CrossMark

# The Impact of Procedurally-Just Policing on Citizen Perceptions of Police During Traffic Stops: The Adana Randomized Controlled Trial

Nusret Sahin[1] · Anthony A. Braga[2] · Robert Apel[1] · Rod K. Brunson[1]

**Abstract**

*Objectives* The process-based model of police legitimacy suggests, when police are perceived to make fair decisions and treat people with respect, they will be viewed as legitimate authorities. A randomized controlled trial was used to test the impact of a procedural justice policing intervention, relative to routine police behavior, during traffic stops for excessive speeding in Adana, Turkey.

*Methods* Drivers stopped by traffic officers for speeding violations were randomly assigned to treatment and control groups. Subjects in the treatment group received the procedural justice policing intervention during traffic stops, while subjects in the control group experienced business-as-usual traffic stops. Treatment officer behavior was guided by a script that helped to ensure that key components of a procedurally-just encounter were delivered. After completion of the traffic stop, drivers were interviewed on the encounter and general perceptions of traffic police.

*Results* The experimental analyses show that the infusion of procedural justice principles into police traffic stops does improve citizens' perceptions of the specific encounter relative to routine police traffic stops. However, the procedural justice treatment did not generate a robust improvement in citizens' general perceptions of traffic officers.

*Conclusion* These results indicate it might be overly optimistic to suggest a single positive encounter can exert a strong influence on durable citizen perceptions of confidence and trust in the police. In addition to ensuring procedurally-just encounters, police executives and police makers should also pay attention to other relevant performance dimensions such as crime control effectiveness, distributive fairness, and lawfulness to change global perceptions of the police.

✉ Anthony A. Braga
a.braga@neu.edu

1   School of Criminal Justice, Rutgers University, Newark, NJ, USA

2   School of Criminology and Criminal Justice, Northeastern University, 360 Huntington Avenue, Boston, MA 02115, USA

## Introduction

In recent years, considerable scholarly attention has been devoted to improving our understanding of how, and under what conditions, community residents establish, grant, withhold, and revoke police legitimacy (Skogan and Frydl 2004; Tyler 2006). Legitimacy not only represents public support, but also public willingness to recognize and defer to official authority voluntarily (Beetham 1991; Parsons 1967; Sarat 1977). Police depend heavily on the public to execute their law enforcement duties successfully (Meares and Kahan 1998; Skogan and Frydl 2004). When citizen view the police as trustworthy, they are more likely to support officers having a wider range of discretion, defer to officer authority, and comply with officer requests (Sunshine and Tyler 2003; Reisig 2010; Tyler 2004). A variety of factors, such as the fair distribution of police resources, police crime control effectiveness, and procedural fairness, have been shown to be associated with citizen perceptions of police legitimacy (Bottoms and Tankebe 2012; Jackson and Bradford 2009; Reisig et al. 2007).

Citizen views on the legitimacy of legal authorities have been linked to their appraisals of the processes by which the police and courts implement the law (Tyler 2006). Observational research generally suggests that people's perceptions of procedural justice (that is, whether police make their decisions fairly and treat people in respectful and polite ways) influences not only their feelings about specific encounters with the police but also shapes their general evaluations of trust and confidence in the police as an institution (Sunshine and Tyler 2003; Tyler and Huo 2002; Tyler and Wakslak 2004). A recent randomized controlled trial in Australia found that procedurally-just traffic stops, relative to routine traffic stops, improved citizen perceptions of procedural justice in the specific police encounter and of the police more generally (Mazerolle et al. 2013). The Australian findings suggested that the police have much to gain by acting fairly and respectfully during even a single, very brief encounter with citizens.

Skogan (2006), however, found little support for the argument that police gain globalized feelings of legitimacy by treating citizens well during specific encounters. In his analysis of a 2003 survey of contacts and evaluations of the police in Chicago and similar surveys from other U.S. states and countries, Skogan (2006) found that positive experiences during a prior police–citizen encounter (including those encounters that included procedural justice components) had little to no impact on citizens' generalized confidence in the police while bad prior experiences has significant, negative impacts. Skogan (2006) suggested that satisfactory treatment did not necessarily produce more public confidence in the police because of this asymmetrical effect of negative encounters when compared to positive encounters with the police. Similarly, using data from the London Metropolitan Police Public Attitude Survey, Bradford et al. (2009) also found that police–citizen contacts could have negative asymmetrical impacts on citizen perceptions of police effectiveness. However, they also found citizen perceptions of police fairness and community engagement could be positively impacted by positive encounters with the police.

This paper reports the results of a randomized controlled trial testing the impact of a procedural justice policing intervention, relative to routine police behavior, during traffic

stops for excessive speeding in Adana, Turkey. It is worth noting here that this research represents the first policing randomized field experiment conducted in a non-Western country.[1] We hope that this research enterprise inspires other criminologists to conduct randomized field experiments in policing and other crime and justice areas in Middle Eastern and Eastern countries. The paper begins by briefly reviewing the available literature on police legitimacy and procedural justice. We then detail the methods of the Adana randomized field experiments and the statistical models used to analyze the experimental data. Our results suggest that the incorporation of procedural justice principles into police traffic stops do improve citizens' perceptions of the specific encounter relative to routine police traffic stops. We also find, however, that procedurally-just traffic stops do not seem to exert a powerful influence on citizens' general perceptions of the police. This experiment suggests that people's perceptions of the police are durable and it may take more than a single positive encounter to alter general citizen attitudes towards the police. The concluding section of our paper discusses the implications of our findings for the delivery of police services.

## Literature Review

Police legitimacy is strongly influenced by the consequences of varying operational and policy choices. Effective policing requires the support of the public and, as such, a careful balance is required to ensure that proactive crime control efforts are well received by community members (Meares and Kahan 1998). Research suggests that the police benefit from the general willingness of community members to cooperate with them to report crimes, identify criminals, assist in investigations, and address conditions that might facilitate crime (Moore 1992; Braga 2008; Reisig 2010; Tyler and Fagan 2008). However, effective policing practices commonly involve tactics that bring the police into close, ongoing contact with community residents. This contact can be viewed by community residents, particularly minority residents, as intrusive and unwarranted, leading citizens to doubt whether the police respect their rights and care about their wellbeing (Carr et al. 2007; Brunson and Miller 2006; Brunson and Weitzer 2009). Whether or not individuals have personal contact with police officers, their perceptions of the legitimacy of police have important consequences for police effectiveness (Tyler 2004, 2006).

Research suggests that people are sensitive to the manner through which the police exercise their authority. As a consequence, the procedural justice of police actions is central to police legitimacy and policies that are not evaluated to be just, such as racial profiling, undermine police legitimacy (Fagan 2002; Tyler and Wakslak 2004). Police behavior is very important in shaping the views of the public. Studies in the United States emphasize that both Whites and minority group members focus on the manner in which the police exercise their authority both when making general evaluations of the legitimacy of the police (Sunshine and Tyler 2003) and when reacting to personal experiences with the

---

[1] A recently-completed systematic review of randomized experiments in policing identified 63 such studies competed between 1970 and 2011 (Braga et al. 2014). All 63 policing randomized experiments were completed in the United States (47, 74.6 %), United Kingdom (11, 17.5 %), Australia (4, 6.3 %) and Canada (1, 1.6 %). The Evidence-Based Policing Matrix (Lum et al. 2011) maintained by George Mason University's Center for Evidence-Based Crime Policy also does not identify any other randomized field experiments completed in non-Western countries between 2012 and 2014. We are also unaware of any new policing randomized experiments completed in any non-Western countries since the completion of the Braga et al. (2014) systematic review.

police (Tyler and Huo 2002). As will be described further below, the key insight from this body of research is that procedurally-fair practices can enhance the work of police forces by raising citizen compliance and cooperation.

Research has shown that other factors may also be quite important in stimulating citizen cooperation with the police. For instance, using survey data from the United States, Reisig et al. (2007) found that the fair distribution of police resources across individuals and neighborhoods (i.e., distributive fairness) was correlated with cooperation with the police and, using survey data from Ghana, Tankebe (2009) showed that perceived police crime control effectiveness was the main factor that determined citizen cooperation. Jackson and Bradford (2009) find that people think about their local police in ways less to do with the risk of victimization and more to do with judgments of social cohesion and moral consensus. Further, Jackson et al. (2012) found that people accept the right of the police to dictate appropriate behavior not only when they feel a duty to obey officers, but also when they believe that the institution acts according to a shared moral purpose with citizens. Drawing on the work of Beetham (1991) and Coicaud (2002), Bottoms and Tankebe (2012) suggest effectiveness, distributive fairness, procedural fairness, and lawfulness as some of the likely main contents of the dimensions of police legitimacy in liberal democracies. Through an analysis of London survey data, Tankebe (2013) found empirical support for the relevance of these broader dimensions to police legitimacy and that legitimacy has both a direct and an indirect influence on people's willingness to cooperate with the police.

Pre-existing opinions of the police strongly shape citizen perceptions of their interactions with the police (Brandl et al. 1994; Rosenbaum et al. 2005). People are suggested to form general impressions of the police before they have any personal contact with them; this, in turn, influences the nature of interactions between individuals and the police when such contact occurs (Hawdon 2008). Moreover, vicarious experiences, such as stories that people hear from their friends, family, and the media, influence the way citizens interpret and evaluate their own encounters with the police (Brunson 2007; Gallagher et al. 2001; Hohl et al. 2010; Weitzer and Tuch 2006). For instance, Warren (2011) found that people who hear negative stories about the police from family and friends are four times more likely to perceive disrespect during their own encounters with the police.

## The Process-Based Model of Police Legitimacy

Previous research on a variety of law enforcement issues establishes that legal institutions gain and preserve legitimacy through adherence to procedural fairness norms (Tyler 2003, 2005). That is, judgments about the fairness of the manner in which these actors exercise their authority influence evaluations of legitimacy of the police and other legal actors in critically important ways. Such procedural justice judgments are found to both shape reactions to personal experiences with legal authorities and to be important in assessments based upon the general activities of the police (e.g., Paternoster et al. 1997; Reisig and Chandek 2001). In both instances, citizens view the police and courts as less legitimate when they personally experience or vicariously become aware of instances of unfair, disrespectful or unethical treatment—in other words, procedural injustice (Tyler 2004). For example, respectful and polite treatment by police reduces perceptions of racial profiling (Tyler and Wakslak 2004), and such treatment combined with officer efforts to explain the reasons for their actions translates into feelings of citizen satisfaction with police more generally (Skogan and Hartnett 1997; Tyler and Huo 2002). These legitimacy

gains, in turn, translate into higher levels of respect for law and cooperation with law enforcement efforts.

Studies of personal encounters with the police consistently document that post-experience feelings are determined by the fairness in which the problem was handled. The National Research Council's Committee to Review Police Policy and Practices identified four dimensions of fairness in police–citizen interactions (Skogan and Frydl 2004). First, citizens need to have meaningful participation in interactions. Importantly, citizens must have the ability to explain situations and communicate with the police. Second, citizens need to feel that the police officers were neutral in their assessments of situations by using objective indicators to make decisions rather than personal views. Third, citizens must feel that they were treated with respect and dignity by the police during interactions. Fourth, police officers need to inspire trust in the citizenry. If people believe authorities care about their well-being and are considerate of their needs and concerns, they view procedures as fairer. Police can encourage the public to view them as trustworthy by explaining their decisions and accounting for their conduct.

Tyler (2003) proposed a process-based model of police legitimacy that suggests a direct and measurable relationship between how police treat citizens and then, in turn, what citizens think of the police. Two related components are used to evaluate whether police practices are procedurally-just in the eyes of the public: quality of decision making (e.g., officers' use of objective indicators to make decisions) and quality of treatment (e.g., authorities treat citizens with dignity and respect) (Tyler 2003; Reisig et al. 2007). If the police are perceived to make fair decisions and to treat people respectfully, they will be viewed as legitimate authorities. As a result, the police will enjoy enhanced citizen cooperation and compliance with the law. A series of research studies have been found to support the key theoretical constructs in the process-based model of police legitimacy (see, e.g. Mastrofski et al. 1996; McCluskey 2003; Paternoster et al. 1997; Sunshine and Tyler 2003; Tyler and Fagan 2008; Tyler and Wakslak 2004).

It is important to note here that there are very few randomized controlled trials in this important area of policing research.[2] A recent Campbell Collaboration systematic review of legitimacy policing concluded, "there is a clear lack of randomized experiments in the international research literature that specifically seek to isolate and test the component parts of a legitimacy policing intervention" (Mazerolle et al. 2012, p. 10). In general, observational studies suggest that when police are evaluated as exercising their authority fairly in a general manner, they are viewed as more legitimate (Engel 2005; Elliott et al. 2011; Gau and Brunson 2009; Murphy et al. 2008; Reisig et al. 2007). However, as noted by Mazerolle et al. (2013), these judgments of police by citizens are not linked explicitly to assessments of specific police–citizen encounters. Impacts on long-run generalized views of legitimacy often are inferred rather than directly tested by research analyzing the relationship between police–citizen encounters and citizen assessments of police (e.g., see Dai et al. 2011).

---

[2] Schuck and Rosenbaum (2011) present the preliminary results of a randomized experiment testing the impacts of a Chicago Police Department recruit training program aimed at improving the quality of interpersonal encounters between officers and residents. Preliminary results suggest that recruits who received training displayed more positive procedural-justice attitudes, greater conflict-resolutions skills, and more empathy than did non-trained recruits. Their report did not mention any measurement of changes in citizen perceptions of encounters with treatment and control recruits, however.

There are two noteworthy exceptions in the large body of mostly non-experimental research in this area. The first is the landmark Queensland Community Engagement Trial (QCET) in Australia which examined the direct and indirect outcomes of procedural justice policing under randomized field trial conditions. Mazerolle et al. (2013: 35) operationalized the four key components of procedural justice (citizen participation, dignity and respect, neutrality, and trustworthy motives) into a script delivered as the experimental condition by police to drivers during police-initiated random breath testing traffic roadblocks. The "business-as-usual" mode of random breath testing traffic operations was the comparison condition. Based on survey responses mailed to drivers after the encounter, Mazerolle et al. (2013) found procedurally-just traffic encounters in the treatment group significantly improved citizen perceptions of the actual encounter directly and general views of the police indirectly relative to encounters in the comparison group. The authors concluded that the theorized process-based model was supported by their research and suggested that the police had much to gain from acting fairly during even short encounters with citizens.

The second randomized experiment is the Scotland Community Engagement Trial (ScotCET) (MacQueen and Bradford 2015). A block randomized design using pre-test and post-test measures was used to test the effects of procedurally-just policing during roadside vehicle stops on public trust and police legitimacy relative to routine police behaviors during roadside vehicle stops. MacQueen and Bradford (2015) found that the treatment diminished citizen trust in the officers who made the stop and satisfaction with their conduct relative to control conditions. Moreover, relative to routine encounters, procedurally-just policing during vehicle stops had no significant effects on general trust in the police or police legitimacy. The authors suggested that contextual factors, such as broadly favorable opinions of the police in Scotland at the outset of the trial, may have limited the impact of the intervention.

Given these conflicting findings, this study represents another much-needed experimental test of the process-based model of police legitimacy. As will be detailed below, a randomized controlled trial was implemented to test whether procedurally-just policing during traffic stops influence citizen perceptions of the specific encounter and of the police generally relative to routine traffic stops in Adana, Turkey. While the current study builds on certain aspects of QCET, it more appropriately represents an extension of an important line of research rather than a straight-up replication of a specific study. Key distinctions include the implementation of procedural justice principles during a different type of police–citizen traffic encounter, the randomization of treatment and control conditions to specific encounters rather than the randomization of groups of encounters to treatment and control conditions, all study subjects receiving a negative outcome (a speeding ticket) rather than the vast majority of subjects not receiving a negative outcome, on-site interviews of subjects resulting in much higher subject response rates rather than the use of mail-in surveys, different statistical modeling approach, and a study setting in a Middle Eastern, rather than Western, city.[3]

---

[3] While not randomized experiments, the basic propositions of the process-based model of police legitimacy have been tested in non-Western countries such as China (Hu et al. 2015), Israel (Jonathan-Zamir and Weisburd 2013), Jamaica (Reisig and Lloyd 2009), Slovenia (Reisig et al. 2014), and Trinidad and Tobago (Kochel et al. 2013).

## Randomized Controlled Trial Design and Implementation

### Research Setting

The Turkish National Police (TNP) has some 250,000 officers and provides police services to citizens of Turkey. While the TNP has a variety of centralized departments, such as intelligence, organized crime, and counterterrorism divisions, the provincial organization comprises 81 city police departments, 884 Security Directorates of Towns affiliated to provinces, and 834 Police Stations throughout Turkey. In 2008, a nationally-representative survey found that the TNP was the third most trusted public institution in Turkey (6.4 on a scale of 0 to 10, with 0 being not-at-all trustworthy and 10 being highly trustworthy), placing behind the military (8.3) and pre-high school education system (6.5) (Adaman et al. 2009). Cao and Burton (2006), however, noted that this relatively high-level of global trust in TNP may not extend equally to all of its divisions. They suggest that higher levels of trust might be limited to the TNP's divisions that are responsible for their relatively-successful efforts to investigate serious violent crimes and combat counterterrorism and organized crime rather than broadly extended to patrol units and traffic divisions responsible for less popular, mundane policing tasks.

Due to their high visibility on the streets and intensive efforts to prevent motor vehicle accidents, traffic officers are generally regarded as the most visible component of the TNP (Aytac 2005; Kazu 2003; Ozbaran 2010). However, survey research indicates that the Turkish citizens have less trust in and hold stronger negative attitudes toward TNP traffic officers than non-traffic officers (Adaman et al. 2005; Aytac 2005). Negative public opinion of the TNP traffic police stemmed mainly from citizen perceptions of unfair enforcement practices that protect "privileged" citizens, corrupt officers who solicit and accept bribes, and the generally rude demeanor of traffic officers toward drivers during stops (Yalcinkaya 2012). Given these concerning perceptions of traffic officer behavior, the TNP participated in a randomized experiment to determine whether procedurally-just policing could improve citizen perceptions of encounters with traffic police officers specifically and improve citizen perceptions of the TNP more generally.

The data for this study were collected during police speed control operations within the city boundaries of Adana, Turkey in the spring of 2013. The city of Adana is a highly populated city located in the Southern part of Turkey and it is the administrative seat of the Adana province (which has a population of 2.1 million). Adana is the fifth largest city of Turkey with a population of almost 1.6 million, encompassing approximately 1000 square miles. According to the 2011 Turkish Statistics Institute address-based population survey, Adana citizens had a median age of 29.3 years (median age for Turkey is 28.9) and a median household income of $15,521 (median household income for Turkey is $15,137). The Adana Police Department (APD) is the 5th largest unit of the TNP with roughly 6200 sworn officers. APD's traffic division is comprised of 350 traffic officers and 2 non-sworn officers. Road speed control operations are a usual practice of traffic division. During 2012, APD traffic officers issued roughly 3800 speeding tickets per month.

### Research Design

Randomized experimental designs allow researchers to assume that the only systematic difference between the control and treatment groups is the presence of the intervention; this permits a clear assessment of causes and effects (Campbell and Stanley 1966; Sechrest and

Rosenblatt [1987](#); Shadish et al. [2002](#)). This randomized controlled trial was designed to determine whether incorporating procedural justice components into police–citizen interactions during traffic stops for speeding influenced citizen perceptions of the specific encounter and of the police more generally relative to routine interactions during traffic stops for speeding. As such, the units of analysis for this study were police–citizen speeding traffic stop encounters. As will be detailed below, drivers stopped by APD traffic officers for speeding violations were randomly assigned to treatment and control groups. Subjects in the treatment group received the procedural justice policing intervention during traffic stops, while subjects in the control group experienced business-as-usual traffic stops. Treatment officer behavior was guided by a script that helped to ensure that key components of a procedurally-just encounter were delivered. Drivers in both treatment and control groups received the same outcome, a speeding ticket. After completion of the traffic stop, drivers were asked whether they were willing to volunteer to answer a questionnaire administered by a researcher.

Two teams of APD traffic officers and two researchers staffed each experimental speed control operation. The first team comprised two officers in an unmarked radar-equipped police cruiser who monitored traffic speeds from the side of the road. The second team comprised treatment and control officers who set up a checkpoint at a location further on the roadway to issue citations. Two marked APD cruisers were parked at the checkpoint. When the officers in the radar-equipped vehicle detected a speeding violation, they contacted the other officers via radio and transmitted the violator's car type, plate number and the cited speed to them. Based on a randomization protocol developed by the research team, a senior officer in the second team assigned the violator to treatment or control conditions. The assigned traffic officers interacted with the violator when he or she reached the checkpoint.

All participating officers were trained on the general components of the experimental design. While APD traffic officers staffing the radar-equipped car varied over the course of the experiment, a total of 17 APD traffic officers participated in the actual delivery of treatment and control conditions. Three senior officers served as supervisors for the speed control operations and were responsible for stopping speeding motorists and directing them to treatment and control conditions. Six officers delivered the treatment conditions and 8 officers delivered routine encounter control conditions.[4] Comparison officers were instructed to conduct speeding stops in a routine manner and interact with stopped motorists consistent with their everyday behavior patterns. Treatment officers, however, received more extensive training on the delivery of the procedural justice script and maintaining a polite and respectful demeanor during their interactions with stopped motorists.

The APD carried out the speed enforcement operations at 15 different locations. Speed control operations were conducted in the mornings and afternoons. The operations in the morning continued for 3 h (from 9:00 am to 12:00 pm), while the afternoon operations continued for 2 h (from 2:00 pm to 4:00 pm). Over the course of the experiment, APD traffic officers completed speeding violation traffic stops of 743 drivers during the operations. On average, the delivery of the procedural justice policing intervention took an

---

[4] The treatment and control traffic officers did not differ significantly in terms of age (Mean = 40.9), years on the job (Mean = 17.8), education (all but one control officer had more than a high school education), and place of birth (roughly one-third of each group were born in Adana with the remainder coming from other areas of Turkey). The control group did have two female officers while the treatment group was comprised completely of male officers. Researchers did not note any substantive differences in the way male and female control officers interacted with stopped motorists.

additional minute to complete when compared to the length of time recorded for routine police–citizen encounters. The mean stop time for the treatment group was approximately 5.5 min and the mean stop time for the control group was approximately 4.5 min.

## Treatment Conditions

Consistent with previous studies (Mazerolle et al. 2013; Sunshine and Tyler 2003; Tyler 2006), the treatment included the delivery of the four key components of the procedural justice model during each encounter: neutrality, trust, participation, and dignity/respect. Specifically, we drew upon the QCET experience to develop an easy-to-implement scripted message to enhance the existing routine of the police that was slightly modified for the Turkish context and adapted for use in this study. A printed postcard-sized aide-memoire containing the full text of the scripted message (with key points highlighted) was provided to each officer conducting the speed control (Appendix 1). The officers were asked to memorize the script if they could. If they could not, notecards made it easier for them to recall the key elements in the script.

Treatment officers started their interactions with stopped motorists by giving them information on the number of speed-related deaths and injuries in Adana specifically and Turkey more generally. Treatment officers then explained to drivers that they were conducting these speed control operations to make roads safer in an effort to save peoples' lives. The drivers were then given the opportunity to share their thoughts regarding speed controls, explain their driving behaviors, and ask any questions. After listening to their concerns and answering any questions, the officer informed drivers about their specific violations and stated that a speeding ticket would be issued. After getting their driver's license and registration, a speeding ticket was issued and given to each driver. In sum, officers who executed the treatment conditions read the scripted message in a polite and respectful manner, and gave the drivers a voice before issuing a ticket.

## Control Conditions

The "routine" procedure did not involve the delivery of a scripted message prior to issuing a speeding ticket. In the routine procedure, no explicit instructions were given to guide the officer's demeanor. Officers behaved in whatever manner they typically used to interact with citizens. In general, control officers approached the driver after stopping the car and informed the driver that he or she exceeded the speed limit without providing an opportunity for the driver to ask questions or provide an explanation or apology. Officers then asked the motorist for their driver's license and registration, returned to their patrol car to issue a ticket, wrote a speeding ticket, handed it to the driver, and released the stopped vehicle. Researchers monitored control conditions to ensure that these officers did not start to take on the behaviors mandated by the treatment condition. No instances of treatment contamination into control conditions were noted.

## Administration and Content of the Interview Instrument

After the traffic stop was completed, a researcher approached the motorist and asked if she/he was willing to participate in a brief interview about the interaction. The researcher explained that they were not part of the TNP and assured prospective subjects that their

responses would be kept confidential. If the motorist agreed to be interviewed, the researcher asked her/him to move their car to a location roughly 50 feet away from the speed control operation area. Treatment and control officers were required to stay away from in-progress interviews. Researchers then asked participating drivers to provide responses to a series of questions about the police in general and the traffic stop encounter in particular. The interview concluded with demographic questions on age, gender, education, district of residency, occupation, and income. All interviews were conducted in Turkish and each interview took between two and four minutes to complete.

Interview questions were drawn from previous studies that revealed the items to be reliable and valid indicators of key police legitimacy and procedural justice concepts (Mazerolle et al. 2013; Sunshine and Tyler 2003; Tyler, 2006; Tyler and Huo 2002; Tyler and Wakslak 2004).[5] Specifically, respondents were asked how much they agreed or disagreed with the following nine statements: (1) "I trust the police," (2) "I am satisfied with the way police treat citizens," (3) "The police are polite when dealing with people," and (4) "Police could not/would not issue a traffic ticket to the privileged," (5) "The officer was polite and treated me with respect," (6) "Despite the outcome (speeding ticket), I think that stationary speed controls are necessary," (7) "I felt the officer would do the same and issue a ticket to anyone in my situation," (8) "The officer was trustworthy," and (9) "I was satisfied with the officer's behavior and how I was treated." The first four questions were designed to measure the respondent's "general perceptions" about the police, while the last five questions were designed to measure "encounter perceptions" concerning the respondent's interaction with the traffic officer during the stop. All responses were measured using a five-point Likert scale, ranging from "strongly disagree" to "strongly agree."

## Randomization to Treatment and Control Groups

The research team predetermined the order of random allocation of stopped drivers to treatment or control conditions prior to each speed control operation. This random order was designated on pads of report forms that were provided by researchers to the officers. After using radar technology to establish that motorists were exceeding established speed limits, a senior officer waved speeding cars off the road and recorded the license plate of the pulled-over cars on the pads. Depending on random condition indicated on the pad, the senior officer then instructed either treatment or control officers to approach the car. If multiple cars were pulled over at the same time, officers were required to keep control and treatment cars separated by 30 feet to ensure that subjects did not know whether they were being treated differently during their encounters. Control officers were instructed not to interact with stopped motorists randomly allocated to the treatment group and vice versa. Researchers observed all speed control operations and, with commanding officers, reviewed paperwork post-operations to ensure that all cases were randomized appropriately.[6]

---

[5] The final interview instrument did not contain an item that directly measured citizen compliance. The QCET compliance measures were tested for possible inclusion in the Adana RCT during a pilot speed control operation. Unfortunately, respondents provided nearly uniform responses during the pilot. The Adana RCT research team suspected that subjects may have been fearful of encountering legal consequences if reporting non-compliance immediately after the traffic stop. Therefore, a compliance measure was not included in the final instrument used during the actual RCT.

[6] This randomization protocol bears some resemblance to the method used in the Minneapolis Domestic Violence Experiment that was well known to be subverted by some of the participating officers (Sherman

Drawing on the QCET experience and differential attrition rates noted in a pilot Adana speed control operation, the research team anticipated that fewer motorists assigned to the control group would participate in the post-encounter interview as compared motorists assigned to the treatment group due to the different kinds of police–citizen interactions. Thus, more drivers were randomly assigned to the control condition than the experimental condition in an attempt to ensure equal numbers of respondents in both groups. The target sample size was roughly 700 cases, with a split of 300 drivers to the treatment group and 400 to the control group. With differential response rates, the research team anticipated 250 drivers in each group. After excluding motorists who were stopped for reasons other than speeding (N = 38) and motorists who were speeding due to health emergencies (N = 3), the speed control operations accrued 702 eligible speeding stops after completing 41 speed control operations, with 305 in the treatment group and 397 in the control group. TNP policy prohibits ticketing particular public officials, such as judges and prosecutors, whose identities were not established until after random allocation. These individuals were subsequently not included in the study (4 treatment and 13 control exclusions).

As anticipated, there were differential response rates in the treatment and control groups. Some 46 motorists in the treatment group and 147 motorists in the control group refused to participate in the post-traffic stop interview.[7] There were another 5 motorists in the treatment group and 4 motorists in the comparison group who did not complete the interview after it began. The final N for the treatment group was 254 police–citizen traffic encounters, reflecting an 84.3 % response rate from 301 treated subjects, and the final N for the control group was 246 police–citizen traffic encounters, reflecting a 64.1 % response rate from 384 untreated subjects.[8] While the initial sample thus includes 500 respondents, because of non-response to some survey questions, the working sample was reduced to 458.

Descriptive statistics for the variables used in the analysis are provided in Table 1. We elaborate in the next section on the construction of the dependent variables. Of the eight control variables, two differed significantly between the experimental and control groups, indicating some imbalance. Namely, subjects assigned to the experimental group who agreed to be surveyed are significantly more likely to be college educated and to have a family member or acquaintance who is a member of the TNP. Because of concern that respondents in the experimental condition might be more dispositionally prone to have

---

Footnote 6 continued

and Berk 1984). In this randomized experiment, however, the presence of researchers during all speed control operations, coupled with the follow-up review by commanding officers, seemed to provide adequate safeguards against subversion of the randomization procedure. No violations of randomization protocols were noted during the implementation of the experiment.

[7] Please see Sahin (2014) for statistical comparisons of individuals who refused to participate relative to those who did participate as well as comparisons of RCT participants to the resident populations of Adana. In both sets of comparisons, no substantive differences were noted.

[8] In criminology, experimental research involving the administration of surveys to subjects generally shows response rates ranging from 60 to 70 % (Antrobus et al. 2013 drawing on randomized experiments in Lum et al. 2011). The QCET experiment reported a much lower 13.1 % overall response rate (2746 valid responses out of 20,985 surveys distributed to drivers; Mazerolle et al. 2013). In ScotCET, the overall response rate was only 6.6 % (816 responses returned out of 12,431 surveys distributed to drivers; Mac-Queen and Bradford 2015). However, subsequent analyses using Cochrane and Elffers methods to explore non-response bias found that the QCET results were robust to any biases associated with low response rates across the treatment and control groups (Antrobus et al. 2013). For a two-tailed $\alpha = 0.05$ test, the statistical power of the Adana randomized experiment to detect a small effect size (ES = 0.20) was 0.682 and, for both medium and large effect sizes, statistical power exceeded 0.999 (Lipsey 1990).

**Table 1** Descriptive statistics

| Measure | Mean (SD) | Balance Diagnostics | |
|---|---|---|---|
| | | $t$ | $|d|$ |
| Assignment variable | | | |
| Experimental group | 51.8 % | – | – |
| Dependent variables | | | |
| General perceptions | –0.01 (1.0) | +1.69 | 0.16 |
| Encounter perceptions | –0.00 (1.0) | +6.85 | 0.67 |
| Control variables | | | |
| Age | 37.2 (11.5) | –1.16 | 0.11 |
| Prior police contact | 46.2 % | +0.17 | 0.02 |
| Prior demerits | 24.6 % | –1.74 | 0.16 |
| Male | 88.4 % | –0.00 | 0.00 |
| College educated | 41.9 % | +2.55 | 0.23 |
| High income | 46.5 % | +0.06 | 0.01 |
| Excessive speeding | 23.5 % | –1.40 | 0.13 |
| Police acquaintance | 38.4 % | +2.35 | 0.22 |

$N = 458$. The means of binary variables are shown as percentages. The balance diagnostics are an independent-samples $t$ test and Cohen's $d$. The equality of variances is tested and confirmed for all variables except encounter perceptions, for which unequal variances are assumed. A positive $t$ test indicates that the experimental group has a higher mean than the control group. Covariate imbalance is exhibited by a $|t|$ in excess of 1.96 and a $|d|$ in excess of 0.20

favorable attitudes toward the police, it was important to control for these variables in the empirical models.

## Analytical Framework

All analyses reported herein were performed using Stata/MP 14.1. The first step in preparation for the analysis involved investigating the dimensionality of the nine procedural justice and police legitimacy measures. Pearson and polychoric correlation matrices with the nine measures are provided in Table 2. Two confirmatory factor analyses were estimated to produce the two latent variables which serve as the dependent variables. The first factor was labeled *general perceptions* concerning the police generally, and included the four following measures (Cronbach's alpha = 0.78):

Item 1: "I trust the police"
Item 2: "I am satisfied with the way police treat citizens"
Item 3: "The police are polite when dealing with people"
Item 4: "The police could/would not issue a ticket to the privileged" (reversed)

The second factor was labeled *encounter perceptions* related to the encounter with the traffic officer, and included the five following measures (Cronbach's alpha = 0.79):

Item 5: "The officer was polite and treated me with respect"
Item 6: "I think that stationary speed controls are necessary"
Item 7: "I felt the officer would do the same and issue a ticket to anyone in my situation"
Item 8: "The officer was trustworthy"
Item 9: "I was satisfied with the officer's behavior and how I was treated"

Figure 1 provides the distributions of the two procedural justice measures, suggesting approximate normality but with mild right-censoring, as might be expected with Likert

**Table 2** Pearson and polychoric correlation matrices of procedural justice measures

| Measure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. "I trust the police" | – | 0.80 | 0.71 | 0.41 | 0.44 | 0.46 | 0.58 | 0.54 | 0.50 |
| 2. "I am satisfied with the way police treat citizens" | 0.70 | – | 0.88 | 0.29 | 0.48 | 0.49 | 0.58 | 0.51 | 0.51 |
| 3. "The police are polite when dealing with people" | 0.61 | 0.83 | – | 0.27 | 0.47 | 0.43 | 0.47 | 0.52 | 0.45 |
| 4. "The police could/would not issue a ticket to the privileged" (reversed) | 0.30 | 0.22 | 0.18 | – | 0.14 | 0.13 | 0.64 | 0.30 | 0.18 |
| 5. "The officer was polite and treated me with respect" | 0.36 | 0.39 | 0.37 | 0.09 | – | 0.51 | 0.35 | 0.73 | 0.72 |
| 6. "I think that stationary speed controls are necessary" | 0.34 | 0.36 | 0.32 | 0.05 | 0.37 | – | 0.48 | 0.57 | 0.54 |
| 7. "I felt the officer would do the same and issue a ticket to anyone in my situation" | 0.45 | 0.46 | 0.36 | 0.48 | 0.23 | 0.31 | – | 0.52 | 0.50 |
| 8. "The officer was trustworthy" | 0.42 | 0.43 | 0.43 | 0.17 | 0.59 | 0.41 | 0.34 | – | 0.82 |
| 9. "I was satisfied with the officer's behavior and how I was treated" | 0.40 | 0.42 | 0.38 | 0.12 | 0.61 | 0.41 | 0.35 | 0.73 | – |
| Mean | 3.9 | 3.8 | 3.8 | 2.8 | 4.6 | 4.4 | 3.2 | 4.4 | 4.2 |
| SD | 1.5 | 1.4 | 1.4 | 1.8 | 0.9 | 1.2 | 1.8 | 1.1 | 1.0 |
| 10th percentile | 1 | 1 | 1 | 1 | 4 | 2 | 1 | 3 | 3 |
| 50th percentile | 5 | 4 | 4 | 2 | 5 | 5 | 4 | 5 | 4 |
| 90th percentile | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

$N = 458$. Correlations below the diagonal are Pearson correlations, whereas correlations above the diagonal are polychoric correlations. Measures 1–4 are included in the "general perceptions" latent variable, while measures 5–9 are included in the "encounter perceptions" latent variable
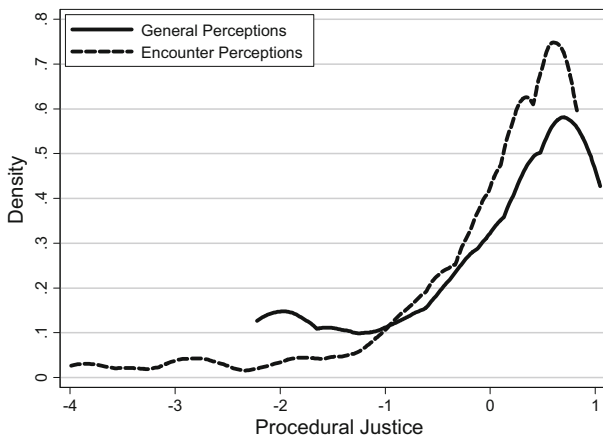


**Fig. 1** Distributions of procedural justice perceptions. *Note*: $N = 458$. Both variables are factor scores from a principal component analysis

response formats. The statistical model was based on bivariate-normal regression, which is similar to the estimation of two separate regression models, but allows for correlation between the errors of the two equations. Because the factor scores were estimates rather than the true latent variables, the standard errors in all models were derived from bootstrapping with 500 replications.

Sensitivity analyses were also performed and their results described at relevant points below. For example, we performed robust regression, median regression, and censored normal regression to ensure that the results were not distorted by unusually influential observations or significant departures from normality. A set of appendices provide even more relevant output and sensitivity analyses. As Farrington (2003) has suggested, the issue of attrition is an important threat to assumptions of treatment and control group balance in randomized experiments. As noted, the participation rate in the treatment group was higher than in the control group in our study. In some ways, improved response rates for the treatment group could be interpreted as an indication that the procedural justice treatment improved subject compliance. Nevertheless, we estimated selection-corrected regression models, using Heckman's two-step method, to evaluate the degree to which the results were sensitive to the possibility that the unobserved determinants of participation in the survey were correlated with the unobserved determinants of procedural justice perceptions (Heckman 1979; Winship and Mare 1992).

Table 3  Bivariate-normal regression model of procedural justice perceptions

| Variable | Dependent variable | | Difference $|z|$ |
|---|---|---|---|
| | General perceptions Coeff. (S.E.) | Encounter perceptions Coeff. (S.E.) | |
| Experimental group | 0.14 (0.09) | 0.56 (0.09)*** | 5.13*** |
| Age | 0.01 (0.00)** | 0.00 (0.00) | 3.32*** |
| Prior police contact | −0.19 (0.11) | 0.01 (0.09) | 2.32* |
| Prior demerits | −0.12 (0.11) | −0.15 (0.12) | 0.35 |
| Male | −0.17 (0.16) | −0.27 (0.09)** | 0.67 |
| College educated | 0.05 (0.11) | 0.15 (0.09) | 1.03 |
| High income | −0.13 (0.11) | −0.05 (0.10) | 0.85 |
| Excessive speeding | −0.08 (0.11) | −0.23 (0.12)* | 1.45 |
| Police acquaintance | 0.12 (0.10) | 0.19 (0.09)* | 0.78 |
| R-square | 0.06 | 0.14 | – |

$N = 458$. The correlation between the residuals from the two equations is +0.59 ($p < 0.0001$). Because the dependent variables are empirical Bayes estimates from graded response models, standard errors are obtained via the bootstrap with 500 replications

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed tests)

**Table 4** Sensitivity of empirical findings to model selection

| Statistical model | Dependent variable | |
|---|---|---|
| | General perceptions Coeff. (S.E.) | Encounter perceptions Coeff. (S.E.) |
| Robust regression | 0.07 (0.09) | 0.26 (0.05)*** |
| Median regression | 0.17 (0.10) | 0.34 (0.08)*** |
| Censored normal regression | 0.16 (0.12) | 0.72 (0.11)*** |
| Heckman two-step regression | 0.33 (0.22) | 0.61 (0.21)** |
| Ordered logistic regression (multilevel) | 0.27 (0.21) | 1.18 (0.20)*** |

$N = 458$. Each model is fully specified as in Table 3, but only the coefficient for treatment assignment is shown

\* $p < 0.05$; \*\* $p < 0.01$; \*\*\* $p < 0.001$ (two-tailed tests)

## Results

As presented in Table 1, independent-samples $t$-tests indicate that the treatment and control groups do significantly differ in their mean encounter perceptions (experimental = 0.29; control = –0.34; $t = 6.85$; unequal variances $df = 330$; $p < 0.0001$). However, the treatment and control groups differ in their mean general perceptions at a less restrictive threshold ($p < 0.10$) for statistical significance (treatment = 0.07; control = –0.08; $t = 1.69$; equal variances $df = 456$; $p < 0.092$). The corresponding effect size estimates (Cohen's $d$) are 0.16 and 0.67, respectively (see Cohen 1988). The latter effect size is notable indeed, indicating that, while the intervention seemed to have a marginal impact on overall perceptions about the police, it did substantially improve procedural justice perceptions concerning respondents' encounters with the traffic police officers.

In Table 3, we estimate bivariate-normal regression models that introduce the control variables. The coefficients for the control variables indicate that general perceptions are significantly more favorable among older respondents, but no other regressor achieves statistical significance. On the other hand, encounter perceptions are significantly more favorable among female respondents, those who were speeding less than 30 % over the limit, and those with police acquaintances. Importantly, the control variables do not alter inference about treatment assignment. The treatment and control groups do not differ significantly in their general perceptions, but differ greatly in their encounter perceptions. A $z$-test for cross-equation differences confirms that the estimated "treatment effect" on encounter perceptions differs significantly from the effect on general perceptions.

In Table 4, we evaluate the sensitivity of the findings with respect to model choice, and present only the coefficients for treatment assignment. The first row is a robust regression model, which is an iterative procedure intended to limit the influence of outliers on inference by down-weighting problematic observations and performing weighted least squares (see Andersen 2008; Verardi and Croux 2009). The second row is a median (i.e., least absolute deviations) regression model, which estimates the conditional median rather than the conditional mean (see Koenker 2005).[9] The third row is a censored normal (i.e.,

---

[9] Although the full model results are not shown, in both the robust and median regression models, gender was not significantly correlated with encounter perceptions. This contradicts the result reported in Table 2.

tobit) regression model intended to address the mild right-censoring apparent in the distributions of procedural justice perceptions (refer to Fig. 1). The fourth row is a Heckman two-step regression model, in which a separate model is specified for whether a respondent agreed to participate in the survey, and a function of the linear predictor from that step is included as an additional regressor in the substantive model (see Heckman 1979; Winship and Mare 1992).[10] The fifth row is a multilevel, ordered logistic regression model in which procedural justice perceptions are stacked, and a single set of coefficients is estimated, representing an average across each set measures.

As the coefficients in Table 4 clearly show, in no model was inference altered about the effect of treatment assignment on procedural justice perceptions. In all instances, the intervention had little effect on procedural justice perceptions concerning the police in general, but it significantly improved procedural justice perceptions concerning respondents' encounters with the police during their traffic stops. Moreover, the magnitude of the coefficient implies that the improvement in encounter perceptions was substantial. Importantly, the Heckman model results suggest that differential attrition rates did not substantially influence our outcome analyses.

As a final assessment of the nature of the relationship between the intervention and procedural justice perceptions, we regressed encounter perceptions on general perceptions, treatment assignment, and the control variables. We did so expecting that general perceptions represent "dispositional" attitudes toward the police, which would serve as a strong control variable to estimate the impact of treatment assignment on encounter perceptions. The regression model includes an interaction between general perceptions and treatment assignment. The results are not tabulated, but the predictive margins of encounter perceptions by the interaction are shown in Fig. 2. The results imply that, irrespective of a respondent's procedural justice perceptions concerning the police in general, the intervention significantly improved their procedural justice perceptions concerning the officer's behavior during the traffic stops. Even among those with the most favorable general attitudes toward the police, assignment to the experimental condition significantly improved procedural justice perceptions concerning the encounter (although the 95 % confidence intervals overlap slightly, the means significantly differ).

## Discussion and Conclusion

This randomized controlled trial was designed to test whether incorporating procedural justice principles into TNP traffic stops impacted citizen views of the specific encounter and of the police more generally in Adana, Turkey. Some 700 police–citizen traffic encounters were randomly allocated to treatment and control conditions. Subjects in the

---

[10] In the first step, a probit regression model was estimated using regressors which had the least amount of missing data, several of which were obtained from driving records. The resulting model was estimated using 686 of the original 702 drivers invited to participate in the study. The regressors included the treatment assignment dummy ($b = 0.70$; $s.e. = 0.11$), the raw number of demerits ($b = -0.02$; $s.e. = 0.01$) and its square ($b \times 100 = 0.06$; $s.e. \times 100 = 0.03$), a dummy for male ($b = 0.23$; $s.e. = 0.22$), a dummy for excessive speeding ($b = 0.17$; $s.e. = 0.13$), a dummy for having been born in Adana ($b = 0.49$; $s.e. = 0.32$), order of study entry ($b = 0.06$; $s.e. = 0.03$), and the interaction between the dummies for gender and birthplace ($b = -0.56$; $s.e. = 0.34$). It should be noted that the coefficients corresponding to the inverse Mills ratio are positive but not statistically significant in either of the substantive equations. Therefore, while there is evidence of positive selection (i.e., the unobservables that make a person more likely to participate in the survey also give him or her more favorable procedural justice perceptions), it is not substantial and does not appear to badly bias the reported results.
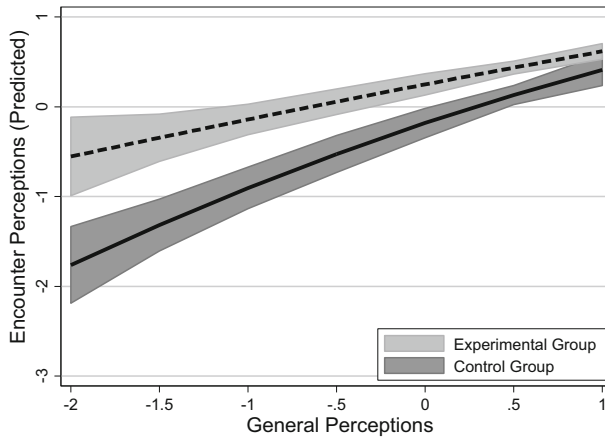
**Fig. 2** Predictive margins of encounter perceptions by treatment assignment, conditional on general perceptions. *Note*: $N = 458$. The estimates are derived from a least squares regression of encounter perceptions on treatment assignment interacted with general perceptions (quadratic), along with the control variables (results are not tabulated). The 95-percent confidence bands are provided

treatment group received the procedural justice policing intervention during these traffic stops, while subjects in the control group experienced business-as-usual traffic stops. All subjects received speeding tickets. Our statistical analyses found that drivers who experienced the procedurally-just traffic encounters reported improved perceptions of the specific police–citizen encounter relative to citizens who experienced routine traffic enforcement procedures. However, while there were some indications of a general improvement, the results suggest that a single procedurally-just encounter does not have a striking impact on drivers' general views of the police. These findings were robust to a variety of alternative model specifications and sensitivity tests.

As with any study, the Adana randomized controlled trial had some limitations. While approaching drivers right after traffic stops were completed helped to ensure higher response rates, it is possible that subject responses were influenced by the general presence of TNP officers in the area or suspicion that the interviewers were actually officers rather than civilians. However, if subjects were influenced in this way, this limitation would have biased responses in both treatment and control groups to a similar degree and, as such, probably did not undermine the observed treatment effect. Well-executed randomized controlled trials enjoy high levels of internal validity; however, like other randomized experiments, our study may have limited external validity (Shadish et al. 2002). The procedural justice intervention was implemented during routine speeding enforcement operations, which is only one type of encounter setting. Generalizing the results of this study to other encounter settings could be questionable, given the broad variations in routine police–citizen encounters.

It is also important to note that this randomized experiment was implemented in a Middle Eastern city with a unique political, cultural, and religious context. Contextual differences between Turkey and Australia may account for the divergent findings between QCET and our randomized experiment on the prospects of influencing general attitudes towards the police based on a single, procedurally-just encounter with the police. Indeed, in the ScotCET study, MacQueen and Bradford (2015) suggested that pre-existing, broadly-

favorable opinions of the police may have limited the impact of the treatment on general perceptions of the police. In fact, the scripted and "bureaucratic" nature of the treatment encounters may have diminished positive driver perceptions of their encounters of the police. In the Adana context, TNP traffic officers faced a legitimacy crisis similar to police departments in many countries. Turkish citizens viewed traffic officers as generally corrupt and unfair in their enforcement practices and felt that they were disrespectful and dismissive during traffic stop encounters. This is a common concern held by many citizens, especially residents of disadvantaged, minority communities in U.S. cities (Carr et al. 2007; Brunson and Miller 2006; Brunson and Weitzer 2009).

Our results corroborate prior research regarding the durability of negative police experiences (Skogan 2006). Specifically, we found that a single, procedurally-just encounter had a marginal impact on Turkish motorists' general perceptions of the traffic police. While the vast majority of research on citizen perceptions of the police involves direct encounters, scholars have recently begun to examine the relevance of learning about other group member's police interactions as well (Rosenbaum et al. 2005; Weitzer and Tuch 2005; Brunson 2007). These relatively recent studies underscore the importance of examining the impact of accumulated (both direct and vicarious) police contacts for helping to shape individuals' overall appraisals of the police. Further, an abundant body of knowledge consistently demonstrates that minority citizens hold less favorable views of the police than their white counterparts (Hurst and Frank 2000; Hurst et al. 2000; Leiber et al. 1998; Taylor et al. 2001). In fact, scholars conducting research on the topic submit that minority citizens' enduring negative evaluations of the police arise from their disproportionate, unwelcome police contacts (Solis et al. 2009; Fine et al. 2003; Leiber et al. 1998; Snyder and Sickmund 1996).

The longstanding and well documented tensions between police and residents of distressed minority communities in the U.S. are relevant for the current study. Specifically, given Turkish citizens' widespread distrust of TNP traffic officers, it stands to reason that our study participants' accumulated negative evaluations persisted following a single positive police encounter. This finding provides further evidence that citizens' assessments of police legitimacy are multifaceted, involving a collection of experiences that ultimately shape their views of police as an institution. Moreover, our novel study of traffic stops in Adana, Turkey casts additional light on comprehensive efforts to improve citizen trust of, and cooperation with, the police, suggesting that as a matter of practice, officers should strive to demonstrate procedurally-just principles during *every* citizen encounter.

Research on police-initiated contacts suggests that fair and courteous treatment, giving people reasons for stopping them, and explaining their rights, contribute to citizen satisfaction with police encounters (Bland et al. 2000; Bucke 1997; Quinton et al. 2000; Reisig and Chandek 2001; Stone and Pettigrew 2000). The results of this randomized controlled trial confirm that procedurally-just police behaviors do generate positive citizen assessments of specific encounters. However, in this test, the impact of a single positive encounter did not exert a powerful influence on pre-existing global feelings towards the police. We believe it might be overly optimistic to believe that durable citizen perceptions of confidence and trust in the police can be strongly impacted by a solitary interaction. Beyond procedural fairness in police–citizen interactions, research suggests that police legitimacy is also shaped by people's assessment of other relevant police performance dimensions such as crime control effectiveness, distributive fairness, and lawfulness (Bottoms and Tankebe 2012; Tankebe 2013). Police performance in these areas can have both direct and indirect influences on the public's willingness to cooperate with the police.

This is precisely why police performance management scholars advocate for appraisal based on a "balanced scorecard" that includes valuable goals such as reducing criminal victimization, holding offenders accountable, reducing fear and enhancing personal security, guaranteeing safety in public spaces, using financial resources efficiently and effectively, using force and authority efficiently and effectively, and satisfying customers/ achieving legitimacy among those policed (Moore 2002: 76). Police administrators intent on solidifying their support among voters, taxpayers, and consumers of police services need to improve their performance in all these areas. Procedural justice should be embraced by police administrators as one among many approaches to enhance police legitimacy. Indeed, adherence to the process-based model of police legitimacy can help to minimize the number of negative police–citizen encounters that seem to generate large negative effects on people's assessments of the police. As positive direct and vicarious police–citizen encounters accumulate in a community, and police improve their performance in other areas, it seems likely that resident opinion of the police departments that serve them and their willingness to cooperate with the police will also improve.

## Appendix 1: Procedural Justice Script

Good morning/afternoon sir/madam. My name is officer_____
Do you know how we conduct our speed control operations?

…

Let me provide you some brief information about speed controls.
It is one of the most well-enforced traffic controls in Turkey.
The radar equipment in our patrol car accurately records the car's speed
We give tickets to all drivers who pass the speed limit we stop for speeding regardless of their socioeconomic and occupational position.
Our aim is to reduce traffic accidents
Do you know that approximately 30 percent of traffic accidents in Turkey are related to speeding?
In Adana alone there were 55 deaths and 5371 injuries in 2011 related to traffic accidents.
Guess how difficult for us to tell a person that his/her loved one has died or has been seriously injured.
You can help us reduce these accidents by continually driving carefully and responsibly.
Do you think we should continue conducting speed controls?

…

Today, you have been stopped because our radar equipped patrol car detected that your speed was _____. This speed is clearly above the stated limit of 70 km/h.
Now, may I have your documents please?

…

Thank you. I wish you a safe trip. Please be careful next time. Thank you for your cooperation.

# Appendix 2

See Table 5.

**Table 5**  Principal component analysis of procedural justice perceptions

|  | Loading | Uniqueness |
|---|---|---|
| *Model 1: general perceptions* | | |
| Trustworthiness: "I trust the police" | 0.85 | 0.27 |
| Satisfaction: "I am satisfied with the way police treat citizens" | 0.92 | 0.15 |
| Politeness: "The police are polite when dealing with people" | 0.89 | 0.21 |
| Fairness: "The police could/would not issue a ticket to the privileged" (reversed) | 0.40 | 0.84 |
| *Model 2: encounter perceptions* | | |
| Politeness: "The officer was polite and treated me with respect" | 0.78 | 0.40 |
| Necessity: "I think that stationary speed controls are necessary" | 0.64 | 0.58 |
| Fairness: "I felt the officer would do the same and issue a ticket to anyone in my situation" | 0.54 | 0.70 |
| Trustworthiness: "The officer was trustworthy" | 0.86 | 0.27 |
| Satisfaction: "I was satisfied with the officer's behavior and how I was treated" | 0.86 | 0.25 |

$N = 458$. The factor loading represents the correlation between the measure and the latent variable. The uniqueness represents the proportion of variance unexplained by the latent variable. The distributions of the resulting variables are shown in Fig. 1

Response format: 1 = strongly disagree; 2 = somewhat disagree; 3 = neither agree nor disagree; 4 = somewhat agree; 5 = strongly agree
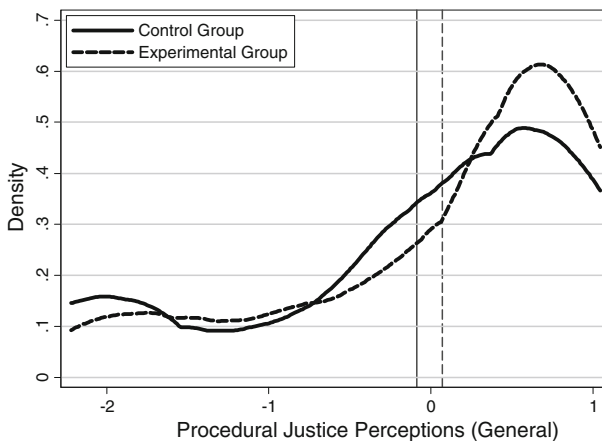
# Appendix 3

See Fig. 3.



**Fig. 3**  Distribution of procedural justice perceptions (general), by treatment assignment. *Note*: $N = 458$. The *vertical lines* mark the mean for the control group (*solid*) and experimental group (*dashed*)
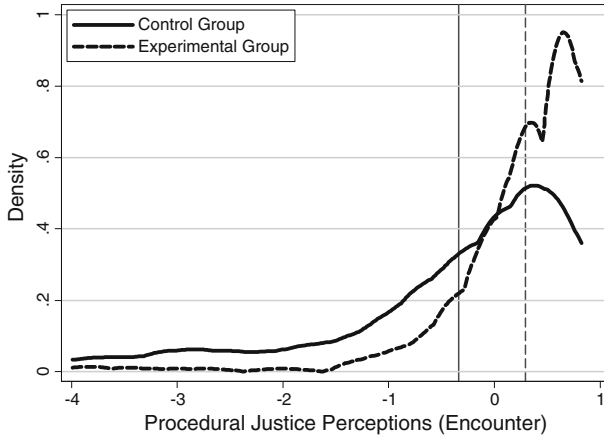
# Appendix 4

See Fig. 4.



**Fig. 4** Distribution of procedural justice perceptions (encounter), by Treatment Assignment. *Note*: $N = 458$. The *vertical lines* mark the mean for the control group (*solid*) and experimental group (*dashed*)
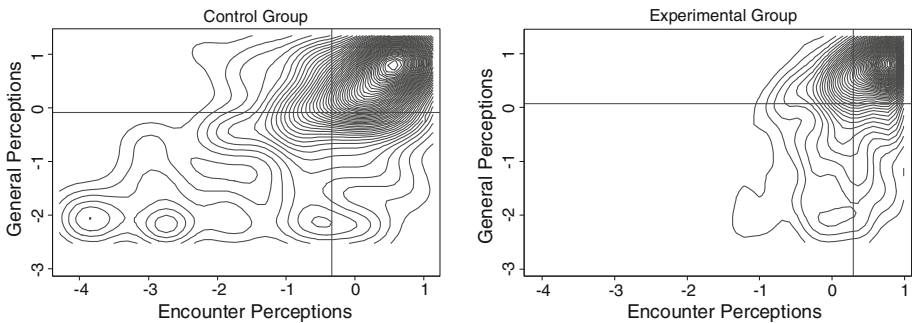
# Appendix 5

See Fig. 5.



**Fig. 5** Joint density of general and encounter perceptions of procedural justice, by treatment assignment. *Note*: $N = 458$. The *vertical* and *horizontal lines* mark the means of the procedural justice measures

# Appendix 6

See Table 6.

**Table 6** Bivariate-normal regression models of alternative operational definitions of procedural justice perceptions

| Operational definition of procedural justice | Dependent variable | | Residual correlation |
|---|---|---|---|
| | General perceptions Coeff. (S.E.) | Encounter perceptions Coeff. (S.E.) | |
| Principal component analysis | 0.14 (0.09) | 0.56 (0.09)*** | +0.59 |
| Polychoric factor analysis | 0.18 (0.13) | 0.49 (0.10)*** | +0.62 |
| Structural equation model | 0.19 (0.11) | 0.44 (0.08)*** | +0.60 |
| One-parameter GRM | 0.21 (0.16) | 0.86 (0.14)*** | +0.61 |
| Two-parameter GRM | 0.09 (0.09) | 0.39 (0.08)*** | +0.60 |
| Mean of measures | 0.14 (0.11) | 0.39 (0.08)*** | +0.63 |

$N = 458$. Each model is fully specified as in Table 2, but only the coefficient for treatment assignment is shown. The first row replicates the results shown in Table 2. Because the dependent variables are estimates, standard errors are obtained via the bootstrap with 500 replications

*GRM* graded response model

\* $p < 0.05$; \*\* $p < 0.01$; \*\*\* $p < 0.001$ (two-tailed tests)

# Appendix 7

See Table 7.

**Table 7** Ordered Logistic Regression Models of Procedural Justice Perceptions

| Variable | "I trust the police" Coeff. (S.E.) | "I am satisfied with the way police treat citizens" Coeff. (S.E.) | "The police are polite when dealing with people" Coeff. (S.E.) |
|---|---|---|---|
| Experimental group | 0.16 (0.19) | 0.39 (0.18)* | 0.39 (0.18)* |
| Age | 0.02 (0.01)* | 0.02 (0.01)** | 0.03 (0.01)*** |
| Prior police contact | –0.29 (0.19) | –0.38 (0.18)* | –0.31 (0.18) |
| Prior demerits | –0.13 (0.21) | –0.19 (0.20) | –0.23 (0.20) |
| Male | –0.53 (0.31) | –0.42 (0.30) | –0.22 (0.29) |
| College educated | 0.02 (0.21) | –0.06 (0.20) | 0.05 (0.20) |
| High income | –0.50 (0.21)* | –0.05 (0.20) | –0.13 (0.20) |
| Excessive speeding | –0.20 (0.21) | –0.15 (0.20) | –0.09 (0.20) |
| Police acquaintance | 0.55 (0.20)** | 0.51 (0.19)** | 0.41 (0.18)* |

| Variable | "The police could/would not issue a ticket to the privileged" (reversed) Coeff. (S.E.) | "The officer was polite and treated me with respect" Coeff. (S.E.) | "I think that stationary speed controls are necessary" Coeff. (S.E.) |
|---|---|---|---|
| Experimental group | –0.13 (0.18) | 1.62 (0.28)*** | 0.65 (0.22)** |
| Age | 0.01 (0.01) | 0.00 (0.01) | –0.02 (0.01) |
| Prior police contact | –0.19 (0.18) | 0.18 (0.26) | 0.01 (0.23) |
| Prior demerits | –0.01 (0.21) | –0.46 (0.28) | –0.14 (0.25) |

**Table 7** continued

| Variable | "The police could/would not issue a ticket to the privileged" (reversed) Coeff. (S.E.) | "The officer was polite and treated me with respect" Coeff. (S.E.) | "I think that stationary speed controls are necessary" Coeff. (S.E.) |
|---|---|---|---|
| Male | 0.05 (0.28) | –0.54 (0.49) | –0.75 (0.44) |
| College educated | –0.14 (0.20) | 0.49 (0.29) | 0.30 (0.26) |
| High income | 0.16 (0.20) | –0.12 (0.28) | 0.01 (0.25) |
| Excessive speeding | 0.12 (0.20) | –0.63 (0.27)* | –0.18 (0.25) |
| Police acquaintance | –0.33 (0.18) | 0.13 (0.26) | 0.73 (0.24)** |

| Variable | "I felt the officer would do the same and issue a ticket to anyone in my situation" Coeff. (S.E.) | "The officer was trustworthy" Coeff. (S.E.) | "I was satisfied with the officer's behavior and how I was treated" Coeff. (S.E.) |
|---|---|---|---|
| Experimental group | –0.05 (0.18) | 1.43 (0.22)*** | 1.83 (0.21)*** |
| Age | 0.00 (0.01) | 0.00 (0.01) | 0.01 (0.01) |
| Prior police contact | –0.27 (0.18) | –0.06 (0.22) | 0.10 (0.20) |
| Prior demerits | –0.32 (0.21) | –0.03 (0.24) | –0.08 (0.23) |
| Male | –0.09 (0.29) | –1.33 (0.47)** | –0.19 (0.31) |
| College educated | –0.15 (0.20) | 0.20 (0.24) | 0.11 (0.22) |
| High income | 0.13 (0.20) | –0.07 (0.23) | –0.18 (0.22) |
| Excessive speeding | –0.14 (0.20) | –0.42 (0.23) | –0.14 (0.22) |
| Police acquaintance | 0.73 (0.19)*** | 0.13 (0.22) | 0.90 (0.21)*** |

$N = 458$. To conserve space, the response thresholds are not shown

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed tests)

# References

Adaman F, Carkoglu A, Senatalar B (2005) Toplumun Kamu Yönetimine ve Kamu Hizmetlerine ve Reforma Bakışı. TESEV Yayinlari, Istanbul

Adaman F, Carkoglu A, Senatalar B (2009) Hanehalki Gozunden Kamu Hizmetleri ve Yolsuzluk, vol 43. TESEV, Ankara

Andersen R (2008) Modern methods for robust regression. Sage, Thousand Oaks

Antrobus E, Elffers H, White G, Mazerolle L (2013) Non-response bias in randomized control experiments: putting the Queensland community engagement trial under a microscope. Eval Rev 37:197–212

Aytac O (2005) Halkın Polise Bakışı: Güveniyorum ama Rüşvetçi ve Kaba. Retrieved October 5, 2013, from http://www.memurlar.net/haber/20671

Beetham D (1991) The legitimation of power. Humanities Press International, Atlantic Highlands

Bland N, Miller J, Quinton P (2000) Upping the PACE? An evaluation of the recommendations of the Stephen Lawrence inquiry on stops and searches, police research series (paper 128). Home Office, London

Bottoms A, Tankebe J (2012) Beyond procedural justice: a dialogic approach to legitimacy in criminal justice. J Crim Law Criminol 102:119–170

Bradford B, Jackson J, Stanko E (2009) Contact and confidence: revisiting the impact of public encounters with the police. Polic Soc 19:20–46

Braga AA (2008) Problem-oriented policing and crime prevention, 2nd edn. Lynne Rienner Publishers, Boulder

Braga AA, Welsh B, Papachristos A, Schnell C, Grossman L (2014) The growth of randomized experiments in policing: the vital few and the salience of mentoring. J Exp Criminol 10:1–28

Brandl S, Frank J, Worden R, Bynum T (1994) Global and specific attitudes toward the police: disentangling the relationship. Justice Q 11:119–134

Brunson RK (2007) 'Police don't like black people': african American young men's accumulated police experiences. Criminol Public Policy 6:71–102

Brunson RK, Miller J (2006) Young black men and urban policing in the United States. Brit J Criminol 46:613–640

Brunson RK, Weitzer R (2009) Police relations with black and white youths in different urban neighborhoods. Urb Aff Rev 44:858–885

Bucke T (1997) Ethnicity and contacts with the police: latest findings from the British Crime Survey (study 59). Home Office, London

Campbell DT, Stanley J (1966) Experimental and quasi-experimental designs for research. Rand McNally, Chicago

Cao L, Burton V (2006) Spanning the continents: assessing the Turkish public confidence in the police. Policing 29:451–463

Carr PJ, Napolitano L, Keating J (2007) We never call the cops and here is why: a qualitative examination of legal cynicism in three Philadelphia neighborhoods. Criminology 45:445–480

Cohen J (1988) Statistical power analysis for the behavioral sciences, 2nd edn. Lawrence Erlbaum, Hillsdale

Coicaud J-M (2002) Legitimacy and politics. Cambridge University Press, Cambridge

Dai M, Frank J, Sun I (2011) Procedural justice during police–citizen encounters: the effects of process-based policing on citizen compliance and demeanor. J Crim Justice 39:159–168

Elliott I, Thomas S, Ogloff J (2011) Procedural justice in contacts with the police: testing a relational model of authority in a mixed methods study. Psychol Public Policy Law 14:592–610

Engel R (2005) Citizens' perceptions of distributive and procedural injustice during traffic stops with police. J Res Crime Delinq 42:445–481

Fagan J (2002) Law, social science and racial profiling. Justice Res Policy 4:104–129

Farrington D (2003) Methodological quality standards for evaluation research. Annals 587:49–68

Fine M, Freudenberg N, Payne Y, Perkins T, Smith K, Wanzer K (2003) 'Anything can happen with police around': urban youth evaluate strategies of surveillance in public places. J Soc Issues 59:141–158

Gallagher C, Maguire E, Mastrofski S, Reisig M (2001) The public image of police. International Association of Chiefs of Police, Washington, DC

Gau J, Brunson RK (2009) Procedural justice and order maintenance policing: a study of inner-city young men's perceptions of police legitimacy. Justice Q 27:255–279

Hawdon J (2008) Legitimacy, trust, social capital, and policing styles. Police Q 11:182–201

Heckman J (1979) Sample selection bias as a specification error. Econometrica 47:153–161

Hohl K, Bradford B, Stanko E (2010) Influencing trust and confidence in the London Metropolitan Police. Brit J Criminol 50:491–513

Hu R, Sun I, Wu Y (2015) Chinese trust in the police: the impact of political efficacy and participation. Soc Sci Q 96:1012–1026

Hurst Y, Frank J (2000) How kids view cops: the nature of juvenile attitudes toward the police. J Crim Justice 28:189–202

Hurst Y, Frank J, Browning S (2000) The attitudes of juveniles toward the police: a comparison of black and white youth. Policing 23:37–53

Jackson J, Bradford B (2009) Crime, policing and social order: on the expressive nature of public confidence in policing. Brit J Sociol 60:493–521

Jackson J, Bradford B, Hough M, Myhill A, Quinton P, Tyler T (2012) Why do people comply with the law? Legitimacy and the influence of legal institutions. Brit J Criminol 52:1051–1071

Jonathan-Zamir T, Weisburd D (2013) The effects of security threats on antecedents of police legitimacy: findings from a quasi-experiment in Israel. J Res Crime Delinq 50:3–32

Kazu I (2003) Polis-Halk İlişkileri (Elazığ Örneği). Polis Dergisi 39:169–199

Kochel T, Parks R, Mastrofski S (2013) Examining police effectiveness as a precursor to legitimacy and cooperation with police. Justice Q 30:895–925

Koenker R (2005) Quantile regression. Cambridge University Press, New York

Leiber M, Nalla M, Farnsworth M (1998) Explaining juveniles' attitudes toward the police. Justice Q 15:151–174

Lum C, Koper C, Telep C (2011) The evidence-based policing matrix. J Exp Criminol 7:3–26

MacQueen S, Bradford B (2015) Enhancing public trust and police legitimacy during road traffic encounters: results from a randomized controlled trial in Scotland. J Exp Criminol 11:419–443

Mastrofski S, Snipes J, Supina A (1996) Compliance on demand: the public's response to specific police requests. J Res Crime Delinq 33:269–305

Mazerolle L, Bennett S, Davis J, Sargeant E, Manning M (2012) Legitimacy in policing: a systematic review. Camp Syst Rev 9

Mazerolle L, Antrobus E, Bennett S, Tyler T (2013) Shaping citizen perceptions of police legitimacy: a randomized field trial of procedural justice. Criminology 51:33–64

McCluskey J (2003) Police requests for compliance: coercive and procedurally just tactics. LFB Scholarly Publishing, New York

Meares T, Kahan D (1998) Law and (norms of) order in the inner city. Law Soc Rev 32:805–838

Moore M (1992) Problem-solving and community policing. In: Tonry M, Morris N (eds) Modern policing, crime and justice, vol 15. University of Chicago Press, Chicago, pp 99–158

Moore M (2002) Recognizing value in policing. Police Executive Research Forum, Washington, DC

Murphy K, Hinds L, Fleming J (2008) Encouraging public cooperation and support for police. Polic Soc 18:136–155

Ozbaran Y (2010) The relationship between Turkish traffic enforcement officers' job satisfaction and officers' perception of their leaders' leadership styles. Ph.D. dissertation, University of Texas, Dallas

Parsons T (1967) Some reflections on the place of force in social process. In: Parsons T (ed) Sociological theory and modern society. The Free Press, New York, pp 192–219

Paternoster R, Brame R, Bachman R, Sherman L (1997) Do fair procedures matter? Law Soc Rev 17:457–479

Quinton P, Bland N, Miller J (2000) Police stops: decision-making and practice, police research series (paper 130). Home Office, London

Reisig M (2010) Community and problem-oriented policing. In: Tonry M (ed) Crime and Justice, vol 39. University of Chicago Press, Chicago, pp 1–53

Reisig M, Chandek M (2001) The effects of expectancy disconfirmation on outcome satisfaction in police–citizen interactions. Policing 21:88–99

Reisig M, Lloyd C (2009) Procedural justice, police legitimacy, and helping the police fight crime: results from a survey of Jamaican adolescents. Police Q 12:42–62

Reisig M, Bratton J, Gertz M (2007) The construct validity and refinement of process-based policing measures. Crim Justice Behav 34:1005–1028

Reisig M, Tankebe J, Mesko G (2014) Compliance with the law in Slovenia: the role of procedural justice and police legitimacy. Eur J Crim Pol Res 20:259–276

Rosenbaum D, Schuck A, Costello S, Hawkins D, Ring M (2005) Attitudes toward the police: the effects of direct and vicarious experience. Police Q 8:343–365

Sahin NM (2014). Legitimacy, procedural justice, and police–citizen encounters: a randomized controlled trial of the impact of procedural justice on citizen perceptions of the police during traffic stops in Turkey. Ph.D. dissertation, Rutgers University

Sarat A (1977) Studying American legal culture. Law Soc Rev 11:427–488

Schuck A, Rosenbaum D (2011) The Chicago Quality Interaction Training Program: a randomized control trial of police innovation. National Institute of Justice, Washington, DC

Sechrest L, Rosenblatt A (1987) Research methods. In: Quay H (ed) Handbook of juvenile delinquency. Wiley, New York, pp 417–450

Shadish W, Cook T, Campbell D (2002) Experimental and quasi-experimental designs for generalized causal inference. Houghton Mifflin, Boston

Sherman L, Berk R (1984) The specific deterrent effects of arrest for domestic assault. Am Sociol Rev 49:261–272

Skogan W (2006) Asymmetry in the impact of encounters with police. Polic Soc 16:99–126

Skogan W, Frydl K (eds) (2004) Fairness and effectiveness in policing: the evidence. National Academies Press, Washington, DC

Skogan W, Hartnett S (1997) Community policing, Chicago style. Oxford University Press, New York

Snyder H, Sickmund M (1996) Juvenile offenders and victims: a national report. Office of Juvenile Justice and Delinquency Prevention, Washington, DC

Solis C, Portillos E, Brunson RK (2009) Latino/a youths' experiences with and perceptions of negative police encounters. Annals 623:39–51

Stone V, Pettigrew N (2000) The views of the public on stops and searches, police research series (paper 129). Home Office, London

Sunshine J, Tyler T (2003) The role of procedural justice and legitimacy in shaping public support for policing. Law Soc Rev 37:513–548

Tankebe J (2009) Public cooperation with the police in Ghana: does procedural fairness matter? Criminology 47:1265–1293

Tankebe J (2013) Viewing things differently: the dimensions of public perceptions of police legitimacy. Criminology 51:103–135

Taylor T, Turner K, Esbensen F-A, Winfree L (2001) Coppin' an attitude: attitudinal differences among juveniles toward the police. J Crim Justice 29:295–305

Tyler T (2003) Procedural justice, legitimacy, and the effective rule of law. In: Tonry M (ed) Crime and Justice, vol 30. University of Chicago Press, Chicago, pp 431–505

Tyler T (2004) Enhancing police legitimacy. Annals 593:84–99

Tyler T (2005) Policing in black and white: ethnic group differences in trust and confidence in the police. Police Q 8:322–342

Tyler T (2006) Why people obey the law. Princeton University Press, Princeton

Tyler T, Fagan J (2008) Legitimacy and cooperation: why do people help the police fight crime in their communities? Ohio State J Crim Law 6:231–276

Tyler T, Huo Y (2002) Trust in the law: encouraging public cooperation with the police and courts. Russell Sage Foundation, New York

Tyler T, Wakslak C (2004) Profiling and police legitimacy: procedural justice, attributions of motive, and acceptance of police authority. Criminology 42:253–281

Verardi V, Croux C (2009) Robust regression in Stata. Stata J 9:439–453

Warren P (2011) Perceptions of police disrespect during vehicle stops: a race-based analysis. Crime Delinq 57:356–376

Weitzer R, Tuch S (2005) Racially biased policing: determinants of citizen perceptions. Soc Forces 83:1009–1030

Weitzer R, Tuch S (2006) Race and policing in America: conflict and reform. Cambridge University Press, New York

Winship C, Mare R (1992) Models for sample selection bias. Annu Rev Soc 18:327–350

Yalcinkaya A (2012) Polis Halk İlişkilerini Olumlu Yönde Katalizleyecek Unsurlar ve İzlenmesi Gereken Yol. Polis Akademisi, Ankara