

2016; Loughran, Pogarsky, Piquero, & Paternoster, 2012; Nagin, 2013a, 2013b; Nagin, Solow, & Lum, 2015). The same might be proposed for officer compliance with police regulations because the certainty of officers being sanctioned for noncompliance with laws/rules is more forceful when cameras are on.

It is worth noting, however, that the theoretical basis for BWCs, set out in the previous paragraph, rests on citizen and officer awareness of being filmed. As Ariel (2016d) discussed, the intervention in the Rialto Experiment was not simply the presence of cameras. In addition, officers were tasked to verbally warn citizens that their encounter was being recorded. Sutherland and Ariel (2014) hypothesized,

This verbal warning could sensitize people leading them to modify their behavior. It could also serve to remind people of the rules that are in play—politeness being the bare minimum—but other rules such as laws. Similarly, the verbal prompt may jolt individuals into thinking a little more before they act, becoming more deliberative and reflecting on future consequences. In short, there could be lots of mechanisms that account for changes in behavior when camera and verbal warning are used together.

METHOD

PARTICIPANTS

The Rialto experiment generated heated debates worldwide, particularly around the transferability of the findings to other jurisdictions or to larger police departments (e.g., Ariel, 2016a; Reddit, 2014). For instance, Rialto is a medium-sized force, and larger law enforcement agencies operate on a different scale (e.g., Brooks & Piquero, 1998; Cordner, 1989; Regoli, Crank, & Culbertson, 1989). Cross-national comparisons are needed as well, to verify whether or not the Rialto experiment results can be generalized to other police forces and jurisdictions.

In response to these limitations, our aim was to replicate the Rialto Experiment in police departments around the world. We invited 10 police departments (e.g., Ariel et al., 2016a, 2016b), of which seven agreed to adopt the same experimental protocol that was used in the Rialto experiment (Ariel & Farrar, 2012) and test the effect of BWCs on complaints against the police under controlled conditions. While a convenience sample of police departments should not be construed as representative of the entire population of police departments, results from a seven-site design, in four jurisdictions and two English-speaking countries, provide a robust framework for testing the effect of BWCs in police operations. The research encompasses 1,429,868 officer hours across 4,264 shifts. Overall, these jurisdictions cover a total population of about 2,000,000 citizens. Information on participating sites is presented in Table 1.

MEASURES

We were provided access to the number of complaints filed against police officers at each site during treatment and control shifts, as well as the number of complaints lodged against officers during the 12 months prior to our study. As not all sites completed a 12-month trial, the complaint counts were annualized for comparability purposes (Table 1). It must be noted that our data included complaints filed with an official complaints unit within the police department, before any investigation into the allegation had been made. Complaints

TABLE 1: Seven Participating Sites—Descriptive Statistics

Site	Population size	Total arrests during RCT	No. of shifts	No. of frontline officers	Officer hours during RCT	Follow-up period post-RA (in weeks)
A	161,400	1,889	462	546	221,760	22
B	285,700	590	268	46	18,224	26
C	203,800	1,097	462	111	410,256	22
E	751,500	3,390	462	870	369,600	22
G	115,000	— ^a	988	54	105,996	52
H	108,817	2,591	734	115	176,160	50
K	249,470	1,175	888	105	127,872	43
Total	1,875,687	10,732	4,264	1,847	1,429,868	
<i>M</i>	267,955.3	1,788.7	609.1	263.9	204,266.9	33.9
<i>SD</i>	223,107.7	1,049.7	264.0	318.7	141,990.5	13.9

Note. RCT = randomized controlled trial; RA = random assignment.

^aData not provided by the department.

against police officers can be made for a range of reasons, including (perceived) excessive or unnecessary use of police force and misconduct (e.g., incivility, lack of fairness, partiality, or any other discriminatory behavior). Given data sharing issues, we were not given access to the types of complaints, but only to the total number of complaints during each shift. We discuss these limitations below.

RESEARCH DESIGN

Beyond large-scale cluster-randomized designs, randomizing shifts is the most practical approach to implementing BWC trials with the police, as even small forces can leverage a large sample size (for a more elaborate discussion on the unit of analysis, see Ariel et al., 2015; Sutherland & Ariel, 2014; however, cf. Ariel, 2016b).³ Each study included here was a two-arm trial that randomly assigned officer shifts to either experimental (with cameras) or control (no cameras) conditions, on a weekly basis, using the Cambridge Randomizer (Ariel, Vila, & Sherman, 2012). These treatment and control shift sequences were communicated to the patrol officers, who would be deployed on patrol with or without the BWCs. This resulted in 4,264 shifts being assigned ($M = 609.1$; $SD = 264.0$ per site), with equal allocation of day and night shifts, including days of the week. No differences were observed between treatment and control conditions in terms of the distribution of shifts.⁴

PROCEDURES

Our prepublished protocol, consented to by each police department, stated that officers on “camera on” shifts had to keep the camera on during their entire shift (typically between 8 and 12 hr) and inform members of the public, during any encounter, that they were wearing a camera that was recording their interaction (e.g., see Supplementary Materials in Ariel et al., 2016a). As discussed above, the intervention consisted of both camera and notification (on the importance of the interaction between these elements, see Ariel, 2016c; Sutherland & Ariel, 2014). To be clear, the trial design meant that officers were not able to exercise any personal discretion in deciding when cameras were turned on; cameras were on throughout their shift, during every interaction with members of the public. Officers’

cameras were switched off between jobs (e.g., when traveling between calls for service) and when officers were on breaks. Leaving the decision to switch on the camera during an encounter and not before officers begin engaging with a citizen may backfire (Ariel et al., 2016a). It also defeats one of the major purposes of the camera: to record the interaction from the officer's perspective, from beginning to end, therefore providing crucial evidence of the decision-making processes that have led him or her to exercise use of force (Ariel, 2016d). The only exception to this rule was when officers responded to specific types of incidents, as preagreed with senior staff in each force (e.g., when conversing with informants, serious sexual assaults, or major public events).

TREATMENT FIDELITY

Maintaining consistent treatment integrity across several sites is a challenge in experimental criminology (see MacKenzie, Umamaaheswar, & Lin, 2013; Slothower, Sherman, & Neyroud, 2015; Weisburd & Taxman, 2000). To deal with risks to fidelity, each trial was managed by a local point of contact, all graduate students on the Cambridge University Police Executive Programme who were also police officers or civilian staff (what some have referred to as "pracademics"; Morreale & McCabe, 2012). This is part of the growing role of science in policing and incorporating evidence-based policies (Sherman, 2013; Weisburd & Neyroud, 2013). All research managers had undergone extensive training in experimental designs and signed up for a rigid trial protocol, committing their respected agencies to take part in the study. Fortnightly meetings were held in which research managers were asked to provide reports on implementation fidelity, any concerns raised, or issues with treatment misassignments. This process, while costly, reduced the chance of drift in implementation, although, as we discuss below, on-site management does not fully remove the risk of diffusion of treatment conditions (i.e., some police officers used BWCs when they should not have, and some police officers did not use BWCs when they ought to have done so). This in-person monitoring is bolstered by having each force consent to the trial design in advance and coming to a consensus with senior officers on implementation (see Ariel et al., 2016b). Finally, treatment integrity was monitored with a high level of reliability using BWCs metadata, which at the very least provided a convenient measure of fidelity (see also Ariel et al., 2016a). Cross-tabulating between date and time of evidence uploaded from the BWCS and random assignment provides a direct measure of manipulation checks. Based on these checks, protocol breaches were immediately communicated to the supervising officers (on the importance of feedback, see Fixsen, Blase, Naoom, & Wallace, 2009).

RESULTS

All sites followed an identical protocol, so we used a prospective meta-analytic approach to analyze between-group differences. We observed the number of complaints per treatment and control shifts and computed standardized mean differences for the treatment effect, presenting these in terms of Cohen's d (Cohen, 1988). We used the Comprehensive Meta-Analysis v.2 software (CMA) to then synthesize the results from the trials and present the overall results. As each trial used the same design and outcomes, it was appropriate to combine and report them accordingly (Lipsey & Wilson, 2001). The data inputted into CMA consisted of (a) the number of treatment and control shifts and (b) the number of incidents of complaints per treatment condition.

TABLE 2: Citizen Complaints Across Seven Sites: Pretreatment, Posttreatment, and Between-Group Results

Site	Complaints before (12 months)	Complaints after (12 months ^a)	No. complaints treatment shifts	No. complaints control shifts	Treatment shifts	Control shifts	Rate per officer (pre-treatment)	Rate per officer (post-treatment)
A	558	33	7	4	183	186	1.02	0.06
B	10	0	0	0	129	106	0.22	0.00
C	331	21	3	4	184	185	2.98	0.19
E	251	30	4	6	111	188	0.29	0.03
G	24	3	2	1	489	499	0.44	0.06
H	34	19	7	12	367	367	0.30	0.17
K	331	7	4	3	445	443	3.15	0.07

^aAnnualized.

To estimate the treatment effect on a pretest–posttest basis, we used a nonparametric analogue to paired *t* tests, the Wilcoxon signed-rank test. This test is more appropriate for paired comparisons when looking at nominal variables, when the differences are nonnormally distributed, and when the overall number of pairs is relatively small (McDonald, 2014).

Across the seven experimental sites, 1,539 complaints were lodged against police officers in the 12 months preceding the study ($M = 219.86$; $SD = 206.9$), or 1.20 complaints per officer. The number of complaints lodged against the police then dropped in the posttreatment period to 113 ($M = 16.14$; $SD = 13.1$), or 0.08 complaints per officer (Table 2). This marks an overall reduction of 93% in the incidence of complaints, mimicking findings from the Rialto experiment (Ariel et al., 2015). A Wilcoxon signed-ranks test indicated that posttest complaints were statistically significantly lower than at pretest ($Z = -3.234$; $p < .001$).

Interestingly, posttreatment between-group differences were not statistically significant ($d = .053$, $SE = .11$; 95% confidence interval [CI] = $[-.163, .269]$), with minimal and nonsignificant heterogeneity between the sites ($Q = 4.905$; $p = .428$). These results can also be read as a nonsignificant 10.1% reduction in the odds of a complaint lodged against officers during a treatment shift, compared with the odds of a complaint filed during a control shift ($p = .629$), which is likely to be influenced by the results of one study site, Site A ($d = .348$, $SE = .67$; 95% CI = $[-.931, -1.720]$, $p = .095$). Our between-groups analyses are presented within a forest plot as in Figure 1, and our before–after comparisons are depicted in Figure 2.

DISCUSSION

In this multisite randomized controlled trial, we replicated the design as well as findings of the Rialto experiment (Ariel et al., 2015) in terms of the change in magnitude and direction of complaints against the police across seven distinct police departments. Using the officer's shift as the unit of analysis, we have contributed to the evidence in three major ways, and we discuss these advances below.

A TECHNOLOGICAL SOLUTION FOR POLICE ACCOUNTABILITY, LEGITIMACY, AND POLICE–COMMUNITY RELATIONS?

Citizens initiate complaints against the police. This might be because an officer has behaved so badly that a citizen feels he must seek redress or acknowledgment, or because

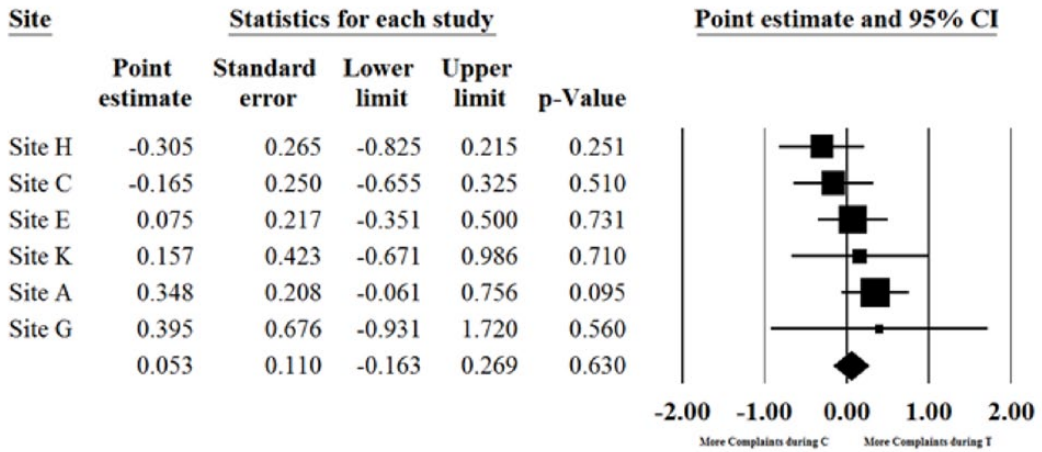


Figure 1: Complaints Against Officers per Shift. Treatment Versus Control Conditions

Note. Only six sites included in the meta-analysis, as one site—B—had nil complaints in both treatment and control arms. CI = confidence interval.

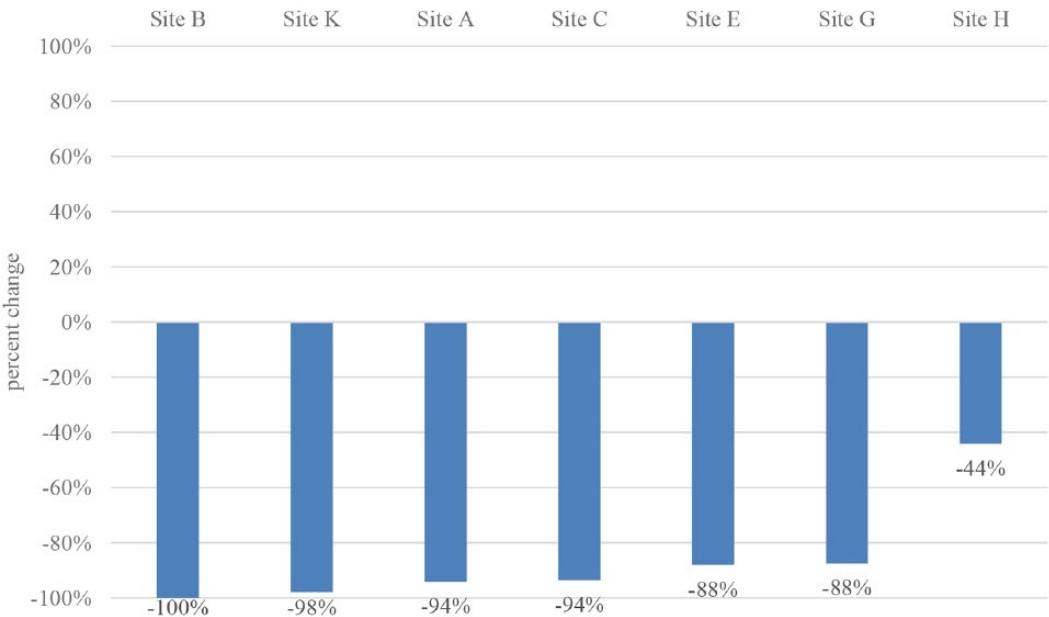


Figure 2: Complaints Filed Against Police Officers (Seven Experimental Sites): Before–After Percent Changes

the citizen seeks to “make trouble” for the officer (“vexatious complaints”). We demonstrated that the use of BWCs in police operations dramatically reduces the incidence of complaints lodged against police officers, thus illustrating that the treatment effect, first detected in a relatively small force in Rialto, carried a strong external validity.

If complaints are a proxy to police (mis)conduct, and if cases of police misconduct predict perceptions of illegitimacy, such a significant, large drop can potentially be interpreted as a technological solution for the legitimacy problem (Hasisi & Weitzer, 2007; Myhill & Bradford, 2012; Pew Research Center, 2014; Tillyer & Kennedy, 2008). Cooling-down potentially volatile police–public encounters to the point where official grievances against the police have virtually vanished may well lead to the conclusion that the use of BWCS indeed signals a profound sea change in modern policing—or what Sherman and Strang (2015) accurately described as a turning point in policing.

Indeed, one view of police legitimacy (e.g., Tyler, 1990) lends weight to the claim that the impressive reduction in complaints, evidenced by the research, should be interpreted as “increased procedural compliance.” In other words, BWCS lead to increased procedural justice and, consequently, to greater legitimacy. This view is, to an extent, supported by correlational studies. Complaints are often used to measure the extent and scope of police legitimacy. For instance, Braga et al. (2008) used complaint databases in Boston as a proxy to various types of legitimacy and justice-related outcomes. If a causal link exists between procedures and legitimacy (see Jonathan-Zamir & Harpaz, 2014; Langley, 2014; Mazerolle, Antrobus, Bennett, & Tyler, 2013; Tyler, 1990; see also Stevens, Willis, & Oxby, 1981; Tankebe, 2009, 2013), then the lower rates of complaints detected across our seven tests can be viewed as a marker of enhanced perceptions of police legitimacy and satisfaction with police performance.

At the same time, BWCS are probably not the panacea for a deeply rooted issue such as police legitimacy. As the literature suggests, the correlation between complaints and legitimacy is not strong, and it is presently not at all clear to what extent the prevalence of citizen complaints correlates with general police legitimacy, beyond our assumption that they are a proxy of the latter. Even if BWCS can lead to perfectly executed police procedures—an ideal Tylerist world of 100% implementation of procedural fairness (Tyler & Bies, 1990)—what happens before or after the encounter might still be perceived as unfair, racist, unprofessional, or malicious. Officers’ decisions to arrest (Brown & Frank, 2006; Kochel, Wilson, & Mastrofski, 2011), willingness to initiate stop and frisk encounters, distributive justice, historical accounts (Braga et al., 2008), and even the collocation of crime and race (Eck & Weisburd, 1995) all affect perceptions of police and policing—and this is likely to be but a partial list of factors. That procedural justice is not the whole story of legitimacy has already been established (Bottoms & Tankebe, 2013). BWCS directly mediate the physical encounter between the police and the public but whether they have impact on other factors associated with legitimacy remains to be seen. More evidence is therefore needed, but we would speculate that BWCS are only likely to have a limited effect on this broad concept of “police legitimacy.”

Furthermore, any assumption that a change in officers’ behavior in police–public encounters engenders a more “general effect on legitimacy”—that is, on the broad group of members of the community who are not directly involved in the videotaped encounter, is tenuous. Ariel (2016b) recently illustrated that wearing BWCS in one police district (Denver, Colorado) was linked to an increase in cooperation with the police compared with other districts, but only in residential and low-crime street segments (see also Murphy & Barkworth, 2014). However, to the extent that strong evidence is concerned, there is currently no research available on the effect of BWCS on police legitimacy in places where BWCS are already in use (White, 2014). Nor are there experimental studies comparing

legitimacy scores in wide policing environments with and without BWCs (which are likely to be shown only through large cluster-randomized controlled trials that are difficult to implement). More broadly speaking, it would be a mistake to assume that police initiatives—even major policy changes such as BWCs—are even noticed by the public (see Brain, 2014; Home Office, 2010). Even the infamous stop-and-frisk practice in New York City carried a significant, but only modest, deterrent effect on the general offender population (Weisburd, Telep, & Lawton, 2014) and we would speculate that the recent reduction in the use of stop-and-account policy by the NYPD has gone largely unnoticed by the local residents. Erroneous assumptions about how the public understands police work can be referred to as an “awareness illusion,” whereby police interventions may or may not work, but the public is unaware of policy changes or their consequences. In this respect, if BWCs were to have an effect on public support for the police and on legitimacy, it would prove a difficult phenomenon to measure unbiasedly, again, without large cluster-randomized trials. We raise this matter given the weight assigned to legitimacy in the discourse on BWCs, even though our study does not offer evidence of this sort, and call for more research on the link between complaints and general legitimacy within, or without the specific context of BWCs.

CONTAGIOUS ACCOUNTABILITY

However, in terms of police accountability, BWCs can very well be construed as a “fix” (for a wider discussion regarding technology usage in law enforcement, see King, 2000; Weiss, 1997). We hold this view because complaints reflect most directly on procedural compliance (irrespective of legitimacy), and procedural compliance is an essential part of the definition of accountability (United Nations Office on Drugs and Crime, 2011):

[A] system of internal and external checks and balances aimed at ensuring that police carry out their duties properly and are held responsible if they fail to do so. Such a system is meant to uphold police integrity and deter misconduct and to restore or enhance public confidence in policing. Police integrity refers to normative and other safeguards that keep police from misusing their powers and abusing their rights and privileges. (p. 9)

There can be no doubt that BWCs increase the transparency of frontline policing (Ready & Young, 2015; Scheindlin & Manning, 2015). Anything that has been recorded can be subsequently reviewed or scrutinized. Individual officers become more accountable as BWCs accentuate the need for oversight and reflection on their own actions (Lumina, 2006; Reiner, 1993; Walsh & Conway, 2011). BWCs thus sit squarely within what D. A. Harris (2010) referred to as a “holistic” approach to police oversight, which “combines the traditional ‘reactive’ functions (i.e., tracking cases of individual misconduct) with ‘proactive’ functions designed to promote organizational changes that might reduce individual misconduct” (p. 240). In turn, greater transparency not only primes power-holders to adhere to protocols, guidelines, and “best practice” (for the same reasons we alluded to earlier in the context of deterrence theory and self-awareness) but also creates an equilibrium between the account of the officer and the account of the suspect about the same event (see Frank, Smith, & Novak, 2005). Without corroborating evidence (e.g., bystanders testimonies, forensic evidence), a complainant would find it difficult to prove, in the necessary forums, that police misconduct had, indeed, occurred (see J. Miller & Merrick, 2002). With the evidence from BWCs,

however, an officer's transgression can be revealed and legally proven, much as a suspect's transgression can. For this reason, there will be little value of recording incidents as they become more aggressive; BWCs need to stay on for the entire police–public contact, from start to finish, and as a method of corroborating the rationale for any action that the officer has taken to deal with the situation. In deterrence theory terms, the “credible threat” of apprehension is elevated through complete transparency, to the extent that complainants now have the necessary evidence to support their claim that they have been wronged by the officer (and, again, vice versa). (In this respect, personal discretion should be kept to a minimum with as few exclusions as possible.) The awareness of being videotaped leads to transparency, and transparency leads to accountability; ergo, greater awareness leads to increased police accountability. Our evidence supports this model.

Our findings, however, go beyond this model. The pre–post results show that the introduction of cameras reduced complaints overall, but why were reductions seen in both the treatment and control arms of the trial? There are several ways to interpret these results. We offer two approaches in the context of accountability although they are not mutually exclusive. Both interpretations are born out of our research design, where the unit of analysis was the officer's shift.

Experiments test treatment contrasts rather than single treatments (Holland, 1986). Cook and Campbell (1979) drew attention to a novel threat that affects this treatment contrast, without necessarily influencing the major treatment purportedly under test: diffusion of one treatment to other treatments. Reflecting on this diffusion, Cook and Shadish (1994) wrote,

Treatment providers or recipients learn what other treatment groups are doing and, impressed by the new practices, copy them. . . . It threatens to bias treatment effect estimates when compared to situations where the experimental units cannot communicate about the different treatments. Statisticians now subsume them under the general rubric of SUTVA—the stable-unit-treatment-value assumption (Holland & Rubin, 1988)—in order to highlight how much the interpretation of experimental results depends on the unique components of one treatment group not diffusing to other groups and hence contributing to the misidentification of the causal agent operative within a treatment contrast. Is it the planned treatment that influences the outcome, or is it serving in a control group? (p. 555)

Our study somewhat reflects this scenario. While we found a reduction in complaints in pre–post comparisons, we also found no significant differences across the seven tests when looking at posttreatment comparisons, and no discernible heterogeneity between the sites. Taken at face value, it may be unclear as to whether deterrence theory was wrong, the implementation weak, or the statistical power to detect the effect of BWCs on police behavior inadequate. As the same officers wore the cameras and did not wear the cameras, we cannot rule out a violation of stable unit treatment value assumption (SUTVA) and treatment diffusion (Ariel et al., 2015; Bloom, Bos, & Lee, 1999; Sampson, 2010). The same officers, all of whom were participating in the same program, experienced both treatment and control conditions. We return to these points when discussing the additional limitations of our study below. However, the evidence must be read holistically, along with the before–after comparisons. This multisite experiment provides direct evidence that repeated and systematic exposure to a stimulus that elicits deterrence can increase accountability, even when the stimulus has vanished. Our officers learned, by their repeated exposure to the surveillance effect of the cameras, what normative or appropriate reactions are, even when

they were no longer under surveillance. This may be true for officers who once wore BWCs and no longer do (through the process of random assignment), or officers in the department who did not take part in the experiment (e.g., neighborhood police teams, special victim support units, etc.). We argue that that BWCs affect entire police departments through a process we label *contagious accountability*. Perhaps naively, we find it difficult to consider alternatives to the treatment effect beyond the panopticonic observer effect when the reduction in complaints is by nearly 100%. Whatever the precise mechanism of the deterrence effect of being watched and, by implication, accountability, all officers in the departments were acutely aware of being observed more closely, with an enhanced transparency apparatus that has never been seen before in day-to-day policing operations. Everyone was affected by it, even when the cameras were not in use, and collectively everyone in the department(s) attracted fewer complaints.

There is, however, a caveat associated with this conclusion, which is important for future experiments on BWCs. It is not the camera device alone that caused the contagious accountability, but rather a two-stage process. First, the treatment effect incorporated the camera as well as a warning at the beginning of every interaction that the encounter was being videotaped. We urge practitioners to acknowledge that the verbal warning, which our protocol dictated should be announced as soon as possible when engaging with members of the public, is a quintessential component of the treatment effect. It primed both parties that a civilized manner was required and served as a nudge to enhance the participants' awareness of being observed. Without the warning, the effect might easily have been reduced or failed to materialize.

The second element to the process is the need for affirmation that the videotaped footage can be used. People may be aware of CCTV or bystanders filming the encounter but still conduct themselves inappropriately, believing the camera to either not be recording or not monitoring their demeanor. Without the actualization of the warning, transgressors may be quick to assume that the threat of apprehension and risk of sanctioning are not real. Therefore, the fact that the officially collated, recorded footage can be used against the participants moves this intervention from being a "toothless policy" (Ariel, 2012, p. 57) into an effective technological solution.

UNTANGLING OBSERVER EFFECTS

Since BWCs came out, a question has been raised about which person in the encounter is most affected. Does the self-awareness effect or the "announcement effect" of surveillance (see Mann, 2002; Surette, 2005), concentrate on the person the camera is videotaping or the person holding the camera? Does the causal chain start with the police officer, who is holding the BWC and is deterred from reacting with excessive or unnecessary demeanor, or does it first cool down the aggressive demeanor of the suspect?

On one hand, most empirical research suggests that the suspect's actions and resistance during police-public encounters precipitate force reactions from police officers (Alpert & Dunham, 1997; Alpert, Dunham, & MacDonald, 2004; Crawford & Burns, 2002; Engel, Sobol, & Worden, 2000; Terrill, 2001; Terrill & Mastrofski, 2002; Worden & Shepard, 1996). This demeanor hypothesis (Croft & Austin, 1987; Engel et al., 2000; Garner, Maxwell, & Heraux, 2002) shows that the relationship between police-public encounter characteristics and police use-of-force is significantly dependent on resisting arrest and

therefore concentrates on the suspect. If the effect of BWCs is wholly on the suspect, then BWCs should deter members of the public from resisting arrest, “talking trash” to the officer, or exhibiting behavior that may result in force being used by the officer. This in turn might lead to officers refraining from reacting in ways that will more likely lead to a complaint. If this is the case, then the causal chain starts with the suspect:

BWC + verbal warning → suspect’s demeanor “cools down” → officers do not “react” aggressively → fewer complaints than without BWCs.

Alternatively, the amount of response officers use is dependent on the cognitive and emotional capacities of the officer, as well as his or her training and experiences (see Paoline & Terrill, 2011). Common to all organizations, the police force includes “thin skinned” individuals who are primed to act aggressively when encountering certain members of the public (Holmes, 2000; Reiss, 1968; Worden, 2015; see also Fielding & Fielding, 1991). Recent studies have shown that identifiable officer characteristics can predict police behavior; for instance, officers with prior problematic performance are 3 times more likely to discharge a firearm (Ridgeway, 2015). Likewise, the ability to de-escalate a situation is critical in public–police encounters (Sherman, 1983), and while the officer ought to respond with a proportionate “response dosage,” he or she also needs to have the skill to reduce the need to engage in what can, in hindsight, be construed by the citizen as misconduct. Under this model, the causal chain is as follows:

BWC + verbal warning → officer’s reaction to suspect’s demeanor is “cooler” → fewer complaints than without BWCs.

It is also worth considering the possibility that both the officer and suspect are being affected simultaneously. The mechanism that might bring this about is as described above; the verbal reminder, combined with the camera, “cools down” both participants at the same time, owing to the jolt of the verbal reminder of being watched, nudging them to think about their actions more consciously. This might mean that officers are beginning encounters with more awareness of rules of conduct (internal behavior control), and suspects’ demeanor is less likely to elicit an aggressive response because they are aware they are being watched (external behavior control). In this scenario the causal chain would be

BWC + verbal warning → officer’s starting point for the interaction is cooler + suspect’s demeanor “cooler” → officers less likely to react aggressively → fewer complaints than without BWCs.

Leaving aside the officer–suspect interaction, we have sufficient evidence to conclude that the BWC had a more pervasive effect on officers. This conclusion is based on the contagious accountability effect of the intervention across all sites. Because we detected a reduction in complaints in our before–after analysis, we conclude that officers changed their behavior in encounters during control conditions as well as treatment conditions. To use an analogy from the medical world, suspects were not given the medication during control conditions, but officers were. The treatment effect carried over to no-treatment shifts as well, and officers’ behavior was affected by it. The alternative model—that the chain of causality begins with the suspect—requires us to assume that the suspect anticipated that his interaction with the officer

would be videotaped and therefore significantly amended his behavior so as not to provoke the officer. This seems unlikely in the many thousands of interactions we have reported, and we are not aware of any large-scale advertising campaigns having taken place at research sites that might have alerted suspects to the use of BWCs beforehand, the evidence about the ineffectiveness of such campaigns notwithstanding. It is therefore logical and more parsimonious to conclude that, insofar as the demeanor hypothesis is concerned, BWCs offer a novel nudge for de-escalation by affecting police officers' approaches to encounters.

REVISITING THE SUTVA CONCERN

The fact that officers participated on multiple occasions in both treatment and control conditions, potentially violates the SUTVA (Rubin, 1986) and/or the requirement that observations are independent. However, the unit of analysis is the shift, not the officer. The set of conditions encountered in each shift cannot be repeated, because time moves on in one direction. The treatment manipulation was whether the shift involves cameras and a verbal warning or no cameras and no verbal warning. Outcomes (complaints) filed by citizens against officers are essentially driven by how officers act and citizens perceive those actions. Likewise, because the shift was randomized and officers experienced multiple shifts with and without cameras, we know that on average, all else was equal—including which officer was involved. Being able to define units, treatments, and outcomes in this way makes SUTVA less plausible (Rubin, 1986). However, spillover effects often result from experiments, and indeed may be the intention (Angelucci & Di Maro, 2016). In all of our tests reported above, officers were exposed to both treatment and control conditions. This is akin to a cross-over trial with more than one switch between conditions for each officer. The spillover, we propose, is that officers in control conditions were influenced by their counterpart treatment conditions and altered their behavior enough, overall, to reduce the likelihood of complaints being filed against them, regardless of treatment condition. In short, we believe that our results point to the success of this intervention in terms of complaints: Complaints fell so far, as much as to zero, that between-group differences in treatment conditions could not be detected.

As we noted earlier, despite these reservations about our choice of unit of analysis, it is still the best of all possible worst options of units of analysis. With every officer on the shift either wearing the device or not, depending on the research protocol, and with every participating force maintaining the same random allocation of shift patterns, the shift is the best option for noncluster experiments, given the practical and statistical implications briefly mentioned herein. In addition, there is also a good reason for using a shift-based approach, particularly in light of our interest in the impact of the observer effect. Suppose that indeed there is a 100% diffusion effect, namely, that policing during control conditions is completely affected by policing during treatment conditions. This means that officers modified their behavior entirely and followed protocol when cameras were used and when the cameras were not used. One way to interpret this is clinically, as a contamination effect. Following this line of reasoning, then one may simply ignore the between-group analyses of our findings and view this as a preexperimental multisite study, with seven independent before–after analyses. The results still seem informative to us. Nonetheless, from a theoretical as well as practical perspective, the entire premise of BWCs in police operations is to cause a change in behavior through the deterrent effect of being observed. The diffusion of

the treatment effect, if it exists, is the treatment effect, which therefore makes the lessons learned from our estimates even more informative. The purpose of BWCs is to modify behavior, and ultimately this was achieved, with direct and unmediated measures of change. Therefore, the implications for learning theorists, psychology scholars interested in priming or nudges, are consequently substantive.

With these in mind, there are also implications for social policy researchers, who would benefit from understanding that a social control apparatus can be implemented partially (e.g., in half of the temporal shifts rather than all the time), and still provide a desirable effect; the cost and resources consequences are therefore noted as well, particularly in an age of public domain austerity. One can achieve the same goal of reducing complaints against the police through the systematic application of BWCs at half of the costs (for a more elaborate discussion on these cost implications, see Sutherland & Ariel, 2014).

ADDITIONAL LIMITATIONS

We cannot rule out the possibility that forces' policies on how complaints were handled and processed changed over the period of the experiment, for example, by forces making complaints more difficult for citizens to register, or by ignoring them. The literature on how written policies and their enforcement or nonenforcement influence officer behavior is developed. This line of research observed that policies could influence street officers' behavior. However, the ways in which policies modify behavior is heavily dependent on how the policies are enforced in the context of use of force guidelines (see Fyfe, 1978; Sherman, 1980; Sherman & Langworthy, 1979; White, 2001), pursuit policies, and in the area of domestic violence mandatory arrest policies (see Eitle, 2005). If we assume that was the case, then it would be disingenuous in the extreme if forces were already under pressure to reform and improve officer behavior (and be seen to do so), while making it more difficult for citizens to complain. However, the level of Machiavellian preplanning that would have been required for this to happen, in all participating forces, just in time for the trials, seems highly implausible.

Future studies will need to look into the type of complaints that are reduced as a result of the intervention and against whom these complaints are filed. As in the Rialto experiment, we did not observe the categories of complaints filed against officers. It may be the case that certain kinds of complaints are reduced because of wearing BWCs, whereas others are not. Recently, Ariel (2016a) has shown a reduction in complaints against use of force but an increase in complaints against misconduct because of using BWCs. The situations from which complaints arise most often, whether during police-initiated contacts, emergency calls for service, multiplayer events, or solo contacts, as well as offense types, also bear future scrutiny as these may condition the effect of BWCs and are presently unknown. It is also important for future research to more closely observe how the cameras affect the power few (Sherman, 2007) of complaints, as we already know that certain officers are more likely to attract complaints than others. These are important avenues for future research, as they may carry cost-benefit implications for police departments around the globe.

NOTES

1. One possible solution could be systematic social observations of police patrols with or without body-worn cameras (BWCs; Mastrofski, Parks, & McCluskey, 2010; Sampson & Raudenbush, 1999); however, when considering the first challenge mentioned above (rarity of events and wide spatiotemporal dispersion), one would have to assign costly observers to

every police vehicle, during all hours of the day, for many months. This was beyond the scope of the present study, nor would qualitative ride-a-longs methodologies go without critique (Mastrofski & Parks, 1990).

2. <http://www.justice.gov/opa/pr/justice-department-awards-over-23-million-funding-body-worn-camera-pilot-program-support-law>

3. While randomly assigning shifts as the unit of analysis is not ideal, given the potential spillover effect, it represents the best of all worst options (what is sometimes referred to as the maximin rule—that is, to compare the alternatives by the worst possible outcome under each alternative and choose the option which maximizes the utility of the worst outcome). As alluded to by Ariel et al. (2015)—but shown more strongly in light of recent evidence—the risk for a contamination effect is substantially more concerning, almost detrimental, when the unit of analysis is the single officer or the squad (Jennings et al., 2015), the borough (Owens, Mann, & Mckenna, 2014), or studies where random allocation was confounded by geography (Ready & Young, 2015). First, if the unit of analysis were the individual police officer, then the contamination would be even greater: The overwhelming majority of police responses that result in complaints have at least one or two more police officers arriving at the scene as backup (Ariel, 2016a). Suppose the primary/first responding officer is a “control officer,” but the second officer arriving at the scene as backup is a “treatment officer,” then would this case be a “treatment case” or a “control case?” Suppose that both the primaries as well as the secondary response units are “control officers,” but the third unit is a “treatment officer?” Furthermore, another reason why using the individual officer as the unit of analysis seems wrong is that it dismisses group dynamics and organizational factors that cannot be controlled for. There are underlying forces and cultural codes of behavior that characterize entire shifts, such as the character of the “officer in charge” (OIC) or the sergeant managing the shift, the degree of officers’ cynicism, comradery, codes of silence, and a host of institutional undercurrents that are recognized in the literature—but cannot be factored into a statistical model.

The best methodological solution for this spillover effect problem is to randomly assign entire forces, or a population of geographic divisions and sectors, in what are called cluster random assignment designs (see Bloom et al., 1999; Cook, 2005). Yet from a practical perspective, this *beau idéal* methodology is close to impossible to implement in policing because it requires many police forces to achieve sufficient statistical power. This is why, to the best of our knowledge, cluster-randomized trials are not common in criminology. Obtaining the necessary buy-in from these forces, securing thousands of BWCs for treatment conditions, having full-time field management to this scale, and safeguarding treatment integrity, are only but a few of the operational challenges that such a design would entail, which would go beyond the scope of our project—which had zero funding of any kind. For example, obtaining permission to conduct a multisite experiment with a selective sample of up to 10 small- to midrange forces and local divisions was lucky; but systematically assigning a “sufficiently large” sample of forces for a clustered design, who would all commence their trial simultaneously, is a dream not imagined. Simply, from a statistical power perspective (see Cook, 2005; Cohen, 1988), we would require such a large number of willing and able forces to randomly assign into treatment and control arms, which we cautiously conclude that this design is practically impossible, at least in BWCs research at present.

4. Following consolidated standards of reporting trials (CONSORT) guidelines, we did not test statistically for differences between trial conditions (<http://www.consort-statement.org/checklists/view/32-consort/510-baseline-data>). If the reviewer(s) see fit, we can report these distributions as well.

REFERENCES

- Adams, K. (1996). Measuring the prevalence of police abuse of force. In W. A. Geller & H. Toch (Eds.), *Police violence: Understanding and controlling police abuse of force* (pp. 52-93). New Haven, CT: Yale University Press.
- Angelucci, M., & Di Maro, V. (2016). Programme evaluation and spillover effects. *Journal of Development Effectiveness*, 8, 22-43.
- Alpert, G. P., & Dunham, R. G. (1997). *The force factor: Measuring police use-of-force relative to suspect resistance*. Washington: Police Executive Research Forum.
- Alpert, G. P., Dunham, R. G., & MacDonald, J. M. (2004). Interactive police–citizen encounters that result in force. *Police Quarterly*, 74, 475-488.
- Ariel, B. (2012). Deterrence and moral persuasion effects on corporate tax compliance: Findings from a randomized controlled trial. *Criminology*, 50, 27-69.
- Ariel, B. (2016a). The effect of police body-worn videos on use of force, complaints and arrests in large police departments. *The Journal of Criminal Law and Criminology*, 106, 101-136.
- Ariel, B. (2016b). Increasing cooperation with the police using body-worn cameras. *Police Quarterly*, 19, 326-362.
- Ariel, B. (2016c). The puzzle of police body cams. *IEEE Spectrum*, 53(7), 32-37.
- Ariel, B. (2016d). Technology in policing: The case for body-worn cameras and digital evidence. *The Police Chief*, 83(3), 27-42.
- Ariel, B., & Farrar, W. A. (2012). *The Rialto police department wearable cameras experiment: Crimport* (Experimental protocol). Retrieved from <http://www.crim.cam.ac.uk/research/experiments/rex-post/rialto.pdf>
- Ariel, B., Farrar, W. A., & Sutherland, A. (2015). The effect of police body-worn cameras on use of force and citizens’ complaints against the police: A randomized controlled trial. *Journal of Quantitative Criminology*, 31, 509-535.

- Ariel, B., & Partridge, H. (2016). Predictable policing: Measuring the crime control benefits of hotspots policing at bus stops. *Journal of Quantitative Criminology*. Advance online publication. doi:10.10007/s10940-016-9312-y
- Ariel, B., Sutherland, A., Henstock, D., Young, J., Drover, P., Sykes, J., . . . Henderson, R. (2016a). Report: Increases in police use of force in the presence of body-worn cameras are driven by officer discretion: A protocol-based subgroup analysis of ten randomized experiments. *Journal of Experimental Criminology*. Advance online publication. doi:10.1007/s11292-016-9261-3
- Ariel, B., Sutherland, A., Henstock, D., Young, J., Drover, P., Sykes, J., . . . Henderson, R. (2016b). Wearing body cameras increases assaults against officers and does not reduce police use of force: Results from a global multi-site experiment. *European Journal of Criminology*. Advance online publication. doi:10.1177/1477370816643734
- Ariel, B., & Tankebe, J. (2016). Racial stratification and multiple outcomes in police stops and searches. *Policing & Society*. Advance online publication. doi:10.1080/10439463.2016.1184270
- Ariel, B., Vila, J., & Sherman, L. (2012). Random assignment without tears: How to stop worrying and love the Cambridge randomizer. *Journal of Experimental Criminology*, 8, 193-208.
- Armacost, B. E. (2003). Organizational culture and police misconduct. *George Washington Law Review*, 72, 453-546.
- Barker, T., & Carter, D. L. (1991). *Police deviance*. Cincinnati, OH: Anderson.
- Bloom, H. S., Bos, J. M., & Lee, S. W. (1999). Using cluster random assignment to measure program impacts statistical implications for the evaluation of education programs. *Evaluation Review*, 23, 445-469.
- Bodyworn. (n.d.). Bodyworn [Brochure]. Retrieved from <http://www.utility.com/perch/resources/bodyworndigitalbrochure.pdf>
- Bottoms, A., & Tankebe, J. (2013). Beyond procedural justice: A dialogic approach to legitimacy in criminal justice. *The Journal of Criminal Law and Criminology*, 102, 119-170.
- Braga, A. A., Hureau, D., & Winship, C. (2008). Losing faith-police, black churches, and the resurgence of youth violence in Boston. *Ohio State Journal of Criminal Law*, 6, 141-172.
- Brain, T. (2014). Police and crime commissioners: The first twelve months. *Safer Communities*, 13, 40-50.
- Brandl, S. G., Strohshine, M. S., & Frank, J. (2001). Who are the complaint-prone officers? An examination of the relationship between police officers' attributes, arrest activity, assignment, and citizens' complaints about excessive force. *Journal of Criminal Justice*, 29, 521-529.
- Breitenbach, S. (2015). *States grapple with public disclosure of police body-camera footage*. Retrieved from <http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2015/09/22/states-grapple-with-public-disclosure-of-police-body-camera-footage>
- Brooks, L. W., & Piquero, N. L. (1998). Police stress: Does department size matter? *Police Studies*, 21, 600-617.
- Brown, R. A., & Frank, J. (2006). Race and officer decision making: Examining differences in arrest outcomes between black and white officers. *Justice Quarterly*, 23, 96-126.
- Brunson, R. K. (2007). "Police don't like black people": African-American young men's accumulated police experiences. *Criminology & Public Policy*, 6, 71-101.
- Cohen, J. (1988). *Statistical power analysis*. Hillsdale, NJ: Lawrence Erlbaum.
- Considering police body cameras. (2015, April 10). Retrieved from <http://harvardlawreview.org/2015/04/considering-police-body-cameras/>
- Cook, T. D. (2005). Emergent principles for the design, implementation, and analysis of cluster-based experiments in social science. *The ANNALS of the American Academy of Political and Social Science*, 599, 176-198.
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Boston, MA: Houghton Mifflin.
- Cook, T. D., & Shadish, W. R. (1994). Social experiments: Some developments over the past fifteen years. *Annual Review of Psychology*, 45, 545-580.
- Cordner, G. W. (1989). Police agency size and investigative effectiveness. *Journal of Criminal Justice*, 17, 145-155.
- Crawford, C., & Burns, R. (2002). Resisting arrest: Predictors of suspect non-compliance and use-of-force against police officers. *Police Practice and Research* 3(2), 105-117.
- Croft, E., & Austin, B. A. (1987). Police use-of-force in Rochester and Syracuse, New York 1984 and 1985. *Report to the New York State Commission on Criminal Justice and the Use-of-Force*. Albany, NY: New York State Commission on Criminal Justice and the Use of Force.
- Cubitt, T. I., Lestic, R., Myers, G. L., & Corry, R. (2016). Body-worn video: A systematic review of literature. *Australian & New Zealand Journal of Criminology*. Advance online publication. doi:10.1177/0004865816638909
- Dawes, D., Heegaard, W., Brave, M., Paetow, G., Weston, B., & Ho, J. (2015). Body-worn cameras improve law enforcement officer report writing accuracy. *The Journal of Law Enforcement*, 4(6), 1-21.
- Dinger, D. R. (1999). Should lost evidence mean a lost chance to prosecute: State rejections of the United States Supreme Court decision in *Arizona v. Youngblood*, American. *Journal of Criminal Law*, 27, 329-384.
- Drover, P., & Ariel, B. (2015). Leading an experiment in police body-worn video cameras. *International Criminal Justice Review*, 25, 80-97.
- Dugan, J. R., & Breda, D. R. (1991). Complaints about police officers: A comparison among types and agencies. *Journal of Criminal Justice*, 19, 165-171.
- Durlauf, S. N., & Nagin, D. S. (2011). Imprisonment and crime. *Criminology & Public Policy*, 10, 13-54.

- Durose, M. R., Smith, E. L., & Langan, P. A. (2007). *Contacts between police and the public, 2005*. Washington, DC: Bureau of Justice Statistics, Office of Justice Programs, U.S. Department of Justice. Retrieved from <http://www.bjs.gov/content/pub/pdf/cpp05.pdf>
- Duval, T. S., & Wicklund, R. A. (1972). *A theory of objective self-awareness*. New York: Academic.
- Eck, J. E., & Weisburd, D. (1995). Crime places in crime theory: Crime and place. *Crime Prevention Studies*, 4, 1-33.
- Eitle, D. (2005). The influence of mandatory arrest policies, police organizational characteristics, and situational variables on the probability of arrest in domestic violence cases. *Crime & Delinquency*, 51, 573-597.
- Elliott, J. (2015). *Body-worn cameras: A step toward trust and legitimacy for campus police*. Retrieved from <http://pdx-scholar.library.pdx.edu/cgi/viewcontent.cgi?article=1161&context=honorstheses>
- Ellis, T., Jenkins, C., & Smith, P. (2015). *Evaluation of the introduction of personal issue body worn video cameras (Operation Hyperion) on the Isle of Wight: Final report to Hampshire Constabulary*. Retrieved from http://eprints.port.ac.uk/16979/1/Operation_Hyperion_Final_Report_to_Hampshire_Constabulary.pdf
- Engel, R. S., Sobol, J. J., & Worden, R. E. (2000). Further exploration of the demeanor hypothesis: The interaction effects of suspects' characteristics and demeanor on police behavior. *Justice Quarterly*, 17, 235-258.
- Fielding, N. G., & Fielding, J. (1991). Police attitudes to crime and punishment: Certainties and dilemmas. *British Journal of Criminology*, 31, 39-53.
- Fixsen, D. L., Blase, K. A., Naoom, S. F., & Wallace, F. (2009). Core implementation components. *Research on Social Work Practice*, 19, 531-540.
- Floyd v. City of New York (2013). 959 F., Supp. 2d 540.
- Frank, J., Smith, B. W., & Novak, K. J. (2005). Exploring the basis of citizens' attitudes toward the police. *Police Quarterly*, 8, 206-228.
- Friedman, U. (2015, December 3). Do police body cameras actually work? *The Atlantic*. Retrieved from <http://www.theatlantic.com/international/archive/2014/12/do-police-body-cameras-work-ferguson/383323/>
- Fyfe, J. J. (1978). *Shots fired: An examination of New York City police firearms discharges* (No. 78-14335 UMI). Albany, NY: School of Criminal Justice, State University of New York at Albany.
- Garner, J. H., Maxwell, C. D., & Heraux, C. G. (2002). Characteristics associated with the prevalence and severity of force used by the police. *Justice Quarterly* 19(4), 705-746.
- Gates, K. (2016). The work of wearing cameras: Body-worn devices and police media labor. In R. Maxwell (Ed.), *The Routledge companion to labor and media* (pp. 252-264). New York, NY: Routledge.
- Gaub, J. E., Choate, D. E., Todak, N., Katz, C. M., & White, M. D. (2016). Officer perceptions of body-worn cameras before and after deployment: A study of three departments. *Police Quarterly*, 19, 275-302.
- Grossmith, L., Owens, C., Finn, W., Mann, D., Davies, T., & Baika, L. (2015). *Police, camera, evidence: London's cluster-randomised controlled trial of Body Worn Video*. London: College of Policing.
- Haggerty, K. D., & Ericson, R. V. (2000). The surveillant assemblage. *British Journal of Sociology*, 51, 605-622.
- Harris, D. A. (2010). Picture this: Body worn video devices ("head cams") as tools for ensuring Fourth Amendment compliance by police. *Texas Tech Law Review*, 43, 357-435.
- Harris, F. (2012). Holding police accountability theory to account. *Policing*, 6, 240-249.
- Hasisi, B., & Weitzer, R. (2007). Police relations with Arabs and Jews in Israel. *British Journal of Criminology*, 47, 728-745.
- Hayes, J., & Ericson, L. (2012). A primer on body-worn cameras for law enforcement. Retrieved from <https://www.justnet.org/pdf/00-Body-Worn-Cameras-508.pdf>
- Holland, P. W. (1986). Statistics and causal inference (with discussion). *Journal of American Statistician Association*, 81, 945-970.
- Holmes, M. D. (2000). Minority threat and police brutality: Determinants of civil rights criminal complaints in US municipalities. *Criminology*, 38, 343-368.
- Home Office. (2010). *Policing in the 21st century: Reconnecting police and the people* (Cm 7925). London, England: The Stationery Office. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/118241/policing-21st-full-pdf.pdf
- House of Parliament. (2015). *Body-worn video in UK policing*. Retrieved from <http://researchbriefings.parliament.uk/ResearchBriefing/Summary/POST-PB-0014>
- Independent Police Complaints Commission. (2015). *Police complaints: Statistics for England and Wales 2013/14 and 2012/13*. Retrieved from www.ipcc.gov.uk/sites/default/files/Documents/research_stats/complaints_statistics_2012-13_and_2013-14.PDF
- Jennings, W. G., Fridell, L. A., & Lynch, M. D. (2014). Cops and cameras: Officer perceptions of the use of body-worn cameras in law enforcement. *Journal of Criminal Justice*, 42, 549-556.
- Jennings, W. G., Lynch, M. D., & Fridell, L. A. (2015). Evaluating the impact of police officer body-worn cameras (BWCs) on response-to-resistance and serious external complaints: Evidence from the Orlando Police Department (OPD) experience utilizing a randomized controlled experiment. *Journal of Criminal Justice*, 43, 480-486.
- Jervis, R., Lebow, R. N., & Stein, J. G. (1989). *Psychology and deterrence*. Baltimore, MD: Johns Hopkins University Press.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York, NY: Macmillan.

- Katz, C. M., Choate, D. E., Ready, J. R., Nuño, L., Kurtenbach, C. M., & Kevin, S. (2014). *Evaluating the impact of officer worn body cameras in the Phoenix police department*. Retrieved from https://publicservice.asu.edu/sites/default/files/ppd_spi_feb_20_2015_final.pdf
- King, W. R. (2000). Measuring police innovation: Issues and measurement. *Policing*, 23, 303-317.
- Kitzmuller, M. (2014). Are you recording this? Enforcement of police videotaping. *Connecticut Law Review*, 47, 167-196.
- Kochel, T. R., Wilson, D. B., & Mastrofski, S. D. (2011). Effect of suspect race on officers' arrest decisions. *Criminology*, 49, 473-512.
- Langley, B. (2014). *A randomised control trial comparing the effects of procedural justice to experienced utility theories in airport security stops* (Unpublished master's dissertation). University of Cambridge, UK.
- Lawton, B. A., Piquero, A. R., Hickman, M. J., & Greene, J. R. (2001). Using GIS to analyze complaints against police: A research note. *Justice Research and Policy*, 3, 95-108.
- Lersch, K. M. (1998). Predicting citizen race in allegations of misconduct against the police. *Journal of Criminal Justice*, 26, 87-97.
- Lewis, C. (1999). *Complaints against police: The politics of reform*. Sydney, Australia: Hawkins Press.
- Liederbach, J., Boyd, L. M., Taylor, R. W., & Kawucha, S. (2007). Is it an inside job? An examination of internal affairs complaint investigation files and the production of nonsustained findings. *Criminal Justice Policy Review*, 18, 353-377.
- Lipsey, M. W. (1990). *Design sensitivity: Statistical power for experimental research*. Newbury Park, CA: SAGE.
- Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis* (Vol. 49). Thousand Oaks, CA: SAGE.
- Livingston, D. (1999). Police reform and the department of justice: An essay on accountability. *Buffalo Criminal Law Review*, 2, 817-859.
- Loughran, T. A., Pogarsky, G., Piquero, A. R., & Paternoster, R. (2012). Re-examining the functional form of the certainty effect in deterrence theory. *Justice Quarterly*, 29, 712-741.
- Lum, C., Koper, C. S., Merola, L. M., Scherer, A., & Reieux, A. (2015). *Existing and ongoing body worn camera research: Knowledge gaps and opportunities* (Report for the Laura and John Arnold Foundation). Fairfax, VA: Center for Evidence-Based Crime Policy, George Mason University. Retrieved from <https://www.bja.gov/bwc/pdfs/BodyWornCameraResearch.pdf>
- Lumina, C. (2006). Police accountability and policing oversight mechanisms in the Southern African Development Community. *African Security Studies*, 15, 92-108.
- MacKenzie, D. L., Umamaaheswar, J., & Lin, L. C. (2013). Multisite randomized trials in criminology. In B. C. Welsh, A. A. Braga, & G. J. Bruinsma (Eds.), *Experimental criminology: Prospects for advancing science and public policy* (pp. 163-193). New York, NY: Cambridge University Press.
- Maguire, M. (1991). Complaints against the police: The British experience. In A. J. Goldsmith (Ed.), *Complaints against the police: The trend to external review* (pp. 177-209). New York, NY: Oxford University Press.
- Maguire, M., & Corbett, C. (1991). *A study of the police complaints system*. London, England: Home Office, The Stationery Office.
- Mann, S. (2002). *Sousveillance*. Retrieved from <http://wearcam.org/sousveillance.htm>
- Mastrofski, S. D., & Parks, R. B. (1990). Improving observational studies of police. *Criminology*, 28, 475-496.
- Mastrofski, S. D., Parks, R. B., & McCluskey, J. D. (2010). Systematic social observation in criminology. In A. R. Piquero & D. Weisburd (Eds.), *Handbook of quantitative criminology* (pp. 225-247). New York, NY: Springer.
- Mateescu, A. C., Rosenblat, A., & Boyd, D. (2015). *Police body-worn cameras*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2569481
- Mazerolle, L., Antrobus, E., Bennett, S., & Tyler, T. R. (2013). Shaping citizen perceptions of police legitimacy: A randomized field trial of procedural justice. *Criminology*, 51, 33-63.
- McDonald, J. H. (2014). *Handbook of biological statistics* (3rd ed.). Baltimore, MD: Sparky House Publishing.
- Miller, J., & Merrick, C. (2002). *Civilian oversight of policing: Lessons from the literature*. Retrieved from http://www.vera.org/sites/default/files/resources/downloads/Civilian_oversight.pdf
- Miller, L., & Toliver, J. (2014). *Implementing a body-worn camera program: Recommendations and lessons learned*. Washington, DC: Office of Community Oriented Policing Services.
- Morreale, S. A., & McCabe, J. E. (2012). Pracademics in criminal justice education. *ACJS Now*, 6(2), 8-11. Retrieved from http://www.acjs.org/pubs/uploads/ACJS_NOW_Vol6_Issue2_January2012.pdf
- Munger, K., & Shelby, J. H. (1989). Effects of an observer on hand washing in a public restroom. *Perceptual and Motor Skills*, 69(3), 733-734.
- Murphy, K., & Barkworth, J. (2014). Victim willingness to report crime to police: Does procedural justice or outcome matter most? *Victims & Offenders*, 9, 178-204.
- Myhill, A., & Bradford, B. (2012). Can police enhance public confidence by improving quality of service? Results from two surveys in England and Wales. *Policing & Society*, 22, 397-425.
- Nagin, D. S. (2013a). Deterrence in the twenty-first century. *Crime and Justice*, 42, 199-263.
- Nagin, D. S. (2013b). Deterrence: A review of the evidence by a criminologist for economists. *Annual Review of Economics*, 5, 83-105.

- Nagin, D. S., Solow, R. M., & Lum, C. (2015). Deterrence, criminal opportunities, and police. *Criminology*, 53, 74-100.
- Owens, C., Mann, D., & Mckenna, R. (2014). *The Essex body worn video trial: The impact of body worn video on criminal justice outcomes of domestic abuse incidents*. Ryton, UK: College of Policing.
- Paoline, E. A., III, & Terrill, W. (2011). Listen to me! Police officers' views of appropriate use of force. *Journal of Crime & Justice*, 34, 178-189.
- Paulhus, D. L. (2002). Socially desirable responding: The evolution of a concept. In H. I. Braun, D. N. Jackson, & D. E. Wiley (Eds.), *The role of constructs in psychological and educational measurement* (pp. 49-72). Mahwah, NJ: Erlbaum.
- Pew Research Center. (2014). *Sharp racial divisions in reactions to Brown, Garner decisions* (A Pew Research Center/ USA TODAY Survey). Retrieved from <http://www.people-press.org/2014/12/08/sharp-racial-divisions-in-reactions-to-brown-garner-decisions/>
- Prenzler, T. J., Allard, T. J., Curry, S., & Macintyre, S. (2010). Complaints against police: The complainants' experience. *The Journal of Criminal Justice Research*, 1, 1-18.
- Prenzler, T. J., Porter, L., & Alpert, G. P. (2013). Reducing police use of force: Case studies and prospects. *Aggression and Violent Behavior*, 18, 343-356.
- President's Task Force on 21st Century Policing. (2015). *Final report of the President's task force on 21st century policing*. Washington, DC: Office of Community Oriented Policing Services.
- Ready, J. T., & Young, J. T. (2015). The impact of on-officer video cameras on police-citizen contacts: Findings from a controlled experiment in Mesa, AZ. *Journal of Experimental Criminology*, 11, 445-458.
- Reaves, B. A. (2015). *Local police departments, 2013: Equipment and technology*. Washington, DC: Bureau of Justice Statistics (BJS), U.S. Department of Justice, Office of Justice Programs.
- Reddit. (2014). First scientific report shows police body-cameras can prevent unacceptable use-of-force [Blog post]. Retrieved from https://www.reddit.com/r/science/comments/2qg9p0/first_scientific_report_shows_police_bodycameras/
- Regoli, R. M., Crank, J. P., & Culbertson, R. G. (1989). Police cynicism, job satisfaction, and work relations of police chiefs: An assessment of the influence of department size. *Sociological Focus*, 22, 161-171.
- Reiner, R. (1993). Police accountability: Principles, patterns and practices. In R. Reiner & S. Spencer (Eds.), *Accountable policing: Empowerment, effectiveness and equity* (pp. 1-24). London, England: Institute for Public Policy Research.
- Reiss, A. J. (1968). Police brutality-answers to key questions. *Society*, 5(8), 10-19.
- Reveal Media. (2015). *Reveal official website*. Retrieved from <http://revealmedia.com/news>
- Richards, N. M. (2013, November 4). Watching the watchers. *Wired Magazine*. Retrieved from <http://ssrn.com/abstract=2350002>
- Ridgeway, G. (2015). *Risk factors associated with police shootings: A matched case-control study* (Working Paper No. 2015-10.0). Philadelphia: Department of Criminology, University of Pennsylvania.
- Rosenfeld, R. (2015). *Was there a "Ferguson effect" on crime in St. Louis?* The Sentencing Project. Retrieved from http://sentencingproject.org/doc/publications/inc_Ferguson_Effect.pdf
- Roy, A. (2014). *On-officer video cameras: Examining the effects of police department policy and assignment on camera use and activation* (Unpublished doctoral dissertation). Arizona State University, Tempe.
- Rubin, D. B. (1986). Statistics and causal inference: Comment: Which ifs have causal answers. *Journal of the American Statistical Association*, 81, 961-962.
- Russell, K. V. (1978). Complaints against the police: An international perspective. *Police Journal*, 51, 34-44.
- Sampson, R. J. (2010). Gold standard myths: Observations on the experimental turn in quantitative criminology. *Journal of Quantitative Criminology*, 26(4), 489-500.
- Sampson, R. J., & Raudenbush, S. W. (1999). Systematic social observation of public spaces: A new look at disorder in urban neighborhoods. *American Journal of Sociology*, 105, 603-651.
- Santora, M. (2013, August 13). Order that police wear cameras stirs unexpected reactions. *The New York Times*. Retrieved from <http://www.nytimes.com/2013/08/14/nyregion/order-that-police-wear-cameras-stirs-unexpected-reactions.html>
- Scheindlin, S. A., & Manning, P. K. (2015). Will the widespread use of police body cameras improve police accountability? *Americas Quarterly*, 9(2), 24-27.
- Schmidt, W. (2009). Officer privacy and a citizen's right to video record police activity. *AELE Monthly Law Journal*, 5, 201-208.
- Seneviratne, M. (2004). Policing the police in the United Kingdom. *Policing & Society*, 14, 329-347.
- Sherman, L. W. (1980). Causes of police behavior: The current state of quantitative research. *Journal of Research in Crime & Delinquency*, 17, 69-100.
- Sherman, L. W. (1983). Reducing police gun use: Critical events, administrative policy, and organizational change. In M. Punch (Ed.), *Control in the police organization* (pp. 98-125). Cambridge, MA: MIT Press.
- Sherman, L. W. (2007). The power few: Experimental criminology and the reduction of harm. *Journal of Experimental Criminology*, 3, 299-321.
- Sherman, L. W. (2013). The rise of evidence-based policing: Targeting, testing, and tracking. *Crime and Justice*, 42, 377-451.
- Sherman, L. W., & Langworthy, R. H. (1979). Measuring homicide by police officers. *The Journal of Criminal Law and Criminology*, 70, 546-560.

- Sherman, L. W., & Strang, H. (2015, July 7). *Evidence-based policing in 100 milestones: A video course in 26 chapters*. Presented at the 8th International Conference on Evidence Based Policing, University of Cambridge, UK.
- Slothower, M., Sherman, L. W., & Neyroud, P. (2015). Tracking quality of police actions in a victim contact program: A case study of training, tracking, and feedback (TTF) in evidence-based policing. *International Criminal Justice Review*, 25, 98-116.
- Smith, G. (2004). Why don't more people complain against the police? *European Journal of Criminology*, 6(3), 249-266.
- Sousa, W. H., Miethe, T. D., & Sakiyama, M. (2015). *Body worn cameras on police: Results from a national survey of public attitudes*. Retrieved from http://www.unlv.edu/sites/default/files/page_files/27/BodyWornCameras.pdf
- Southgate, P., Ekblom, P., & Hough, J. M. (1984). *Contacts between police and public: Findings from the British Crime Survey*. London, England: Home Office, The Stationery Office.
- Stevens, P., Willis, C. F., & Oxby, C. (1981). *Ethnic minorities and complaints against the police*. London, England: Home Office.
- Strang, H. (2012). Coalitions for a common purpose: Managing relationships in experiments. *Journal of Experimental Criminology*, 8, 211-225.
- Stratton, M., Clissold, P., & Tuson, R. (2014). *The promise of body worn video: Considering the evidence*. Edmonton Police Service, Body Worn Video Pilot Project. Retrieved from <http://www.edmontonpolice.ca/News/BWV.aspx>
- Surette, R. (2005). The thinking eye: Pros and cons of second generation CCTV surveillance systems. *Policing: An International Journal of Police Strategies & Management*, 28(1), 152-173.
- Sutherland, A., & Ariel, B. (2014, December 23). Cameras on cops: The jury's still out. *The Conversation*. Retrieved from <https://theconversation.com/cameras-on-cops-the-jurys-still-out-35644>
- 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.
- TASER. (2015). *The #1 on-officer video platform: Axon cameras are built strong for law enforcement*. Retrieved from <https://www.taser.com/products/on-officer-video>
- Terrill, W. (2001). *Police coercion: Application of the force continuum*. New York: LFB Scholarly Pub LLC.
- Terrill, W., & Mastrofski, S. D. (2002). Situational and officer-based determinants of police coercion. *Justice Quarterly*, 19(2), 215-248.
- Terrill, W., & McCluskey, J. (2002). Citizen complaints and problem officers: Examining officer behavior. *Journal of Criminal Justice*, 30, 143-155.
- Tillyer, M. S., & Kennedy, D. M. (2008). Locating focused deterrence approaches within a situational crime prevention framework. *Crime Prevention & Community Safety*, 10(2), 75-84.
- Tyler, T. R. (1990). *Why people obey the law*. New Haven, CT: Yale.
- Tyler, T. R., & Bies, R. J. (1990). Beyond formal procedures: The interpersonal context of procedural justice. In J. Carroll (Ed.), *Applied social psychology and organizational settings* (pp. 77-98). New York, NY: Psychology Press.
- United Nations Office on Drugs and Crime. (2011). *Handbook on police accountability, oversight and integrity* (United Nations report). Retrieved from https://www.unodc.org/documents/justice-and-prison-reform/crimeprevention/PoliceAccountability_Oversight_and_Integrity_10-57991_Ebook.pdf
- Wagner, A. E. (1980). Citizen complaints against the police: The complainant. *Journal of Police Science and Administration*, 8, 247-252.
- Wain, N., & Ariel, B. (2014). Tracking of police patrol. *Policing: A Journal of Policy and Practice*, 8, 274-283.
- Walker, S., Archbold, C., & Herbst, L. (2002). *Mediating citizen complaints against police officers: A guide for police and community leaders*. Washington, DC: U.S. Department of Justice, Office of Community Oriented Policing Services.
- Walsh, D. P., & Conway, V. (2011). Police governance and accountability: Overview of current issues. *Crime, Law and Social Change*, 55(2-3), 61-86.
- Waters, I., & Brown, K. (2000). Police complaints and the complainants' experience. *British Journal of Criminology*, 40, 617-638.
- Wedekind, C., & Braithwaite, V. A. (2002). The long-term benefits of human generosity in indirect reciprocity. *Current Biology*, 12, 1012-1015.
- Weisburd, D., & Neyroud, P. (2013). Police science: Toward a new paradigm. *Australasian Policing*, 5(2), 13-21.
- Weisburd, D., & Taxman, F. S. (2000). Developing a multicenter randomized trial in criminology: The case of HIDTA. *Journal of Quantitative Criminology*, 16, 315-340.
- Weisburd, D., Telep, C. W., & Lawton, B. A. (2014). Could innovations in policing have contributed to the New York City crime drop even in a period of declining police strength? The case of stop, question and frisk as a hot spots policing strategy. *Justice Quarterly*, 31, 129-153.
- Weiss, A. (1997). The communication of innovation in American policing. *Policing*, 20, 292-310.
- West, P. (1988). Investigation of complaints against the police: Summary report of a national survey. *American Journal of Policing*, 7, 101-122.

- White, M. D. (2001). Controlling police decisions to use deadly force: Re-examining the importance of administrative policy. *Crime & Delinquency*, 47, 131-151.
- White, M. D. (2014). *Police officer body-worn cameras: Assessing the evidence*. Washington, DC: Office of Community Oriented Policing Services.
- White House Office of the Press Secretary. (2014, December 1). *FACT SHEET: Strengthening community policing*. Retrieved from <https://www.whitehouse.gov/the-press-office/2014/12/01/fact-sheet-strengthening-community-policing>
- Wicklund, R. A. (1975). Objective self-awareness. *Advances in Experimental Social Psychology*, 8, 233-275.
- Worden, R. E. (2015). The causes of police brutality: Theory and evidence on police use of force. In E. R. Maguire & D. E. Duffee (Eds.), *Criminal justice theory: Explaining the nature and behavior of criminal justice* (pp. 149-204). New York, NY: Routledge.
- Worden, R. E., & Shepard, R. L. (1996). Demeanor, crime, and police behavior: A reexamination of the police services study data. *Criminology*, 34, 83-105.
- YouGov. (2015, April). *Overwhelming support for police body cameras*. Retrieved from <https://today.yougov.com/news/2015/05/07/body-cams/>
- Young, J. (2014). *Implementation of a randomized controlled trial in Ventura, California-A body-worn video camera experiment* (Unpublished master's dissertation). University of Cambridge, UK.

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