

RESEARCH ARTICLE**RESEARCH ON BODY-WORN CAMERAS**

Research on body-worn cameras

What we know, what we need to know

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Research Summary: In this article, we provide the most comprehensive narrative review to date of the research evidence base for body-worn cameras (BWCs). Seventy empirical studies of BWCs were examined covering the impact of cameras on officer behavior, officer perceptions, citizen behavior, citizen perceptions, police investigations, and police organizations. Although officers and citizens are generally supportive of BWC use, BWCs have not had statistically significant or consistent effects on most measures of officer and citizen behavior or citizens' views of police. Expectations and concerns surrounding BWCs among police leaders and citizens have not yet been realized by and large in the ways anticipated by each. Additionally, despite the large growth in BWC research, there continues to be a lacuna of knowledge on the impact that BWCs have on police organizations and police–citizen relationships more generally.

Policy Implications: Regardless of the evidence-base, BWCs have already rapidly diffused into law enforcement, and many agencies will continue to adopt them. Policy implications from available evidence are not clear-cut, but most likely BWCs will not be an easy panacea for improving police performance, accountability, and relationships with citizens. To maximize the positive impacts of BWCs, police and researchers will need to give more attention to the ways and contexts (organizational and community) in

which BWCs are most beneficial or harmful. They will also need to address how BWCs can be used in police training, management, and internal investigations to achieve more fundamental organizational changes with the long-term potential to improve police performance, accountability, and legitimacy in the community.

KEYWORDS

body-worn cameras, evidence-based, law enforcement, policing, review, technology

1 | INTRODUCTION

Body-worn cameras (BWCs) are one of the most rapidly diffusing technologies in policing today, costing agencies and their municipalities millions of dollars. In 2013, the Bureau of Justice Statistics Law Enforcement Management and Administrative Statistics (LEMAS) survey (Bureau of Justice Statistics, 2013) revealed that almost a third of agencies had “utilized video cameras on patrol officers.” The Major Cities Chiefs and Major County Sheriffs associations surveyed their members in 2015 and found that 19% had adopted BWCs, whereas an additional 77% stated that they planned to adopt them in the near future (Lafayette Group, 2015). The International Association of Chiefs of Police (IACP, 2014) has already developed model policies for this technology, signaling its widespread use and importance in law enforcement. At the time of this publication, the Bureau of Justice Statistics had just released its first body-worn camera supplement to the LEMAS, which reports that as of 2016, 60% of local police departments and 49% of sheriffs' offices had fully deployed their BWCs (Hyland, 2018). It would likely not be an exaggeration to estimate that the number of U.S. law enforcement agencies today (end of 2018) that currently use BWCs has more than likely doubled since 2013.

The rapid adoption of BWCs in the United States has been propelled by highly publicized events in this decade involving (often) White police officers killing (often) unarmed Black individuals. Arguably the first pivotal event of this era did not involve a police officer but an armed individual posing as a neighborhood watchman, who killed an unarmed Black youth—Travon Martin—in 2012. This was followed by the shooting of Michael Brown in 2014 by a Ferguson, Missouri, police officer and then the death of Freddie Gray in Baltimore City Police Department custody in 2015. Many of these officer-involved shootings have made national headlines, and in some cases, they have led to the conviction and imprisonment of officers (see Blinder's [2017] coverage of the sentencing of a North Charleston police officer who had shot unarmed Michael Scott). Although most, if not all, of these events were caught on citizen cell phone cameras, the idea that greater accountability for police actions could be obtained had previous events been filmed became a prominent source of citizen demands for BWCs (see general discussions by Braga, Sousa, Coldren, & Rodriguez, 2018; Maskaly, Donner, Jennings, Ariel, & Sutherland, 2017; Nowacki & Willits, 2018; White, 2014).

These events were watershed moments in American policing that spurred on the rapid adoption of BWCs. They reflect, however, long-incubating concerns in the United States about police authority and racial minorities as well as about police–community relations. These concerns include law enforcement's use of stop-question-and-frisk (see Gelman, Fagan, & Kiss, 2007); increases in their use of misdemeanor arrests since the mid-1990s (see Harcourt & Ludwig, 2006; Lum & Vovak,

2018); the consistent incongruent perceptions of treatment between Whites and non-Whites in traffic and pedestrian stops (see Gallup Organization, 2014; Langton & Durose, 2013); and police use of force (see Worden, 2015), especially within Black and Hispanic communities. Many of these issues were embodied in the report and recommendations of President Obama's Task Force on 21st Century Policing (2015), in which the Task Force described the influence of both current and historical context on these issues. In culmination, this context fostered enough public and political will to generate an urgent call for BWCs in this decade. This demand was matched with a prepared supplier; technology companies had already been developing both BWCs and other similar surveillance devices (e.g., in-car cameras, license plate readers, and closed-circuit televisions). Connecting this supply with the demand was the initial \$20 million investment in BWCs by the U.S. Department of Justice (2015; administered by the Bureau of Justice Assistance) followed by continued investment in BWC acquisition and training by federal,¹ state, and local governments.

Because the rapid adoption of BWCs was driven by public protest, law enforcement concerns, a historical backdrop, government funding, and the development of portable video technology, it should not be any surprise that BWCs were quickly adopted in a low-research environment (Lum, Koper, Merola, Scherer, & Reioux, 2015). The first review of BWCs was conducted by White (2014), who discovered only five evaluation studies had been completed as of September 2013, even though almost a third of U.S. agencies had already adopted BWCs. In other words, agencies had already begun rapidly adopting BWCs without clear knowledge about whether the technology could deliver on the high expectations of them (i.e., to increase police accountability, reduce the use of force, reduce disparity, and improve community relationships). A low-information environment is not unusual in the world of police technology adoption. Most technologies are not only adopted without research knowledge but also continue to be adopted with very little growth in evaluation research about their effects. License plate readers, for example, are a case in point (see discussion in Lum & Koper, 2017: 111–124).

The importance of scientific inquiry (and not just of technical research) about police technologies like BWCs, however, cannot be overstated. Most importantly, if law enforcement—and ultimately, citizens—intend to invest heavily in BWCs, then BWCs should do what we expect them to do. Unfortunately, researchers have consistently found that police technology may not lead to the outcomes sought, and often it has unintended consequences for police officers, their organizations, and citizens (Chan, Brereton, Legosz, & Doran, 2001; Colton, 1980; Koper, Lum, Willis, Woods, & Hibdon, 2015; Lum, Hibdon, Cave, Koper, & Merola, 2011; Lum, Koper, & Willis, 2017; Manning, 2008; Orlikowski & Gash, 1994). The reason for this is that technology is often filtered through—and shaped by—human factors (e.g., officers' reactions to and uses of technology) as well as through an agency's organizational, procedural, and cultural ways (Lum et al., 2017; Manning, 2008; Orlikowski & Gash, 1994). Without the results of rigorous research and evaluation, law enforcement leaders are left to rely on best guesses, hunches, notions about “craft,” and “group think” about the impact of technologies like BWCs (see discussion by Lum & Koper, 2017). Research knowledge about technologies, if minded, not only can moderate these forces, but also it can help law enforcement agencies anticipate unintended consequences, optimize their use of already acquired technologies, or decide whether to invest in a specific technology.

Fortunately, researchers have taken a major interest in studying BWCs in the last 5 years and have tried to keep up with its rapid adoption. For example, by November 2015, Lum et al. (2015) found that completed studies about BWCs had grown to more than a dozen, with 30+ additional studies underway. Most of the studies included in both White (2014) and Lum et al.'s reviews were focused on the impact that BWCs had on officer behavior as measured by complaints and their use of force, as well as on officer perceptions about BWCs. Maskaly et al. (2017), in a review of police and citizen outcomes more specifically, found 21 empirical studies as of January 2017, which led them to conclude that

police are generally receptive to BWCs and that the cameras can exert positive effects on police behavior. Our current review, which includes all empirical studies found or accepted for publication through June 2018, consists of 70 published or publicly available studies of BWCs.² Additionally, many of these studies are rigorous outcome evaluations, which are unusual in police technology research.

Here we review, analyze, and comment on this current state of empirical research in the context of this significant era of policing in which we find ourselves. To be as inclusive as possible, we searched all relevant library and research databases available³ for publicly available reports and articles (whether published by a journal, press, organization, or the authors themselves on the Internet, or in thesis or dissertation form). We used multiple keywords (and their variants) in these searches (i.e., body-worn cameras, body worn video, body cameras, officer video, body cams, police, and video) and included any study or article that included empirical analysis (whether qualitative or quantitative). Additionally, since 2015, we have been collecting information from ongoing research projects through criminal justice conferences and symposia, grant awards from both government and nongovernment sources, and from colleagues in the field, which helped to identify studies that did not initially emerge in our database search.

Our definition of “empirical research” is broad and inclusive, and it consists of any study in which either qualitative or quantitative data were collected to study BWCs. For example, we did not limit ourselves to only outcome evaluations of BWCs. A large proportion of BWC research is not evaluative, but descriptive survey research that can lend important insights into perceptions of BWCs and their use. We did exclude theoretical, hypothetical, opinion/editorial, or legal writings in which no systematic scientific study or data collection was attempted. Because of the breadth of this research, we emphasize that we do not present a systematic meta-analysis or meta-aggregation of BWC research here.⁴ The empirical research on BWCs employs a variety of methods and perspectives, and our intention in this article is to draw out tendencies and hypotheses from this research for policy as well as for scholarly audiences. Thus, we not only report on the findings of this evidence-base but also highlight broader debates and discussions that are provoked by the research that law enforcement agencies and researchers should consider.

2 | TRENDS OF BWC RESEARCH

In total, we found approximately 70 publicly available empirical research articles⁵ as of June 2018 in which research findings related to BWCs and the police were reported. We denote these articles in our reference section with an asterisk (*). This body of research reflects, approximately, a 14-fold increase in research since White's (2014) review, a 5-fold increase since Lum et al.'s (2015) assessment, and more than a 3-fold increase since Maskaly et al.'s (2017) review. Furthermore, we found at least 111 substudies of various outcomes within these 70 publications. More than one third of the studies were conducted by researchers at Arizona State University (15 of the 70 studies) or by Barak Ariel and his colleagues (12 of the 70 studies), but the remainder were carried out by numerous researchers from many different institutions. The BWC research also took place in diverse locations. For example, although 52 (74%) of these studies were conducted in U.S. jurisdictions, 14 (20%) were implemented outside of the United States, and 4 (7%) were multisite trials conducted across multiple countries. At least a quarter of the studies were carried out in cities and towns with populations smaller than 250,000 people. Finally, the BWC research we found did not just appear in peer-reviewed journals; a third of the studies are grant reports, unpublished manuscripts, or technical reports by law enforcement agencies.

Building on Lum et al.'s (2015) typology of BWC studies, we grouped these studies into six areas of research shown in Figure 1 (studies may fall into multiple categories). These categories are as

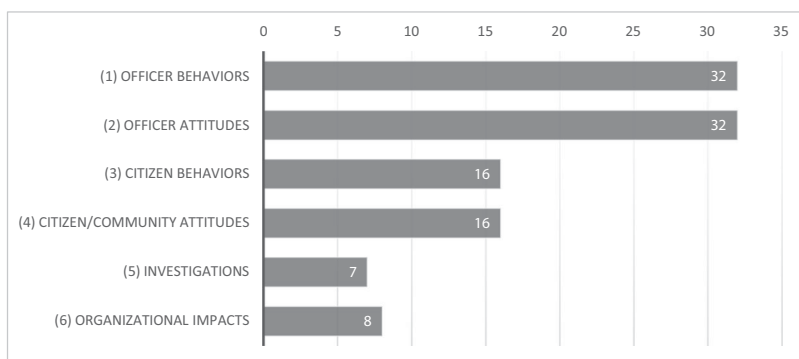


FIGURE 1 Frequency of body-worn camera studies by general outcome studied

follows: (1) the impact of BWCs on officer behavior, (2) officer attitudes about BWCs, (3) the impact of BWCs on citizen behavior, (4) citizen and community attitudes about BWCs, (5) the impact of BWCs on criminal investigations, and (6) the impact of BWCs on law enforcement organizations. As Figure 1 shows, the most common types of research on BWCs focus on how BWCs impact officer behaviors as well as on officer attitudes and perceptions about BWCs.

Table 1 lists the more specific subcategories of topics initially presented by Lum et al. (2015: Table 2, 14–17) and each study that corresponds with that subarea. Studies are listed multiple times if multiple outcomes or aspects of BWCs were examined. Because so few studies have been conducted on the impact of BWCs on police organizations, we collapse Lum et al.’s multiple categories in that area into a single grouping. We now present a narrative review of this research across these six categories.

3 | IMPACT OF BODY-WORN CAMERAS ON OFFICER BEHAVIOR

One of the greatest expectations of BWCs by citizens and perhaps by police supervisors and leaders is that BWCs can change police officer behavior, and a sizeable portion of BWC research—at least 32 studies—has been focused on officer behavior.⁶ For example, BWCs are theorized to have a deterrent effect on excessive use of force and unconstitutional actions by officers (see Ariel, Farrar, & Sutherland, 2015, and Ariel et al., 2017, for extensive discussions of the application of deterrence and self-awareness theories to BWCs). BWCs are also believed to moderate possible negative interactions (i.e., rudeness and disrespect) that officers may have with citizens (either initiated by an officer or citizen). Researchers in this area primarily have measured this impact by examining complaints made against officers as well as reports of officers’ use of force.⁷ In some studies, however, scholars have also examined the impact that BWCs have on other types of officer behaviors such as the use of arrest and citations, or their proactive activities.

Methodologically, the research in this area has been rigorous. In 14 studies, scholars have used randomized controlled experiments to evaluate these effects, and in at least 10 more, they have used strong quasi-experiments or, in one case, systematic social observations. Although many of these studies comprise some amount of contamination, attrition, and design challenges, it is important to emphasize that the level of believability of these findings is fairly strong.

TABLE 1 Subareas of BWC studies with citations

1. Impact of BWCs on officer behavior	
1a. Impact on officer behavior as measured by complaints	Ariel (2016a); Ariel et al. (2015); Ariel et al. (2017); Barela (2017); Braga, Barao, et al. (2018); Braga, Sousa, et al. (2018); Edmonton Police Service (2015); Ellis et al. (2015); Goodall (2007); Goodison and Wilson (2017); Grossmith et al. (2015); Headley et al. (2017); Hedberg et al. (2016); Jennings et al. (2015); Katz et al. (2014); Mesa Police Department (2013); Mitchell et al. (2018); Peterson et al. (2018); Sutherland et al. (2017); Toronto Police Service (2016); White, Gaub, et al. (2018); Yokum et al. (2017)
1b. Impact on officer behavior as measured by use of force reports	Ariel (2016a); Ariel et al. (2015); Ariel et al. (2016a); Braga, Barao, et al. (2018); Braga, Sousa, et al. (2018); Edmonton Police Service (2015); Headley et al. (2017); Henstock and Ariel (2017); Jennings et al. (2015); Jennings et al. (2017); Peterson et al. (2018); Rowe et al. (2018); Sutherland et al. (2017); Toronto Police Service (2016); White, Gaub, et al. (2018); Yokum et al. (2017)
1c. Impact on officer discretion related to arrests or citations	Ariel (2016a); Braga, Sousa, et al. (2018); Goodall (2007); Grossmith et al. (2015); Headley et al. (2017); Hedberg et al. (2016); Katz et al. (2014); McClure et al. (2017); Peterson et al. (2018); Ready and Young (2015); Rowe et al. (2018); Toronto Police Service (2016); Wallace et al. (2018); Yokum et al. (2017)
1d. Impact on officer's proactive behaviors (i.e., problem solving, field interviews, stop and frisk, community policing, etc.	Grossmith et al. (2015); Headley et al. (2017); Peterson et al. (2018); Ready and Young (2015); Wallace et al. (2018); White, Todak, et al. (2018)
1e. Impact on officer-citizen interactions using other measures (e.g., observations)	Koen (2016); McCluskey et al. (2019); Rowe et al. (2018)
2. Officer attitudes about BWCs	Edmonton Police Service (2015); Ellis et al. (2015); Fouche (2014); Gaub et al. (2016); Gaub et al. (2018); Goetschel and Peha (2017); Goodall (2007); Gramaglia and Phillips (2017); Grossmith et al. (2015); Guerin et al. (2016); Headley et al. (2017); Huff et al. (2018); Hyatt et al. (2017); Jennings et al. (2014); Jennings et al. (2015); Katz et al. (2014); Koen (2016); Kyle and White (2017); Lawshe (2018); Makin (2016); McLean et al. (2015); Newell and Greidanus (2017); Obasi (2017); Owens and Finn (2018); Pelfrey and Keener (2016); Ready and Young (2015); Rowe et al. (2018); Smykla et al. (2015); Tankebe and Ariel (2016); Toronto Police Service (2016); White, Todak, et al. (2018); Young and Ready (2015)
3. Impact of BWCs on citizen behavior	
3a. Impact on an individual's compliance with police	Ariel et al. (2016b); Ariel et al. (2018); Barela (2017); Grossmith et al. (2015); Headley et al. (2017); Hedberg et al. (2016); Katz et al. (2014); McCluskey et al. (2019); Toronto Police Service (2016); White et al. (2017); White, Gaub, et al. (2018)
3b. Impact on citizen's (victim or witness) willingness to call the police	Ariel (2016b); Edmonton Police Service (2015); Toronto Police Service (2016)
3c. Impact on citizen's willingness to cooperate in investigations	Edmonton Police Service (2015); Grossmith et al. (2015); Toronto Police Service (2016)
3d. Impact on crime and disorder when officer is present (deterrence)	Ariel (2016b); Ellis et al. (2015); Goodall (2007); ODS Consulting (2011)

(Continues)

TABLE 1 (Continued)

4. Impact of BWCs on citizen and community attitudes about police or cameras	
4a. Impact on citizen satisfaction with specific officer encounters	Goodison and Wilson (2017); McClure et al. (2017); Toronto Police Service (2016); White et al. (2017)
4b. Impact on citizen satisfaction with police more broadly (confidence, legitimacy, trust) and general support for BWCs	Crow et al. (2017); Culhane et al. (2016); Ellis et al. (2015); Goodison and Wilson (2017); Kerrison et al. (2018); Owens and Finn (2018); Plumlee (2018); Sousa et al. (2018); Taylor et al. (2017); Todak et al. (2018); Toronto Police Service (2016); White et al. (2017)
4c. Impact on attitudes related to privacy and willingness to talk to police	Crow et al. (2017); Edmonton Police Service (2015); Grossmith et al. (2015); Taylor et al. (2017); Toronto Police Service (2016)
4d. Impact on fear of crime and safety	Goodall (2007); Toronto Police Service (2016); White et al. (2017)
5. Impact of BWCs on criminal investigations, such as crime resolution, intelligence gathering, or court proceedings and outcomes	
	Ellis et al. (2015); Goodall (2007); Merola et al. (2016) ^a ; Morrow et al. (2016; see also Katz et al., 2014); ODS Consulting (2011); Owens et al. (2014); Yokum et al. (2017)
6. Impact of BWCs on police organizations (training systems, policies, accountability, supervision, management, budgets, resources)	
	Adams and Mastracci (2018); Braga, Sousa, et al. (2018); Culhane et al. (2016); Edmonton Police Service (2015); Koen (2016); Nowacki and Willits (2018) ^b ; Phelps et al. (2018); Toronto Police Service (2016);

^aMerola et al.'s (2016) study is a national survey of prosecutor viewpoints about BWCs. It is included in this review because of its empirical relevance to this area.

^bNowacki and Willits (2018) examined organizational characteristics associated with adoption of BWCs (not the impact of BWCs on police organizations).

3.1 | Impact of BWCs on complaints

Although we discovered two early empirical studies of BWCs (Goodall, 2007; ODS Consulting, 2011), the two earliest outcome evaluations of the impact of cameras on officer behavior were the 2012 Rialto (California) Police Department experiment, carried out by then-Chief William (Tony) Farrar in collaboration with Barak Ariel at the University of Cambridge (see initially Farrar, 2012; Farrar & Ariel, 2013; then subsequently Ariel, Farrar, & Sutherland, 2015),⁸ and the Mesa Police Department (2013) quasi-experiment, analyzed by researchers at Arizona State University. Since the Rialto and Mesa studies, evaluation research on the impact that BWCs have on officer behavior has grown. In total, in 22 of the 32 studies in this area, scholars have used complaints against officers to measure BWC impact on officer behavior (see Table 1:1a), and in at least 18, they have employed experimental or quasi-experimental designs to test such effects between groups of officers, beats, or shifts with and without BWCs. In these studies, researchers have mostly found that officers wearing BWCs receive fewer reported complaints than do those that are not wearing the cameras (see Ariel, 2016a [for complaints related to use of force but not to misconduct]; Ariel et al., 2017; Braga, Barao, McDevitt, & Zimmerman, 2018; Braga, Sousa, et al., 2018; Ellis, Jenkins, & Smith, 2015; Goodall, 2007; Goodison & Wilson, 2017; Grossmith et al., 2015; Hedberg, Katz, & Choate, 2016; Jennings, Lynch, & Fridell, 2015; Katz, Choate, Ready, & Nuño, 2014; Mesa Police Department, 2013; Peterson, Yu, La Vigne, & Lawrence, 2018; Sutherland, Ariel, Farrar, & De Anda, 2017). The exceptions to this finding are

in the minority. Nonsignificant impacts of BWCs on complaints against officers were discovered by Ariel et al. (2015); Edmonton Police Service (2015); Headley, Guerette, and Shariati (2017); Toronto Police Service (2016, whose results were unclear); White, Gaub, and Todak (2018, although noting a downward trend in complaints for the treatment group); and Yokum, Ravishankar, and Coppock (2017).

The more important concern for police agencies and researchers is *why* reports of complaints decline when officers wear BWCs. Perhaps the effect may be a result of a real change in officer behavior given that they know they are being recorded (Ariel et al., 2017), leading to citizens complaining less about them. The research findings on officer perceptions of BWCs in the next section, however, reveal a more complex story. Officers themselves believe that BWCs reduce specific types of complaints—frivolous, malicious, or unfounded—because citizens now realize they are being recorded. Thus, the decline in complaints seen in experimental and quasi-experimental studies may indicate a reporting effect or a change in citizen reporting behavior rather than an effect on officer behavior or even on the quality of police–citizen interactions (which may remain unaffected if the reporting hypothesis holds true). Another possibility is that officers may be informally negotiating complaints by showing potential complainants or supervisors video footage of the encounter, which may discourage citizens from pursuing complaints for reasons unrelated to whether the complaint is legitimate. Goodall (2007) and Koen (2016), for example, observed these types of exchanges.

The use of complaints as a measure of officer behavior or officer–citizen interaction could itself be problematic. Complaints are rare events relative to the large number of police–citizen interactions that occur daily. Complaints (like use of force reports) reflect the tail end of the distribution of police–citizen interactions. Other measurement approaches—such as systematic social observations, ethnographies, and even analysis of BWC footage itself—may provide further clues into the wider impacts of BWCs on everyday citizen–officer interactions. For example, McCluskey et al. (2019), through systematic social observations of officers in the Los Angeles Police Department, asserted that BWCs seem to have a direct impact on increasing the procedural justice experienced by citizens from officers. Whether changes in behavior improve police–citizen interactions may be a matter of perception, however. For example, in their ethnographic study, Rowe, Pearson, and Turner (2018) observed exchanges between officers and citizens becoming more “constrained and scripted” and “stilted and artificial” (p. 2018: 88).

3.2 | Impact of BWCs on use of force

In addition to complaints as a measure of officer behavior, in 16 studies in this area, researchers examined the impact of BWCs on officers’ reported uses of force (see Table 1:1b). As mentioned, concerns about police accountability with their use of force, especially deadly force and among racial and ethnic minorities, was a primary impetus behind the push for police to be outfitted with BWCs. Like those examining complaints, many of these studies have been carried out using rigorous evaluation methods. The findings from this area of research are more equivocal, however.

For example, the findings from four experimental studies (Ariel et al., 2015; Braga, Sousa, et al., 2018; Henstock & Ariel, 2017; Jennings et al., 2015) and one quasi-experimental study (Jennings, Fridell, Lynch, Jetelina, & Reingle Gonzalez, 2017) show that officers wearing cameras use force less than do officers not wearing cameras. Additionally, in a follow-up to the original Rialto study conducted by Sutherland et al. (2017), the authors found sustained effects of BWCs on lowering use of force over time. The results of another four randomized controlled trials and an additional four quasi-experimental studies, however, show no statistically significant differences in the use of force

by officers wearing cameras compared with their non-BWC counterparts (Ariel, 2016a; Braga, Barao, et al., 2018; Edmonton Police Service, 2015; Headley et al., 2017; Peterson et al., 2018; Toronto Police Service, 2016; White, Gaub, et al., 2018; Yokum et al., 2017). The direction of the effects of these nonsignificant findings was not consistent across studies, and the findings have been equivocal in both U.S. and non-U.S. studies.⁹

Ariel et al. (2016a) recently provided one nuanced explanation to these mixed findings. They discovered that when officers have more discretion in turning on their cameras, they tend to exhibit greater uses of force than officers who have less discretion regarding their BWCs. In most of the use-of-force studies reviewed earlier, researchers did not track activation and therefore it was not clear to what extent Ariel et al.'s nuance is salient. If activation is related to use of force in these ways, however, consistently training, reinforcing, and supervising the implementation of mandatory policies may be needed to secure a positive effect of BWCs on reported uses of force (see generally White, Todak, et al., 2018; see also specific discussions on activation by Headley et al., 2017, and Roy, 2014 [later reported as Young & Ready, 2018]).

In total, these study findings do not reveal a definitive conclusion that BWCs can reduce officers' use of force. Furthermore, as with official complaints, reports of uses of excessive force are infrequent relative to more minor forms of force regularly used (i.e., handcuffing or restraining). Agencies also have various thresholds and accountability mechanisms for when a use-of-force report must be written, which could lead to variations in findings across sites. As with complaints, this may challenge whether use-of-force reports are the best measure of the impact of BWCs on police officer behavior.

3.3 | Impact of BWCs on arrest and citation behaviors

In addition to complaints and use of force, researchers have examined whether BWCs change the arrest and citation behavior of the police. For example, the wearing of BWCs might increase the use of arrests or citations if officers feel their discretion is limited or monitored (see discussions in Ariel et al., 2017; Koen, 2016; Rowe et al., 2018). Fourteen studies have been aimed at examining the impact of BWCs on officer arrest and citation behavior (see Table 1:1c). In total, the findings from these studies show no clear pattern of outcomes related to arrests and citations. For example, Ready and Young (2015) found that officers wearing BWCs made fewer arrests but gave more citations. Ariel (2016a) and McClure et al. (2017) also found that BWC-wearing officers made fewer arrests. Braga, Sousa, et al. (2018) and Katz et al. (2014), however, discovered that arrests increase for BWC-wearing officers compared with non-BWC officers, as does the Toronto Police Service (2016). Finally, neither Grossmith et al. (2015) nor Wallace, White, Gaub, and Todak (2018) found any significant impact from BWCs on arrests stemming from violent crimes or calls for service, respectively. These mixed findings occur within both randomized controlled experiments as well as quasi-experimental research. In their ethnographic research, Rowe et al. (2018) reported officers with BWCs feeling constrained in their discretion to not arrest, especially when there is evidence of an assault (i.e., they felt that had to carry out the arrest).

3.4 | Impact of BWCs on proactivity

Much less is known about the impact of BWCs on various types of police proactivity, which can encompass a wide range of activities when police are not responding to citizen-initiated calls for service. Proactivity can include activities such as problem-solving, stop-question-and-frisk, traffic enforcement, community policing and engagement efforts, directed patrol, or the use of misdemeanor

arrests to reduce disorder (National Academies of Sciences, Engineering, and Medicine [NAS], 2017). Some of these activities are controversial (for example, the use of stop-question-and-frisk), whereas others involve fewer enforcement actions (for example, community engagement strategies). Wallace et al. (2018) framed this discussion of the impact of BWCs on proactivity in terms of whether BWCs caused “de-policing” or “camera-induced passivity” of officers. Perhaps BWCs make officers more fearful of scrutiny, which leads them to “pull back” on engaging more proactively with the public. Because of the wide range of proactive activities, there are likely different opinions about whether the intent (or expectation) of BWCs should be to constrain police proactivity or whether the declines in proactivity would be considered positive or negative.

We found only six studies (three randomized experiments, two quasi-experiments, and one multivariate analysis) in which scholars empirically spoke to this question (Table 1:1d). In total, their results are not definitive. The findings of three studies seem to indicate that BWC-wearing officers may initiate more field encounters and contacts overall (Headley et al., 2017; Ready & Young, 2015; Wallace et al., 2018). Focusing specifically on stop-question-and-frisks, Ready and Young (2015) found that officers were less likely to carry out these searches when BWCs were worn, but Grossmith et al. (2015) found no such effect (neither Headley et al. nor Wallace et al. differentiate contacts from stop-and-frisks). Peterson et al. (2018) found no significant impact of BWCs on the levels of traffic stops by officers (also discovered by Headley et al., 2017). Peterson et al. also reported that for both officers with and without cameras, “subject stops” declined over time, and they declined significantly more for officers with cameras. White, Todak, et al. (2018) also found that BWC deployment did not have a significant impact on officer levels of proactivity (as measured using officer-initiated calls for service).

The authors of these studies, in the context of the broader research on proactive police activities, emphasized an important point for researchers and law enforcement officials alike. The question for researchers to pursue that might be operationally helpful to law enforcement is not whether proactivity has overall increased or decreased but which specific types of proactivity have increased or decreased (and why). As the NAS (2017) report indicated (see also reviews by Braga, Welsh, & Schnell, 2015; Lum & Koper, 2017; Lum & Nagin, 2017), some proactive activities can be effective in reducing crime without causing community backlash; some can be effective in improving citizen satisfaction (although not reducing crime); and some can be ineffective and degrade police–citizen relationships. Additionally, some types of proactivity may be controversial but also effective if used in targeted, constitutional, and very specific ways (such as stop-question-and-frisk or focused deterrence). An important question for researchers to tackle is how BWCs impact these different types of proactivity, in light of what we know about the differential impacts of various types of proactive activities.

3.5 | Impact of BWCs on disparity

One of the most important questions about BWCs that has yet to be tackled by any empirical research is whether BWCs have any impact on disparate outcomes in policing and, relatedly, whether BWCs impact 4th Amendment compliance by officers (Lum et al., 2015). The hypothesized impacts of BWCs in increasing the fairness and constitutionality of officer actions were significant reasons behind the push for, and acquisition of, BWCs in law enforcement. Yet, we know nothing about these effects beyond speculation. More generally, we do not know much about the impact that any policing intervention (e.g., specialized training, accountability adjustments, supervisory strategies, or technological advances) has on criminal justice disparity. Such research should be a priority for policing scholars.

4 | OFFICERS' ATTITUDES TOWARD BODY-WORN CAMERAS

One of the largest bodies of research on BWCs (at least 32 studies of all published or publicly available studies) has been focused on examining officer attitudes about cameras (Table 1:2). Agencies have been open to this type of research as leaders have been concerned about how BWCs might be perceived (and implemented) by their officers. Research in this area has been descriptive and focused on officer perceptions about BWCs or on their specific uses within agencies. Some of the studies have taken place within broader experimental studies described previously, whereas others have been stand-alone surveys conducted of sworn personnel within or across jurisdictions.

The methodological rigor of these surveys has varied, and we leave a methodological analysis of this research area to a forthcoming systematic review (see Endnote 6). To summarize, these studies—which most often have occurred within a single agency—have varied in terms of how representative their samples are to the population of officers in that agency, the validity of the questions used, the issues raised, and whether changes or variations in perceptions are measured either before or after cameras are acquired or between officer groups. Some studies have missing information that might help to assess the strength of the survey methodology, such as statistical testing comparing characteristics of respondents with nonrespondents or with the agency population more generally. Sometimes response rates have been less than 50%, whereas other scholars have used samples of convenience.

Despite methodological challenges, the findings from this body of work illuminate some themes for law enforcement and provoke hypotheses for further testing for researchers. For example, one consistent theme that has been reported in many of these studies is that once officers start using cameras, they feel positive (or at least neutral) about BWCs, or they become more positive about them over time (see, e.g., Ellis et al., 2015; Fouche, 2014; Gaub, Todak, & White, 2018; Grossmith et al., 2015; Jennings, Fridell, & Lynch, 2014; Jennings et al., 2015; Koen, 2016; McLean, Wolfe, Chrusciel, & Kaminski, 2015; Smykla et al., 2015; Toronto Police Service, 2016; White, Todak, et al., 2018). Additionally, Young and Ready (2015) have found that officer receptivity to BWCs may also be influenced by participating in shared events with other officers who are wearing BWCs. Overall, the most likely reason for the positive (or improved) feelings for BWCs is that officers see BWCs as protecting themselves from the public, in particular, from frivolous complaints or one-sided stories about officer conduct (Fouche, 2014; Goetschel & Peha, 2017; Koen, 2016; McLean et al., 2015; Owens & Finn, 2018; Pelfrey & Keener, 2016). Granted, some survey results have indicated that some officers believe BWCs would improve their behavior or performance (see Edmonton Police Service, 2015; Gramaglia & Phillips, 2017; Jennings et al., 2014, 2015; Makin, 2016; McLean et al., 2015; Tankebe & Ariel, 2016; White, Todak et al., 2018). In contrary studies, however, officers have been found to be skeptical of such an effect (Pelfrey & Keener, 2016), especially after experiencing BWCs (Headley et al., 2017).

Another value that officers see in BWCs is in improving the quality and availability of evidence they might need to charge individuals with crimes (Gaub et al., 2018; Goodall, 2007; Jennings et al., 2015; Katz et al., 2014; Pelfrey & Keener, 2016; White, Todak, et al., 2018).¹⁰ Some officers also use BWC footage to help them write reports that are more consistent with the interactions they had with citizens, rather than rely on their memory.

The positive perceptions of BWCs discovered in these surveys are in some ways surprising. The notion that officers grow increasingly positive about a technology intended to increase their accountability in light of negative circumstances could be construed as indicative of a significant incongruence between citizen and police perceptions and expectations about this technology. Officers may perceive that BWCs do not necessarily increase their accountability or change their behavior but

rather, the accountability of citizens with regard to frivolous complaints or citizen behavior (see a more general discussion of police and video by Sandhu, 2017, who shows similar findings). This point was also indirectly confirmed by Merola, Lum, Koper, and Scherer (2016) who found that most BWC footage used by prosecutors was not used to prosecute police misconduct but citizen misconduct. Put simply, officers and citizens both seem to believe that BWCs can protect them from each other. These conflicting expectations may reflect a larger dysfunction within police–citizen relationships that BWCs may illuminate but not remedy.

The collective survey results also reveal important nuances that illustrate a more complicated picture of the receptivity of BWCs by officers. For example, the study findings that do not paint a positive outlook of BWCs by officers often tie negative reactions to specific concerns. As an example, Katz et al. (2014) discovered that resistance to BWCs was partially connected to technical difficulties (i.e., the long time it took to download data) or to how it impacted their work or workload (i.e., lengthening the time to complete reports), a finding consistent with other police technology literature (see review in Koper et al., 2015). Both the officers in Katz et al.'s and in Newell and Greidanus's (2018) surveys complained that BWC footage might be used against them and that it might make officers more hesitant in their duties (see also Edmonton Police Service, 2015; McLean et al., 2015). Gaub, Choate, Todak, Katz, and White (2016) reported significant variation across different departments regarding officer perceptions of BWCs. Although over time each agency's officers reported improved perceptions of BWCs, they also became more cynical about the impact that BWCs would have on citizens (also found by Headley et al., 2017, as well as by White, Todak, et al., 2018). Officers also raised concerns in these surveys about cameras restricting their discretion or reducing their engagement in the community.

Additionally, broader organizational and social network factors may be at play in officer receptivity to BWCs, although this evidence is far from conclusive. For example, Kyle and White (2017) found that attitudes toward BWCs may be conditioned by several factors—most interestingly, officer perceptions of organizational justice. In other words, the greater the level of organizational justice that an officer perceived from his or her organization, the more positive view he or she had about BWCs. Relatedly, Tankebe and Ariel (2016) also found that officers who were more committed to their agencies were less cynical about cameras and less resistant to BWCs. In a replication of Kyle and White (2017) in a different agency, however, Lawshe (2018) did not find that perceptions of organizational justice impacted officers' views of BWCs. Similarly, Huff, Katz, and Webb (2018) found no relationship between perceptions of organizational justice and receptivity or resistance to wearing BWCs. Nor was receptivity to BWCs related to an officer's past levels of self-initiated activity, use of force incidents, or citizen complaints.

5 | IMPACT OF BODY-WORN CAMERAS ON CITIZEN BEHAVIOR

At least 16 studies were aimed at examining the impact of BWCs on citizen behavior (two were focused on citizens' perceptions of their behavior but are included). Although much less examined than the impact of BWCs on officer behavior, the researchers behind these studies tried to measure how BWCs impact citizen compliance to police commands or their physical response to police actions, which were often measured by reports of resisting arrest or assaults on officers. Within this area, we also discuss studies that were focused on the willingness of victims or witnesses to call the police and to cooperate in criminal investigations. Furthermore, we consider studies in which scholars tried to assess whether BWCs deter criminal and disorderly conduct among citizens more generally.

5.1 | Impact of BWCs on citizen compliance with police

In 11 of these studies, researchers investigated the impact of BWCs on an individual's compliance with police. In two studies, they used multisite randomized controlled experimental designs to test this impact (Ariel et al., 2016b, 2018), in one they used an experiment in a single agency (White, Gaub, et al., 2018), in six they used quasi-experimental designs of varying quality (Grossmith et al., 2015; Headley et al., 2017; Hedberg et al., 2016; Katz et al., 2014; Toronto Police Service, 2016; White, Todak, & Gaub, 2017), in one they used a systematic social observation study (McCluskey et al., 2019), and in one researchers used a weak pre- and postdesign (Barela, 2017). These researchers applied measures such as assaults on officers, reports of resisting arrest, or reported officer injuries (see Table 1:3a).

The results of these studies vary. The findings from three studies seem to show that wearing BWCs increases assaults on officers (Ariel et al., 2016b, 2018 [although these assaults did not always lead to injury]; Toronto Police Service, 2016). Ariel et al. (2018) try to explain this “paradoxical” effect: Overall assaults went down in the agencies examined, yet officers wearing cameras had higher odds of being assaulted than did their control counterparts (not wearing BWCs). They hypothesized that once officers become aware of being observed by BWCs, this inhibits their ability to function in ways that avoid being assaulted in high-stress situations. In six studies, however, scholars found no significant differences between officers with and without BWCs in terms of assaults upon them or reports of resisting arrest (Grossmith et al., 2015; Headley et al., 2017; Hedberg et al., 2016; Katz et al., 2014; White et al., 2017; White, Gaub, et al., 2018). Indeed, White et al. (2017) were skeptical of a “civilizing effect” of BWCs on citizen behavior.

5.2 | Impact of BWCs on citizen willingness to call and cooperate with the police

Aside from compliance by individuals who encounter the police, we know much less about other ways that BWCs may impact citizen behavior. For example, one concern raised about BWCs is that they may reduce people's willingness to call the police due to worries about personal privacy (Lum et al., 2015). This hypothesis continues to remain untested (see Table 1:3b, 3c). Ariel (2016b) indirectly examined this question, finding that people within low-crime places seem *more* willing to call police when the police have BWCs, but this effect was not found in high-crime places (although there was no evidence that citizens were aware that BWCs were being used in both types of areas).

Furthermore, in only one study—Grossmith et al. (2015)—did researchers examine whether BWCs impact citizens' willingness to cooperate in criminal investigations using proxy measures for cooperation. They found no differences in these proxy measures between cases handled by officers with and without BWCs. Understanding willingness both to call the police for help and to cooperate with investigations seems urgent today for some agencies who have experienced declines in their detection and clearance rates of serious violence. If victim and witness cooperation is an important factor in this decline, then understanding whether BWCs will further negatively impact cooperation for agencies that are struggling to solve cases will be an important consideration for agencies trying to improve case clearance.

In two studies, scholars use surveys to hypothesize about these effects. We include these studies in Table 1:3c, but we caution the reader about drawing causal inferences from them. For example, in the Toronto Police Service (2016) study, scholars found, when interviewing individuals retroactively, that they did not feel BWCs would impact their willingness to talk to the police as a victim, although they

might be less comfortable in an investigative or enforcement situation. The Edmonton Police Service (2015) also found from a public survey that people may be willing to provide incident information to an officer wearing a BWC, but they may not be willing to have an informal chat with the police. In both of these studies, scholars did not gauge whether BWCs have these effects in practice (although in the Toronto study, they did try to gauge this retroactively). What is needed, for example, is a study aimed at comparing areas and officers with and without BWCs and the levels of 911 calls for service over time, or a test in which police dispatchers ask individuals when they call whether they would like officers to respond with or without BWCs activated. Studies focused on examining BWC impacts on investigations might prove harder to design.

5.3 | Impact of BWCs on citizen crime and disorder

Finally, in four studies, scholars examined the impact of BWCs on crime and disorder more generally, which could be interpreted as an indirect measure of the influence of BWCs on citizen behavior. In three studies in the United Kingdom, researchers hypothesized that visible BWCs may reduce antisocial behavior or other crimes when officers with cameras are present (Ellis et al., 2015; Goodall, 2007; ODS Consulting, 2011). Small declines in crime and disorder after BWCs were seen, but these studies employed weak designs. Furthermore, it is not clear whether or why BWCs would create additional deterrent effects beyond those of officer presence. In stronger quasi-experimental study, Ariel (2016b) reported no general deterrent effects of BWCs on crime.

6 | IMPACT OF BODY-WORN CAMERAS ON CITIZEN AND COMMUNITY ATTITUDES ABOUT THE POLICE OR THE CAMERAS

We located 16 studies in which researchers assessed citizen and community attitudes about BWCs or how BWCs might impact citizen and community attitudes about the police. These studies were aimed at examining general support for BWCs by citizens and communities or citizen satisfaction with specific encounters with officers wearing cameras.

6.1 | General support for BWCs by citizens

First, many study findings (as well as widespread media coverage) indicate that citizens have supported police agencies acquiring BWCs and have high expectations for them with regard to making the police more accountable and increasing citizen confidence in the police (see Table 1:4b). This support also extends to those most likely to encounter BWCs—detained suspects of crime (Taylor, Lee, Willis, & Gannoni, 2017) as well as to numerous stakeholders (i.e., lawyers, city council members, business owners, and activists) who might be affected by police use of BWCs (Todak et al., 2018).

Nevertheless, this support comes with important caveats. For example, Crow, Snyder, Crichlow, and Smykla (2017) found that community support can be contingent on a community member's background and concerns about the police. In their study, non-White and younger respondents saw fewer benefits of BWCs (see also a similar finding by Sousa, Miethe, & Sakiyama, 2018). Kerrison, Cobbina, and Bender (2018) in their interviews of Black residents in Baltimore City also found those residents were skeptical of the use of BWCs and video by the police to secure police accountability, despite interviewees' general support for more video footage. Furthermore, Crow et al. (2017) reported that those

who perceived the police to be more procedurally fair and had more positive perceptions of police performance saw more benefits of BWCs (also found by Merola & Lum, 2014, for license plate readers), whereas those with greater fear of crime saw fewer benefits (but see, in contrast, Plumlee, 2018¹¹). The challenge is that those who see fewer benefits may be more likely to have an interaction with an officer wearing a camera. More broadly, this reflects a consistent finding in research: There are disparities between the legitimacy afforded to the police by various groups, which does not seem to be remedied by BWCs.

6.2 | Impact of BWCs on specific citizen–police encounters

Some studies were aimed at examining citizen satisfaction with specific encounters with officers wearing BWCs (Table 1:4a). We note that measures of citizen satisfaction could be approximate measures for officer behavior or even citizen behavior or feelings in response to seeing a camera. Here, the findings are less optimistic. For example, Goodison and Wilson (2017), in their randomized controlled experiment, found no significant differences in citizens' perceptions of police legitimacy, satisfaction with the interaction, or views of police professionalism between those who interacted with officers wearing or not wearing BWCs. These findings suggest that citizens' satisfaction and perceptions are likely conditioned by officers' actions and how they treat and speak to people, not just whether they are wearing BWCs, which in this case does not seem to have changed officers' behaviors. (This is somewhat contrary to the findings of McCluskey et al., 2019, discussed earlier). Interestingly, Goodison and Wilson suggested that their combined findings of a reduction in citizen complaints against officers wearing cameras but no effect on citizen perceptions may indicate a weak relationship between measures of complaints and perceptions of police encounters.

Related to this issue is whether citizens even realize an officer is wearing a camera. Just as officer self-awareness may be affected by BWCs, so too might that of citizens, but this would require citizens to know that they are being filmed (which could have positive or negative effects as discussed later in this article). McClure et al. (2017) found that many citizens who interact with police cannot remember whether officers were wearing BWCs (also discovered by White et al., 2017). This issue is further confounded by additional interventions that officers with BWC are using to improve citizen satisfaction with a specific encounter. For example, McClure et al. reported that officers' use of procedural justice scripts, rather than their wearing of BWCs, may be what creates greater satisfaction in citizens' interactions with police officers (as also hinted at by Goodison & Wilson, 2017). This may also be the case in Mitchell et al.'s (2018) study of traffic officers and complaints; all officers assigned to BWCs were given procedural justice scripts to relay to citizens stopped, which may be what caused the decline in complaints those officers received.

6.3 | Impact of BWCs on attitudes regarding privacy or fear

The findings regarding citizen privacy concerns about BWCs are similarly unclear. Crow et al. (2017), Grossmith et al. (2015), and Toronto Police Service (2016) all found that survey respondents are generally unconcerned about privacy (although the respondents in the Toronto study also said they might be less likely to chat informally with officers wearing BWCs). The Edmonton Police Service (2015) discovered that citizens were concerned about their privacy when asked in a survey but less concerned when confronted with BWCs at checkpoints. The arrestees of Taylor et al.'s (2017) study had disagreements about whether police should be able to record people, raising concerns about what the police would do with videos that were captured.

Often juxtaposed against privacy concerns are concerns about fear. White et al. (2017), for example, reported that most citizens that knew they were being recorded expressed strong agreement that BWCs made them feel safer and more confident in the police. Goodall (2007) also found that victims felt safer when officers had BWCs. As mentioned previously, though, these general feelings might mask variations across different race, ethnicity, age, or gender groups.

7 | IMPACT OF BODY-WORN CAMERAS ON CRIMINAL INVESTIGATIONS

Improving accountability for police misconduct has been a primary motivation for advocates of BWCs. Prosecutors, however, rarely bring cases against the police (Skolnick & Fyfe, 1993), and it remains to be seen whether this will change much as a result of BWCs. In their study of the use of BWCs in the courts, Merola et al. (2016) found that nearly all (93.0%) responding prosecutors' offices in jurisdictions that use BWCs use them primarily to prosecute citizens. Not surprisingly, 80.0% of responding prosecutors in Merola et al.'s survey support BWC use by the police, and 63.0% feel cameras will assist prosecutors more than defense attorneys. Only 8.3% of the respondents who were located in jurisdictions in which BWCs were available had ever used BWC footage in a case brought against an officer. Therefore, it is not surprising that we currently do not know the impact of BWCs on the investigation of officer actions.

Instead, the seven¹² policing studies in this area were aimed at examining whether BWCs can assist with the investigation and resolution of crimes and whether BWCs can increase the rate of guilty pleas, charges filed, or convictions against suspects. As mentioned, officers perceive these to be benefits of BWCs. The findings from three studies in the United Kingdom (Ellis et al., 2015; Goodall, 2007; ODS Consulting, 2011) revealed that BWCs may increase detection and clearance of criminal investigations, as well as the rate of guilty pleas. Conclusions from these studies should be taken cautiously, however, given the weaknesses in their research designs. Nevertheless, the findings from stronger studies also reveal that BWCs have investigative benefits. Owens, Mann, and McKenna (2014), using an experimental design, found that issuing officers BWCs could increase the proportion of detections that resulted in a criminal charge for domestic violence incidents (although they were unable to determine the impact of BWCs on guilty pleas and sentencing). Morrow, Katz, and Choate, in their recent study on intimate partner violence (2016; see earlier Katz et al., 2014), found that BWC footage can make it easier for officers to pursue prosecution even without victim cooperation and that cases may be more likely to be charged or result in a guilty plea or verdict at trial.¹³

8 | BODY-WORN CAMERAS AND POLICE ORGANIZATIONS

A final area of research that has been the least examined is the impact that BWCs have on police organizations. In studies on police technologies, scholars have found that technologies often have unintended consequences on police organizations and may not deliver on their expectations (Chan et al., 2001; Koper et al., 2015; Lum et al., 2017; Manning, 2008). For example, proponents of BWCs have high expectations of them for police organizations, believing that they can improve training, tighten accountability structures and disciplinary systems and practices, or sharpen supervisory practices. But skeptics argue that BWCs place undue financial burdens on agencies with regard to maintaining the technology and hiring personnel to process videos. Some survey research findings indicate that officers fear that BWCs may further damage their relationships with supervisors and command staff or create a "robotic" culture among officers.

At the time of this review, the actual—as opposed to the perceived—effects of BWCs on law enforcement organizations were still not well understood. In Table 1:6, we highlight some studies that serve as starting points for these conversations. For example, in terms of whether BWCs can impact police training, Phelps, Strype, Le Bellu, Lahlou, and Aandal (2018), in their quasi-experimental study using BWCs for replay and decision-reflection, found little difference between groups using BWCs and those not using BWCs in terms of police identity, reflective thinking, peer learning, or attitudes toward training. They did find, however, that officers who trained with BWCs were more likely than a non-BWC control group to say that they had identified mistakes during their training, and to recall more instances of learning and reflection. Much more research is needed to understand whether BWC footage can help officers either in-field or academy training to learn and retain concepts and skills better, and whether that learning then has effects on their behavior (a question for training more generally). Koen (2016) found modest evidence that BWCs could be used for training in his study of a small agency, and BWCs were also found to be used for training by the Toronto Police Service (2016). Nonetheless, it was not clear whether BWCs had been successfully (i.e., consistently, systematically, or mandatorily) incorporated into training in either of these studies, or whether such training with BWCs affected officers' behaviors as a result (Koen, Willis, & Mastrofski, 2018). Finally, we also do not know to what extent BWCs are currently being used for training.

In regard to workload and costs, the Toronto Police Service (2016) found officers with BWCs had an increased number of arrests but a decline in discretionary warnings, the former requiring more work than the latter. At the same time, they also found that the time it took for an agency to investigate a complaint against an officer declined for officers wearing BWCs, implying cost-savings. Similar cost-benefits were also reported by Braga, Coldren, Sousa, Rodriuez, and Alper (2017),¹⁴ who estimated that the Las Vegas Metropolitan Police Department could potentially garner a net annual savings of around \$4 million per year in costs associated with investigating complaints. We do not know, however, the impact that BWCs have on disciplinary and accountability systems more generally, such as on processes related to officer misconduct or officer-involved shootings, all of which have implications for agency costs.

Related to workload is how BWCs might impact officer burnout, an issue specifically examined by Adams and Mastracci (2018). They reported that officer burnout is greater for officers who wear BWCs, and that cameras can reduce officers' perceptions of how much their organizations support them. Nevertheless, positive perceptions of organizational support can mitigate burnout potentially caused by BWCs.

Perhaps more important to point out is that technologies often do not reform organizations inasmuch as organizations shape (or inhibit) the use of the technology (Lum et al., 2017; Manning, 2008). Both citizens and police leaders might expect BWCs to strengthen the accountability infrastructure in policing (i.e., procedures for complaints and discipline; supervision, mentorship, and oversight; or recording and accounting of actions). The introduction of BWCs, however, may not achieve this goal if the existing accountability mechanisms in the agency are weak. For example, mentorship and supervision by first-line supervisors of line officers are important components of a healthy accountability structure that can foster a dynamic and transformational learning environment. Yet, if an agency does not value such mentorship or supervision, or does not have tangible ways to strengthen the officer and first-line supervisor relationship in these ways, then it is unlikely that BWCs can improve this organizational weakness. The inability of BWCs to impact accountability structures may already be seen in findings that cameras are primarily used by the police (and prosecutors) to increase the accountability of citizens, not officers. The unintended consequences frequently seen from technology are often the result of technology being filtered through the existing values, systems, and cultures of the organization, not hoped-for ones.

9 | DISCUSSION

Body-worn cameras are one of the most rapidly diffusing technologies in law enforcement. Unlike many other adopted technologies, researchers have taken a high level of interest in BWCs, and they have tried to keep up with the adoption through extensive research and analysis of both the impacts of BWCs and how BWCs are perceived by officers and communities alike. In total, we examined 70 empirical studies in this review in which scholars spoke to the impact of BWCs on officer and citizen behavior, officer and citizen attitudes, investigations, and police organizations.

What is the picture that seems to be emerging from this research? In general, officers seem supportive of BWCs, particularly as they gain more experience with them. Increasingly, officers value BWCs as a tool for their protection (against false or exaggerated accusations of wrongdoing), for evidence collection (which may be bolstered by prosecutors' support for BWCs), and for accurate reporting. It may be fair to say, however, that BWCs have not produced dramatic changes in police behavior, for better or worse. Although early findings indicated BWCs reduce the use of force by officers, more recent findings have been mixed, perhaps in part as a result of variation in agency policies regarding how the devices should be used. A more encouraging finding is that BWCs seem to reduce complaints against officers. The question remains, then, as to whether and to what degree these changes reflect citizens' reporting behaviors or improvements in officers' behavior or their interactions with citizens. On a related note, it is not clear from available evidence that BWCs improve citizens' satisfaction with police encounters, as might be expected if BWCs were having substantial effects on police behavior. In sum, BWCs may curb some of the worst police behaviors but have little impact otherwise.

Similarly, fears of depolicing from the use of BWCs have not been realized. Arrests seem as likely to increase as to decrease with the use of BWCs, perhaps suggesting that adoption of the cameras leads to more formal and legalistic responses to citizens in some contexts. Otherwise, BWCs do not seem to have discouraged most proactive field contacts or officer-initiated activities. But this issue is complex; citizens may want some types of police proactivity to decline (for example, stop-question-and-frisks or misdemeanor arrests for recreational drug use) but may want other types of proactivity to increase (problem-solving, community engagement, targeted patrol in high crime places). From an evidence-based perspective, it would seem most appropriate to hope that BWCs do not cause police to stop carrying out proactive activities that can prevent and reduce crime and that do not create negative reactions from citizens. But some proactive activities might do both; therefore, expecting BWCs to resolve this challenge is overly optimistic.

For their part, citizens are also generally supportive of police using BWCs. Nonetheless, it is not clear that BWCs improve their views of police or their behaviors toward police. One exception is that BWCs may discourage citizens from filing complaints against police in some contexts (perhaps depending on the seriousness of the officer's misconduct), but this will not necessarily translate into citizens having more positive views of police. BWCs also might exacerbate an already challenged relationship between citizens and the police, especially if citizens expect cameras to be used to increase police accountability and transparency, but officers primarily use them to increase the accountability of citizens.

Overall, then, perhaps anticipated effects from BWCs have been overestimated. If true, this should not be surprising, given the mixed and modest effects that technologies often have more generally in policing (Chan et al., 2001; Koper et al., 2015). Several caveats are in order, however. Although the number of BWC studies is large overall, the number available to evaluate any particular outcome is still often small, and findings are thus subject to change. As the evidence base grows, the use of more sophisticated meta-analyses of results will also provide better estimates of average effect sizes and contextual factors associated with desired and undesired outcomes.

Furthermore, the research evidence is still lacking on many important questions. For example, will BWCs affect legality and disparity in police actions? Will they change citizens' willingness to report crime and cooperate in police investigations? Are there differential impacts of BWCs on different groups of people or officers? Perhaps most importantly, the effects of BWCs on police organizations are still unknown. If BWCs are to produce substantial changes in police behavior and performance, these changes are most likely to come through their effects on processes in police organizations, particularly those pertaining to training, supervision, and investigation of police misconduct. Determining how BWCs affect the processes and outcomes of internal police investigations is particularly central to assessing whether BWCs achieve the purpose that was arguably the main driver of their adoption (i.e., improving transparency and accountability in the investigation of serious police misconduct, particularly surrounding the use of deadly force). These changes will come slowly, if at all, and will require long-term attention from the field. Nevertheless, they may be the most consequential for police–community relations and police legitimacy in the long run.

In the meantime, agencies will almost certainly continue to adopt BWCs. Given the ubiquity of personal video and audio recording devices, more and more police agencies are likely to conclude that they need to have their own recording of events for police–citizen encounters that go bad. There is also likely to be a growing expectation among the public that adopting BWCs is a marker of a responsive, transparent, and legitimate police organization. This will put considerable technical and financial strains on police (and prosecutors) that will also need further attention in cost efficiency analysis. Nevertheless, the behavioral changes in the field may be modest and mixed, at least in the short run.

ENDNOTES

¹ See the Body-worn Camera Toolkit at the following URL: bja.gov/bwc/.

² In some cases, we did not include a study that was technically empirical but of poor methodological quality to be included. For example, this might include a survey of 10 individuals in which no sampling frame or design was provided.

³ These included Criminal Justice Abstracts, National Criminal Justice Reference Service, ProQuest, Google Scholar, Social Science Citation Index, and all criminal justice-related databases available in the George Mason University library system.

⁴ We have been contracted by the Campbell Collaboration to conduct systematic reviews (which will include meta-analyses) of the specific areas of BWC research discussed in this article. In that review, we will present deeper analysis of the various methods (and methodological challenges) of each article as well as of the context and location of each research study to examine how relationships between study design, location, timing, and methodological approach contribute to the findings of BWC research.

⁵ This estimate is an approximation. In some studies, scholars pooled multiple analyses together. Other studies, which we list as distinct because they are published in different outlets with different outcomes, were conducted by the same authors and may have some overlap. Some later studies were peer-reviewed publications of portions of previous reports or unpublished documents. In these cases, we used the most recent, peer-reviewed article, except when an earlier report had findings that were not present in the later peer-reviewed article.

⁶ We distinguish these studies from those that were aimed at examining officers' reflective perceptions of the impact of BWCs on their behavior, which are included in the next section.

⁷ Michael White, Janne Gaub, and their colleagues have developed a handy online resource that summarizes studies in which the impact of BWCs on complaints and use of force has been examined. These tools are located at bwctta.com/resources/bwc-resources/impacts-bwcs-use-force-directory-outcomes and bwctta.com/resources/bwc-resources/impact-bwcs-citizen-complaints-directory-outcomes.

- ⁸ This study was based on Farrar's master's thesis at Cambridge University in the United Kingdom, which we cite as Farrar, 2012; Farrar & Ariel, 2013. Further citations regarding this study, however, refer to the peer-reviewed article: Ariel et al. (2015).
- ⁹ For example, in two non-U.S. studies, scholars found that BWCs were associated with declines in use of force (Ariel et al., 2016a; Henstock & Ariel, 2017), and in another two studies, they found nonsignificant effects (Edmonton Police Service, 2015; Toronto Police Service, 2016). Ariel et al. (2016a) showed both declines and increases in use of force, depending on the protocols followed.
- ¹⁰ Todak, Gaub, and White's (2018) findings also seem to indicate that some of the external stakeholders that they interviewed also saw the evidentiary value of BWCs.
- ¹¹ Interestingly, Plumlee (2018), in his study of university students' perceptions of BWCs, found somewhat contrary findings to Crow et al. (2017). Plumlee found that those students who perceive *greater* inequity in minority-citizen and police officer relations (perhaps suggesting *less* procedural fairness) feel BWCs can be *more* beneficial. This finding, however, was also conditioned on the student's major; interestingly, criminal justice students were much less likely to see positive benefits of BWCs than were noncriminal justice majors.
- ¹² We include Merola et al.'s (2016) study in this category because of its empirical relevance to this area. Merola et al., however, conducted a nationwide survey of prosecutor offices and their perceptions about BWCs (with regard to investigations and other issues) and not a test of the effect of BWCs on investigations.
- ¹³ Yokum et al. (2017) also examined the effects of BWCs on judicial outcomes. As this analysis lacked data to determine this outcome, however, we do not report those findings here.
- ¹⁴ Braga, Sousa, et al.'s (2018) study is the peer-reviewed publication of the Braga et al. (2017) report, and it is used in this article. Nevertheless, only Braga et al. (2017) reported the cost–benefits analysis, which is why we cite to the non–peer-reviewed report here.

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