SELF-AWARENESS TO BEING WATCHED AND SOCIALLY-DESIRABLE BEHAVIOR: A FIELD EXPERIMENT ON THE EFFECT OF BODY-WORN CAMERAS ON POLICE USE-OF-FORCE

INTRODUCTION

The Rodney King story is a potent reminder about the enormous power that police officers have and how it can sometimes be abused. That was the case of an African-American who was repeatedly beaten by Los Angeles police officers, and was arguably the impetus for the 1992 Los Angeles riots. The King incident signifies just how disproportionate use of force could shutter the reputation of the police and lead into social cataclysm. Importantly, there are still somewhat similar cases taking place[1], despite efforts to stop such behavior through better training and prosecution of rogue officers. Are these incidents unavoidable?

A voluminous body of research across various disciplines has shown that when humans become self-conscious about being watched, they often alter their conduct. Accumulated evidence further suggests that individuals who are aware that they being observed often embrace submissive or commonly-accepted behavior, particularly when the observer is a rule-enforcing entity. What is less known, however, is what happens when the observer is not a “real person”, and whether being videotaped can have an effect on aggression and violence. For instance, would the Rodney King incident be avoided had the officers known that they are being videotaped? Would frequency of police use of force be reduced if all interactions between officers and members of the public were under known electronic surveillance?

We have tested whether police body-worn cameras would lead to socially-desirable behavior of the officers who wear them. Individualized HD cameras were “installed” on the officers’ uniforms, and systematically-recorded every police-public interaction. We randomly assigned a year’s worth of police shifts into experimental and control shifts within a large randomized controlled field experiment conducted with the Rialto Police Department (California). We investigated the extent to which cameras effect human behavior and, specifically, reduce the use of police force. Broadly, we have put to test the implication of self-awareness to being observed on compliance and deterrence theory in real-life settings, and explored the results in the wider context of theory and practice.

SELF-AWARENESS LEADING TO SOCIALLY-DESIRABLE BEHAVIOR: THE GENERALIZED MECHANISM BEHIND THE EFFECT OF CAMERAS

Several lines of research across many disciplines of science suggest that most forms of species alter their behaviors once made aware that they are being observed.[2] In humans, a rich body of evidence on perceived social surveillance - self-awareness[3] and socially desirable responding[4] - proposes that people adhere to social norms and alter their behavior because of the awareness that someone else is watching[5]. It seems that knowing with sufficient certainty that our behavior is being observed or judged affects various social cognitive processes: We experience public self-awareness[6] , become more prone to socially-acceptable behavior[7] and sense a heightened need to cooperate with rules[8].

Getting caught doing something morally or socially wrong is often registered as behavior that can potentially lead to negative consequences, which is an outcome rational individuals tend to avoid[9]. Several experiments in social psychology have uncovered a propensity to avoid negative outcomes, and the findings generally agree that individuals react compliantly to even the slightest cues indicating that somebody may be watching. Cues signal how we ought to behave, and they can range from reputational[10], shame[11] to punishment for noncompliance[12]. Paradigmatically, these cues are more broadly explored under deterrence theory.

Deterrence theory relies heavily on self-awareness and how being watched would lead to socially desirable behaviors. Its theoretical roots are found in 18th century enlightenment philosophy[13], but an extensive body of recent rigorous research across several categories of human behavior has shown that when certainty of apprehension for wrongdoing is high, socially and morally unacceptable acts are dramatically less likely to occur[14]. Particularly around crime and disorder, when consequences of apprehension can be bleak (imprisonment, fines, etc.), people simply do not want to get caught. For instance, when meta-analyzing the available data from more than two dozen experiments on policing hotspots of crime, Braga, Papachristos and Hureau (2012) have shown that police presence in high-crime areas specifically meant to increase the perceived certainty of apprehension, can significantly reduce crime incidents at these hotpots compared to control conditions (d=.2, $p<.001$).

Thus, physical presence of other people, especially rule-enforcers, either produces cooperative behavior or deters away non-cooperative or noncompliant behavior[15]. However, evidence further suggests that other, less direct, cues can also manipulate self-consciousness to socially-desirable responding. For example, the mere picture of a pair of eyes has been shown to deter people from noncompliance[16]. Likewise, the presence of various stimuli such as mirrors can be used to situationally-increase self-consciousness[17] and in turn to generate socially desirable behaviors.

Far less is known about cameras and video-cameras, though theoretically they are hypothesized to produce socially desirable behaviors as well. Much like live observers, mirrors or pictures of eyes, cameras can make us self-conscious not only to the fact that we are being watched, but also to drive us into compliance - arguably to a greater extent than other stimuli tested thus far in research. When we become aware that a video-camera is recording our actions, we also become self-conscious that unacceptable behaviors are likely to be captured on film, and the perceived certainly of punishment is at its highest. “Getting away” with rule breaking is thus far less convincible if you are being videotaped.

Despite this conceptual appeal of cameras on human behavior, and possible social control policies around their use, rigorous research on their effect is minimal. Thus far, the evidence on how cameras can potentially deter against morally and socially-undesirable behaviors has primarily been collected on two subtypes of recording devices: CCTVs and speed cameras. Both types are meant to trigger that perceptual mechanism of self-awareness: (passive) cameras are placed in public spaces in order to increase the perceived likelihood of being apprehended. The available meta-analysis of the evidence from 44 studies on the use of public-area CCTV has shown that the mechanism "works" in principle, insofar as cameras caused a modest (16%) decrease in crime in experimental areas compared with control areas. However, this overall result was largely driven by the effectiveness of CCTV schemes in car parks, which caused a 51% decrease in crime[18] and not in more serious or violence crimes. Similarly, speed cameras were found to reduce the incidence of speeding, road traffic crashes, injuries and deaths[19]. A meta-analysis of 35 rigorous studies has found that, compared with controls, the relative reduction in proportion of vehicles speeding was up to 65% and up to 44% for fatal and serious injury crashes

Yet the most prominent type of cameras - mobile cameras - has been virtually ignored in psychology and social sciences. What are their effects on self-awareness? Could they promote socially-desirable behavior? Can they be used as a social control mechanism? Although theoretically compelling, direct experimental research on how portable cameras affect our behavior is currently non-existent, let alone how we would behave in social contexts that require us to follow rules.

HYPOTHESES

We hypothesize that portable cameras would go beyond the limited impact that CCTVs have had on expressive acts of violence in public spaces. CCTV cameras were found to be weak behavior modifiers not because of a flaw in the self-awareness paradigm or the deterrence theory. Rather, the level of certainty of being apprehended necessary for the self-awareness mechanism, which would lead to socially-desirable behavior, is not high enough in CCTV. If cameras are expected to influence behavior and to serve as cues that social norms or legal rules must be followed, then the cue "dosage" of awareness must be intense. Mobile cameras are likely to have this effect.

In passing, we note that self-consciousness caused by active mobile cameras will not necessarily lead people to follow rules, as this largely depends on who is holding the camera. In this research, however, we have focused solely on devices that were operated in the context of law-enforcement. We therefore hypothesize that rational beings including police officers are unlikely to embrace socially *un*desirable behavior when videotaped.

METHODS

RESEARCH SETTINGS

We tested these questions in a large field experiment in Rialto, California, by measuring the magnitude of the effect of wearing highly-visible portable HD cameras by frontline officers on incidents of use-of-force.

Rialto Police is a mid-sized police department that has jurisdiction over 28.5 square miles and services a population of 100,000 residents. The department employs 115 sworn police officers and 42 non-sworn personnel who deal with approximately 3,000 property crimes per year and 500 violent crimes per year. In 2009-2011, the department has dealt with 6 to 7 homicides per year, which is nearly 50% higher than the US national rate per 100,000.

PARTICIPANTS

The entire population of Rialto Police Department frontline officers participated in the experiment (n=54), though we consider the shift to be the unit-of-analysis. Frontline officers work seven days per week, in six shifts of 12 hours per day, or a total 2,038 officer shift-hours per week. Each shift consists of approximately ten armed officers who patrol the streets of Rialto and interact with offenders, victims, witnesses and members of the public. When officers were assigned to treatment conditions (see below), they were instructed to "wear" HD cameras, which would then record all of these interactions.

PROCEDURE AND RANDOM ALLOCATION

The experiment began on February 13, 2012 and ran for 12 months. The experimental procedure included random assignment of all police shifts to either experimental or control conditions. "Experimental shifts" consisted of shifts in which officers were assigned to wear HD audio-visual recording apparatus (see below) that captured all police-public encounters during these shifts. "Control shifts" consisted of shifts in which officers were instructed not to wear the HD cameras. Integrity of assignment was maintained by both measuring the number of "footage-hours" against the assigned shifts as we all dip-sampling dates of footage and ascertaining that officers wore cameras as assigned.

The experimental procedure is illustrated in Table 1 below. As shown, there are 19 shifts during any given week and 54 frontline officers conducted patrols in six teams: Two teams work day shifts, three shifts work nights, and two shifts are cover shifts. Shifts were randomly allocated to treatment and control conditions, using the Cambridge Randomizer[20], on a weekly basis. In total, we assigned 988 (12 months) into 489 treatment and 499 control conditions. Using *G*Power 3.1.3*, we estimated *a-priori* that this sample size can detect small effects of standardized mean difference of 0.2, in which the statistical-significance level is 5% and estimated statistical power of 80%[21].

Insert Table 1 Here

APPARATUS

We collaborated with *Taser Inc.*© to provide all frontline officers their HD body-worn cameras. These body-mounted cameras capture video evidence from the officer's perspective. Weighing 108 grams and small enough to place on the officer's shirt pocket, the camera systems can be affixed to the hat, collar, shoulder, or specially designed Oakley© sunglasses. The unit is water resistant, the video is full color, and the battery life lasts for at least 12 hours, thus making it ideal for the shift patterns of Rialto Police. The cameras can be viewed in Supplementary Materials 1 through 4 below.

All data from the cameras were collated using a web-based computerized video management system developed by *evidence.com*©. The software tracked and inventoried all *Taser Inc.*© video cameras evidence. The system automatically uploaded the officers' videos at the end of their shifts and the research team was granted full access to these rich data, encompassing over 50,000 hours of police-public interactions.

Figures S1-S#1-4 Here

MEASURES

Police General Orders require all officers to document any instance of use of force, which encompasses physical force more than a basic control or "compliance hold", including use of OC spray, baton, Taser, canine bite or firearm[1]. We looked at four main outcomes to measure use-of-force. First, a standardized police tracking system called *Blue Team* measures all recorded use-of-force incidents. The system enabled us to count how many incidents have occurred during the experimental period, in both

[1] Additionally, Penal Code 148 (a) (1) states the following - *Every person who willfully resists, delays, or obstructs any public officer, peace officer, or an emergency medical technician, as defined in Division 2.5 (commencing with Section 1797) of the Health and Safety Code, in the discharge or attempt to discharge any duty of his or her office or employment, when no other punishment is prescribed, shall be punished by a fine not exceeding one thousand dollars ($1,000), or by imprisonment in a county jail not to exceed one year, or by both that fine and imprisonment.*

experimental and control shifts, and to verify the details of the incidents, such as whether the officer or the suspect initiated the incident.

Second, the police tracked formal complaints against officers with a software called *IA Pro*. Citizens' complaints are incidents where the reporting party has filed a grievance form against alleged misconduct or what they perceive as poor performance. We used the data captured on this system to count the number of complaints filed against police officers, as a proxy for use-of-force.

Third, we measured the total number of contacts between the police and the public. Any non-casual interaction with the public was recorded on the Department's computer-aided dispatch system (CAD) as well. These included attending to calls-for-service, formal advices given to individuals, collecting evidence and statements during any type of investigation and the like. With this variable we were able to compute the rate of incidents per 1,000 police-public contacts.

Fourth, we analyzed the content of the videotapes, in order to enrich our analysis with qualitative data. Here, we primarily focused on the incidents in which force was used, though more broadly the data can be used to systematically observe police-public encounters and measure police performance, possibly elements of procedural justice as well. The outcome of choice was primarily a validation of the *Blue Team* and *IA Pro* reports in terms of the type of force used and how the incident was initiated.

BASELINE ANALYSIS

Table 2 below lists the outcome variables at baseline, up to three years prior to the experiment. As shown, use of force is a relatively rare event, with approximately 65 incidents per year, or 1.46 incidents for every 1,000 police-public contacts. Similarly, complaints lodged by citizens against police officers are infrequent, with 28 grievances filed against officers in 2011 (about 0.7 for every 1,000 contacts). Police-public contacts data show that, on average, Rialto officers interacted with members of the public about 3,600 times per-month (approximately 42 recorded contacts per shift).

Insert Table 2 Here

STATISTICAL PROCEDURE

Poisson Generalized Linear Model will be used to model the data, given the distribution of the outcome data. Group assignment ("experimental shifts"/"control shifts") is set as a predicting variable, and the dependent variables will be the number of use-of-force incidents and the number of citizens' complaints. We will also look at the likelihood of use-of-force and the likelihood of filing a complaints, by measuring the magnitude of the treatment effect using odds ratios (OR), and then the magnitude of the difference in terms of the rates of these measures per shift.

RESULTS

Table 3 below summarizes the findings in terms of the predicted effect of the treatment under the statistical model. The table also presents the standard error term, the 95% confidence interval (CI), and the Wald Chi-Square statistic.

Insert Table 3 Here

We have detected a significant treatment effect on use of force {B=-0.924 95% CI [(-.1806)-(-.042)]}. Shifts without cameras experienced twice as many incidents of use of force as shifts with cameras {OR=2.121; 95%CI = (0.907)-(4.960)}. The direction of the findings was mirrored by the difference in the rate of use-of-force per shift between treatment and control conditions, though not to the same magnitude (*d*=.140; CI 95% =.015-.265). We have also detected that, globally, the rate of use of force incidents per 1,000 contacts was reduced by 2.5 times compared to the 12 months prior to the experimental period (mean baseline=1.46; mean treatment=.33; mean control=.78), as shown in Fig. 1 below.

In terms of complaints against officers, we were unable to compute a treatment effect as planned, since the overall reduction was so large that there were not enough complaints to conduct any meaningful analyses (only one complaint lodged for an incident that has occurred during control conditions and two for incidents that occurred during treatment condition). Importantly, there was an overall reduction from 28 complaints filed lodged in the 12 months before the trial to the 3 during the trial - or 0.70 complaints per 1,000 contacts compared to .069 per 1,000 contacts.

Insert Fig. 1 here

The qualitative analysis of the recorded footage – 6,776 video files of 724 gigabytes of memory - and *Blue Team* data revealed three major findings. First, the difference between the study conditions concentrated in less severe cases: during experimental shifts in which use-of-force was required, police weapons were often not used. In all videotaped incidents (treatment condition) in which force was used by officers the subject is clearly seen to be physically-abusive or to physically resisting arrest. On the other hand, in five incidents that have occurred during control shifts (out of a total of seventeen incidents) officers resorted to use force without being physical-threatened.

Second, in both experimental and control groups the police used force using Taser guns but to a far greater degree in the experimental arm (5 out of 8, and 7 out of 17 respectively). The incident logs suggest that Taser guns were used when officers were physically assaulted or threatened (by drunken suspects or while in-pursuit of offenders).

Lastly, we reviewed who has initiated the use-of-force. All videotaped incidents are cases in which the physical contact was commenced by the member of the public, whereas 4 out of the 17 control cases the officer initiated the physical contact.

DISCUSSION

In this experiment we tested for the first time the effect of mobile cameras on self-awareness and ultimately socially-desirable behavior. The cameras were hypothesized to increase police officers self-consciousness that they were being watched and therefore to increase their compliance to rules of conduct, especially around use of force. The findings suggest more than a 50% reduction in the total number of incidents of use of force compared to control conditions, and nearly ten times more citizens' complaints in the 12 months prior to the experiment.

The implications of these findings for psycho-social theories and particularly for our understanding of self-awareness are meaningful but perhaps not unexpected. We anticipated that the videotaped interactions will experience fewer incidents of use of force, because of the fundamental tendency of rational beings to exhibit more desirable behaviors when they know under surveillance, particularly in scenarios that require them to follow rules. What is surprising, however, is that as far as we can tell this is the first field experiment that has tested this paradigm in real-life settings – at least under these conditions. Mobile cameras are "everywhere" but at the same time nowhere in social science research, insofar as studying their effect on compliance is concerned.

Therefore, this convergence of self-awareness theory with deterrence theory in the context of police-public relations, is something of a *terra nullius.* Deterrence theory presupposes self-consciousness to being-observed, but never really explored it with sufficient rigor. What is the *measurable* level of certainty that enables deterrence to take place? What is the threshold of cognitive attentiveness, under which the rule-breaker does not internalize the possibility of getting caught? At the very least, this experiment provides an example of a *way* to measure these dimensions. More broadly, however, the study was able to expose what happens when the level of certainty of apprehension for professional misconduct was set at 100%. These are social circumstances that are characterized with an inescapable panopticonic gaze[22]. Future explorations of the nexus between deterrence and self-awareness to being observed may want to scrutinize other contexts, other recording technologies and other levels of certainty of apprehension.

In practical terms, the findings can easily be extended to other law-enforcement agencies, but to other professional arenas and social contexts as well. We envisage that any rule-enforcing profession can benefit from intensified certainty of apprehension that was "created" by devices such as body-worn cameras. For instance, medical physicians and other care-providers may benefit from having their interactions videotaped as it can potentially reduce cases of alleged unprofessional conduct. We acknowledge that this may pose ethical considerations, though we believe that, on average, the benefits outweigh the costs. One should also bear in mind that those that come in contact with these and other rule-enforcers already use such devices, so the major difference would be to institutional this practice and possibly introduce control measures.

Lastly, we cannot rule out the possibility that the cameras have (also) modified the behavior of those who interacted with the police. Members of the public with whom the officers communicated were also aware of being videotaped and therefore were likely to be cognizant that they ought to act cooperatively. However, we did not collect any evidence from these individuals to be able to ascertain this question. In spite of that, the psychological mechanisms ought to be substantially similar, though this is an avenue best explored experimentally in the future.

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TABLES AND FIGURES

Table 1:

Example of RIALTO POLICE DEPARTMENT PATROL PATTERNS random assignment

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
DAY SHIFT	Exp't	Exp't	Control	Exp't	Exp't	Control	Exp't
NIGHT SHIFT	Exp't	Control	Control	Exp't	Control	Exp't	Exp't
COVER SHIFT		Exp't	Control	Control	Control	Control	

Table 2: Use of Force, Citizens Complaints and Police-Public Raw Figures – Baseline and Experimental Raw Data

	2009	2010	2011	Jan 2012 - Feb 12 2012	13 Feb 2012 - 12 Feb 2013*
Use of Force	70	65	60	7	25^
Complaints	36	51	28	5	3^^
Police-Public contacts	--‡	--‡	40,111	4,993	43,289

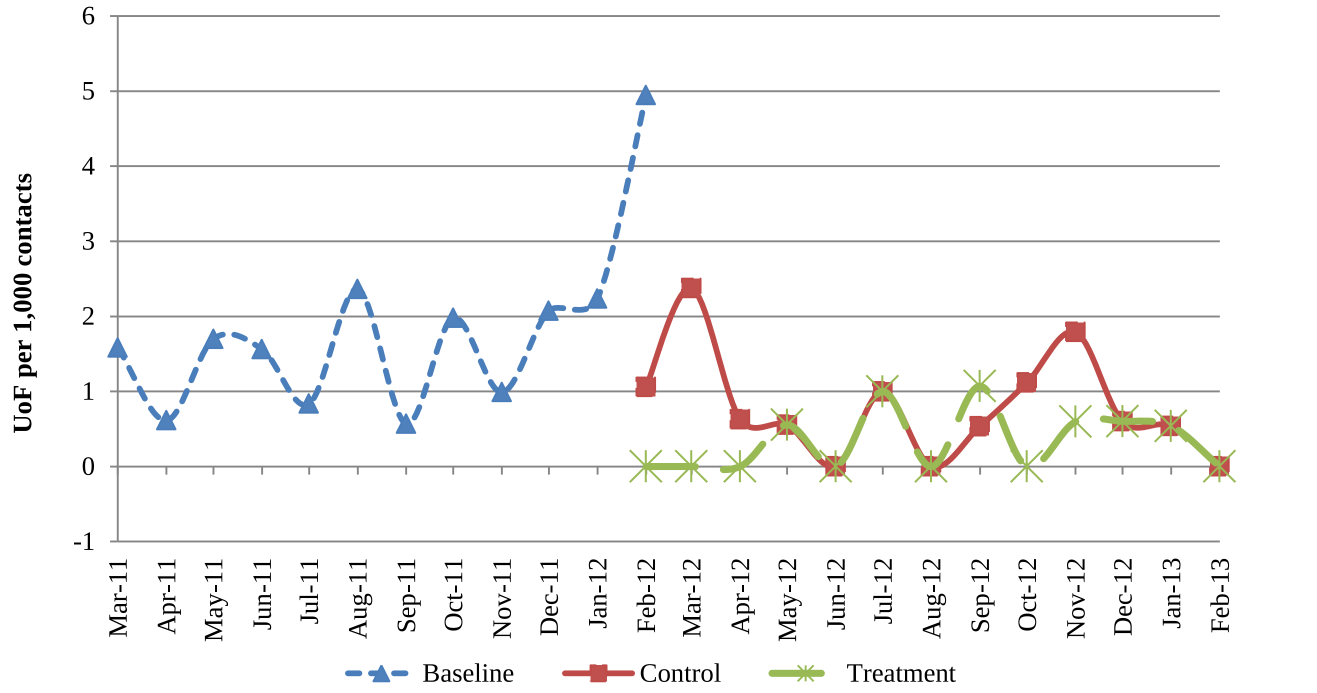
* experimental period
^ 8 during experimental shifts, 17 during control shifts (n=499)
^^ 2 during experimental shifts, 1 during control shifts (n=489)
‡ data automatically collected starting in 2011

Table 3: Poisson Generalized Linear Model and Effect Size Analyses

Parameter Estimates						**Effect Sizes (95%CI)**
			95% Wald CI			
Parameter	*B*	SE	Lower	Upper	Wald χ^2	
Use of Force	-.924	.4500	-1.806	-.042	4.22**	***OR*=2.121 (.907-4.960)**†
(Intercept)	-4.246	.3807	-4.993	-3.500	124.45***	***d*=.140 (.015-.265)**††

* p<.1 , ** p<.05 , *** p<.01
† based on counts of use of force incidents; †† based on rate of use-of-force per shift

Fig. 1: Use of Force Incidents - Rate per 1,000 Police-Public Contacts
(mean baseline=1.46; mean treatment=.33; mean control=.78)
[RCT begain 13 Feb 2013]



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