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# General and specific information in deterring traffic violations: Evidence from a randomized experiment

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## ABSTRACT

In a large-scale field experiment, a random sample of car owners in Tsingtao, China received one of four cell phone text messages from the police. Three groups received general messages, urging them to drive safely, warning them about the widespread use of electronic traffic monitors, or describing the penalty for running a red light. The fourth group received personalized messages about how many traffic tickets they had received from electronic monitors. During the subsequent month, drivers who received general messages were as likely to commit a traffic violation as were drivers in the control group, while those who received a personalized message committed 14% fewer traffic violations. A personalized message did not prevent subsequent violations if it simply repeated information that was known to drivers, and only new information on traffic tickets had a deterrence effect.

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## 1. Introduction

According to standard law and economics models, punishment deters illegal activities (Becker, 1968; Stigler, 1970). However, if people are unaware of the odds of being caught or underestimate the size of the penalty, existing punishment is not effective in deterring violations. Information and salience can play a crucial role in the deterrence effect. This study uses a novel randomized experimental design to test several information-related strategies in deterring road traffic violations.

We randomly assigned drivers in Tsingtao, China, to a control group or one of four treatment groups. All treatment groups received cell phone text messages from the Tsingtao Police Department. An *advocacy* treatment asked drivers to drive safely. A *warning* treatment informed drivers that more than 90% of major street intersections had electronic traffic monitoring devices. A *punishment* treatment repeated the *warning* treatment, and then noted how severe the punishment is for running a red light. The *ticket* treatment informed drivers about how many traffic tickets they had received recently. Unless a driver frequently checks online, the driver may be unaware for months about traffic tickets issued by the electronic monitoring system. Thus, the ticket treatment message provided many drivers with new information.

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Compared to drivers in a control group who did not receive a text message, drivers who received a personalized message about their past violations were 14% less likely to have a traffic violation in the subsequent month. In contrast, drivers in other treatment groups who received general messages were as likely to commit a violation as were those in the control group. These results suggest that drivers respond to personal enforcement information but not to general information. The deterrence effect of the ticket treatment is short-lived. It is effective for six weeks and then decays quickly.

Further evidence shows that the ticket treatment exhibited no deterrence among two subsamples of drivers who would obtain little or no new information from the ticket message. Therefore, the effectiveness of the ticket treatment is due to the information content and not merely because the message was personal. Without knowing the existing traffic tickets, drivers would drive in the same manner as if the past transgressions were not detected by the police. Therefore, this study also provides supplementary evidence on the deterrence effect of previous police enforcement.

A large literature has studied the deterrence effect of police enforcement (see the review in [Marvell and Moody, 1996](#)). Much of the recent research focuses on solving the potential endogeneity problem due to the simultaneous determination of police effort and violations ([Corman and Mocan, 2000](#); [Levitt, 1997](#); [Di Tella and Schargrodsky, 2004](#); [Drago et al., 2009](#); [Draca et al., 2011](#); [Machin and Marie, 2011](#)). Society can prevent some violations by increasing the odds of catching and convicting violators or by punishing them more severely. Existing studies examine the variation in the number of police and cannot separate the preventive function and the punitive function. Holding everything else constant, including the number of monitoring cameras, this study randomly varies only drivers' information about how the police may catch them, the size of the penalty, and whether the police have caught their recent transgressions.

This study contributes to the literature on personal experience. [Sah \(1991\)](#) predicted that a change in policing, even if it is temporary, could have lagged and long-lasting effects if people learned about the probability of arrest from others or through their own experiences. The current study shows that informing drivers that they were caught in the past can deter later law-breaking. Unfortunately, the deterrence effect is short-lived in our traffic experiment. Our results are in line with [Lochner \(2007\)](#), which reported that individuals who had avoided being caught for theft in the past tend to hold a lower probability of being caught for future violations. [Haselhuhn et al. \(2012\)](#) found that the experience of being fined for late returns significantly increased compliance in video rental, but that the effect decayed sharply over time.

Our treatments, in which drivers are informed about the widespread use of monitoring cameras and the severity of punishment, test the effect of limited learning or attention as suggested in the behavioral economics literature ([DellaVigna, 2009](#)). However, we find that these general messages, delivered in cell phone text messages, have no impact. This result differs from [Fellner et al. \(2013\)](#) who found that emphasizing a high detection rate increased an individual's compliance in paying an annual fee for public broadcasting. One possible explanation for our results is that the messages we provide are not new information to most drivers.

Society can benefit substantially if it can reduce traffic violations inexpensively. Traffic violations are a major cause of traffic accidents.<sup>1</sup> As the number of cars has risen dramatically in China, from 5.8 million cars sold in 2005 to 18.5 million cars sold in 2011, reducing traffic violations has become increasingly more important.<sup>2</sup> In China in 2010, the 3.9 million reported traffic accidents resulted in 65,225 deaths, 254,075 injuries, and 930 million yuan (roughly \$150 million U.S.) in monetary losses.

[Retting et al. \(1999a,b\)](#) evaluated the effect of red-light cameras. [Bar-Ilan and Sacerdote \(2004\)](#) found that an increase in fines reduced red-light running. [DeAngelo and Hansen \(2014\)](#) reported that due to a state budget cut, a decrease in the number of roadway troopers was associated with a significant increase in injuries and fatalities. [Hansen \(2015\)](#) showed that more severe sanctions reduced recidivism in drunk driving. [Habyarimana and Jack \(2011\)](#) used evocative messages as a policy instrument and found that motivating passengers to speak up against bad driving behaviors could improve the safety of long-distance minibuses. [Habyarimana and Jack \(2015\)](#) further compared consumer empowerment with top-down regulatory measures, and show the latter is less effective in improving traffic safety. To promote road traffic compliance, this study examines several (inexpensive) informational strategies that are directly sent to drivers via text message.

Section 2 describes the traffic laws and the characteristics of car owners in Tsingtao. Section 3 discusses a pre-experiment survey about drivers' knowledge. Section 4 lays out the experimental design. Section 5 describes the data and tests of randomization. Section 6 presents the estimation results. The final section summarizes the results and draws conclusions.

## 2. Background

We conducted the experiment in Tsingtao, a wealthy coastal city in China. Tsingtao's per capita gross domestic product ranks among the top 10% of all the Chinese cities. Tsingtao has experienced rapid economic growth and car ownership in recent years. In March 2012, the city had 1.8 million registered motor vehicles. Half of these were privately owned cars registered in the name of an individual and used for non-commercial purposes. The city's records list the owner's cell phone number in the registration form for approximately two-thirds of these privately owned cars.

To detect traffic violations, Tsingtao uses three types of electronic devices – velocimeters, red-light cameras, and video cameras – which are commonly referred as “electronic police.” Velocimeters measure a car's speed. Video cameras and

<sup>1</sup> China Transportation Technology Website, [www.tranbbs.com/news/cnnews/Construction/news.82586.shtml](http://www.tranbbs.com/news/cnnews/Construction/news.82586.shtml).

<sup>2</sup> *Statistical Yearbook of Automobile Industry in China* (2011).

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