chi^2(1) = .0951$, $p = .758$), dignity and respect ($\chi^2(1) = .120$, $p = .729$), and trustworthy motives ($\chi^2(1) = .594$, $p = .441$) were found. Based on these tests, we conclude that there are no systematic differences between the observed population and the population that participated in the survey.

5 Alternative methods of handling missing data, such as full information maximum-likelihood (FIML) and multiple imputation (MI), have been applied to the data and resulted in comparable results. EM was chosen because it allows for data imputation independently of model estimations.

Table 3.1: Descriptive statistics of the sample of drivers that were observed and participated in the survey (N=218)

Variable	Score
Age in years: mean (SD)	33.0 (16.1)
Sex: % male	56.4
Person with a migration background: %[a]	17.1
Household income: median class [b]	€ 20,000-30,000
Education: median class [c]	High school 2
Sanctioned by police during current traffic control: % yes	21.1

a. The Central Bureau of Statistics in the Netherlands defines a person with a migration background as someone with (at least) one of his/her parents born abroad.
b. Income was measured by asking respondents to classify their gross household income in 2016: € 0-10,000, € 10,000-20,000, € 20,000-30,000, € 30,000-50,000, € 50,000+ and unknown.
c. With respect to their education respondents were asked about the highest achieved level of schooling, which was then classified as: elementary, vocational, high school levels 1, 2 and 3, college/university and unknown.

3.4.1 Perceived procedural justice

The dimensionality of the perceived procedural justice scale was examined using different techniques. Table 3.2 shows the correlations and descriptives of the items on perceived procedural justice used in the questionnaire, together with the overall procedural justice scale. The mean inter-item correlation for the items is .453 (range: .225 to .798). Mean-item total correlation is .737 (range: .645 to .803). This suggests that all elements are well presented by the overall scale. A third indicator used to gauge the internal consistency of the perceived procedural justice scale, Cronbach's coefficient alpha, is .819 in this case. Acceptable values of alpha range from 0.70 to 0.95 (Nunnally & Bernstein, 1994).

Factor-analytic techniques were used to further investigate whether the six survey items loaded on the perceived procedural justice scale. We used principal axis factor analysis because it corrects for measurement error by using more conservative score reliability estimates (Velicer & Jackson, 1990). The Kaiser-Meyer-Olkin measure of sampling adequacy is .817, indicating that the data are appropriate for factor-analytic techniques (Comrey & Lee, 2013). The factor results indicate a one factor solution: a single factor with an eigenvalue (λ=3.295) above the Kaiser-Guttman criterium (λ>1) and a scree plot supporting this conclusion. The techniques we used to investigate the dimensionality of the perceived procedural justice scale all indicate one dimension.

Table 3.2: Correlation matrix and descriptive statistics of the six items of perceived procedural justice and the perceived procedural justice scale (N=218)

	1	2	3	4	5	6	7
1. Perceived procedural justice scale	1						
Items							
2. The officer treated me with respect	.768*	1					
3. The officer treated me fairly	.803*	.758*	1				
4. The officer took the time to listen to what I had to say	.794*	.552*	.565*	1			
5. The officer treated me the same as other people	.645*	.324*	.360*	.432*	1		
6. The officer made decisions on the basis of the facts of the situation, and not on her/his personal opinions	.740*	.437*	.542*	.529*	.450*	1	
7. The officer explained her/his actions and decisions to me	.671*	.380*	.412*	.444*	.225*	.390*	1
Range	2.33-7	1-7	1-7	1-7	1-7	1-7	1-7
M	6.289	6.42	6.44	6.19	6.18	6.40	6.11
SD	.732	.981	.862	.998	1.121	.864	1.192

* $p < .01$

Figure 3.1 depicts the distribution of the scores on the perceived procedural justice scale, based on the six questionnaire items, showing a negatively skewed distribution with a relatively high mean. Although comparison of this pattern of perceived procedural justice to those reported in previous research on police-citizen contacts is complicated by differences in sampling, for example the reason for contact with the police, overall, it appears that citizens' subjective experiences in our sample are similar to those reported in previous research on routine traffic stops.

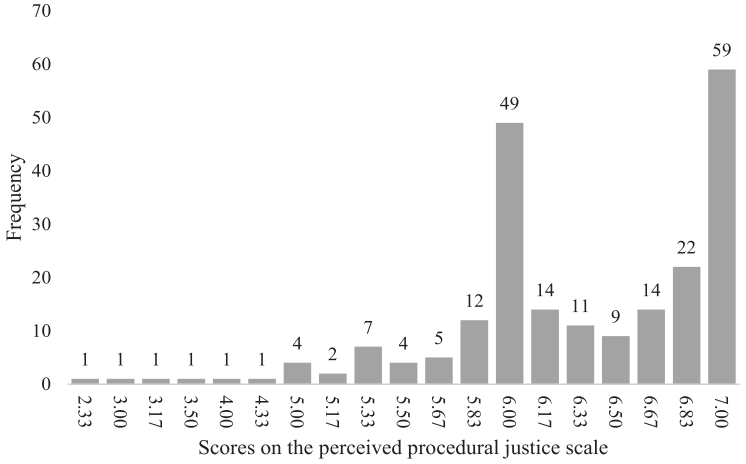

Figure 3.1: Frequency distribution of scores on the perceived procedural justice scale

3.4.2 Police treatment and decision-making

The distribution of the observation-scores of the four categories of police behaviour are shown in Figure 3.2. Most observations of 'participation', are in the categories 'high and very high'. We see no need to alter the construct. The distribution of 'neutrality' has most observations in categories 'very low' and 'low'. In the category 'very high', there is only one observation. For the purpose of our study, we regrouped the categories and merged 'very high' with 'high'. The distribution of 'dignity and respect' shows most of the scores in the category 'dominant respect', a single observation in the category 'brief respect', and the absence of scores in the category 'disrespect'. A more detailed overview of the different items used to construct the four categories of observed police behaviour is provided in Table 3.3. These details do not fundamentally alter the construct. We did merge brief respect with business-like respect.

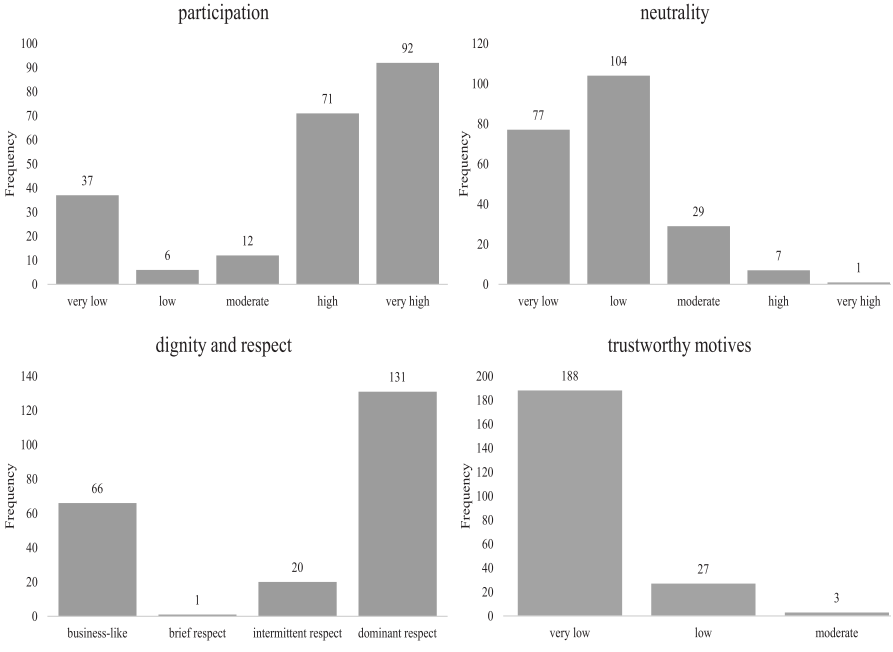

Figure 3.2: Frequency distributions of scores on 'participation', 'neutrality', 'dignity and respect' and 'trust in the motives of the decision-maker: showing care and concern' in police-citizen encounters

The construct of 'trustworthy motives' of the decision-maker is of more concern. In Figure 3.2, we see that the majority of the scores is in the category 'very low'. The reason can be seen in Table 3.3, where we see

that two of the items used in the construct have not been observed in our study. In addition, for the observed behaviours that did occur during our study, we see that the only item of significance concerns advice on handling the situation. Due to the low number of observations in the category 'moderate', we merged this with the category 'low'.

The distribution of the scores on the overall observed procedural justice scale, based on the four separate indices of police treatment and decision-making described above, is depicted in Figure 3.3. Note that that the 'observed procedural justice scale' is based on observations by researchers using an observation protocol, whereas the 'perceived procedural justice scale' is based on perceptions of citizens as revealed in survey research.

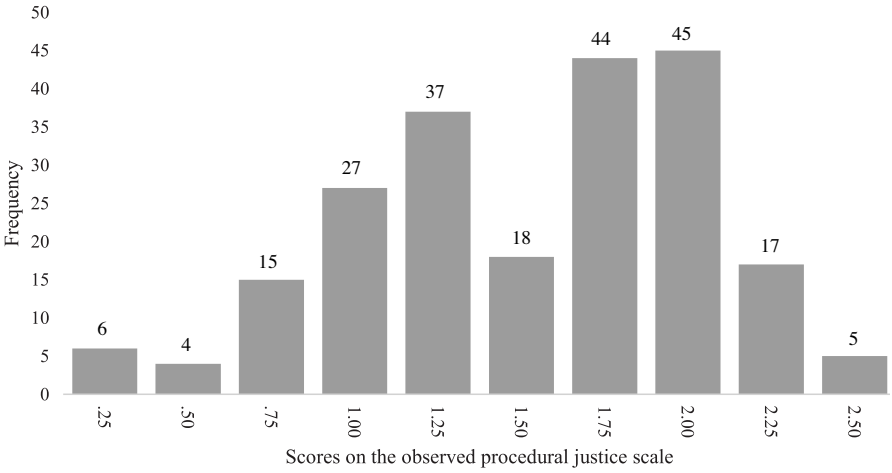

Figure 3.3: Frequency distribution of scores on the overall observed procedural justice scale

Jonathan-Zamir et al. (2015) argue persuasively that, rather than reflecting an underlying construct, the four ingredients form a construct, which implies that they are not expected to develop from a single latent variable. The various behaviours are viewed as tapping different facets of treatment and decision-making, and are not expected to be intercorrelated. Consequently, the dimensionality analysis is restricted to polychoric correlation coefficients for the four constructs of police behaviour together with the overall observed procedural justice scale (Muthén & Kaplan, 1985).

Table 3.3: Descriptive statistics of the individual observation items composing the four categories of police behaviour (N = 218)

	Values	%
Participation		
Officer asked the citizen to provide information/viewpoint	Yes	76.6
Citizen provided information/viewpoint	Yes	81.2
Officer expressed interest in information/viewpoint	Dismissive	.5
	Inattentive	2.8
	Passive	52.7
	Active	44.0
Neutrality		
Officer expressed desire to hear all viewpoints	Yes	5.0
Officer indicated he would not make a decision about what to do until s/he had gathered all the necessary information	Yes	3.7
Officer indicated that his decisions in this situation were influenced by the personal characteristics (race, age, sex) of anyone present (reversed)	Yes	.9
Officer explained why the police carries out routine moped checks	Yes	17.0
Officer explained why s/he chose to resolve the situation ass/he did	Yes	59.3
Dignity and respect		
Officer showed respectful behaviours to this citizen during the encounter	Yes	70.2
Duration of the officer's respectful behaviours	Brief	1.4
	Intermittent	33.5
	Dominant	65.1
Officer showed disrespectful behaviours to this citizen during the encounter	Yes	.0
Trustworthy motives: Showing care and concern		
Officer asked about citizen's well-being	Yes	.5
Officer offered comfort or reassurance to this citizen	Yes	1.8
Officer provided or promised to exert control or influence over another person for the citizen	Yes	.5
Officer filed a report or promised to file a report for the citizen	Yes	.5
Officer acted or promised to act on behalf of the citizen with a government agency or private organization	Yes	.0
Officer provided/arranged or promised to provide/arrange physical assistance to the citizen	Yes	.0
Officer provided or promised to provide advice handling the situation/ problem	Yes	11.9

The results in Table 3.4 show mostly low and insignificant inter-item correlations (range –.074 to .364), and medium to strong item total correlations (range .470 to .793). The Kaiser-Meyer-Olkin measure of sampling adequacy is .461, indicating that, overall, the four constructs have too little in common to warrant a factor analysis (Comrey & Lee, 2013). Since this supports the view that the four ingredients are not reflective of an underlying construct, we find no reason to deviate from the four categories proposed in previous research (Jonathan-Zamir et al., 2015; Schulhofer et al., 2012; Sunshine & Tyler, 2003; Tyler, 2004).

To reflect previous research by Worden and McLean (2017) and research by Jonathan-Zamir et al. (2015), on which we based our observation protocol, we also retain the overall observed procedural justice scale used in their research.

Table 3.4: Polychoric correlation coefficients and descriptive statistics of the four categories of police behaviour and the overall observed procedural justice scale (N = 218)

	1	2	3	4	5
1. Overall observed procedural justice index	1				
2. Participation	.793*	1			
3. Neutrality (revised)	.542*	.191	1		
4. Dignity and respect (revised)	.648*	.319*	–.026	1	
5. Trustworthy motives: care and concern	.470*	.051	.364*	–.074	1
Range		0-4	0-3	0-3	0-1
M		.281	.850	2.300	.140
SD		1.442	.784	.906	.345

* $p < .05$

3.5 Plan of analysis

In order to answer the research question 'To what extent does police behaviour that signals higher quality of treatment or decision-making lead to higher perceived procedural justice?', we used linear regression analysis. The most commonly used regression technique, Ordinary Least Squares (OLS), requires that residuals are random and normally distributed (Field, 2013) but this assumption does not hold true in our analyses. Since a transformation of the data did not solve the problem, we used bootstrapping, a nonparametric approach to effect-size estimation and hypothesis testing that makes no assumptions about the shape of the distributions of the variables or the sampling distribution of the statistic (Efron, 1982).[6] The results presented in the next section are therefore based on 1000 bootstrap iterations using bias-corrected and accelerated (BCa) bootstrap intervals (Efron & Narasimhan, 2020).

6 Different transformations of the dependent variables were also applied, but all possible solutions still violated the normality assumption of normally distributed residuals. Dichotomization of the dependent variable was also considered but not executed because it often yields misleading results (MacCallum et al., 2002).

The dependent variable in all regressions is the overall perceived procedural justice scale. In our first analysis, the independent variables are the four scales of police treatment and decision-making: participation, neutrality, dignity and respect and trustworthy motives. All four scales were coded using dummy variables with the lowest category as the reference category, i.e. for participation, the category 'very low' is the reference category, and four dummy variables represent the categories 'low', 'moderate', 'high' and 'very high'. Similarly, for neutrality and trustworthy motives, 'very low' is the reference category. For dignity and respect, 'business-like' acts as reference category.

If one or more of the estimated parameters of these dummies proves to be significant, it is evidence that variations in treatment and decision-making by police officers affect perceived procedural justice. Based on previous research, we expected the parameters to be positive, i.e. when police officers exhibit more behaviour that transmits signals of fairer treatment and decision-making, we expected perceived procedural justice to increase.

We also performed a second regression in which the independent variable is the overall observed procedural justice index. This index is useful to obtain a broad assessment of the officer's behaviour (Jonathan-Zamir et al., 2015). We expected this relationship to be positive, i.e. when police officers exhibit overall more behaviour that transmits signals of fairer treatment and decision-making, we expected perceived procedural justice to increase.

Both the first and the second regression were performed with and without covariates on age, sex, income, education and a dummy variable that depicts whether or not a driver was sanctioned during the traffic control checks. The sanction dummy was added because previous research has shown that perceptions of procedural justice can be attenuated by the outcome of an encounter with the police (Worden & McLean, 2017).

A statistical power analysis was performed using G*Power 3.1 (Faul et al., 2009) to determine the minimal detectable effect (MDE) identifiable by our study. With an alpha of .05 and power of 0.80, the MDE (f^2) with our sample size (N= 218) ranges between .0363 for the model with the single overall observed procedural justice scale and .0836 for the regression with the four procedural justice scales including covariates.

Thus, depending on the model, we are able to identify small ($f^2 \geq .02$) or medium ($f^2 \geq .15$) effect sizes (Cohen, 1988).

3.6 Results

In this section, we discuss the results of the regressions. We first present the regression results with the four scales of police treatment and decision-making as independent variables, then we present the results of the regressions with the overall observed procedural justice as independent variable. Our results do not support the idea that higher quality of police treatment and decision-making leads to higher levels of perceived procedural justice. In Table 3.5, the results of the regression with the four scales of police treatment and decision-making (Model A) show that most relevant coefficients are insignificant. We find a significant relationship only between neutrality and perceived procedural justice. This specific relationship is not consistent with our expectations. When the neutrality of treatment and decision-making by police officers is low, compared to it being very low, drivers' perception of procedural justice declines. This indicates that drivers perceive a slight improvement in neutrality from the lowest level of neutral behaviour as a signal that they are being treated less procedurally fairly.

Importantly, the proportion of variance of the regression that is explained is relatively small. Only 8.5% of the variation in perception can be explained by the variation in actual treatment and decision-making, and just 4.1% when looking at the adjusted R-squared value. This implies that the vast majority of perception of treatment by the police and, more specifically, perceived procedural justice is determined by factors other than the elements of procedural justice observed in this study.

In model B in Table 3.5, the sanction dummy and demographic and socio-economic characteristics are included.[7] However, the relationships between the added covariates and the perception of procedural justice are all insignificant, causing a larger loss in degrees of freedom

7 For reasons of space, in Table 3.5 we have omitted the estimates for the demographic and socio-economic characteristics, which were mostly insignificant, and followed a rather erratic pattern as far as they were significant.

compared to the loss in sum of squared errors, hence a lower F-value. Adding the covariates to the model does not cause a better fit.

Table 3.5: Regression results with 'perceived procedural justice' as dependent variable and the four scales of police treatment and decision-making as independent variables (N=218)

	Model A						Model B					
					BCa 95% C.L.						BCa 95% C.L.	
	B	Bias	S.E.	Sig.	Lower	Upper	B	Bias	S.E.	Sig.	Lower	Upper
Constant	6.530	–.010	.155	.001	6.238	6.794	6.534	–.012	.218	.001	6.088	6.949
Observed participation low	–.192	.011	.339	.543	–.875	.505	–.149	.026	.276	.569	–.801	.460
Observed participation moderate	.226	.004	.201	.245	–.203	.638	.270	.004	.220	.201	–.197	.707
Observed participation high	–.110	.015	.142	.442	–.425	.240	–.138	.018	.146	.349	–.434	.182
Observed participation very high	–.092	.009	.130	.485	–.326	.199	–.059	.004	.137	.687	–.307	.226
Observed neutrality low	–.301	.004	.103	.011	–.518	–.083	–.301	.013	.111	.018	–.565	–.028
Observed neutrality moderate	.072	.010	.132	.605	–.177	.355	.081	.008	.136	.549	–.192	.381
Observed neutrality high	–.168	.010	.295	.562	–.770	.379	–.063	.008	.309	.843	–.694	.529
Observed respect intermittent	.244	.003	.170	.149	–.089	.563	.256	.000	.177	.155	–.111	.612
Observed respect dominant	–.012	.006	.128	.910	–.298	.284	–.043	.002	.134	.755	–.333	.237
Observed trust in motives low	–.256	–.011	.171	.135	–.627	.044	–.286	–.013	.176	.095	–.655	.012
Demographic and socio-economic characteristics							….	….	….	….	….	….
R^2				.085						.160		
adj. R^2				.041						.050		
F-value				1.925						1.461		
p				.044						.081		

Note. Estimated parameters are based on 1000 bootstrap iterations using bias-corrected and accelerated (BCa) bootstrap intervals.

The results in Table 3.6 show that when we take the overall observed procedural justice index as independent variable, the results do not change. As with the different categories of behaviour, a broad assessment of the officer's behaviour also does not significantly influence perceptions of procedural justice.

Table 3.6: Regression results with 'perceived procedural justice' as dependent variable and the overall observed procedural justice index as the independent variable (N=218)

	Model A						Model B					
					BCa 95% C.L.						BCa 95% C.L.	
	B	Bias	S.E.	Sig.	Lower	Upper	B	Bias	S.E.	Sig.	Lower	Upper
Constant	6.548	.003	.143	.001	6.238	6.857	6.542	.010	.225	.001	6.084	7.036
Overall observed procedural justice	–.163	–.002	.093	.079	–.353	.019	–.155	–.002	.101	.116	–.364	.039
Demographic and socio-economic characteristics							….	….	….	….	….	….
R^2				.013						.084		
adj. R^2				.009						.011		
F-value				2.924						1.156		
p				.089						.306		

Note. Estimated parameters are based on 1000 bootstrap iterations using bias-corrected and accelerated (BCa) bootstrap intervals.

3.7 Discussion and conclusion

A considerable volume of research has shown that citizens are more likely to comply with rules and regulations and to cooperate with the police when they believe that the police act in a procedurally just manner. However, little is known about the relationship between how people are treated and perceptions of procedural justice. Investigating this requires data on both police behaviour and perceptions of procedural justice. We therefore investigated interactions between police officers and citizens, here moped drivers, at police traffic controls in two Dutch cities over a period of six months. We collected data on police behaviour using systematic social observation, and data on perceived procedural justice using a survey administered directly after the traffic controls. Both of the methods, systematic observation and of survey items, were derived from previously validated research.

In police-citizen encounters at routine traffic controls, we found no evidence that police behaviour that signals fairer treatment or decision-making leads to higher perceived procedural justice. Conversely, when police behaviour that signals neutrality, we found that drivers perceive a slight improvement in neutrality from the lowest level of neutral behaviour as a signal that they are being treated less procedurally fairly. Our results on police treatment of moped drivers are in line with previous

research by Worden and McLean (2017) on the relationship between police behaviour and perceptions of procedural justice. Based on a more diverse sample of encounters, they concluded that police behaviour in a single encounter does not substantially influence perceptions of procedural justice. As discussed before, Worden and McLean may have been influenced by the low response rate and by the fact that they gathered their survey data two to five weeks after the interaction between policy officers and citizens. As, on the one hand, memory decay may give rise to random errors and, on the other hand, events after the encounter with the police, such as discussions with peers of the encounter, may influence the recollection of the encounter, we tried to minimize such potential problems by administering our surveys immediately after the traffic control check.

Our results can probably be attributed to the high ratings of perceived procedural justice, even when officers' behaviour represents low-to-moderate levels of quality of treatment and decision-making. This implies that once a certain level of perceived procedural justice is reached, better quality of treatment or decision-making cannot improve citizens' subjective assessments very much, and other factors become more important in further enhancing the perception of procedural justice. As Gau (2013) noted, these elements can consist of pre-existing attitudes and beliefs that have formed based on previous encounters with the police, (social) media, friends and family, or other socialization processes.

The study also has limitations. The first is that the setting of the field study was neither longitudinal nor a true experiment. This limits the control over interference from variables that were not included in our analysis, such as pre-existing beliefs about the police. A second limitation is the external validity of the results. Our findings are based on the behaviours of Dutch police officers during routine moped traffic control checks. This setting is well suited for observing the full range of procedural justice ingredients of police behaviour, since an encounter takes 5 minutes on average and the sample of drivers stopped, consisting of both offenders and non-offenders. However, the specific setting of moped drivers makes it difficult to extrapolate our outcomes to formulate a general theory on the relationship between treatment and decision-making on the one hand, and perceived procedural justice on the other.

These limitations, however, do not override the fact that, with our study we intended to add to the literature on an underexposed element in procedural justice research, i.e. the relation between specific categories of behaviour of the police and perceived procedural justice. In a real-life setting in which we were able systematically observe the full range of procedural justice ingredients of police-behaviour and decision-making, with a high response rate and the absence of an offender-bias, we did not find that higher quality of police treatment and decision-making leads to higher levels of perceived procedural justice.

Our findings raise questions about one of the main ideas in the procedural justice literature: that more procedural just treatment and decision making by authorities leads citizens more likely to view the police as a legitimate institution, and in turn, are more likely to comply with the laws and cooperate with police. A single encounter with police may be less important than assumed in shaping the pathway from procedural justice perceptions to compliance. This does not imply that police officers should not be concerned with respectful treatment, voice, trustworthiness or neutrality, rather that we need to further investigate how these behaviours can contribute to the accumulation of influences on perceptions of procedural justice.

Two lines of future research on this relationship are likely to be fruitful. The first is more research based on the full range of procedural justice ingredients of police behaviour combined with perceptions on procedural justice. The main improvement of SSO-research over experimental studies is its ability to incorporate all procedural justice ingredients of behaviour without asking too much of the police officers involved. Results from different settings and larger sample sizes: different settings may contribute to a better understanding of the conditions under which police behaviour can influence perceptions, and larger sample sizes could contribute by being able to detect smaller differences at the margin. The second line of research would be to use multiple points of measurement over time to accurately investigate how changes in perceptions due to police encounters are influenced by other elements such as pre-existing attitudes and beliefs, (social) media and friends and family.

4 Instrumental and Normative Motivations for Compliance with Traffic Laws: A Closer Look at Specific Violations

Abstract

Objectives: This study examines how instrumental and normative motivations translate into greater legal compliance by looking at motivations for compliance with regard to six specific traffic violations.

Methods: Analyses are based on survey data collected during police traffic controls of moped drivers in two Dutch cities over a period of six months.

Structural equation modelling with Satorra-Bentler estimates was used (n=302), with six different self-reported violations of traffic laws as dependent variables. Independent variables included instrumental and normative motivations based on recent research and psychometric analyses.

Results: I find evidence for both instrumental and normative motivations to comply with traffic laws. Depending on the violation, personal morality, perceived probability of apprehension and the obligation to obey the law are significant predictors of compliance.

Conclusions: The findings show that more general conclusions on compliance with traffic laws should be treated with some caution. Motivations for compliance differ depending on the traffic violation. Field research based on actual offending behaviour would be an interesting next step to gain additional insight in the motivations for compliance.

4.1 Introduction

Laws regulate the behaviour of citizens. Governments and legal institutions interpret and enforce these laws and, for a society to function properly, citizens must comply with the rules and obey the decisions of legal authorities (Tyler & Darley, 2000). However, because laws and directives of legal authorities restrict the ability of citizens to behave as they wish, people do not always comply with the law. This makes it important for those interested in the rule of law, particularly authorities interested in obtaining compliance with the law, to understand motivations for compliance with the law and to identify which motivations translate into greater legal compliance.

Previous research on motivations for compliance with the law is dominated by two perspectives (Piliavin et al., 1986). The instrumental perspective, or deterrence theory is based on the idea that potential offenders will only engage in non-compliant behaviour when the expected returns, discounted by the expected costs of this behaviour, exceed the expected net returns from law-abiding alternatives such as legitimate employment (Becker, 1968). Through the certainty, severity and immediacy of punishment, the expected costs of non-compliant behaviour can be increased and potential offenders can be deterred to engage in non-compliant behaviour (Nagin, 2013). The normative perspective is concerned with intrinsic factors such as personal morality and perceptions about the legitimacy of authorities. According to this perspective, people view compliance with the law as appropriate, because of their attitudes about how they should behave (Eisner & Nivette, 2013). There are two types of personal normative motivations: legitimacy and morality. Normative commitment through legitimacy means obeying a law because one feels that the authority enforcing the law has the right to dictate behaviour. Normative commitment through personal morality means obeying a law because one feels a law is just (Tyler, 2006, 1990).

Multiple studies have presented empirical evidence for both the instrumental and the normative perspective on compliance. However, the results of these studies are not uniform. For example, motivations for compliance are culturally variable (Lee & Cho, 2019; Tankebe, 2009a; Tankebe et al., 2016) and motivations to comply with everyday traffic laws differ from motivations to comply with other everyday laws and regulations (Gao & Zhao, 2018; Jackson, Bradford, Hough, & Murray, 2012). These results underline the importance of research on the circum-

stances under which instrumental and normative motives translate into greater legal compliance (Beetham, 1991; Nagin & Telep, 2017).

The purpose of the present study is to add to the research on the circumstances under which instrumental and normative motivations translate into greater legal compliance by looking at motivations for compliance of six specific violations. While previous research is based on aggregates of offending behaviour, the present study looks at specific violations. This is interesting because not all traffic law violations are considered equal. For example, driving under the influence of alcohol is generally seen as socially unacceptable, while speeding is deemed much more acceptable (Watling & Leal, 2012). The differing nature of the six violations can contribute to identifying differences in motivations for compliance. This in turn can yield insights for crime control policies, as well as crime control theory.

In the next section I start with a short review of the prior research on instrumental and normative motivations for compliance. I then present the set-up of the study in more detail, followed by a description of the data and the plan of analysis. After the presentation of the results, I conclude with a discussion of their implications and limitations.

4.2 Prior research on motivations for compliance

Motivations for compliance have been studied extensively, both from the instrumental, as from the normative perspective. Reviews of the deterrence literature by Apel & Nagin (2015), Durlauf & Nagin (2010), Kleck & Sever (2018) and Nagin (2013, 2017) show that the strongest deterrent effect comes from the certainty of punishment, or more specifically, the certainty of apprehension. Evidence of the effect of the severity of punishment is much less convincing and consistent. Some studies even indicate that the use of threat of punishment can also produce non-compliant behaviour, in particular when perceived as unreasonable (Bardach & Kagan, 1982; Murphy, 2004; Unnever et al., 2004). These results have stimulated the large body of research based on the work by Tyler (1990) in which he presented empirical evidence for the incorporation of normative, or intrinsic motivations into crime control. Tyler's results show that legitimacy (defined as the perceived obligation to obey the law and support for legal authorities), personal morality, age and

sex significantly influence delinquent behaviour, while deterrence, peer disapproval and evaluation of the effectiveness of the police and courts do not. These results are based on cross-sectional survey-research on low-level crimes amongst 1575 Chicago residents and also hold true using a two-wave panel-survey with 291 respondents interviewed a year apart.

Since Tyler's work, multiple studies have found comparable results (Eisner & Nivette, 2013; Jackson, 2018; Nagin & Telep, 2017). Sunshine & Tyler (2003), for example, reported results of two different studies. Their results, based on survey research amongst 1653 registered voters in New York, show that legitimacy was a significant predictor of compliance, while the perceived probability of apprehension was not. Comparable results were also found in survey research amongst 215 adolescent inhabitants of New York. In this research, Fagan & Tyler (2005) found that legitimacy was significantly related to self-reported delinquent behaviour in the last year, while the perceived probability of apprehension was not.

However, the results on motivations on compliance are not uniform. For example, survey research amongst 586 registered voters in New York by Sunshine & Tyler (2003) shows that both legitimacy and perceptions of the perceived probability of apprehension influence compliance. This was corroborated in a study amongst 1603 American adults by Tyler & Jackson (2014) in which they used a broader definition of legitimacy. In addition to studies that provide evidence for influences of both normative and instrumental motivations on compliance, there are also studies that show no support for the influence of legitimacy on compliance behaviour. In a study on the development of criminal behaviour of 1355 juvenile offenders in Phoenix and Philadelphia for example, Fagan & Piquero (2007) found that the perceived probability of apprehension significantly predicted self-reported crime over time while legitimacy did not. Augustyn (2015) used follow-up data of the same group of juvenile offenders and found comparable results. The perceived probability of apprehension was a significant predictor of the frequency of offending, while legitimacy was not.

The differences in results between studies are an indication that motivations for compliance are not universal, but depend on the context. The varying results underline the importance of research on the circumstances under which instrumental and normative motives translate into greater legal compliance (Beetham, 1991; Nagin & Telep, 2017).

There are indications that motivations for compliance are culturally variable. Tankebe et al. (2016) used survey data from cross-sectional samples of young adults in both the United States and Ghana. They found that, after controlling for other factors, police legitimacy influenced self-reported compliance behaviour in the United States. However, in the Ghana sample, using the same variables, they did not find a relationship between legitimacy and compliance, indicating that motivations for compliance, and specifically legitimacy are culturally variable. Results from research by Tankebe (2009a) and Lee & Cho (2019) support these conclusions.

There are also indications that motivations for compliance vary, depending on the types of offending behaviour. Interesting research on these differences comes from Jackson, Bradford, Hough, Myhill, Quinton & Tyler (2012). In their research based on 937 face-to-face interviews with inhabitants of England and Wales, they looked at both normative and instrumental motivations for compliance. The normative motivations included components of legitimacy, as obligation to obey the law and trust in the police, but also incorporated 'moral alignment' and 'personal morality'. Moral alignment with the laws enforced by authorities is a component derived from research by Murphy, Tyler & Curtis (2009) and is based on the belief that authorities share the values of those they govern. This is distinctly different from the perceived obligation to obey the law in general. Personal morality indicates how wrong people believe a given act (proscribed by law) is, a component introduced by Tyler (1990). The instrumental motivations in their research were restricted to a single component: the perceived probability of apprehension. Jackson et al. (2012) found that normative motivations as obligation to obey the law and trust in the police as well as moral alignment with the police and personal morality were predictors of self-reported violations of everyday laws. Perceived probability of apprehension was not. However, when Jackson, Bradford, Hough & Murray (2012) used the same sample to look specifically at traffic violations, the results were different. Then, perceived probability of apprehension and personal morality of traffic violations were predictors of compliance, while both legitimacy of the law and trust in the police were not. The authors concluded that these differences underline how different people feel about traffic laws, compared with other laws. This conclusion however, should be treated with some caution, since studies on compliance with traffic laws by Hertogh (2015) and Yagil (1998) showed

that self-reported offending was not related to instrumental motives as the probability of apprehension. It was however related to normative motives such as obligation to obey the law, support for the police, moral alignment with the police and personal morality of specific traffic laws[1].

Gao & Zhao (2018) also studied the motivations for compliance of different categories of violations. They investigated traffic violations, illegal downloading, distracted driving and public disturbance. In their study amongst 1000 Shanghai residents, they found that, for all four groups of violations, personal morality influenced compliance consistently and more strongly than the perceived legitimacy of the authorities and all other motivations. The influence of perceived legitimacy of authorities was inconsistent across the four categories of laws tested. Second, the study is one of the few studies that investigated the influence of perceived severity of punishment. They found this instrumental motivation to be consistent and significant across all four groups of laws, whereas perceived probability of apprehension had no significant impact on compliance. The results of this study illustrate the necessity to examine different (categories of) violations separately when studying motivations for compliance. They also stress the importance of examining both perceived severity of punishment and perceived probability of apprehension, instead of only including the latter.

Summarizing this short review, I conclude that previous research shows that results on motivations for compliance are not uniform. There are indications that motivations differ from culture to culture, but also across different categories of non-compliant behaviour. This underscores the importance of research on the circumstances under which instrumental and normative motivations translate into greater legal compliance. In addition, previous research also shows that motivations for compliance are not always defined equivalently, making it difficult to interpret differences in results between studies.

1 Interestingly, Hertogh (2015) also performed a regression analysis with the number of traffic tickets as the dependent variable. In this regression based on 461 drivers that were given one or more tickets for traffic violations, none of the motivations were a significant predictor of the number of violations.

4.3 The current study

Previous research has shown that motivations to comply with the law can differ, depending on the type of violation under review. Motivations for compliance with traffic laws for example, differ from compliance with other everyday laws. The research on different types of violations has contributed to a better understanding of how both instrumental and normative motivations influence compliance.

However, possibilities for more differentiated research remain. There are many types of traffic violations, and not all traffic violations are considered equal (Watling & Leal, 2012). Take for example, the difference between driving under the influence of alcohol and speeding.

The purpose of the present study is to add to the research on the circumstances under which instrumental and normative motivations translate into greater legal compliance by looking at motivations for compliance of six specific moped violations. This is the first study to look at motivations for compliance on the level of specific violations.

In addition to the focus on specific violations, the current study makes three other important contributions to the literature on motivations for compliance. First, this is one of the few studies in which motivations for compliance are tested in Continental Europe. Studies from different parts of the world contribute to the understanding of the circumstances under which instrumental and normative motivations translate into greater legal compliance. Second, the current study follows recent insights on motivations for compliance by using motivations for compliance based on the latest research. For the normative motivations, this includes a broader definition of legitimacy and the incorporation of personal morality. For the instrumental motivations, this means that, unlike most previous studies that look at both instrumental and normative motivations for compliance, the current paper includes perceived severity of punishment in the instrumental motivations. Most previous studies on motivations only included certainty of apprehension[2]. Omission of potentially relevant motivations, can lead to wrong conclusions on the influence of instrumental motivations compared to normative motivations. Third, I make a number of methodological improvements. The most important is that, unlike most previous studies, I use confir-

2 The immediacy of punishment is not included in the present study, since it concerns minor traffic violations, for which ordinances are issued within 3 weeks on average from the moment the traffic violation was detected.

matory factor analysis to test for convergent and discriminant validity of the concepts used in the model. A second important methodological improvement is the use of Satorra-Bentler estimates to correct for bias in the estimated intervals due to skewness in the data.

4.4 Methodology

4.4.1 Set-up

The present study uses survey data collected from moped drivers that were stopped during routine traffic control check-points for mopeds. Mopeds are two-wheeled motorized vehicles that can be operated by persons over 16 years of age with a valid driving license. Dutch traffic law distinguishes two kinds of mopeds: mopeds with a top speed of 25 km per hour that can be operated without a helmet and mopeds with a top speed of 45 km per hour for which wearing a helmet is compulsory.

In the Netherlands, the National Police regularly set up traffic control check-points for mopeds where they check for a number of traffic law violations: driving a vehicle with a higher top speed than allowed, driving without a valid driving license or insurance, driving under the influence of alcohol, driving without proper lighting, using a mobile phone while driving, and driving without a helmet when required.

Two different locations were selected for our research: 'Wassenaarseweg' in Leiden and '1ste Stationsstraat' in Zoetermeer. Both these cities are part of the urban agglomeration in the west of the Netherlands, halfway between Amsterdam and Rotterdam. They were selected because of they are comparable in terms of the population of interest (people driving mopeds), the number of moped drivers passing the location, and the average number of traffic violations per driver stopped by the police.

The research was conducted from January 19, 2017 until August 2, 2017. On average 3 or 4 police officers were present at a traffic control check point, and 1 or 2 additional officers driving around the checkpoint in approximately a 2-mile radius. After being stopped or pulled over, drivers were asked for their license and insurance papers. All mopeds were checked for defects. After visual inspection, all mopeds were placed on a roller test bench to determine the top speed. In the case of detection of a traffic law violation, drivers received a sanction.

After the above procedure finished, the drivers were informed by the police that researchers of Leiden University were present at the location, inviting them to participate in a survey.

4.4.2 Survey instrument

Previous research has shown that driving violations can be assessed by self-report surveys (Lajunen & Summala, 2003) and that anonymous surveys can provide more reliable information about motives, that lead to risk driving (Lajunen et al., 2004) since they reduce the likelihood of socially desirable responses (Lindeman & Verkasalo, 1995; Paulhus, 1986).

The survey was conducted by a pool of 8 trained interviewers, student-assistants studying criminology or law at Leiden Law School, three or four interviewers per control. All interviewers received 4 hours of training on how to conduct the survey and how to interpret the questions.

The survey was administered through verbal face-to-face interviews of on average 7 minutes long. This method was chosen to maximize response rates (Lynn, 2011) and minimize self-selection sampling biases (Bethlehem, 2010). Face-to-face interviews do not rely on access to internet or telephone and put less constraints upon the interaction between sample member and interviewer. To ensure that participants were able to disclose all information, the anonymous surveys were conducted approximately 50 meters from the traffic control check.

The survey covered a wide range of topics on motivations for compliance, using questions derived from previous research (Gau, 2013; Sunshine & Tyler, 2003; Tyler, 1990), related both to the traffic control that had just taken place as well as to previous encounters with the police. Most responses were measured using a 7-point Likert scale (answers ranging from 1 to 7, where 1 is 'totally disagree' and 7 'totally agree'). The survey was tested and slightly modified after two pilot traffic controls in November 2016. The main reasons for the modifications were that two items were not representative of the situation of moped checks, one item was difficult to interpret for drivers, and two items were highly correlated with other items ($r > .95$, $p < .001$) so, due to time restrictions, were omitted.

4.4.3 Participants

In the period between January 19, 2017 and August 2, 2017, 687 moped drivers were stopped at traffic control checks, 302 of whom participated in the survey (44.0% response rate). The details of the observed population who participated in the survey are presented in Table 4.1.

Table 4.1: Descriptive statistics of the sample of drivers that were observed and participated in the survey (N=302)

Variable	% of sample
Sex	
male	58%
Age in years	
16-18	16%
19-27	38%
28-43	16%
44-60	24%
61+	5%
Household income	
0-10000	36%
10000-20000	11%
20000-30000	11%
30000-50000	12%
50000+	8%
unknown	21%
Education	
elementary	6%
vocational	6%
high school 1	26%
high school 2	30%
high school 3	11%
college/university	20%
unknown	1%

Not all respondents who completed the interview answered every question. In the entire dataset used for the current study, .009% of the data was missing. According to Little's multivariate-test, (χ^2 (795) = 684.178, p = .998), for all missing data, the likelihood of missingness depends neither on the observed data nor on the missing data. Consequently, due to the reduced sample size, ignoring missing data will increases the SE of the sample estimates rather than introducing bias (Dong & Peng, 2013). To respond to this, missing data was substituted using joint multivariate normal imputation (JM-MVN) based on all variables used in the study, with 500 iterations creating 10 imputed datasets (Buuren, 2012; Enders, 2010).

4.4.4 Variables

The dependent variables in this study are self-reported offending behaviour with respect to six different traffic violations. Seven independent variables are included in the analyses. These variables include both instrumental and normative factors which, according to previous literature, may have an important influence on compliance. The variables related to instrumental motivations are perceived probability of apprehension, perceived severity of punishment and peer disapproval. The variables related to normative motivations are based on legitimacy and personal morality. For controlling purposes, covariates are added to all analyses.

Compliance with the law

While there is clear potential for bias with self-report data, comparisons between self-report and other methods have indicated that self-report can be a reliable and valid means to establish frequency of criminal activity (Hindelang et al., 1981; Thornberry & Krohn, 2000). In this case, self-report data is on less serious infractions, making it a) more likely that people engage in the behaviour studied and b) are more likely to honestly report in an interviews situation (Jackson, 2018).

In the survey the participants were asked whether and how often, in past the 12 months, they had committed any of the following six traffic law violations: (1) driving a vehicle with a higher top speed than allowed, (2) operating a mobile phone while driving, (3) driving under the influence of alcohol, (4) driving without proper lighting, (5) driving without a valid license or insurance, and (6) driving without a helmet when required. Higher scores indicate that drivers are less compliant.

No less than 211 out of the 302 respondents, that is 69.9%, admitted to have offended at least once in the previous 12 months against any one of the six traffic rules that were surveyed. Table 4.2 shows the descriptive statistics of the self-reported violations. Most common among the offenses was driving with a higher top speed than allowed (50.0%), followed by driving while making a telephone call (23.7%), driving under the influence (21.7%) and driving without proper lighting (18.4%). Driving without a valid license or insurance (11.0%) and driving without a helmet when required (7.7%) were less common. Furthermore, the descriptives show a broad dispersion in self-reported violations. For example, most people have reported to have committed to have driven with a higher top speed than allowed, but on average, people who speeded, also did this more frequently compared to other violations.

Table 4.2: Descriptives of self-reported violations in the past 12 months (N=302)

Behaviour	Committed offense in past 12 months: % yes	Mean	SD.
Driving with a higher top speed than allowed	50.0	58.24	121.07
Operating a mobile phone while driving	23.7	9.03	45.34
Driving under the influence of alcohol	21.7	1.91	9.47
Driving without proper lighting	18.4	1.77	11.96
Driving without a valid license or insurance	11.0	3.58	30.37
Driving without a helmet when required	7.7	0.31	1.57

Perceived probability of apprehension

Levels of perceived probability of apprehension were measured asking participants to estimate the likelihood of being apprehended in the past 12 months. The perceived probability of apprehension had to be rated on a scale ranging from 1 (very unlikely) to 7 (very likely). The results in table 4.3 show a broad dispersion of scores, in line with previous studies on people's perceptions of the probability of apprehension. With the exception of driving without proper lighting, median scores fall in the category 'somewhat likely' and 'likely'. The perceived probability of apprehension is highest for more visible violations, such as driving without a helmet or proper lighting.

Table 4.3: Distribution of scores of Perceived probability of apprehension for the different violations (N=302)

Behaviour	Perceived Probability of Apprehension							Mean
	Very unlikely	Unlikely	Somewhat unlikely	Not likely or unlikely	Somewhat likely	Likely	Very likely	
Driving with a higher top speed than allowed	9%	20%	15%	21%	16%	14%	4%	3.74
Operating a mobile phone while driving	7%	16%	11%	16%	19%	24%	7%	4.24
Driving under the influence of alcohol	5%	13%	16%	13%	22%	20%	11%	4.39
Driving without proper lighting	5%	13%	9%	11%	17%	31%	13%	4.66
Driving without a valid license or insurance	10%	26%	15%	17%	13%	14%	6%	3.64
Driving without a helmet when required	2%	5%	9%	13%	19%	37%	15%	5.11

Perceived severity of punishment

Levels of perceived severity of punishment were measured asking participants to estimate the severity of the sanction in case of a traffic conjunction. The scores range from 1 (very low) to 7 (very high). The results in table 4.4 show a slightly skewed dispersion of scores with most scores in the category 'high'. The perceived severity of punishment for driving under the influence of alcohol has the highest mean score, while driving without proper lighting has the lowest.

Table 4.4: Distribution of scores of Perceived severity of punishment for the different violations (N=302)

Behaviour	Perceived Severity of Punishment							Mean
	Very low	Low	Somewhat low	Not low / not high	Somewhat high	High	Very high	
Driving with a higher top speed than allowed	0%	2%	5%	16%	22%	43%	12%	5.37
Operating a mobile phone while driving	1%	3%	4%	13%	16%	49%	14%	5.46
Driving under the influence of alcohol	1%	4%	2%	7%	9%	36%	41%	5.92
Driving without proper lighting	1%	7%	15%	22%	21%	24%	8%	4.62
Driving without a valid license or insurance	0%	2%	4%	14%	20%	42%	17%	5.46
Driving without a helmet when required	0%	2%	7%	22%	20%	38%	11%	5.14

Peer disapproval

In addition to perceptions of formal sanctions, the current study also includes perceptions of informal sanctions in the form of peer disapproval that addresses social norms. Grasmick and Bursik (1990) argued that shame emotions imposed by significant others can contribute to the effectiveness of deterrence measures. The negative judgment of significant others matters to offenders (Akers, 1994). Anderson, Chiricos, and Waldo (1977) even found that informal networks (e.g., family or neighbourhood structures) indeed had a stronger impact on deterring wrongdoing than actual or perceived deterrence imparted by authorities.

The inclusion of 'peer morality' is derived from previous research by Hertogh (2015) and Tyler (1990) and was measured by asking: 'Think about five adults that you know best. If you got a fine or got arrested for doing each of the following things, how much would they disapprove or feel that you had done something wrong?'. Again, the questions were asked for all six violations.

A higher score on this scale reflects higher perceptions of peer disapproval.

Table 4.5: Distribution of scores of Peer disapproval for the different violations (N=302)

Behaviour	Judgement of peers							Mean
	Completely moral	Very much moral	Slightly moral	Not moral/ not immoral	Slightly immoral	Very much immoral	Completely immoral	
Driving with a higher top speed than allowed	3%	10%	13%	18%	20%	20%	15%	4.61
Operating a mobile phone while driving	1%	4%	6%	8%	10%	30%	40%	5.74
Driving under the influence of alcohol	0%	1%	1%	3%	4%	16%	74%	6.53
Driving without proper lighting	1%	4%	6%	14%	18%	29%	28%	5.42
Driving without a valid license or insurance	1%	4%	2%	7%	11%	32%	42%	5.90
Driving without a helmet when required	2%	2%	4%	9%	13%	28%	42%	5.79

The scores in table 4.5 indicate that people perceive the disapproval of relevant peers highest on driving under the influence of alcohol. The other violations are perceived to be less disapproved of, although very few respondents think that relevant peers approve of violating the law.

Perceived legitimacy

Compliance based on legitimacy refers to the idea that people comply because they view the legal authority as legitimately entitled to influence their behaviour, that is, people feel the obligation to obey because they recognize that they should behave in accordance with the command of legal authority (Friedman, 1975; Gao & Zhao, 2018).

In the original work by Tyler (1990), legitimacy was based on two dimensions, the obligation to obey the law (e.g. 'all laws should strictly be obeyed') and trust in authorities (e.g. 'police are generally honest'). Many studies have followed Tyler's work by viewing legitimacy as a single construct measured by questionnaire-items based on the two dimensions. (Jackson, 2018). Research on the convergent and discriminant validity of the construct of legitimacy however, is scarce. Based on exploratory factor analysis, Reisig, Bratton & Gertz (2007) conclude that these dimensions are two unique constructs and that combining the two can lead to misleading results. Based on confirmatory factor analysis, Gau (2011, 2013) corroborates these results.

Based on work by Murphy et al. (2009), studies by Jackson et al. (2012), Hertogh (2015), Tyler & Jackson (2014) and Tyler, Jackson & Mentovitch (2015) extend the construct of legitimacy by adding moral (or normative) alignment with the law (e.g. 'My own feelings about what is right and wrong usually agree with the laws that are enforced by the police').

In the current study I use the dimensions of this extended concept of legitimacy. Table 4.6 shows the distribution of the scores on the items used to measure the three dimensions of legitimacy.

Table 4.6: Distribution of scores of the items used to measure the three dimensions of legitimacy (N=302)

Dimensions and questionnaire items	Completely disagree	Mostly disagree	Slightly disagree	Don't agree or disagree	Slightly agree	Mostly agree	Completely agree	Mean
Obligation to obey the law								
When the police issue a formal order, you should do what they say even if you disagree with it	0%	0%	0%	5%	8%	47%	40%	6.20
You should accept police officers' decisions even if you think they're wrong	1%	2%	4%	7%	17%	47%	23%	5.67
It would be hard to justify disobeying a police officer	7%	16%	7%	16%	19%	24%	12%	4.41
A person who refuses to obey the law is a menace to society	4%	9%	9%	21%	21%	24%	12%	4.64
Respecting and obeying authorities is one of the most important values that children should learn	1%	2%	3%	2%	10%	36%	46%	6.11
Disobeying the law is seldom justified	1%	8%	3%	14%	17%	45%	13%	5.23
Trust in the police								
I respect the police	1%	2%	1%	8%	11%	46%	31%	5.88
Police are generally honest	2%	4%	1%	14%	18%	44%	17%	5.41
I feel that one should support the police	0%	1%	3%	7%	14%	48%	28%	5.88
I trust the police	2%	3%	4%	7%	21%	43%	20%	5.49
Police protect people's basic rights	1%	1%	1%	3%	7%	53%	33%	6.04
Most police officers do their job well	1%	2%	2%	6%	19%	49%	21%	5.72
Moral alignment with the law								
My own feelings about what is right and wrong usually agree with the laws that are enforced by the police	1%	3%	6%	9%	16%	49%	17%	5.52
The laws police enforce are generally consistent with the views of ordinary Dutch citizens about what is right and wrong	0%	4%	5%	14%	21%	46%	8%	5.23
You should always obey traffic laws	1%	1%	3%	5%	11%	37%	43%	6.08
Traffic laws are generally consistent with my own feelings about what is wright and wrong	0%	2%	2%	5%	12%	53%	26%	5.88

To keep the current results consistent with the strategies generally employed by researchers in this area of study, the dimensionality of legitimacy was initially examined using correlations and Cronbach's alpha. Obligation to obey correlated with trust in the police at .522 ($p<.000$) and with moral alignment with the law at .532 ($p<.000$). Trust in the police correlated with moral alignment with the law at .468 ($p<.000$). These modest correlations indicate that the three dimensions can be treated as separate constructs (Gomez et al., 2005). However, Cronbach's coefficient alpha (.862) was high, indicating high internal consistency (Nunnally & Bernstein, 1994). These results show that using only these techniques can lead to wrong conclusions on the dimensionality of legitimacy. Therefore, factor-analytic techniques were used to further investigate the psychometric properties of the legitimacy dimensions. Following Reisig et al. (2007), exploratory factor analysis was executed. The method used was principal axis factoring because it corrects for measurement error by using more conservative score reliability estimates (Velicer & Jackson, 1990). The Kaiser-Meyer-Olkin measure of sampling adequacy of .876 indicated that the data are appropriate for factor-analytic techniques (Comrey & Lee, 2013). The factor loadings presented in table 4.5 indicate a four-factor solution: four factors with an eigenvalue above the Kaiser-Guttman criterium ($\lambda>1$) and a scree plot supporting this conclusion. In addition, the results in table 4.7 show that the item 'respecting and obeying authorities is one of the most important values that children should learn', had a low factor loading and therefore was omitted.

Table 4.7: Principal axis factor loadings for the items used to measure the dimensions of legitimacy

Dimensions and questionnaire items	Factors			
	1	2	3	4
Obligation to obey the law				
When the police issue a formal order, you should do what they say even if you disagree with it	**.452**	.200	.027	.119
You should accept police officers' decisions even if you think they're wrong	**.573**	.147	.081	.188
It would be hard to justify disobeying a police officer	**.565**	.125	.153	.155
A person who refuses to obey the law is a menace to society	**.503**	.231	.035	.039
Respecting and obeying authorities is one of the most important values that children should learn	.102	.301	.076	.253
Disobeying the law is seldom justified	**.444**	.145	.333	.210
Trust in the police				
I respect the police	.319	**.723**	.083	.079
Police are generally honest	.214	**.712**	.137	.033
I feel that one should support the police	.217	**.556**	.416	.103
I trust the police	.151	**.748**	.046	.136
Police protect people's basic rights	.056	**.474**	.124	.423
Most police officers do their job well	.255	**.694**	.227	.175
Moral alignment with the law				
My own feelings about what is right and wrong usually agree with the laws that are enforced by the police	.338	.245	**.455**	.259
The laws police enforce are generally consistent with the views of ordinary Dutch citizens about what is right and wrong	.038	.090	**.464**	.101
You should always obey traffic laws	.341	.014	.157	**.476**
Traffic laws are generally consistent with my own feelings about what is wright and wrong	.304	.218	.234	**.609**

Note. The data were rotated using Varimax with Kaiser Normalization.

The first two factors (obligation to obey the law and trust in the police) are in line with dimensions used in previous research on legitimacy. The third and fourth factor deviate slightly from dimensions used in previous studies. Instead of a single dimension depicting moral alignment with the law, the results in table 4.5 show that this alignment can be divided into two different dimension that can be labelled as 'moral alignment with laws enforced by the police' and 'moral alignment with traffic laws.'

Following Gau (2011, 2013), confirmatory factor analysis (CFA) was used to compare the fit of the four-factor model to two other models based on previous research; 1) a model with all factors combined into a single legitimacy scale and 2) a model based on three factors, namely the obligation to obey the law, trust in the police and moral alignment with laws. All 7 point-Likert scales in the CFA were treated as continuous.

Although this method relies on the assumption that the intervals between values are presumed equal, it is not likely that it will result in much practical impact on CFA results (Babakus et al., 1987; Dolan, 1994; Hutchinson & Olmos, 1998; Rhemtulla et al., 2012).

Due to skewness of the data, Satorra-Bentler scaling corrections were applied (Satorra & Bentler, 2001).

The fit of the three models was evaluated using the chi-square goodness-of-fit test, comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR). No fit index is, by itself, fully indicative of model fit; SEM models must be evaluated holistically using a multiple presentation method. The CFI is normed and ranges from 0 to 1.0, with values equal to or greater than .950 being considered quite good and values between .90 and .94 being considered acceptable fit, depending on the values of the other indices (Hu & Bentler, 1999). The RMSEA and SRMR are measures of error and, therefore, will be close to zero when a model provides a good fit to the data. RMSEA values should ideally be less than .06, but values lower than .08 are reasonable and values up to .08 or .10 are acceptable, especially when sample size is small (Byrne, 2013). The SRMR should be no greater than .08 or less (Hu & Bentler, 1999).

Table 4.8: CFA Results for the one- three and four-factor Models

	MLM X2	df	CFI	RMSEA	SRMR	Loading Range	Between-Factor Correlations
Four-Factor	130.561*	84	.954	.043	.050	.375–.894	.364–.478
Three-Factor	181.075*	101	.924	.051	.061	.326–.797	.468–.512
One-Factor	317.228*	104	.782	.083	.081	.256–.787	N/A

* = p<.001

The results in table 4.8 show that the four-factor model has an acceptable absolute fit and that the fit is the best compared to the alternative models tested. The psychometric properties of the dimensions of legitimacy in this study, confirm indications of previous research by Reisig et al. (2007) and Gau (2011, 2013), that legitimacy subscales should be treated as separate concepts. In this paper, I will use the concepts of 1) obligation to obey, 2) trust in the police, 3) moral alignment with laws enforced by the police and 4) moral alignment with traffic laws, when investigating motivations on compliance.

Personal morality

Following Gao & Zhao (2018), Jackson et al. (2012), Murphy, Bradford & Jackson (2016), Reisig, Tankebe & Mesko (2014) and Tyler (1990), 'personal morality' was also included in the current study.

Where legitimacy is based on an internalized motivation to comply with an authority and the laws they govern, personal morality is an obligation to one's own sense of moral appropriateness independent of the law (Jackson, 2018; Schauer, 2015; Tyler & Darley, 2000). The morality of different laws and regulations can differ, and therefore also the inclination to voluntarily comply.

In the current study, personal morality was measured by asking respondents: 'Think about your own feelings about what is right and wrong. How wrong do you think it is to do each of the following things? The questions were asked for all six violations. Higher scores depict higher perceptions of immorality.

Table 4.9: Distribution of scores of Personal morality for the different violations (N=302)

Behaviour	Moral judgement							Mean
	Completely moral	Very much moral	Slightly moral	Not moral/ not immoral	Slightly immoral	Very much immoral	Completely immoral	
Driving with a higher top speed than allowed	6%	8%	25%	14%	21%	20%	6%	4.22
Operating a mobile phone while driving	1%	2%	5%	4%	13%	33%	41%	5.89
Driving under the influence of alcohol	0%	1%	0%	2%	5%	21%	72%	6.60
Driving without proper lighting	0%	3%	7%	9%	18%	35%	29%	5.61
Driving without a valid license or insurance	1%	3%	5%	6%	11%	32%	42%	5.87
Driving without a helmet when required	2%	3%	4%	10%	17%	32%	31%	5.57

The scores in table 4.9 show that citizens view breaking laws as a violation of their personal morality, although there are differences between violations. Driving with a higher top speed than allowed is deemed much less immoral than the other violations, while driving under the influence of alcohol is deemed completely immoral by 72% of the respondents. The other four violations are deemed more immoral than speeding but much less immoral than driving under the influence of alcohol.

Covariates

Because previous research has shown that the tendency to commit traffic violations can differ depending on sex, age, income and education (Ahmed & Alghafli, 2017), these variables were added as covariates. The addition of these covariates does not imply that the model differs for these specific subgroups. Rather, by adjusting for covariates, the possibility is reduced that associations between motivations and traffic violations act as a proxy for socioeconomic and demographic differences.

4.5 Analytical strategy

In order to study the motivations for compliance on specific laws, I use structural equation modeling (SEM) because of its ability to perform multivariate analysis and to reduce measurement errors through the use of latent variables. All violations are tested simultaneously in the model to explore potential relationships among motivations. Figure 4.1 shows the schematic structure of the SEM model.

All variables in the model are based on survey data. Due to skewness of parts of this data, Satorra-Bentler scaling corrections are applied (Lai, 2018; Satorra & Bentler, 2001).

The dependent variables in the model are self-reported offending behaviour for the following six traffic law violations: (1) driving a vehicle with a higher top speed than allowed, (2) operating a mobile phone while driving, (3) driving under the influence of alcohol, (4) driving without proper lighting, (5) driving without a valid license or insurance, and (6) driving without a helmet when required.

The variables related to instrumental motivations are perceived probability of apprehension, perceived severity of punishment and peer disapproval. These three variables are manifest (also named observed) items based on seven-point Likert-scales.

The variables related to normative motivations are obligation to obey, trust in the police, alignment with laws enforced by police, alignment with traffic laws and personal morality. Personal morality is a manifest variable based on a single item measured as a seven-point Likert-Scale. The other four normative motivations are latent variables; variables that are unobserved, but whose influence can be summarized through multiple indicator variables.

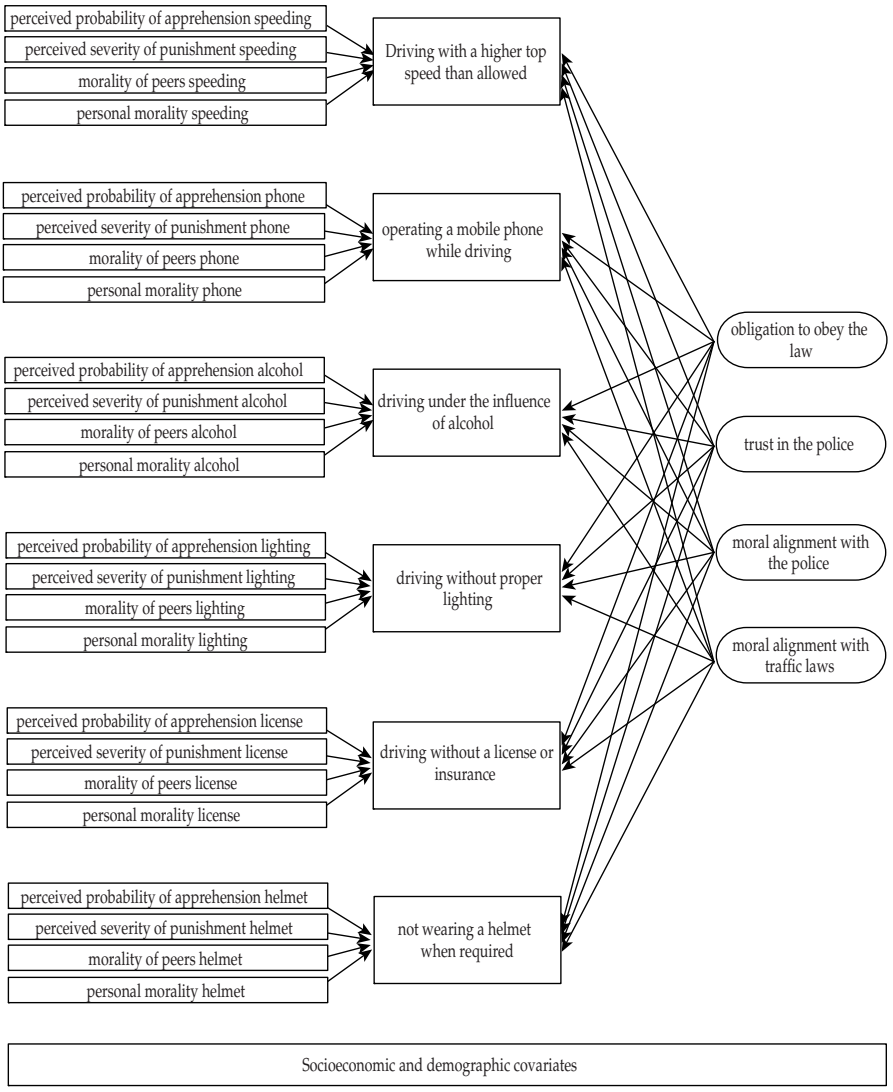

Figure 4.1: Structural equation model of motivations for compliance regarding six traffic violations

Note. Manifest variables are depicted with squares, latent variables are depicted with rounded squares. Measurement variables are included in the model but not shown in the figure to reduce clutter.

For example, the latent variable 'obligation to obey the law' was measured by five Likert-scale items. All variables based on Likert-scale items are treated as continuous since it is not likely to result in much practical impact on structural equation modelling results (Babakus et al., 1987; Dolan, 1994; Hutchinson & Olmos, 1998; Rhemtulla et al., 2012). The sample size is considered sufficient to maintain low type-1 error rates,

obtain good fit and acquire stable model parameters (Sideridis et al., 2014; Wolf et al., 2013).

To reduce the possibility that associations between motivations and compliance do not, to some degree, act as a proxy for gender, age, income and education differences, covariates are added to all models. Age, is a continuous variable. The other covariates are coded as dummies.

Each motivation was allowed to correlate with all other motivations to explore potential relationships among motivations and possible crowding out effects (Bénabou & Tirole, 2006). Negative correlations, especially between instrumental motivations and normative motivations, would be of particular interest, for they could be a signal that law enforcement is crowding out intrinsic motivations to comply. The correlations among motivations for compliance were also reviewed to identify potential multicollinearity, or non-independence of predictor variables.

4.6 Results

4.6.1 Overall model

In this section, the results of the structural equation model are presented. The main findings are presented in table 4.10. The overall model-fit is adequate (CFI = .930, RMSEA = .035, SRMR = .037), indicating that the hypothesized model provides an appropriate characterization of the collective relationships among its variables (Hu & Bentler, 1999). However, it is likely that the fit of the model refers mostly to the measurement of the latent variables, since all motivations were allowed to correlate with each other (McDonald & Ho, 2002; Mulaik et al., 1989).[3]

According to the results in table 4.10, there is evidence for both instrumental and normative motivations to comply with traffic laws. Depending on the violation, personal morality, perceived probability of apprehension and the obligation to obey the law are significant predictors of self-reported traffic violations. The instrumental motivations based on judgements by relevant others (peer disapproval) and

3 Correlations between the error terms of the six different violations in the model were also investigated. All correlations are insignificant ($p > .13$), indicating that the estimated parameters in the model are efficient compared to estimating separate models for the different violations (Kline, 2015).

perceived severity of punishment are not significant predictors of reported traffic violations. Neither are the normative motivations based on trust in the police or alignment with traffic laws and other laws enforced by the police.

4.6.2 Different traffic violations

Looking at the different traffic violations separately shows diversity in motivations for compliance. Moped drivers with a stronger obligation to obey the law, report fewer speeding violations in the past 12 months ($p<.03$). Other normative or instrumental motivations have no significant relationship with speeding violations.

When looking at the covariates, the results show that speeding violations are more often committed by drivers with a vocational education, compared to drivers with only elementary education. The results also indicate that drivers with an annual net household income between € 10,000 and € 20,000 commit more speeding violations compared to the reference group with the lowest annual household income, although at a lower level of significance ($p = .07$). Overall, 26.9% of the variation in speeding violations can be explained by variations in the variables in the model. It is interesting to note, that the descriptives in table 4.9 show that moped drivers find speeding much less immoral compared to other traffic violations and that table 4.2 shows that a relatively high percentage of drivers (50%) has indicated to have committed a speeding violation.

In contrast, the descriptives in table 4.9 show that operating a mobile phone is judged much more immoral compared to speeding and also relative to other traffic violations, although still 23.7% of the drivers indicated to have committed the violation. But the more drivers judge it as wrong, the less likely they are to operate a mobile phone ($p = .02$). In addition, operating a mobile phone while driving is, just as with speeding, influenced by the obligation to obey the law. The more legitimacy drivers invest in the law, the less likely they are to report that they have operated a mobile phone while driving ($p<.04$). In the sample, there are no differences in socio-economic and demographic factors and the variations in motivations between drivers can account for 19.3% of the variation in operating a mobile phone while driving.

Driving under the influence of alcohol is the only violation where instrumental motivations have a significant relationship with compliance. In this case, probability of apprehension is a significant predictor

of self-reported violations in the past 12 months. Moped drivers that think it more likely that one would be caught, report less violations ($p = .01$). They also report significantly less alcohol violations in the past 12 months when they judge it more immoral ($p = .00$). Driving under the influence of alcohol is generally perceived as the most immoral of all violations: 93% of the population judges driving under the influence of alcohol as very much or completely immoral (see table 4.9). Also, the severity of punishment for driving under the influence of alcohol is perceived to be the highest of all violations: 77% of the drivers perceive the severity to be high or very high (see table 4.4). But even still, almost 22 percent of the drivers in the sample indicated they had offended in the past 12 months.

The reported number of alcohol violations differs significantly depending on sex, age, income and education. Female drivers are less likely to drink and drive, and drivers with higher education levels on average report more alcohol violations. Overall, 27.1% of the alcohol violations can be explained by the model.

The results for driving without proper lighting show no significant relationship between self-reported offending and any of the motivations included in the study. Only 7.9% of the variation in driving without proper lighting can be explained by the model. Given these results, it is important to note that the nature of the violation likely differs from other violations in this study. Driving without proper lighting can be the result of a defect, a specific that is not applicable to the other violations. The fact that the drivers in our sample that drove without lighting, on average only violated less than two times corroborates this rationale. It is plausible that people who had a defect light, fixed it rather swiftly after detection. If a defect is indeed the explanation for the (majority of) violations detected in our sample, then it is logical that normative nor instrumental motivations play a role in this specific type of offending behaviour.

Reported violations of driving without a valid license or insurance in this sample are only related to personal morality. When drivers judge it as more immoral, they report less violations in the past twelve months ($p = .07$). However, in our sample, most people obey the rule, which is moreover of an administrative nature and of minor relevance. For these reasons it is quite understandable that no other instrumental or normative motivations were found to influence driving without a license or insurance and that only 14.4% of the variations can be explained by the model.

The results for driving without a helmet should be treated with caution. Many of the respondents drove a moped with a top speed of only 25 km per hour that does not necessitate wearing a helmet. Hence, for these respondents it was difficult to relate to the question and only 7.7% of the entire sample reported to have committed this violation. This makes it difficult to interpret the effect between personal morality and driving without a helmet when required ($p = .10$).

A review of the significant correlations between the motivations for compliance in the model shows that most normative motivations are significantly positively correlated (see Appendix A). Correlations between instrumental motivations show a more diversified image. Perceived probability of apprehension is correlated positively with perceived severity of punishment in all violations, but sometimes is also positively correlated with moral alignment with traffic laws. Perceived severity of punishment in turn is sometimes also positively correlated with the obligation to obey the law. In the case of driving without a valid license or insurance, perceived severity of punishment was found to be negatively correlated with moral alignment with laws enforced by the police ($r (302) = -,13$, $p = .025$). This is an indication of possible crowding out of normative motivations to comply.

The correlations presented in Appendix A show no indication for multicollinearity. All significant correlations show r-values below .7 (Dormann et al., 2013).

Table 4.10: Determinants of non-compliance based on full SEM model (N=302)

	Self-reported offending behaviour																	
	Speeding			Phone			Alcohol			Lighting			License			Helmet		
	b	*95% Conf. Interval*		*b*	*95% Conf. Interval*		*b*	*95% Conf. Interval*		*b*	*95% Conf. Interval*		*b*	*95% Conf. Interval*		*b*	*95% Conf. Interval*	
Personal morality	–4.87	–23.06	13.32	–6.66**	–12.08	–1.24	–4.28**	–7.09	–1.47	.01	–1.33	1.36	–6.10*	–12.68	.48	–.10*	–.23	.02
Peer disapproval	5.47	–5.93	16.87	–2.48	–6.57	1.62	.66	–.44	1.75	–.10	–.91	.71	–.48	–6.54	5.59	.05	–.06	.17
Perceived probability of apprehension	–3.03	–11.55	5.48	–1.36	–4.52	1.80	–.67**	–1.16	–.18	–.77	–1.77	.22	–1.44	–3.94	1.05	–.15	–.34	.04
Perceived severity of punishment	–5.53	–19.03	7.98	2.96	–.95	6.87	–1.38	–3.07	.31	–.02	–.90	.85	.30	–1.62	2.21	.09	–.10	.28
Obligation to obey the law	–198.85**	–374.19	–23.52	–40.57**	–79.73	–1.41	–1.01	–7.03	5.02	–6.28	–15.53	2.98	8.01	–5.18	21.19	–.86	–2.13	.42
Trust in the police	16.64	–10.28	43.56	2.44	–2.93	7.80	–.88	–2.09	.33	.81	–.87	2.50	–.10	–3.23	3.02	–.11	–.43	.22
Moral alignment with laws enforced by the police	20.55	–15.65	56.74	4.08	–2.77	10.94	–.23	–1.41	.95	.43	–1.68	2.54	–.71	–6.06	4.65	.20	–.10	.50
Moral alignment with traffic laws	–.78	–31.23	29.66	4.08	–4.79	12.94	1.42	–.76	3.60	1.06	–1.10	3.22	.59	–3.89	5.07	.20	–.06	.46
Sex – female	7.95	–16.32	32.21	–3.61	–13.10	5.89	–2.28**	–4.56	–.01	1.93	–.44	4.30	–3.41	–9.11	2.30	.17	–.18	.52
Age	–.12	–1.18	.93	–.11	–.49	.27	–.06*	–.12	.00	.00	–.05	.05	.21	–.26	.68	.00	–.01	.02
Income – 10000-20000	51.92*	–2.03	105.86	–1.72	–15.17	11.73	–3.25**	–5.92	–.58	–3.20**	–6.23	–.17	6.86	–5.65	19.37	–.29	–.84	.27
Income – 20000-30000	38.36	–17.68	94.40	–2.24	–18.64	14.15	–.51	–3.86	2.85	–4.23*	–8.57	.11	1.41	–6.11	8.92	–.31	–.89	.27
Income – 30000-50000	–2.12	–44.62	40.39	3.94	–12.68	2 .57	–.87	–3.19	1.44	–4.07*	–8.62	.48	–1.14	–9.53	7.24	–.42*	–.87	.04
Income – 50000+	–17.99	–71.30	35.32	–2.42	–21.89	17.05	–2.66	–6.04	.72	–6.84	–15.07	1.40	–.57	–13.31	12.17	–.76**	–1.39	–.13
Income – unknown	–2.60	–35.92	30.71	9.19	–9.47	27.84	–1.11	–3.19	.97	–3.38	–7.46	.70	3.89	–12.86	20.64	–.23	–.80	.33
Education – vocational	73.36**	.80	145.91	31.89	–11.71	75.49	6.44**	1.72	11.17	–2.23	–9.98	5.52	–11.30	–24.85	2.26	–.01	–.57	.56
Education – high school 1	39.76	–11.26	90.79	7.66	–7.83	23.16	4.39**	.29	8.50	–3.86	–11.48	3.75	2.90	–14.20	20.01	.15	–.34	.63
Education – high school 2	30.44	–21.17	82.04	7.24	–9.16	23.63	4.98**	1.03	8.93	–2.69	–11.23	5.86	–2.74	–15.89	10.42	.45	–.16	1.06
Education – high school 3	1.09	–58.22	60.40	11.83	–11.72	35.38	2.40	–1.32	6.11	–3.98	–11.75	3.78	–3.95	–19.84	11.94	–.17	–.65	.32
Education – college / university	27.60	–37.89	93.10	8.39	–13.35	30.13	5.45**	.91	9.99	–2.02	–10.73	6.69	–5.46	–20.26	9.35	–.08	–.63	.47
Education – unknown	46.89	–28.91	122.70	15.31	–16.83	47.44	4.88	–1.07	10.84	–1.46	–9.95	7.02	–22.21**	–42.47	–1.94	1.15	–.28	2.59
Constant	57.34	–70.03	184.71	47.02*	–6.51	100.54	36.81**	12.95	60.68	10.13	–4.09	24.34	41.61**	8.53	74.69	.70	–1.21	2.60
R^2		.269			.193			.271			.079			.144			.091	

Note. Coefficients are unstandardized. Significant coefficients are denoted by two asterisks on a 5% level, and by one asterisk on a 10% level. Reference category for education is elementary education. Reference category for income is € 0-10,000,-.

4.7 Discussion and conclusion

4.7.1 Interpretation of results

Because not all law violations are considered equal, the purpose of the present study was to add to the research on the context under which instrumental and normative motivations translate into greater legal compliance by looking at motivations for compliance regarding six different traffic violations. The current study shows that motivations differ depending on the traffic violation.

In general, the results show that both normative and instrumental motivations play a role in compliance with everyday traffic laws. Obligation to obey the law, personal morality and the perceived probability of apprehension were found to influence multiple types of offending behaviour. This general result is in line with previous research on traffic violations that also showed that personal morality plays a role in compliance, as well as the obligation to obey the law and the probability of apprehension, although results were not uniform (Gao & Zhao, 2018; Hertogh, 2015; Jackson, Bradford, Hough, Myhill, et al., 2012). The results in previous research have led to a number of conclusions on traffic violations. Jackson et al. (2012) conclude that their results show how differently many people think about traffic laws compared to other laws. Gao and Zhao (2018) conclude that the most dominant motivation for compliance with traffic laws is personal morality and Hertogh (2015) concludes that normative motivations (including legitimacy) offer a better explanation for regulatory compliance with traffic laws than instrumental motives.

However, the current study shows that these more general conclusions on compliance with traffic laws should be treated with some caution. Motivations for compliance differ depending on the traffic violation.

The results in table 4.10 show that personal morality is inversely related to self-reported offending behaviour for most violations. Previous studies on both minor offences and traffic violations have also found personal morality to be related to compliance (Gao & Zhao, 2018; Jackson, Bradford, Hough, & Murray, 2012; Murphy et al., 2016; Reisig et al., 2014). However, an interesting result of the current study is that the relationship between morality and compliance is absent for driving

without proper lighting and driving with a higher top speed than allowed. A possible explanation for the absent link with driving without proper lighting is that this violation is likely caused by a defect, rather than a deliberate action. A possible explanation for the result for driving with a higher top speed than allowed could be that on average, it is deemed much less immoral than the other violations. This implies that changes in personal morality only influence compliance when morality is already relatively high.

When looking at the four dimensions of legitimacy, namely obligation to obey the law, trust in the police and moral alignment with laws enforced by the police and traffic laws in particular, only obligation to obey the law is related to self-reported compliance. Previous research has found mixed results on the influence of legitimacy on traffic violations. Jackson et al. (2012) and Gao & Zhao (2018) found no relationship with traffic violations, while Hertogh (2015) did. By looking at different traffic violations, the current study provides an insight into a possible explanation for these differences. The obligation to obey is not related to all traffic violations. It only influences compliance in the case of driving with a higher top speed than allowed and operating a mobile phone while driving. Jackson (2018) argues that the obligation to obey the law steps in when moral values and social norms in some sense 'fail'. This is a plausible explanation for the results found for driving with a higher top speed than allowed. However, the current study also shows that the obligation to obey can also influence compliance behaviour when violations are judged highly immoral. Drivers in the current sample find using a mobile phone when driving highly immoral, but they also report less violations when the obligation to obey is stronger, which shows that it does not only step in when personal morality is relatively low.

When looking at instrumental motivations for compliance, an interesting result is that peer disapproval is not related to compliance in the current study. This is a confirmation of results in previous research on traffic violations by Hertogh (2015). It is possible that shame emotions as argued by Grasmick and Bursik (1990) are not as important in the case of traffic violations.

Severity of punishment is also not found to influence compliance behaviour for the six different types of violations. These results are in line with previous evidence on traffic violations and also with the large body of evidence on other violations in which the effect of the severity of punishment is inconsistent.

Where the current study differs from previous studies, is that the results show that perceived probability of apprehension is related to traffic violations, or more specifically, to driving under the influence of alcohol. It is very plausible that previous research was unable to detect this relationship as a consequence of grouping the different traffic violations into a single category.

With one exception, the results show that different motivations are not significantly negatively correlated. This implies that in the setting of moped traffic laws, police policy based on both instrumental and normative motivations can be executed without the risk of one policy crowding out another. More specifically, it indicates that, in the current setting of moped traffic controls, the use of deterrence measures does not negatively impact driver's normative motivations such as trust in the police or their felt obligation to obey the law. This is an important implication, since it mitigates the proposed contrast between instrumental and normative motivations brought forward in previous research.

Overall, the implication of the current study for police policy is that routine traffic controls can be a successful instrument in obtaining compliance with traffic laws. These controls, that are generally aimed at detecting different types of violations, can be effective when they succeed in influencing the perceived probability of apprehension, but also personal morality and the obligation to obey the law. There is no indication that methods used to influence these perceptions will have an adverse negative effect on other motivations.

4.7.2 Contributions to the field

This study has shown that it is useful to investigate motivations for compliance for different laws. This focus has made it possible to compare the influence of motivations on self-reported offending-behaviour with regard to different laws. And although the results are based on self-report data, it is likely that all six violations are affected equally by this potential weakness, making the differences found relevant and useful. In addition to the acquired insights based on the focus on specific laws, the current study also contributes to research on motivations for compliance tested in Continental Europe. Studies from different parts of the world contribute to the understanding of the circumstances under which instrumental and normative motivations translate into greater legal compliance.

The relevance of the results in the current study is enhanced by the methodological improvements over previous research. Unlike most previous studies, the current results are based on a comprehensive range of instrumental and normative motivations for compliance derived from the latest research, thus reducing omissions of potentially relevant motivations. In addition, the latent components in the model are thoroughly tested for convergent and discriminant validity and the estimates produced by the model were corrected for skewness.

4.7.3 Limitations

The current study also has a number of limitations. The first pertains the setting of moped traffic control checks. This specific setting was selected due to the possibility to investigate multiple violations. And while this setting provided a high response-rate (44%) and a sample including both offenders and non-offenders, the external validity of the results is restricted. Moped traffic controls checks are a specific setting in which the police check for mostly minor violations. It is not possible to extend the conclusions of this research to more serious offences or to other minor violations.

The second limitation of the study concerns the fact that the results are based on self-report frequencies of violations. And although previous research has shown that self-report can be a reliable and valid means to establish frequency of criminal activity, especially concerning minor violations (Hindelang et al., 1981; Thornberry & Krohn, 2000), there still is potential for bias with self-report data.

A third and related limitation regards the correlational nature of the results. In this study, I have not necessarily established causation. The directions of the relationships in the model are based on previous research, but the direction of the relationships between variables could not be confirmed and are therefore not necessarily in the directions as described. This limits the causal claims that can be made based on the results. It is possible to construct alternative explanations for the relationships observed. For example, while it is likely that personal morality influences compliance behaviour, it is also possible that violating the law can cause for changes in personal morality. The solution to this problem is not just to simply add lags to the model, since feedback over time creates a dynamic process whereby motivations and legal compliance mutually affect each other (Hsiao, 2003). Panel data could be a solution to this potential problem, although the variables in the model could still

be affected by the enduring impact of the third common cause (Maguire & Johnson, 2010).

However, notwithstanding the limitations of the current study, the results in this research contribute to a more thorough understanding of the circumstances under which instrumental and normative motivations translate into greater legal compliance. I have shown that motivations for compliance ought to be investigated separately for different violations. The differences found in motivations for compliance between traffic laws show that grouping different violations into 'types of violations' is too coarse which makes interpreting results difficult and can possibly lead to wrong conclusions. The additional benefit of comparing the results of different violations is that all behaviours are likely affected similarly by the limitations of this study. By acquiring results on different violations, I have been able to reliably draw inferences about the differences between violations.

On the other hand, I acknowledge that this type of research needs to be expanded. This is the first research specifically aimed at investigating compliance at the level of specific violations. In a field of research in which motivations and legal compliance can mutually affect each other, properly set-up real life experiments and longitudinal studies with person and time fixed affects may add to a better understanding of the exact nature of the relationships under investigation. This also holds true for the use of actual offending behaviour. Properly set-up field research based on actual offending behaviour would be an interesting next step to gain additional insight in the motivations for compliance.

Samenvatting (Summary in Dutch)

Instrumentele en normatieve routes naar naleving
Resultaten van veldonderzoek naar bromfietsers

Handhaving dient om naleving van wet- en regelgeving te bevorderen. Hoe handhaving naleving kan bevorderen is door veel auteurs onderzocht. In dit onderzoek staan twee perspectieven centraal. Het eerste perspectief is gebaseerd op het risico op een sanctie. De hypothese is dat burgers een min of meer rationele afweging maken van de verwachte voor- en nadelen, zowel materieel als immaterieel, van het naleven dan wel overtreden van de regels. Door de verwachte kosten van een handeling in de vorm van een sanctie hoger te maken dan de verwachte baten is afschrikking mogelijk. Deze afweging tussen de kosten en baten als invloed op naleving van wetten en regels staat bekend als het instrumentele perspectief.

Het tweede perspectief is het zogeheten normatieve perspectief. Hier is de centrale hypothese dat eerlijke en respectvolle procedures essentieel zijn voor de acceptatie van het gezag van autoriteiten (zoals politie en justitie). Deze acceptatie, ofwel legitimiteit van autoriteiten, leidt volgens dit perspectief tot een groter publiek respect voor de wet en een grotere gevoelde verplichting om de wet na te leven.

In dit proefschrift worden de resultaten gepresenteerd van veldonderzoek dat ingaat op enkele onderbelichte punten in de reeds bestaande literatuur over de instrumentele en normatieve routes naar naleving. Het onderzoek is gebaseerd op reguliere bromfietscontroles. Hierbij wordt gecontroleerd op meerdere overtredingen zoals rijden op een bromfiets met een hogere maximumsnelheid dan toegestaan, rijden zonder geldig rijbewijs of WA-verzekering, rijden onder invloed, rijden zonder deugdelijke verlichting, het vasthouden van een mobiele telefoon tijdens het rijden en rijden zonder helm (voor zover verplicht).

Controles zijn uitgevoerd tussen 19 januari 2017 en 2 augustus 2017 door de Verkeerspolitie, eenheid Den Haag, in Leiden en Zoetermeer. In deze periode hebben onderzoekers van de Universiteit Leiden interviews afgenomen bij bestuurders, is gedrag van de politie en bestuurders geobserveerd en heeft de politie de intensiteit van brom-

fietscontroles in Leiden verhoogd terwijl de intensiteit in Zoetermeer gelijk bleef aan de reguliere intensiteit.

De combinatie van vragenlijstdata, gestructureerde sociale observaties en een experiment hebben het mogelijk gemaakt om drie interessante onderzoeksvragen te beantwoorden.

Leidt meer politiecontrole tot een hogere verwachte pakkans?

De eerste onderzoeksvraag draagt bij aan inzicht in de relatie tussen wat de politie doet en hoe dit wordt ervaren door burgers. Hoewel er veel onderzoek naar naleving is gedaan zijn er weinig studies die hebben gekeken naar deze essentiële relatie. Wijzigingen in handhavingsbeleid kunnen echter alleen doorwerken in nalevingsgedrag als deze wijzigingen ook door burgers worden opgemerkt. Hoofdstuk twee gaat in op de vraag of een intensivering van politiecontroles ook daadwerkelijk leidt tot een opwaartse bijstelling van de individuele subjectieve pakkansen. Om deze vraag te beantwoorden worden de resultaten van het eerste veldexperiment naar deze relatie gepresenteerd, waarbij de politie de frequentie van de bromfietscontroles in Leiden intensiveerde, terwijl deze in Zoetermeer het normale patroon bleven volgen. De resultaten van het experiment laten zien dat de intensivering van de politiecontroles daadwerkelijk leidt tot een opwaartse bijstelling van de individuele subjectieve pakkansen van duidelijk zichtbare en door de politie makkelijk vast te stellen overtredingen zoals rijden onder invloed en mobiel bellen tijdens het rijden.

Wat is de invloed van gedrag en besluitvorming van de politie op percepties van procedurele rechtvaardigheid?

Waar de eerste onderzoeksvraag gericht is op de instrumentele route naar naleving, gaat de tweede onderzoeksvraag over de normatieve route. Ook hier is de relatie tussen wat de politie doet en hoe dit door burgers wordt gepercipieerd slechts beperkt onderzocht.

Door vragenlijstdata te combineren met gestructureerde sociale observaties is het mogelijk een antwoord te geven op de vraag of een meer procedureel rechtvaardige behandeling en besluitvorming door politie ook leidt tot een hogere ervaren procedurele rechtvaardigheid

door burgers. De setting van bromfietscontroles maakt het mogelijk om zowel overtreders als niet-overtreders te bevragen en tegelijkertijd alle elementen van procedureel rechtvaardig gedrag en besluitvorming te observeren. In deze setting is geen relatie gevonden tussen procedureel rechtvaardige behandeling en besluitvorming door politie en ervaren procedurele rechtvaardigheid door burgers.

Waarschijnlijk zijn de gevonden resultaten het gevolg van relatief hoge waarderingen van gepercipieerde procedurele rechtvaardigheid door burgers. De implicatie is dat vanaf een bepaald niveau van gepercipieerde procedurele rechtvaardigheid er weinig additionele invloed is van beter gedrag of besluitvorming door de politie. Vanaf dat punt lijken andere factoren belangrijker te worden in het verder verhogen van percepties van procedurele rechtvaardigheid.

Hoe werken instrumentele en normatieve motivaties door in naleving van verkeerswetgeving?

De derde onderzoeksvraag gaat over de wijze waarop instrumentele en normatieve motivaties van invloed zijn op zes verschillende overtredingen.

De resultaten laten zien dat motivaties voor naleving van verkeerswetgeving verschillen per overtreding. Zowel normatieve als instrumentele motivaties spelen een rol in de overweging om een overtreding te begaan, maar voorzichtigheid is geboden bij conclusies over motivaties voor naleving van verkeerswetgeving in het algemeen. De resultaten laten namelijk een divers beeld zien. Zo heeft persoonlijke moraliteit een negatieve relatie met de meeste overtredingen, maar niet met rijden zonder licht of te hard rijden. De gevoelde verplichting om de wet na te leven (een onderdeel van legitimiteit) is negatief gerelateerd aan te hard rijden en mobiel bellen tijdens het rijden. De perceptie van de pakkans heeft een negatieve relatie met rijden onder invloed.

De resultaten laten zien dat reguliere verkeerscontroles een effectief instrument kunnen zijn om naleving van verkeerswetgeving te bevorderen. Dit kan door percepties van pakkans te vergroten evenals persoonlijke moraliteit van bestuurders en de gevoelde verplichting om de wet na te leven. Er is geen indicatie dat het vergroten van een van deze motivaties zal leiden tot een afname bij andere motivaties.

Relevantie

Met het beantwoorden van de onderzoeksvragen voegt dit proefschrift wezenlijke inzichten toe aan een aantal onderbelichte punten in het reeds bestaande onderzoek naar normatieve en instrumentele routes naar naleving. Een belangrijke bijdrage is de uitbreiding van het beperkte aantal studies waarin is gekeken naar de essentiële vraag hoe percepties van burgers worden beïnvloed door acties van handhavers zoals de politie. Daarnaast draagt het onderzoek ook bij aan meer inzicht in de omstandigheden waaronder de normatieve en instrumentele routes leiden tot meer naleving. Bovendien geven de toegepaste psychometrische analyses meer inzicht in de gehanteerde concepten waardoor meer uniformiteit kan ontstaan in toekomstig onderzoek.

Dit proefschrift biedt ook praktische handvatten voor handhavingsbeleid, al moet hierbij wel vermeld worden dat deze zich vooral richten op bromfietscontroles. De gecombineerde resultaten uit de verschillende hoofdstukken laten zien dat het in Nederland mogelijk is om via de verhoging van de intensiteit van bromfietscontroles meer naleving te stimuleren. Deze verhoging van de pakkans lijkt niet nadelig te zijn voor andere motivaties van bromfietsbestuurders. De gecombineerde resultaten laten ook zien dat het voor de politie lastiger is om naleving nog verder te bevorderen via de normatieve route. Nederlandse bromfietsbestuurders beoordelen de procedurele rechtvaardigheid van de politie al relatief hoog. Dit beperkt de mogelijkheden om naleving te verhogen door nog meer aandacht en training te richten op eerlijke en respectvolle procedures door agenten.

Toekomstig onderzoek

Dit proefschrift draagt bij aan een beter begrip van de werking van de instrumentele en normatieve routes naar naleving, maar geeft tegelijkertijd aanleiding voor vervolgonderzoek.

Een goed voorbeeld hiervan wordt gegeven door de resultaten in hoofdstuk vier. Daar blijkt dat normatieve motieven zoals persoonlijke moraliteit en legitimiteit van invloed zijn op het nalevingsgedrag van bromfietsbestuurders. Met de geconstateerde beperkte mogelijkheden van meer procedurele rechtvaardige behandeling door de politie, roept dit de vraag op welke mogelijkheden er dan wel zijn om deze motieven te beïnvloeden.

In aanvulling op dergelijke vragen is het ook belangrijk om in toekomstig onderzoek verder te gaan met het opzetten van veldexperimenten en onderzoeken gebaseerd op paneldata, waardoor nog meer inzicht vergaard kan worden in de causale relatie tussen politieactiviteit, percepties van burgers en nalevingsgedrag.

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Appendix A – Questionnaire

Vragenlijst handhaving Politie

uniek nummer

datum

locatie

Kenteken

Universiteit Leiden

Afgenomen door

Intro U bent net gecontroleerd door de politie. Wij willen u graag een aantal vragen stellen over deze controle en over uw mening over de politie in het algemeen. Door middel van deze vragenlijst willen wij inzicht krijgen in hoe u het optreden van de politie beleeft en hoe dit verbeterd kan worden. Uw antwoorden komen bij de onderzoekers van de Universiteit Leiden en niet bij de politie. Uw gegevens worden door de onderzoekers vertrouwelijk behandeld en zijn door de politie niet te herleiden naar u persoonlijk.
De vragenlijst duurt maximaal 5 minuten. U krijg van ons een vergoeding van € 5,- voor uw tijd.

Heeft u zojuist een boete of een waarschuwing gehad? ja / nee

En mag ik vragen waarvoor (indien ja)?

Was de uitkomst van uw contact met de politie voor u positief of negatief?
- ❍ positief
- ❍ niet positief maar ook niet negatief
- ❍ negatief

Voorbeeld De vragen die we voorleggen zijn voornamelijk stellingen over de politie, uw contact met de politie en over wetten en regels. Wilt u aangeven in hoeverre u het eens of oneens bent met de stellingen – hierbij staat 1 voor helemaal mee oneens en 7 voor helemaal mee eens. Het gaat om uw mening. Er zijn geen goede of foute antwoorden. We vragen bijvoorbeeld:

	helemaal mee oneens (1)	mee oneens (2)	enigszins mee oneens (3)	niet mee eens/ oneens (4)	enigszins mee eens (5)	mee eens (6)	helemaal mee eens (7)
De (meeste) regels van de politie sluiten goed aan bij mijn eigen waarden en normen	❍	❍	❍	❍	❍	❍	❍

Is alles duidelijk?

Instructie Ik ga u nu de vragen voorleggen. Denk goed na voor u antwoord geeft en neem daarvoor rustig de tijd.
De eerste vragen gaan over **wetten en regels**. Kunt u aangeven in hoeverre u het eens bent met de volgende stellingen?

	helemaal mee oneens (1)	mee oneens (2)	enigszins mee oneens (3)	niet mee eens/ oneens (4)	enigszins mee eens (5)	mee eens (6)	helemaal mee eens (7)
Iedereen moet zich aan de wet houden, ook als men het er niet mee eens is	❍	❍	❍	❍	❍	❍	❍
Ik probeer me altijd aan de wet te houden, ook als ik het er niet mee eens ben	❍	❍	❍	❍	❍	❍	❍
Als ik de wet overtreed dan voel ik me schuldig	❍	❍	❍	❍	❍	❍	❍
Iemand die weigert zich aan de wet te houden, is een bedreiging voor de samenleving	❍	❍	❍	❍	❍	❍	❍
Gezag respecteren en gehoorzamen is de belangrijkste waarde die ieder kind bijgebracht moet worden	❍	❍	❍	❍	❍	❍	❍
Het is bijna nooit terecht om de wet te overtreden	❍	❍	❍	❍	❍	❍	❍
De wetgeving in ons land sluit goed aan bij mijn eigen waarden en normen	❍	❍	❍	❍	❍	❍	❍
De wetgeving in ons land sluit goed aan bij de waarden en normen van de meeste Nederlanders	❍	❍	❍	❍	❍	❍	❍
Je moet je altijd aan de verkeersregels houden	❍	❍	❍	❍	❍	❍	❍
De verkeersregels sluiten goed aan bij mijn eigen waarden en normen	❍	❍	❍	❍	❍	❍	❍
De verkeersboetes in ons land zijn veel te hoog	❍	❍	❍	❍	❍	❍	❍
Je moet altijd je verkeersboete betalen ook als je het er niet mee eens bent	❍	❍	❍	❍	❍	❍	❍

Hieronder staan vragen **over de politie**. Kunt u aangeven in hoeverre u het eens bent met de volgende stellingen? (*evt benadrukken dat 7 geheel mee eens is en 1 geheel mee oneens*)

	helemaal mee oneens (1)	mee oneens (2)	enigszins mee oneens (3)	niet mee eens/ oneens (4)	enigszins mee eens (5)	mee eens (6)	helemaal mee eens (7)
Ik heb veel respect voor de politie	❍	❍	❍	❍	❍	❍	❍
De meeste agenten zijn eerlijk	❍	❍	❍	❍	❍	❍	❍
Ik vind dat ik de politie moet gehoorzamen	❍	❍	❍	❍	❍	❍	❍
Ik heb vertrouwen in de politie	❍	❍	❍	❍	❍	❍	❍
De politie is er om de rechten van mensen te beschermen	❍	❍	❍	❍	❍	❍	❍
De meeste agenten doen hun werk goed	❍	❍	❍	❍	❍	❍	❍
De politie behandelt mensen, in het algemeen, respectvol	❍	❍	❍	❍	❍	❍	❍
De politie behandelt mensen, in het algemeen, eerlijk	❍	❍	❍	❍	❍	❍	❍
De politie neemt, in het algemeen, de tijd om naar mensen te luisteren	❍	❍	❍	❍	❍	❍	❍
De politie behandelt mensen, in het algemeen, op dezelfde manier	❍	❍	❍	❍	❍	❍	❍
De politie baseert besluiten, in het algemeen, op de feiten en niet op persoonlijke meningen	❍	❍	❍	❍	❍	❍	❍
De politie licht, in het algemeen, zijn/haar handelingen en besluiten toe	❍	❍	❍	❍	❍	❍	❍

Hieronder staan vragen **over de controle die de politie net heeft uitgevoerd**. Kunt u aangeven in hoeverre u het eens bent met de volgende stellingen? (*evt benadrukken dat 7 geheel mee eens is en 1 geheel mee oneens*)

	helemaal mee oneens (1)	mee oneens (2)	enigszins mee oneens (3)	niet mee eens/ oneens (4)	enigszins mee eens (5)	mee eens (6)	helemaal mee eens (7)
Ik vind dat ik respectvol ben behandeld door de politie	❍	❍	❍	❍	❍	❍	❍
Ik vind dat ik eerlijk ben behandeld door de politie	❍	❍	❍	❍	❍	❍	❍
Ik vind dat de politie me de kans gaf om mijn kant van het verhaal te vertellen	❍	❍	❍	❍	❍	❍	❍
Ik denk dat de politie mij op dezelfde manier heeft behandeld als anderen	❍	❍	❍	❍	❍	❍	❍
De agent heeft zijn/haar besluit gebaseerd op de feiten en niet op zijn/haar eigen persoonlijke mening	❍	❍	❍	❍	❍	❍	❍
De agent heeft zijn/haar handelingen en besluiten toegelicht	❍	❍	❍	❍	❍	❍	❍
Ik denk dat de uitkomst van deze controle eerlijk is in verhouding tot andere mensen	❍	❍	❍	❍	❍	❍	❍
Ten opzichte van de wet is deze controle eerlijk	❍	❍	❍	❍	❍	❍	❍

(*Eventueel aangeven dat je over de helft van de vragenlijst bent*)

We gaan u nu een aantal vragen stellen over de pakkans en over de hoogte van verkeersboetes. Kunt u aangeven hoe groot u denkt dat de pakkans is en hoogte van de boete als u één van de volgende overtredingen zou begaan.

		zeer klein/laag (1)	klein /laag(2)	redelijk klein/laag (3)	niet groot en niet klein (4)	redelijk groot /hoog (5)	Groot /hoog (6)	zeer groot /hoog(7)
Overschrijden van de toegestane snelheid	P	❍	❍	❍	❍	❍	❍	❍
	B	❍	❍	❍	❍	❍	❍	❍
Rijden zonder geldige verzekering of geldig bromfietsrijbewijs	P	❍	❍	❍	❍	❍	❍	❍
	B	❍	❍	❍	❍	❍	❍	❍
Rijden onder invloed van alcohol	P	❍	❍	❍	❍	❍	❍	❍
	B	❍	❍	❍	❍	❍	❍	❍
Rijden zonder verlichting	P	❍	❍	❍	❍	❍	❍	❍
	B	❍	❍	❍	❍	❍	❍	❍
Mobiel bellen tijdens rijden	P	❍	❍	❍	❍	❍	❍	❍
	B	❍	❍	❍	❍	❍	❍	❍
Rijden zonder helm	P	❍	❍	❍	❍	❍	❍	❍
	B	❍	❍	❍	❍	❍	❍	❍

Nu volgen een aantal vragen over overtredingen. Kunt u aangeven hoe fout u het vindt als u zelf één van de volgende dingen zou doen? Als u iets heel erg fout vindt dan geeft u het een 7. Als u het helemaal niet fout vindt dan geeft het een 1.

	Helemaal niet fout (1)	niet fout (2)	niet heel erg fout (3)	niet goed of fout (4)	enigszins fout (5)	fout (6)	Heel erg fout (7)
Overschrijden van de toegestane snelheid	❍	❍	❍	❍	❍	❍	❍
Rijden zonder geldige verzekering of geldig bromfietsrijbewijs	❍	❍	❍	❍	❍	❍	❍
Rijden onder invloed van alcohol	❍	❍	❍	❍	❍	❍	❍
Rijden zonder verlichting	❍	❍	❍	❍	❍	❍	❍
Mobiel bellen tijdens rijden	❍	❍	❍	❍	❍	❍	❍
Rijden zonder helm	❍	❍	❍	❍	❍	❍	❍

Denk nu eens aan de vijf volwassenen die u het beste kent. In hoeverre zouden zij het goed of fout vinden, of het gevoel hebben dat u iets verkeerd had gedaan, als u een boete zou krijgen of gearresteerd zou worden voor één van de volgende dingen?

	Helemaal niet fout (1)	niet fout (2)	niet heel erg fout (3)	niet goed of fout (4)	enigszins fout (5)	fout (6)	Heel erg fout (7)
Overschrijden van de toegestane snelheid	❍	❍	❍	❍	❍	❍	❍
Rijden zonder geldige verzekering of geldig bromfietsrijbewijs	❍	❍	❍	❍	❍	❍	❍
Rijden onder invloed van alcohol	❍	❍	❍	❍	❍	❍	❍
Rijden zonder verlichting	❍	❍	❍	❍	❍	❍	❍
Mobiel bellen tijdens rijden	❍	❍	❍	❍	❍	❍	❍
Rijden zonder helm	❍	❍	❍	❍	❍	❍	❍

We zijn nu bijna aan het einde van de vragenlijst gekomen. Er volgen nog wat algemene vragen en vragen over overtredingen. Hoe vaak heeft u het afgelopen jaar een van de volgende overtredingen begaan? (*het gaat ook om overtredingen die niet door de politie zijn geregistreerd*)

	Aantal keer
Overschrijden van de toegestane snelheid	
Rijden zonder geldige verzekering of geldig bromfietsrijbewijs	
Rijden onder invloed van alcohol	
Rijden zonder verlichting	
Mobiel bellen tijdens rijden	
Rijden zonder helm	

Hoe vaak bent u het afgelopen jaar (vóór deze controle) staande gehouden door de politie?

Hoeveel waarschuwingen heeft u het afgelopen jaar (vóór deze controle) ontvangen van de politie?

Hoeveel boetes en/of sancties heeft u het afgelopen jaar (vóór deze controle) ontvangen van de politie?

Hoe hoog was de hoogste boete of sanctie?

Hoe hoog was de laagste boete of sanctie?

Hoeveel keer heeft u het afgelopen jaar contact gehad met de politie om andere redenen dan hiervoor genoemd?

En wat was de reden voor dit contact?

U bent net staande gehouden door de politie. Wat is hiervan het effect op uw gedrag?

	helemaal mee oneens (1)	mee oneens (2)	enigszins mee oneens (3)	niet mee eens/ oneens (4)	enigszins mee eens (5)	mee eens (6)	helemaal mee eens (7)
Ik zal nu minder overtredingen begaan dan vóór deze controle	❍	❍	❍	❍	❍	❍	❍
Deze controle heeft invloed op mijn gedrag	❍	❍	❍	❍	❍	❍	❍
Ik zal in de toekomst nog wel eens verkeersovertredingen begaan	❍	❍	❍	❍	❍	❍	❍

Tot slot volgen nog wat algemene vragen.

In welk jaar bent u geboren? ☐

Wat is uw geslacht? (*evt zelf invullen*)
- ❍ man
- ❍ vrouw

Wat is uw hoogste voltooide opleiding?
- ❍ Geen enkele
- ❍ basisschool
- ❍ VMBO basis beroepsgerichte leerweg, LBO of vergelijkbaar
- ❍ VMBO gemengde, theoretische of kader gerichte leerweg, MAVO, MBO niveau 1 of 2, of vergelijkbaar
- ❍ HAVO, MBO niveau 3 of 4
- ❍ VWO
- ❍ HBO, HBO/WO bachelor
- ❍ WO, HBO/WO master
- ❍ Weet niet

Wat was uw totale bruto inkomen, dus voor belastingen, in 2016?
- ❍ 0-10.000
- ❍ 10.000-15.000
- ❍ 15.000-20.000
- ❍ 20.000-30.000
- ❍ 30.000-50.000
- ❍ Meer dan 50.000
- ❍ Weet niet
- ❍ Wil ik niet zeggen

In welk land bent u geboren? ☐

In welk land is uw vader geboren?

In welk land is uw moeder geboren?

Hiermee zijn we bij het einde van de vragenlijst gekomen. Heeft u nog vragen?

Mogen wij de gegevens van de politie over uw staande houdingen van de afgelopen en de komende 12 maanden gebruiken om beter inzicht te krijgen in de controles van de politie? De gegevens zijn zowel voor de politie als voor ons niet herleidbaar tot u persoonlijk.

Naam:

Handtekening:

Naar welk mailadres kunnen we uw digitale VVV-bon sturen? (blokletters s.v.p.)

En wilt u de uitkomsten van dit onderzoek ontvangen? ja/nee

Appendix B – Observation protocol

datum	
locatie	
observator	

kenteken

sanctie/waarschuwing/nvt

participatie					
De agent heeft naar informatie/de mening van de bestuurder gevraagd	ja	nee			nvt
De bestuurder heeft informatie/mening gegeven	ja	nee			nvt
De agent heeft interesse getoond in de info/mening van de bestuurder	afwijzend	onaandachtig	passief	actief	nvt
neutraliteit					
De agent heeft aangegeven alle standpunten te willen horen	ja	nee			nvt
De agent heeft aangegeven geen besluit te nemen voordat alle relevante info bekend was	ja	nee			nvt
De agent heeft aangegeven dat besluiten worden bepaald door persoonlijke kenmerken (ras/geslacht/leeftijd)	ja	nee			nvt
De agent heeft aangegeven waarom brommercontroles worden gehouden	ja	nee			nvt
De agent heeft aangegeven waarom hij/zij heeft gekozen voor een sanctie/waarschuwing of geen sanctie	ja	nee			nvt
Waardigheid en respect					
De agent heeft respectvol gedrag getoond naar de bestuurder	respectloos	neutraal	respectvol		
De duur van respectvol gedrag was	kort	gemiddeld	overwegend		
Betrouwbare motieven van de besluitvormer					
De agent heeft de bestuurder of anderen in de omgeving gevraagd naar zijn/haar welzijn	ja	nee			nvt
De agent heeft troost of geruststelling geboden	ja	nee			nvt
De agent heeft aangegeven in te grijpen indien nodig	ja	nee			nvt
De agent heeft een PV opgemaakt of beloofd een PV op te maken	ja	nee			nvt
De agent heeft aangegeven het op te nemen voor de bestuurder bij een andere instantie	ja	nee			nvt
De agent heeft fysieke ondersteuning gegeven of geregeld	ja	nee			nvt
De agent heeft geadviseerd of beloofd om advies te geven hoe om te gaan met de situatie	ja	nee			nvt

opvallende zaken:

Appendix C – Correlation coefficients of motivations for compliance per traffic violation

Table C1: Correlation coefficients of motivations for compliance regarding driving a higher top speed than allowed (N=302)

	1)	2)	3)	4)	5)	6)	7)	8)
1) Personal morality	–							
2) Peer disapproval	.43	–						
3) Perceived probability of apprehension	.15	.12	–					
4) Perceived severity of punishment			.23	–				
5) Obligation to obey the law	.53	.29			–			
6) Trust in the police	.25				.48	–		
7) Moral alignment with laws enforced by the police	.17	.16			.38	.39	–	
8) Moral alignment with traffic laws	.33	.18			.47	.38	.36	–

Note. Only coefficients with p<.05 are depicted.

Table C2: Correlation coefficients of motivations for compliance regarding operating a mobile phone while driving (N=302)

	1)	2)	3)	4)	5)	6)	7)	8)
1) Personal morality	–							
2) Peer disapproval	.46	–						
3) Perceived probability of apprehension	.19		–					
4) Perceived severity of punishment			.34	–				
5) Obligation to obey the law	.32	.26			–			
6) Trust in the police	.15	.14			.48	–		
7) Moral alignment with laws enforced by the police		.15			.38	.39	–	
8) Moral alignment with traffic laws	.18	.24			.47	.38	.36	–

Note. Only coefficients with p<.05 are depicted.

Table C3: Correlation coefficients of motivations for compliance regarding driving under the influence of alcohol (N=302)

	1)	2)	3)	4)	5)	6)	7)	8)
1) Personal morality	–							
2) Peer disapproval	.23	–						
3) Perceived probability of apprehension	.13		–					
4) Perceived severity of punishment			.36	–				
5) Obligation to obey the law	.37				–			
6) Trust in the police	.19	.17			.48	–		
7) Moral alignment with laws enforced by the police	.14	.21			.38	.39	–	
8) Moral alignment with traffic laws	.16	.18	.16		.47	.38	.36	–

Note. Only coefficients with p<.05 are depicted.

Table C4: Correlation coefficients of motivations for compliance regarding driving without proper lighting (N=302)

	1)	2)	3)	4)	5)	6)	7)	8)
1) Personal morality	–							
2) Peer disapproval	.56	–						
3) Perceived probability of apprehension	.19	.19	–					
4) Perceived severity of punishment	.27	.15	.37	–				
5) Obligation to obey the law	.32	.24		.12	–			
6) Trust in the police	.13				.48	–		
7) Moral alignment with laws enforced by the police	.13	.15			.38	.39	–	
8) Moral alignment with traffic laws	.31	.27	.14		.47	.38	.36	–

Note. Only coefficients with p<.05 are depicted.

Table C5: Correlation coefficients of motivations for compliance regarding driving without a valid license or insurance (N=302)

	1)	2)	3)	4)	5)	6)	7)	8)
1) Personal morality	–							
2) Peer disapproval	.53	–						
3) Perceived probability of apprehension			–					
4) Perceived severity of punishment			.17	–				
5) Obligation to obey the law	.16				–			
6) Trust in the police	.12				.48	–		
7) Moral alignment with laws enforced by the police				–.13	.38	.39	–	
8) Moral alignment with traffic laws			.16		.47	.38	.36	–

Note. Only coefficients with p<.05 are depicted.

Table C6: Correlation coefficients of motivations for compliance regarding driving without a helmet when required (N=302)

	1)	2)	3)	4)	5)	6)	7)	8)
1) Personal morality	–							
2) Peer disapproval	.48	–						
3) Perceived probability of apprehension			–					
4) Perceived severity of punishment	.16	.20	.44	–				
5) Obligation to obey the law	.36	.23		.12	–			
6) Trust in the police	.20	.14			.48	–		
7) Moral alignment with laws enforced by the police	.12	.16			.38	.39	–	
8) Moral alignment with traffic laws	.26	.19			.47	.38	.36	–

Note. Only coefficients with p<.05 are depicted.

Curriulum Vitae

Bo Terpstra (10-02-1978, Utrecht), is a teacher and researcher in Behavioural Economics at the Department of Economics of Leiden Law School, Leiden University. His research mainly focuses on studying behavioural change and decision-making processes.

His interest in behavioural economics developed during his years at the Utrecht School of Economics where he studied Social and Institutional Economics. During the time of this study, Bo also studied Econometrics at Amsterdam University to broaden his methodological knowledge.

After his graduation in 2005, Bo started as a trainee at the Dutch Central Government where he worked for the Ministry of Justice and the Ministry of Social Affairs and Employment. During this time, he was responsible for developing models and information reports on migration, but also for the preparation of cabinet-level meetings and the cooperation between the Ministry of Justice and organizations such as the Police and the Royal Netherlands Marechaussee.

After attending a two-year education on coaching and training, Bo started a position as a strategic advisor and trainer for works councils and boards of directors in 2009. In 2010 he also started a position at Leiden University as a lecturer on Law and Economics and started a third study; Psychology at Utrecht University. The knowledge acquired during that Bachelor has helped to further understand the interaction between attitudes, motives and behaviour.

Based on the economic, econometric and psychological knowledge acquired in his studies and his experience with governance, Bo started his Ph.D. at the Economics Department of Leiden University in 2016. Under the supervision of prof. dr. K.P. Goudswaard and dr. P.W. van Wijck, he wrote his thesis on *Instrumental and Normative Pathways to Compliance*.

Currently he combines teaching and doing research at Leiden University with being a partner in a small firm that provides strategic advice and training. In addition to his work-achievements, Bo is the loving father of two young children. Together with his wife he enjoys every minute of their time together.

In the range of books published by the Meijers Research Institute and Graduate School of Leiden Law School, Leiden University, the following titles were published in 2021 and 2022

MI-365 M.P.A. Spanjers, *Belastingbudget. Onderzoek betekenis budgettaire impact belastingen bij parlementaire vaststelling belastingwetgeving* (diss. Leiden), Den Haag: Flosvier 2021, ISBN 978 90 8216 072 7

MI-366 J. Zhang, *The Rationale of Publicity in the Law of Corporeal Movables and Claims. Meeting the Requirement of Publicity by Registration?* (diss. Leiden), Den Haag: Boom juridisch 2021

MI-367 B.C.M. van Hazebroek, *Understanding delinquent development from childhood into early adulthood in early onset offenders* (diss. Leiden), Amsterdam: Ipskamp Printing 2021, ISBN 978 94 6421 2723

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