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Body-Worn Camera Activations:

Demographic, Attitudinal, and Job Function Predictors

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Abstract

What drives an individual police officer to activate his body-worn camera (BWC)? Some evidence suggests officer attitudes and resistance to the technology contributes to the equivocal results in studies testing for BWCs effect on use-of-force, complaints, and other outcomes of interest. Leveraging a novel survey and administrative dataset, we investigate the predictors of BWC activation among 147 police officers in a single agency. With a test of three nested models, we find job function covariates offer robust predictive power of how often an officer activates her or his BWC. Neither demographic nor attitudinal measures significantly predict BWC activations, except for a negative relationship with how officers perceive BWC impacts on professional discretion. The study furnishes empirical support for understanding officers as Principled Agents: job function, guided by administrative policy is the most explanatory and parsimonious, while models of attitudes and demographics fail to improve upon the job function model.

Keywords: Body-Worn Cameras, Police, Activation, Attitudes, Principled Agents

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1. INTRODUCTION

Body-worn cameras (BWCs) are a workplace surveillance technology that have become part of the new normal of US policing and are quickly becoming standard kit for police forces across the world. While there is little reliable reportage on exactly how many police departments have adopted BWCs, an industry report suggests up to 96% of major police agencies in the United States have either already implemented BWCs or were planning to within the year (Lafayette Group, 2015, p. ii). Previous work has laid out the political and social reasons behind the rapid adoption of BWCs (Wasserman, 2014; White, 2014). The rush to implement BWCs was initiated in a low-evidence environment, which at the time was comprised of the 'Rialto study' (Ariel, Farrar, & Sutherland, 2015). The Rialto study provided late-2014 evidence for a substantial reduction in use-of-force and complaints for shifts of officers equipped with BWCs, otherwise there was little scientific evidence upon which to rely (Lum, Koper, Merola, Scherer, & Reioux, 2015; White, 2014). Implementation has continued apace, despite the well-known history of technology failing to deliver the proposed benefits in the policing context, and having " unintended consequences for police officers, their organizations, and citizens" (Lum, Stoltz, Koper, & Scherer, 2019, p. 3). In the absence of evidence, policymakers, police executives, researchers, and other stakeholders relied upon a theoretical base of deterrence which commingled lawful use-of-force with its bloody cousin, police brutality.

A review of the relevant research literature follows, in which the equivocal BWC research results are appraised. One reason for the uneven empirical record may be due to a mismatch between the theoretical ground and the outcomes measured. Most BWC research takes deterrence theory as its taproot, which predicts officers will be less likely to engage in illegitimate and unlawful force the more likely those acts are to be discovered. BWCs, then, act as a measure of surety that police brutality will be discovered. However, illegitimate, unlawful, and brutal force incidents are challenging to measure (Hickman, Piquero, & Garner, 2008), and moreover are not the outcomes measured in BWC literature, which due to feasibility constraints are limited to counting instances of nonlethal force more generally. Still, the mismatch between lawful use-of-force and deterrence theory has not precluded optimism that as "the degree of deterrence increases, officers are less likely to use force" (Ariel, Sutherland, Henstock, Young, & Sosinski, 2017, p. 2).

The inability for 'gold standard' experimental techniques to establish convincing, consistent effects for BWCs may be due to mismeasurement, but alternative explanations exist. One recent article argues that research designs that randomize individual officers rather than shifts have led to spillover effects which violate the Stable Unit Treatment Value Assumption (Ariel, Sutherland, & Sherman, 2018), while Lum and her colleagues (2019) wonder if the infrequency of excessive force, combined with varying agency-level factors are responsible. Moreover, given the penetration of BWCs into U.S. policing, researching the effect of BWCs will continue to become more difficult as adequate research sites where the technology has not already been used become rarer. Within those constraints, establishing how officers use BWCs, and what predicts that use, becomes more salient. For the present research, the probative force/no-force condition is less salient than investigating what predicts how often an officer uses a BWC.

Even if the cameras are capable of substantively altering officer bad behavior, if officers deliberately fail to activate their BWCs in order to avoid the surveillant gaze of agencies and

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communities, then the harmful behavior will not be deterred. On the other hand, if officers are good stewards of their profession and willingly engage with the demands for BWCs from their employers and citizens, then we should rely on a theoretical base more akin to the "Principled Agents" proposed by John Dilulio Jr. (1994). In such a case, job function – the actual work of an officer, guided by agency policy, assignment, and oversight – and not individual characteristics of officers including their attitudes about BWCs, should provide a more reliable theoretical base for future BWC research.

This study tests Principled Agent theory in the context of BWCs, by revealing whether demographic descriptors, job function, or an individual officer's attitudes towards the cameras better predict how often the camera is activated. The study proceeds as follows. First, a review of the two dominant themes in BWC research – the effects of the technology on police use-of-force and officer perceptions of the cameras – are reviewed. Taken together, both themes suggest the need for a theoretical and empirical base to understand how and why police officers activate BWCs. Next, three hypotheses are offered to test the main reasons why officers activate their BWCs: demographic, job function, and officer attitudes and beliefs towards the technology. In the third section, the study's methods are reviewed, followed by a demonstration of the results. Following the results is a discussion of the implications of the findings, as well as limitations for interpreting and applying the results in other contexts. The paper closes with a conclusion and calls for additional research to challenge and extend the findings reported here.

2. Literature Review

The research momentum around BWCs lagged behind their adoption in US policing, but the body of evidence has grown substantially in the last several years. Studies have increased fourteenfold (Lum et al., 2019) since the first review of the evidence by leading BWC researcher Michael D. White (White, 2014). The dominant theme of research in this area has been investigating the proposed benefits from the cameras on policing, particularly a reduction in police use-of-force and a reduction in complaints. The growth in studies has not coalesced into straightforward answers, however, and overall the "anticipated effects from BWCs have been overestimated" (Lum et al., 2019, p. 20).

The research record since the most impactful study, known as the Rialto Study (Ariel et al., 2015), has resulted in equivocal support for the contention that the cameras will dramatically change use-of-force by police officers. While four works have shown statistically significant reduction in use-of-force by police officers wearing the cameras (Braga, Sousa, Coldren Jr, & Rodriguez, 2018; Henstock & Ariel, 2017; Jennings, Fridell, Lynch, Jetelina, & Reingle Gonzalez, 2017; Jennings, Lynch, & Fridell, 2015), none of the studies have established a magnitude of effect similar to the ones found in Rialto. Contrasting those three reports are the eight since the Rialto Study which have not found a reduction in use-of-force (Ariel et al., 2016b; Braga, Barao, McDevitt, & Zimmerman, 2018; Headley, Guerette, & Shariati, 2017; Peterson, Yu, La Vigne, & Lawrence, 2018; Stratton, Clissold, & Tuson, 2015; Toronto Police Service, 2016; White, Gaub, & Todak, 2017; Yokum, Ravishankar, & Coppock, 2017).

In at least one large field experiment (Ariel et al., 2016b) the researchers find that not only is there no reduction in police use-of-force, but assaults on officers rose 15%. This counter-intuitive finding has been revisited in a later piece by the same lead author (Ariel, Sutherland, Henstock, et al., 2018) who attempts to establish both theoretical and treatment fidelity reasons

for understanding why BWCs might increase assaults on police. The lead author of the study has also recently expanded the BWC field by testing how the cameras effect assaults on non-policing railway personnel (Ariel, Newton, et al., 2018), and find the BWC-equipped employees had a 47% reduction in the odds of being assaulted compared to non-BWC-equipped employees.

In sum the studies investigating the impact of BWCs on police use-of-force do not produce clear answers. The theoretical basis for expecting a change is rooted in theories of deterrence. Deterrence theory is centuries old (Beccaria, 1764), and forms the basis for mainline body-worn camera research. Simply put, deterrence theory expects to alter police use-of-force with the expectation that officers will rationally respond to camera surveillance by following the rules when they believe they are being observed, and that detection of rule-breaking is likely (Nagin, 2013). Proponents contend the cameras act to ensure that the probability of apprehension for officers using illegitimate force is high, thus "deterring" them from such unlawful acts. As "the degree of deterrence increases, officers are less likely to use force" (Ariel, Sutherland, Henstock, Young, & Sosinski, 2017, p. 2).

This theoretical stance is problematic at the conceptual and operational level – police officers do not consider lawful use-of-force – the variable actually measured in the experimental studies – to be an illegitimate behavior, and therefore are not likely to be deterred from it. To be sure, there may be a deterrent effect on illegitimate and excessive force, but that is not what is being measured by body-camera researchers, and may explain why the most extensive experimental study of body-camera outcomes to date – the Washington DC study – did not detect a single statistically significant effect on any outcome, including use-of-force. The null finding prompted the authors to advise "we should recalibrate our expectations" (Yokum, Ravishankar, & Coppock, 2017, p. 22) regarding body-worn cameras.

2.1. Police Attitudes Towards BWCs

Studies of officer perceptions and attidudes form the second largest sub-theme in the BWC literature. Lum and co-authors (2019) identify at least thirty-two separate studies that investigate officer attitudes towards BWCs, a significant increase from the thirteen studies identified in an earlier report by many of the same scholars (Lum et al., 2015), or the two identified in the earliest review of BWC evidence (White, 2014).

The officer attitude literature consistently finds that as officers grow more experienced with the technology, their perceptions generally become more positive, despite early reports revealing skepticism and some negativity. This temporal effect has been noted across both early and recent studies and across a variety of policing contexts (Ellis, Jenkins, & Smith, 2015; Fouche, 2014; Gaub, Choate, Todak, Katz, & White, 2016; Grossmith et al., 2015; Jennings, Fridell, & Lynch, 2014; Smykla, Crow, Crichlow, & Snyder, 2016; White, Todak, & Gaub, 2018), and the consensus indicates a durable, portable effect.

The increasing acceptance of BWCs may be due to officers finding them to be useful tools in public complaint and internal affairs investigations (Fouche, 2014; Goetschel & Peha, 2017; Owens & Finn, 2017; Pelfrey Jr & Keener, 2016). Other job-related benefits of BWC footage have been identified as well, including aiding evidence collection (Gaub, Todak, & White, 2018; Katz, Choate, Ready, & Nuño, 2014; White et al., 2018), and improving job performance (Gramagila & Phillips, 2017; Stratton et al., 2015). Along with the positive attitudes

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reviewed above, officers' negative perceptions are tested in the current study for their impact on BWC activations.

Contrary to the general findings of positive attitudes towards BWCs, some reports find negative or neutral perceptions as well. Perceptions linked to the burden of additional time related to BWCs and technical difficulties were reported in an early study (Katz et al., 2014), though the quick advance of BWC hardware and software development may have blunted these concerns. The most credible reasoning advanced for officers' negative attitudes is that BWCs curb/curtail officer discretion or make them more hesitant to use force, even when justified to do so (Gaub et al., 2016; McLean, Wolfe, Chrusciel, & Kaminski, 2015; Stratton et al., 2015). This phenomenon has been documented in an experimental study and dubbed the "over-deterrent" effect (Ariel, Sutherland, Henstock, et al., 2018).

Young and Ready (2016) find evidence that variance in behavior between officers is responsible for 61.8% of the variation in BWC activation. The authors contend that officers' individual preferences for BWCs are mediated by departmental policy on activations. Further, officers who volunteered to wear BWCs were significantly more likely to activate their cameras over the study period compared to officers who were mandated to participate in the treatment group by their agency. In other words, despite their individual preferences for the technology, agency policy was the better predictor of BWC activation. In this way, Young and Ready provide the first limited support in the BWC literature for understanding police officers as Principled Agents (Dilulio Jr, 1994) rather than shirkers intent on subverting agency policy and community expectations, which motivates the core research question investigated in this study.

A recent line of research has tied officer attitudes towards BWCs to organizational factors. Adams and Mastracci (2018) show evidence that officers' levels of perceived organizational support (Rhoades & Eisenberger, 2002) mediates increased burnout observed among officers equipped with BWCs. Relatedly, officer perceptions of organizational justice have been tied to their attitudes towards BWCs (Kyle & White, 2017; Tankebe & Ariel, 2016), though two other studies (Huff, Katz, & Webb, 2018; Lawshe, Burruss, Giblin, & Schafer, 2018) quickly followed and found no link. Given the conflicting findings, this study tests the predictive power of demographics, job function, and officer attitudes towards BWCs on activations.

2.2. BWC Activations – A Measure of Discretion

Police work "entails a tension between the exercise of discretion by officers on the street and the control of that discretion by police organizations" (Engel & Worden, 2003, p. 131). The choice to activate a BWC, or not, is the directly measurable ability of an officer's discretion – whether they either comply with or confound agency BWC implementation. Merely wearing a BWC does not implement a BWC – the camera must record at appropriate times, and in order to record an officer must manually activate the camera. The importance of discretion, and its appropriate use, has been noted not only in the general public management literature (Dilulio Jr, 1994; Lipsky, 2010; S. W. Maynard-Moody, Musheno, & Musheno, 2003; Tummers & Bekkers, 2014), but in policing specific contexts as well (Epp, Maynard-Moody, & Haider-Markel, 2014). Police officers are often recognized as having among the highest levels of discretion due to the unstructured, often chaotic problems facing them, and understanding police officer exercise of discretion has been a long-standing concern of researchers (Davis, 1975; Engel & Worden, 2003; Goldstein, 1963; Mastrofski, 2004; Rowe, 2007).

Discretion is at the core of the professional police identity (Crank, 2014; Sklansky, 2007; Skolnick, 2008), and professional identity is a core component of officer performance and well-being (Schaible, 2018). Officers are protective of their professional discretion as Bayley (2011, p. 314) notes in his somewhat light-hearted comparison of the institutions of policing and the academy: "The discretion given professors is very great, and like police officers, they bitterly resent any attempt to supervise them." Despite its importance to both the institution of policing and the members of the policing profession, discretion is often viewed negatively, as a confounding tendency to undermine agency policy (Tummers & Bekkers, 2014) or specified research design (Ariel et al., 2016a). When misused, officer discretion can become a legalistic excuse to perpetuate social inequities, so "while street-level worker judgment is necessary and ever-present, it is fundamentally illegitimate unless operating within specific, juridical bounds" (S. Maynard-Moody & Musheno, 2012, p. S18).

2.3. BWC Activations: A Principal-Agent Problem, or Principled Agents?

Two competing views of discretion in BWC activation emerge. In the first, situated within the principal-agent problem literature (Miller, 2005), officers are likely to choose to activate a BWC according to their desires and attitudes rather than acting as required by their 'principals,' the agency and the community. The principal-agent problem, then, arises when public employees act "not as public-spirited souls but as self-seeking slugs who are disposed to shirk, subvert, and steal whenever and wherever they can get away with it" (Dilulio Jr, 1994, p. 278). At the extreme of this view, officers will subvert the intended benefit of BWCs through their control of the cameras' activation, specifically (Kerrison, Cobbina, & Bender, 2018, p. 281) "their ability to turn [the BWC] off or position a partner to block the view finder frame." Even in the absence of motivation to hide outright criminal behavior, in the principal-agent problem view, officers with cynical attitudes towards BWCs because of perceptions that camera footage will be used against them, or negatively impact their professional practices and discretion (Katz et al., 2014) may opt to activate the cameras less, as (Newell & Greidanus, 2017, p. 4) "officer perceptions and interpretations of the technology may impact how they use it."

Representing the principal-agent problem view, some studies have raised questions about both the intended and unintended effects of BWCs through the lens of activations. In the first (Ariel et al., 2016b), a multisite, multinational experimental study found that officers equipped with BWCs had 37% higher odds of being assaulted compared to officers without the cameras, while also not reducing police use-of-force. The authors contend the unexpected findings in that study could be the result of several factors, but focus in on protocol compliance violations. In seven of the ten study sites, breakdowns with study protocol were observed. In a follow-up study to try and explain the paradoxical rise in assaults on officers while police use-of-force remained unchanged, the authors identify several types of non-compliance (Ariel, Sutherland, Henstock, et al., 2018). Within three of the sites "departments gave officers the discretion to use BWCs how and when they deemed fit during treatment condition" (Ariel et al., 2018, p. 30). The authors assert this granting of discretion in BWC activation confounded the expected results of decreased use-of-force.

The second view of discretion in the BWC context can be situated with the 'Principled Agent' theory advanced by John D. Dilulio (1994). Dilulio argued that principal-agent theory is useful in explaining the relatively rare instances where public employees chase their self-interest,

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subverting their principals' wishes and guidance. What principal-agent theory lacks, argues Dilulio (p. 277), is sufficient explanatory power to help us understand what motivates public employees to "perform thankless tasks, go above and beyond the call of duty, and make virtual gifts of their labor even when the rewards for behaving that way are highly uncertain at best." Following Dilulio's work (1994), research has consistently found weak or non-existent links between officer attitudes and behavioral outcomes. Arrest decisions are not predicted by job satisfaction (Smith & Klein, 1983), nor DUI arrests by attitudes about enforcement (Mastrofski, Ritti, & Snipes, 1994; Meyers, Heeren, & Hingson, 1989). Officer attitudes towards domestic violence are not strongly linked to domestic violence arrests (Stith, 1990), and officer attitude fails to predict coercive behavior by officers (Terrill & Mastrofski, 2002). Engel and Worden (2003) directly investigate the link between officer attitude and behavior and find no link, concluding that agency policy and supervision is predictive of officers' problem-solving.

Young and Ready (2016) directly investigate the effects of agency policy and officer discretion on BWC activation and provide at least some evidence for the Principled Agent view. The authors' find that despite individual officer attitudes towards BWCs, activations of the cameras are predicted and guided by agency policy rather than their attitudes and desires. In the study both compulsory and volunteer officers in the treatment group (with BWCs) had similar activation rates at the beginning of the study, which was guided by an agency directive mandating BWC recordings with the following language (Young & Ready, 2016, p. 35): "when practical, officers will make every effort to activate the on-officer body camera when responding to a call or have any contact with the public."

We follow Young and Ready (2016) and apply the theory of the Principled Agent to explain variations in BWC activations. Dilulio (1994, p. 277) defined Principled Agents as "workers who do not shirk, subvert, or steal on the job even when the pecuniary and other tangible incentives to refrain from these behaviors are weak or nonexistent." Deterrence theory predicts decreased use of force in the presence of BWCs, yet research fails to produce evidence of this effect. Perhaps a different explanation is in order. Perhaps officers are using BWCs just as they should, according to department policy as is consistent with Maynard-Moody and Musheno (2012, p. S22) who find police officers to be "far from rogue agents" and instead "are, in most instances, conservers of institutional norms." We, therefore, anticipate BWC activation to be based on officer job function, in line with the expectations of Principled Agent theory, and not their demographic characteristics or individual attitudes towards the technology.

2.4. Hypotheses

There is a growing need for theoretical grounding in the BWC literature, as the empirical literature has provided equivocal support for the initial optimism that the technology would result in impactful reductions to police use-of-force, and "BWCs have not produced dramatic changes in police behavior" (Lum et al., 2019, p. 19). Dominant voices in the BWC literature (Ariel et al., 2016a, p. 456) have centered the unexpected results in some conditions on officer discretion, arguing "it is precisely the issue of discretion where we believe that the effect of BWCs can vary." To that end, this study aims to test the three likely classes of covariates identified in the broader policing literature as well as previous BWC studies.

Relatively little specific guidance is offered by previous research on BWC activation. However, the influence of age, sex, and race in work, behavior, and belief is vast, and within the

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policing literature all three have been connected to important outcomes related to this work, including use-of-force (Fridell & Lim, 2016; Paoline III & Terrill, 2007; Sklansky, 2005; Skolnick, 2008). Provoked by that literature but lacking a theoretical expectation for the direction of effect from demographic variance, the following baseline hypothesis (and minimal model for nesting) is constructed:

> *Hypothesis One*: BWC activations will be significantly related to officer demographics (age, sex, and professional experience).

Previous study of BWC activation among officers found preliminary support for the importance of an agency's administrative policy in guiding both compulsory and volunteer officers in their use of the cameras (Young & Ready, 2016). These policies distinguish between the types of situations in which a BWC recording is expected, and it is assumed that those situations are encountered at varying rates according to an officer's job function and job-related activities. A second hypothesis logically follows, then, that variations in officers' BWC activations are primarily due to job functions and activities:

> *Hypothesis Two:* Police officers who are involved in more calls, make more arrests, and are involved in more use-of-force incidents will activate their BWCs more often than officers with less activity in those areas.

Finally, the importance and influence of street-level discretion in public service (S. W. Maynard-Moody et al., 2003), and how that discretion can be influenced by the individual's own beliefs, bias, and perception, is well established in the context of policing (Epp et al., 2014). Although perception and attitude research represents the second largest subset of BWC research (Lum et al., 2015, 2019), in relation to BWC activation there is relatively limited guidance offered (Ariel, Sutherland, Henstock, et al., 2018; Lawshe et al., 2018; Young & Ready, 2016). While we are led to believe there will be an effect, the direction of the effect is not known. Expanding that literature to understand if individual attitudes overcome the strength of administrative policy – whether officers act as Principled Agents of their agency and community (Dilulio Jr, 1994) or as principal-agent problems – the following hypothesis is tested:

> *Hypothesis Three*: Police officers with negative attitudes towards body-worn cameras will activate their cameras less often compared to officers with positive attitudes.

3. Methods

3.1. Data

The current study is one part of a more extensive survey focused on law enforcement employee attitudes, emotional labor, and wellness. Participating agencies were contacted in late Spring 2018, and following initial approval from the chief executive of each agency, we worked with a command staff representative from each of the three final participating agencies to develop supplemental questions specific to the agency and its interests, which were added to the core survey. The final survey was distributed simultaneously to all employees of all three agencies. For this study, a single participating agency was selected for its widespread, longstanding implementation of BWCs, as well as its ability to provide detailed data on use-of-

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force, BWC activation, and other variables of interest alongside the information collected via employee survey. Survey questions which were potentially inter-related, such as BWC attitudes and perceived organizational support, were randomized between respondents to lessen the risk of response order bias (Israel & Taylor, 1990).

After removal of non-valid emails, double-entries, and "bounce backs," a total of 657 unique, anonymous URL links were emailed to both sworn and civilian employees on July 25, 2018. Three reminder emails were sent over one month, and a substantial number of new responses were received following each wave. Once the survey closed on August 25, 2018, a total of 322 responses had been collected, and new responses were no longer received. For data analysis, responses with less than 20% of the survey completed were dropped from the dataset for excessive missingness. In the end, we evaluate a total of 314 responses, equal to a 49% response rate. Of the 314 survey observations, 188 are sworn law enforcement officers, and 147 are equipped with a BWC, forming the final sample for this study.

Following the completion of the thirty-day survey period, data related to BWC activation and related job function correlates were compiled. This type of data is already collected by the study agency, including use-of-force, arrest, and dispatched call information. One advantage to this study design is it allows for a definitive comparison of the model correlates and the outcome of interest (BWC activation count) in the same discrete time window of 30 days. Study participants were not made aware of the intent to combine survey data with agency level reporting on activations, use-of-force, or other job function predictors, allowing the study to limit the risk of participant bias towards research results.

3.2. Respondents

Study participants are 147 police officers, all of whom are assigned a BWC, in a single police agency located in the US regional West. The department is a municipal police department of a capital city and serves a population of approximately 200,000 residents (U.S. Census Bureau, 2017). The agency has implemented body-worn cameras (BWCs) across their front-line policing personnel for what they deem are "first responder roles," such as patrol, motor and bike officers, SWAT personnel, gang and accident investigators. The agency was the first in the state to invest significantly in the technology, deploying the first 250 BWCs across the agency by October 2014, well in advance of the national trend towards BWC adoption.

The respondent pool is majority white (71%) and male (92%). The average respondent is approximately 40 years old and has just over 14 years of law enforcement experience. The respondent pool generally reflects the demographic descriptions of police officer population in the state they work, although slightly fewer respondents report a white racial identity than would be expected. The respondent pool also reports a slightly higher education level on average, with 33.9% reporting having attained a bachelor's degree and another 10.82% with a master's degree or higher. Approximately ten percent of respondents report less than a year experience wearing a BWC, while 56% report having more than three years of experience with the technology. A listing of descriptive statistics for the study can be found in Table 1 below. Univariate distributions and missingness data by variable are reported in the appendix.

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374 **Table 1.** Descriptive Statistics

Variable	n	Mean	Std. Dev.	Min	Max
Dependent Variable					
ln(BWC Activations)	147	3.41	1.51	0	5.29
Demographic Controls					
Female	117	0.060	0.238	0	1
White	147	0.714	0.453	0	1
Age	118	39.068	7.855	18	68
Education	119	2.176	1.079	1	4
Years LEO Experience	147	13.068	7.320	0	33
How Long Worn BWC	147	4.204	1.098	1	5
Rank	146				
Officer	115				
Sergeant	25				
Lieutenant	6				
Job Function Measures					
Use-of-Force Count	147	0.313	0.628	0	3
Total Primary Calls	147	40.401	38.506	0	205
Arrests	147	1.544	2.581	0	17
Front-line Officer	147	0.844	0.365	0	1
BWC Attitude Measures					
BWCs Modify Professional Discretion	144	3.417	1.637	1	7
BWCs are Positive	147	4.577	1.200	1	7
Perceived Organizational Support	123	3.443	1.536	1	6.714
BWC Helpful in Complaints	143	6.140	1.004	1	7
Public Does not Understand Policing	143	5.923	1.095	1	7
BWC Leads to Using Less Force	143	3.566	1.879	1	7

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376 ### 3.3. Measurement

377 Table One above gives the descriptive statistics for all measures reported in the study.
378 Explaining variability in BWC activation among officers is the focus of the study. The

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distribution of activations among 147 officers forms a count between zero and 198 ($\bar{x}$ = 57.71, σ = 46.84). Approximately 25% of the sample had ten or fewer activations during the study period, and 8.84% had no activations. Because of the highly skewed distribution in the raw count, a natural log of the raw count plus one (to account for null counts) is used ($\bar{x}$ = 3.41, σ = 1.51).

Demographic measures are all reported untransformed and can be interpreted directly. Education level is collapsed to an ordinal measure ($\bar{x}$ = 2.16, σ = 1.08) where a high school degree is equal to 1, associate's degree at 2, bachelor's degree at 3, and graduate degree at 4. The majority of officers self-report a white racial identity, and a dummy construction for White is reported, although like education level, racial identity is not modeled in the regression tables for lack of theoretical expectation for affecting BWC activation. Some scholars have suggested veteran officers hold differing views regarding BWCs compared to their junior colleagues (Jennings et al., 2014), and so years of law enforcement experience is reported. Similarly, previous studies expect that as officers become more familiar with BWCs, their attitudes towards the cameras will become more positive. If it is true that an officer with positive attitudes towards BWCs are more likely to use the camera (Young & Ready, 2016), and that attitudes improve with time (Gaub et al., 2016), then we would expect officers with more BWC experience to have more BWC activations. This temporal effect is operationalized with a five-point scale which asks an officer how long they have worn a BWC: (1) less than six months, (2) up to a year (3) up to two years (4) up to three years, and (5) over three years. Numerous empirical studies have noted differences in use-of-force between male and female officers, we report and control for sex with a dichotomous indicator variable for female officers. A breakdown of officer rank is also provided, with 78.7% of participants holding the rank of officer.

Job function measures include use-of-force, which is modeled as a count variable between zero and three. The limited range and high skewness of the use-of-force count are in line with research establishing any use-of-force as a rare occurrence (Alpert & Dunham, 2004). The use-of-force measure is heavily skewed towards zero, with 75.51% of respondents having no use-of-force incidents during the study period. The count combines physical use-of-force incidents from across the spectrum, including oleo capsicum spray (OC), Taser deployments, hard strikes (hands and feet), and firearm pointing (handgun and firearm). There were no firearm uses or deadly force incidents by officers of the agency during the study period. Total primary calls documents how many calls an officer is recorded as the primary, documenting officer for, and includes both dispatched and proactive incidents. A minority of police calls result in either physical or citation arrest, though due to agency data limitation only physical arrests are collected as another measure of job activity. While arrests during the study period range up to 17, 57.82% of respondents had zero arrests, and among those who had any arrests the average was 3.66 (σ = 2.84). While rank is seen as a demographic measure, it is not a good measure of an officer's job function. Officers with frontline, patrol, and street-investigation assignments are expected to activate their BWCs more often than those with more administrative or office-centered assignments, a difference controlled for with the dichotomous dummy measure "front-line assignment." Moderate correlation between some job function predictors was noted, but regression diagnostics (see results below) did not indicate the correlation resulted in impairing multicollinearity.

Officer attitude measures are all reported using a seven-point Likert-like scale – strongly disagree (1) to strongly agree (7), with the neutral point of 4 representing "neither agree nor disagree." Perceived organizational support, or POS, (Rhoades & Eisenberger, 2002) is a

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summed construct of seven items with high internal consistency ($\alpha = 0.959$). The measure of an officer's positive perceptions of BWCs ('BWCs are Positive') is a summed construct of eight items with high internal consistency ($\alpha = 0.883$). In both summed constructs the underlying items also use the seven-point Likert scale reported above. Figures for variable correlations, data missingness, and univariate distributions, along with a listing of the individual items comprising summed constructs, are all included in the study appendix.

Table 2. Nested Model Results of Log-Linear Regressions on BWC Activations

		Demographic	Job Function	Attitude	Supported Model
Demographic	Years LEO	-0.0346 (0.0193)	-0.0207 (0.0156)	-0.0166 (0.0159)	-0.0220 (0.0152)
	Female	-0.219 (0.532)	-0.0994 (0.418)	-0.0487 (0.435)	-0.110 (0.409)
	Officer	(.)	(.)	(.)	(.)
	Sergeant	-0.488 (0.354)	0.220 (0.299)	0.154 (0.304)	0.227 (0.293)
	Lieutenant	-1.954** (0.651)	-0.735 (0.526)	-0.928 (0.532)	-0.782 (0.515)
	How long worn BWC	0.00646 (0.128)	0.0886 (0.101)	0.112 (0.102)	0.0947 (0.0992)
Job Function	Use-of-Force Count	--	0.298 (0.155)	0.414* (0.163)	0.394* (0.157)
	Total Calls	--	0.0150*** (0.00351)	0.0146*** (0.00350)	0.0150*** (0.00344)
	Total Arrests	--	0.0993* (0.0443)	0.0866 (0.0449)	0.0853 (0.0437)
	Front-Line Assignment	--	1.231*** (0.289)	1.172*** (0.288)	1.216*** (0.283)
Officer Attitudes Towards BWCs	BWCs Modify Professional Practices	--	--	-0.145* (0.0641)	-0.145* (0.0607)
	BWC are Positive	--	--	0.0388 (0.107)	--
	Perceived Organizational Support	--	--	0.0928 (0.0758)	--
	BWCs Help in Complaints	--	--	-0.0774 (0.118)	--
	Public Not Understand Police Work	--	--	0.0697 (0.0947)	--
	BWCs Cause Less Force	--	--	0.0481 (0.0553)	--

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Constant	4.115*** (0.575)	1.499** (0.553)	1.298 (1.080)	1.996*** (0.579)
Observations	117	117	117	117
Adjusted R^2	0.121	0.475	0.489	0.497
AIC	407.199	350.598	352.595	346.439
BIC	423.772	378.220	396.790	376.823
LR chi² diff	--	0.000***	0.599	0.013*

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4. Results

The results of the log-linear regressions for three nested models are presented above in Table 2, along with a fourth 'Supported model' which was inferentially constructed *post-hoc* and is provided not as a test of hypotheses, but for reader information and research guidance. The results of the nested model support the importance of agency policy on BWC activations in leveraging the use of the technology, even in the face of some officers' negative personal perceptions and preferences regarding it. The findings reported below both confirm results from previous research on BWC activations (Young & Ready, 2016), as well as depart from and build upon it.

Results do not support hypothesis one, which predicted that individual demographic characteristics will significantly predict BWC activation. Years of experience, sex, and rank are all non-significant at the $p < .05$ level, except for officers with command rank (lieutenant or higher), who are significantly less likely to activate their BWC. Officers of command rank represent a rather small portion of police officers overall, with only six in the sample studied here. Surprisingly, when other factors are held constant, the length of time an officer has worn a BWC is not significantly related ($p= .384$) to how often they activate the camera, contrasting with previous attitude research suggesting a temporal effect on underlying officer attitudes towards BWCs. While this study is not measuring a temporal change in attitude, we expected that experience with BWCs to influence activations positively. The impact of experience with BWCs reported here are in the positive direction but is very small and non-significant. Overall the demographic model of BWC activations explains only .121 of the variance observed.

Robust support is found for hypothesis two, which predicts job function covariates will be significantly related to BWC activation. Regarding the individual predictors only partial support is found, with arrest count, number of assigned calls, and whether an officer is in a front-line assignment all significantly and positively related to BWC activations. While use-of-force is only marginally significant in this model ($p= .058$), given it is in the hypothesized positive direction it is included in the final supported model and attains reliable significance ($p= .014$). A likelihood ratio test statistic ($p<=.0000$) indicates the job function model provides adequate explanatory power for its increase in complexity and should be accepted over the nested demographic model.

Hypothesis three posits that individual officer attitudes regarding BWCs would have a significant effect on BWC activations. Minimal support is found for the effect of officers' attitudes towards BWCs, as significance is only observed for an officer's endorsement that BWCs affect their professional discretion. A full reporting of the individual questions which are

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used to construct the summed "BWC approval" measure is included in the appendix, but the measure fails to significantly affect BWC activations, nor does an officer's perception of the camera's ability to reduce use-of-force or assist them when a member of the public complains about them. Similarly, neither an officer's perception of organizational support, nor their belief that BWCs will depict policing situations the public will not understand, influence their BWC activations. A likelihood ratio test statistic of $p<=.599$ indicates the officer attitudes model does not provide sufficient explanatory power over the nested job function model, and therefore should not be accepted.

The fourth model ('Supported') reported in Table 2 is a construction of the job function model along with the sole attitude measure (BWC modifies professional practice) which attained significance in the officer attitude model. Both the AIC and BIC indicators show the supported model performs best, and a likelihood ratio test of the job function model nested within the supported model ($p<=0.013$) indicates the discretion attitude measure adequately improves the job function model and should be accepted. As shown, the model attains enough of a gain in explanatory power, while keeping complexity at a relative minimum, to warrant future research effort to replicate.

As previously noted in the measures section, some moderate correlation was noted, particularly among the job function predictors. The highest correlation noted was between the officer rank and line officer conditions (0.63), still well below the generally accepted problematic cutoff of 0.80 (Berry, Berry, Feldman, & Stanley Feldman, 1985). All findings were robust to adding or dropping predictor variables with moderate correlation. Post-estimation diagnostics show all models are free from impairing multicollinearity, with mean variance inflation factors (VIF) scores well below the standard cutoff: Model 1 (1.13); Model 2 (1.30); Model 3 (1.38); Model 4 (1.29).

5. Discussion

This study investigated the impact of three classes of predictors on police officers' activations of body-worn cameras: Individual demographic characteristics, individual attitudes towards BWCs, and job function indicators. We find job function to explain variations on BWC activation, which implies that officers are Principled Agents (Dilulio Jr, 1994) of their agencies and communities. This finding is in line with the vast majority of literature which investigates the link between officer attitudes and behavior and finds that "officers' behavior is only weakly related, if at all, to their occupational attitudes" (Engel & Worden, 2003, p. 156).

Regardless of an officer's attitudes towards BWCs, or their demographic characteristics, this study finds little evidence of an impact of those correlates on how the cameras are used. This finding supports Dilulio's reckoning that 'front-line' public service workers (see also Lipsky, 2010) are far more constrained by agency policy and leadership than they are motivated by self-interest, because "there is more self-sacrifice, and less self-interest, than rational choice theory allows."

The top-line finding of this study is that job function correlates strongly predict BWC activation, with the model explaining nearly half of the variation found among officers. This top-line finding successfully links empirical findings from previous work showing the impact of administrative policy on BWC activations (Young & Ready, 2016) with the proposal from Lum

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and colleagues (2019, p. 19) that the equivocal empirical results from experimental tests of BWCs on police use-of-force might arise at least partly from "variation in agency policies regarding how the devices should be used." Variation in BWC activation should be expected across differing policing contexts because there is variation in the policies employed in those contexts, not because of differences in individual officer perception of the technology itself.

We operationalize professional discretion with a survey question which asks for an officer to disagree or agree with the statement "Wearing a body camera pressures me to modify certain professional practices I have had in the past." Previous scholars have revealed that negative attitudes about BWCs stem from officer concerns about the suppressive effects of BWCs on their exercise of professional discretion (Gaub et al., 2016, 2018; Headley et al., 2017; White et al., 2018). The findings here support those previous findings, as this perception is the only one tied significantly to BWC activation.

6. Limitations and Future Research

Variations in policy and use of BWCs are expected at the departmental, state, and international levels, and as policies regarding BWCs are still evolving across policing contexts the findings of this study must be contextualized in its limitations. First, like any cross-sectional design, the study is vulnerable to both missingness and confounding effects. While the study has a healthy response rate of 49%, it is possible officers who chose not to respond to the survey have a non-random reason for not responding which might relate to BWC activations and could bias the reported results. Relatedly, while both the job function model and the supported model report adjusted r-squared statistics of close to 0.5, a confounding unmeasured variable cannot be discounted from any cross-sectional study, and caution in interpreting the results outside of the study context is warranted.

In line with the broad research questions provoked by Young and Ready's longitudinal findings (2016), this study provides empirical evidence that factors outside personal attitudes provide the most explanatory power for understanding how often an officer activates their BWC. However, that policy direction relies on good agency policy. The agency where this study is located has a BWC policy with a strong bias towards recording interactions between officers and the public. In the context of BWC studies, the policy would be considered a "mandatory activation" one, as opposed to a "discretionary activation" policy (see both Ariel, Sutherland, et al., 2018; Young & Ready, 2016). Since the study agency implemented BWCs, command staff estimate there have been less than five sustained allegations that an officer did not activate their BWC when they should have. With that in mind, porting the findings of these studies to agencies with a more discretionary policy, or significantly higher activation non-compliance, is not recommended until further research can establish replicability in that setting.

A third limitation of this study is in the operationalization of the dependent variable. It is theoretically possible, though technically infeasible, to establish a ratio rather than a count variable to measure BWC activation. In this theoretical counter-factual, researchers could establish a denominator of how often a BWC ought to have been activated and establish a measure against how often the camera was actually activated. In practice, however, this is a fundamentally implausible goal, as establishing the numerator is reasonably uncomplicated while identifying and then measuring the denominator is infeasible for a number of reasons. Problems in denominator measurement have been dubbed the "iceberg phenomenon" in social science

(Schlaud, Brenner, Hoopmann, & Schwartz, 1998, fig. 1, p. 14S) and criminological research (Tregle, Nix, & Alpert, 2018).

In the specific case of BWC activation, the first challenge to the denominator is the nature of police work itself. Officers work in chaotic, fluid environments, and while policy can control for many of the contextual decisions – activate when force is expected to be used, during arrests, but not in hospitals or when interviewing the victim of sexual assault (Adams & Mastracci, 2017) – there is no policy possible which can predict all situations all the time. This reality may at least partly explain that the sole officer perception to attain significance in the results is the impact of BWCs on professional discretion.

Any policy which grants any discretion to officers in BWC activation neatly confounds researcher intent to measure how often a camera should have been activated. While maybe such a count could be established by a researcher for a single officer in a single shift during a ride-along, post-hoc quantitative analysis does not allow for even establishing the most basic definition for such a denominator. The second, sharper edge lurking below the surface of the iceberg is that policy change in BWCs is relatively constant at this time, and best-practices even within a single agency can shift unexpectedly in response to local events. Such an event did take place before this study and resulted in additional discretionary language being added to the agency's BWC activation policy. A final problem is attempting to generalize best activation policy across agencies, which is unrealistic and ignores the underlying structural reasons for the balkanization of U.S. policing. Agencies are ideally responsive to their communities, each of which has particular considerations, desires, and demands for their police forces generally, and BWC policy specifically.

Given these denominator problems, this study forgoes its measure and instead constructs a series of models that attempt to capture the intended benefits of an accurate denominator through inference. The benefits of an accurate denominator should not be forgone, and through accurate measures of the number of calls, involvement in use-of-force situations, the number of arrests, experience level, and job assignment an adequate proxy of the environmental variables likely to influence how often a BWC ought to have been activated is established. Still, the mix of proxy measures is not the idealized measure itself, and places limits on interpreting the findings reported here.

Future research should be done in larger and multi-site settings to increase the number of observations and test the replicability of the relatively simple model presented here. With over 18,000 agencies with policing powers in the United States alone, the mix of job function and limited perception impacts on BWC activations could likely shift in different contexts. Similarly, comparative international studies are suggested and warranted, especially given the importance of culture on organizations (Hofstede, 1984; Hofstede, Hofstede, & Minkov, 2010; Mastracci & Adams, 2018) in shaping individual employee perception (Yang et al., 2018) and behavior (Triandis, 1989).

7. Conclusion

The results reported here support straight-forward reasoning for why officers activate, or do not activate, their BWCs. Neither underlying demographic characteristics nor variation in officers' attitudes towards BWCs explains how often an officer activates their BWC. Instead,

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officers use the BWCs because agency policy requires them to do so while handling calls, making arrests, and (rarely) using force. When it comes to BWC activations, officers act as principled agents, not principal-agent problems. This study joins a long line of research which has found weak or absent links between officer attitude and behavior (Engel & Worden, 2003; Mastrofski et al., 1994; Meyers et al., 1989; Smith & Klein, 1983; Terrill & Mastrofski, 2002).

While there continue to be no easy answers to explain the mixed results from BWC research, our findings should contribute to the literature by providing preliminary evidence that the failure to capture the intended benefits of the cameras does not fall on the shoulders of individual officers. That is not to say that the institution of policing will not be responsible, but that is a question left to future research. As noted in other works (Epp et al., 2014; S. Maynard-Moody & Musheno, 2012), the impacts of officer discretion are nuanced. While individual officer behavior is better explained by agency policy and legalistic guidance than by individual attitude and bias, the policies themselves can perpetuate inequity, and the juridical bounds may grant so much latitude that they "take on the nature of a farce" (S. Maynard-Moody & Musheno, 2012, p. S18). It is contingent upon the still developing guidance for best-practices related to the deployment and use of BWCs to provide proper guidance to the officers tasked with implementing the cameras. The evidence presented in this study suggests, at least, that officers will implement such policy as Principled Agents.

8. References

Adams, I., & Mastracci, S. (2017). Visibility is a Trap: The Ethics of Police Body-Worn Cameras and Control. *Administrative Theory & Praxis*, *39*(4), 313–328. https://doi.org/10.1080/10841806.2017.1381482

Adams, I., & Mastracci, S. (2018). Police Body-Worn Cameras: Effects on Officers' Burnout and Perceived Organizational Support. *Police Quarterly*, 1098611118783987. https://doi.org/10.1177/1098611118783987

Alpert, G. P., & Dunham, R. G. (2004). *Understanding police use of force: Officers, suspects, and reciprocity*. Cambridge University Press.

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*(3), 509–535.

Ariel, B., Newton, M., McEwan, L., Ashbridge, G. A., Weinborn, C., & Brants, H. S. (2018). Reducing Assaults Against Staff Using Body-Worn Cameras (BWCs) in Railway Stations. *Criminal Justice Review*, 0734016818814889.

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*, *12*(3), 453–463.

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*, *13*(6), 744–755.

Ariel, B., Sutherland, A., Henstock, D., Young, J., Drover, P., Sykes, J., … Henderson, R. (2018). Paradoxical effects of self-awareness of being observed: testing the effect of police body-worn cameras on assaults and aggression against officers. *Journal of Experimental Criminology*, *14*(1), 19–47.

Ariel, B., Sutherland, A., Henstock, D., Young, J., & Sosinski, G. (2017). The deterrence spectrum: Explaining why police body-worn cameras 'work'or 'backfire'in aggressive police–public encounters. *Policing: A Journal of Policy and Practice*, *12*(1), 6–26.

Ariel, B., Sutherland, A., & Sherman, L. W. (2018). Preventing treatment spillover contamination in criminological field experiments: the case of body-worn police cameras. *Journal of Experimental Criminology*, 1–23.

Bayley, D. H. (2011). Et tu brute: are police agencies managed better or worse than universities? *Police Practice and Research*, *12*(4), 313–316.

Beccaria, C. (1764). *On crimes and punishments*.

Berry, W. D., Berry, W. D., Feldman, S., & Stanley Feldman, D. (1985). *Multiple regression in practice*. Sage.

651 Braga, A. A., Barao, L., McDevitt, J., & Zimmerman, G. (2018). *The Impact of Body-*
652 *Worn Cameras on Complaints Against Officers and Officer Use of Force Incident Reports:*
653 *Preliminary Evaluation Findings*. Unpublished Manuscript, Boston, MA.

654 Braga, A. A., Sousa, W. H., Coldren Jr, J. R., & Rodriguez, D. (2018). The Effects of
655 Body-Worn Cameras on Police Activity and Police-Citizen Encounters: A Randomized
656 Controlled Trial. *Journal of Criminal Law and Criminology*, *108*(3), 511.

657 Crank, J. P. (2014). *Understanding police culture*. Routledge.

658 Davis, K. C. (1975). *Police discretion*. West Publishing Company.

659 Dilulio Jr, J. D. (1994). Principled agents: The cultural bases of behavior in a federal
660 government bureaucracy. *Journal of Public Administration Research and Theory*, *4*(3), 277–318.

661 Ellis, T., Jenkins, C., & Smith, P. (2015). Evaluation of the introduction of personal issue
662 body worn video cameras (Operation Hyperion) on the Isle of Wight: Final report to Hampshire
663 Constabulary.

664 Engel, R. S., & Worden, R. E. (2003). POLICE OFFICERS' ATTITUDES, BEHAVIOR,
665 AND SUPERVISORY INFLUENCES: AN ANALYSIS OF PROBLEM SOLVING.
666 *Criminology*, *41*(1), 131–166.

667 Epp, C. R., Maynard-Moody, S., & Haider-Markel, D. P. (2014). *Pulled over: How police*
668 *stops define race and citizenship*. University of Chicago Press.

669 Fouche, A. (2014). Officer attitudes on deployment of body-worn cameras in the
670 University of Georgia Police Department Patrol Division. *Campus Law Enforcement Journal*,
671 *44*(3), 21–28.

672 Fridell, L., & Lim, H. (2016). Assessing the racial aspects of police force using the
673 implicit-and counter-bias perspectives. *Journal of Criminal Justice*, *44*, 36–48.

674 Gaub, J. E., Choate, D. E., Todak, N., Katz, C. M., & White, M. D. (2016). Officer
675 perceptions of body-worn cameras before and after deployment: A study of three departments.
676 *Police Quarterly*, *19*(3), 275–302.

677 Gaub, J. E., Todak, N., & White, M. D. (2018). One Size Doesn't Fit All: The
678 Deployment of Police Body-Worn Cameras to Specialty Units. *International Criminal Justice*
679 *Review*, 1057567718789237.

680 Goetschel, M., & Peha, J. M. (2017). Police perceptions of body-worn cameras. *American*
681 *Journal of Criminal Justice*, *42*(4), 698–726.

682 Goldstein, H. (1963). Police discretion: The ideal versus the real. *Public Administration*
683 *Review*, 140–148.

684 Gramagila, J. A., & Phillips, S. W. (2017). Police Officers' Perceptions of Body-Worn
685 Cameras in Buffalo and Rochester. *American Journal of Criminal Justice*, 1–16.

686 Grossmith, L., Owens, C., Finn, W., Mann, D., Davies, T., & Baika, L. (2015). Police,
687 camera, evidence: London's cluster randomised controlled trial of Body Worn Video. *London,*
688 *UK: College of Policing and the Mayor's Office for Policing and Crime (MOPAC)*.

Headley, A. M., Guerette, R. T., & Shariati, A. (2017). A field experiment of the impact of body-worn cameras (BWCs) on police officer behavior and perceptions. *Journal of Criminal Justice*, *53*, 102–109.

Henstock, D., & Ariel, B. (2017). Testing the effects of police body-worn cameras on use of force during arrests: A randomised controlled trial in a large British police force. *European Journal of Criminology*, *14*(6), 720–750.

Hickman, M. J., Piquero, A. R., & Garner, J. H. (2008). Toward a national estimate of police use of nonlethal force. *Criminology & Public Policy*, *7*(4), 563–604.

Hofstede, G. (1984). *Culture's consequences: International differences in work-related values* (Vol. 5). sage.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the Mind* (3rd ed.). New York: McGraw-Hill.

Huff, J., Katz, C. M., & Webb, V. J. (2018). Understanding police officer resistance to body-worn cameras. *Policing: An International Journal*, *41*(4), 482–495.

Israel, G. D., & Taylor, C. L. (1990). Can response order bias evaluations? *Evaluation and Program Planning*, *13*(4), 365–371.

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*(6), 549–556.

Jennings, W. G., Fridell, L. A., Lynch, M., Jetelina, K. K., & Reingle Gonzalez, J. M. (2017). A quasi-experimental evaluation of the effects of police body-worn cameras (BWCs) on response-to-resistance in a large metropolitan police department. *Deviant Behavior*, *38*(11), 1332–1339.

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*(6), 480–486.

Katz, C. M., Choate, D. E., Ready, J. R., & Nuño, L. (2014). Evaluating the impact of officer worn body cameras in the Phoenix police department. *Phoenix, AZ: Center for Violence Prevention & Community Safety, Arizona State University*.

Kerrison, E. M., Cobbina, J., & Bender, K. (2018). Stop-gaps, lip service, and the perceived futility of body-worn police officer cameras in Baltimore City. *Journal of Ethnic & Cultural Diversity in Social Work*, 1–18.

Kyle, M. J., & White, D. R. (2017). The impact of law enforcement officer perceptions of organizational justice on their attitudes regarding body-worn cameras. *Journal of Crime and Justice*, *40*(1), 68–83.

Lafayette Group. (2015). *Major Cities Chiefs and Major County Sheriffs Survey of Technology Needs—Body Worn Cameras* (Report prepared for the Major Cities Chiefs and Major

727 County Sheriffs Associations) (pp. 1–49). Retrieved from
728 https://assets.bwbx.io/documents/users/iqjWHBFdfxIU/rvnT.EAJQwK4/v0

729 Lawshe, N. L., Burruss, G. W., Giblin, M. J., & Schafer, J. A. (2018). Behind the lens:
730 police attitudes toward body-worn cameras and organizational justice. *Journal of Crime and*
731 *Justice*, 1–20.

732 Lipsky, M. (2010). *Street-level bureaucracy, 30th ann. Ed.: dilemmas of the individual in*
733 *public service*. Russell Sage Foundation.

734 Lum, C. M., Koper, C. S., Merola, L. M., Scherer, A., & Reioux, A. (2015). *Existing and*
735 *ongoing body worn camera research: Knowledge gaps and opportunities* (pp. 1–30). George
736 Mason University. Retrieved from http://cebcp.org/wp-
737 content/technology/BodyWornCameraResearch.pdf

738 Lum, C. M., Stoltz, M., Koper, C. S., & Scherer, J. A. (2019). Research on Body-Worn
739 Cameras: What We Know, What We Need to Know. *Criminology and Public Policy*, *18*(1), 1–29.

740 Mastracci, S., & Adams, I. (2018). Is Emotional Labor Easier in Collectivist or
741 Individualist Cultures? An East–West Comparison: *Public Personnel Management*.
742 https://doi.org/10.1177/0091026018814569

743 Mastrofski, S. D. (2004). Controlling street-level police discretion. *The Annals of the*
744 *American Academy of Political and Social Science*, *593*(1), 100–118.

745 Mastrofski, S. D., Ritti, R. R., & Snipes, J. B. (1994). Expectancy theory and police
746 productivity in DUI enforcement. *Law and Society Review*, 113–148.

747 Maynard-Moody, S., & Musheno, M. (2012). Social equities and inequities in practice:
748 Street-Level workers as agents and pragmatists. *Public Administration Review*, *72*(s1), S16–S23.

749 Maynard-Moody, S. W., Musheno, M., & Musheno, M. C. (2003). *Cops, teachers,*
750 *counselors: Stories from the front lines of public service*. University of Michigan Press.

751 McLean, K., Wolfe, S. E., Chrusciel, M. M., & Kaminski, R. J. (2015). *Body-Worn*
752 *Cameras in South Carolina: Law Enforcement Executives' Views Concerning Use, Policies, and*
753 *Outcomes* (pp. 1–38). Colombia: University of South Carolina. Retrieved from
754 https://sc.edu/study/colleges_schools/artsandsciences/criminology_and_criminal_justice/docume
755 nts/2015_census_report.pdf

756 Meyers, A. R., Heeren, T., & Hingson, R. (1989). Discretionary leniency in police
757 enforcement of laws against drinking and driving: Two examples from the state of Maine, USA.
758 *Journal of Criminal Justice*, *17*(3), 179–186.

759 Miller, G. J. (2005). The political evolution of principal-agent models. *Annu. Rev. Polit.*
760 *Sci.*, *8*, 203–225.

761 Nagin, D. S. (2013). Deterrence: A review of the evidence by a criminologist for
762 economists. *Annu. Rev. Econ.*, *5*(1), 83–105.

763 Newell, B., & Greidanus, R. (2017). Officer Discretion and the Choice to Record: Officer
764 Attitudes Towards Body-Worn Camera Activation.

765 Owens, C., & Finn, W. (2017). Body-Worn Video through the Lens of a Cluster
766 Randomized Controlled Trial in London: Implications for Future Research. *Policing: A Journal*
767 *of Policy and Practice*, *12*(1), 77–82.

768 Paoline III, E. A., & Terrill, W. (2007). Police education, experience, and the use of force.
769 *Criminal Justice and Behavior*, *34*(2), 179–196.

770 Pelfrey Jr, W. V., & Keener, S. (2016). Police body worn cameras: a mixed method
771 approach assessing perceptions of efficacy. *Policing: An International Journal of Police*
772 *Strategies & Management*, *39*(3), 491–506.

773 Peterson, B. E., Yu, L., La Vigne, N., & Lawrence, D. S. (2018). *The Milwaukee Police*
774 *Department's Body-Worn Camera Program* (pp. 1–11). Washington, D.C.: Urban Institute.
775 Retrieved from https://www.urban.org/research/publication/milwaukee-police-departments-
776 body-worn-camera-program

777 Rhoades, L., & Eisenberger, R. (2002). Perceived organizational support: a review of the
778 literature. *Journal of Applied Psychology*, *87*(4), 698.

779 Rowe, M. (2007). Rendering visible the invisible: police discretion, professionalism and
780 decision-making. *Policing & Society*, *17*(3), 279–294.

781 Schaible, L. M. (2018). The impact of the police professional identity on burnout.
782 *Policing: An International Journal of Police Strategies & Management*, *41*(1), 129–143.

783 Schlaud, M., Brenner, M. H., Hoopmann, M., & Schwartz, F. W. (1998). Approaches to
784 the denominator in practice-based epidemiology: a critical overview. *Journal of Epidemiology*
785 *and Community Health (1979-)*, 13S–19S.

786 Sklansky, D. A. (2005). Not your father's police department: Making sense of the new
787 demographics of law enforcement. *J. Crim. L. & Criminology*, *96*, 1209.

788 Sklansky, D. A. (2007). Seeing blue: Police reform, occupational culture, and cognitive
789 burn-in. In *Police Occupational Culture* (pp. 19–45). Emerald Group Publishing Limited.

790 Skolnick, J. H. (2008). Enduring issues of police culture and demographics. *Policing &*
791 *Society*, *18*(1), 35–45.

792 Smith, D. A., & Klein, J. R. (1983). Police agency characteristics and arrest decisions.
793 *Evaluating Performance of Criminal Justice Agencies*, *19*, 63–98.

794 Smykla, J. O., Crow, M. S., Crichlow, V. J., & Snyder, J. A. (2016). Police body-worn
795 cameras: Perceptions of law enforcement leadership. *American Journal of Criminal Justice*,
796 *41*(3), 424–443.

797 Stith, S. M. (1990). Police response to domestic violence: The influence of individual and
798 familial factors. *Violence and Victims*, *5*(1), 37.

799 Stratton, M., Clissold, P., & Tuson, R. (2015). *Body Worn Video: Considering the*
800 *Evidence: Final Report of the Edmonton Police Service Body Worn Video Pilot Project.*
801 Edmonton, AB, Canada: Edmonton Police Service. Retrieved from
802 https://issuu.com/edmontonpolice/docs/bwv_final_report

 doi:10.20944/preprints201901.0061.v1

Tankebe, J., & Ariel, B. (2016). Cynicism Towards Change: The Case of Body-Worn Cameras Among Police Officers.

Terrill, W., & Mastrofski, S. D. (2002). Situational and officer-based determinants of police coercion. *Justice Quarterly*, *19*(2), 215–248.

Toronto Police Service. (2016). *Body-worn Cameras: A Report on the Findings of the Pilot Project to Test the Value and Feasibility of Body-Worn Cameras for Police Officers in Toronto* (p. 101). Toronto, ON, Canada. Retrieved from http://www.tpsb.ca/component/jdownloads/send/40-body-worn-cameras/534-toronto-police-service-bwc

Tregle, B., Nix, J., & Alpert, G. P. (2018). Disparity does not mean bias: making sense of observed racial disparities in fatal officer-involved shootings with multiple benchmarks. *Journal of Crime and Justice*, *0*(0), 1–14. https://doi.org/10.1080/0735648X.2018.1547269

Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, *96*(3), 506.

Tummers, L., & Bekkers, V. (2014). Policy implementation, street-level bureaucracy, and the importance of discretion. *Public Management Review*, *16*(4), 527–547.

U.S. Census Bureau. (2017). Population. Retrieved December 18, 2018, from https://www.census.gov/topics/population.html

Wasserman, H. M. (2014). Moral panic and body cameras. *Wash. UL Rev.*, *92*, 831.

White, M. D. (2014). *Police Officer Body-Worn Cameras: Assessing the Evidence.* (pp. 1–60). Washington, DC: Office of Community Oriented Policing Services. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.683.3623

White, M. D., Gaub, J. E., & Todak, N. (2017). Exploring the potential for body-worn cameras to reduce violence in police–citizen encounters. *Policing: A Journal of Policy and Practice*, *12*(1), 66–76.

White, M. D., Todak, N., & Gaub, J. E. (2018). Examining body-worn camera integration and acceptance among police officers, citizens, and external stakeholders. *Criminology & Public Policy*.

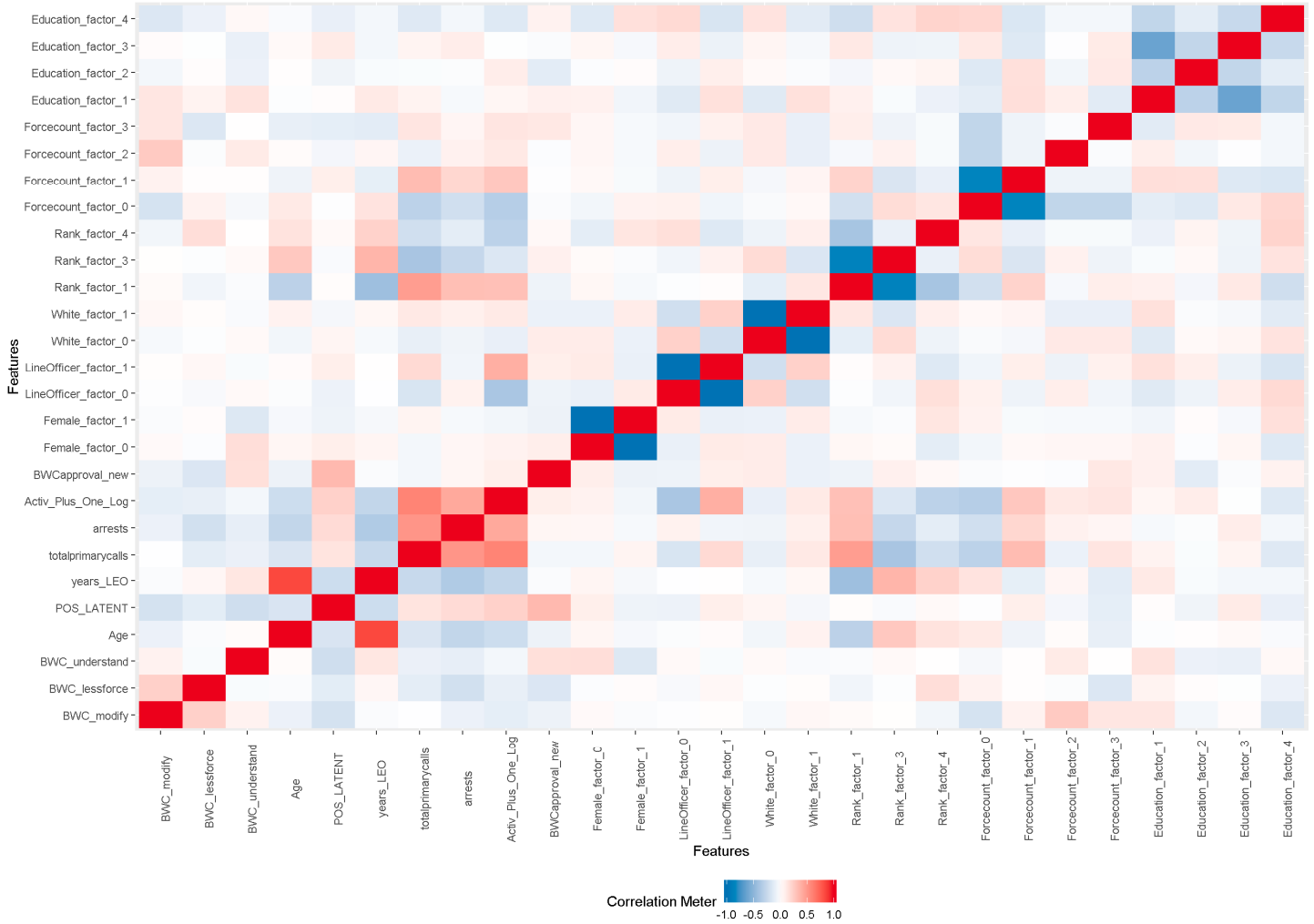
Yang, S.-B., Guy, M. E., Azhar, A., Hsieh, C.-W., Lee, H. J., Lu, X., & Mastracci, S. (2018). Comparing apples and manzanas: instrument development for cross-national analysis of emotional labour in public service jobs. *International Journal of Work Organisation and Emotion*, *9*(3), 264–282.

Yokum, D., Ravishankar, A., & Coppock, A. (2017). *Evaluating the Effects of Police Body-Worn Cameras: A Randomized Controlled Trial*. LAB@ DC.

Young, J. T., & Ready, J. T. (2016). A longitudinal analysis of the relationship between administrative policy, technological preferences, and body-worn camera activation among police officers. *Policing: A Journal of Policy and Practice*, *12*(1), 27–42.

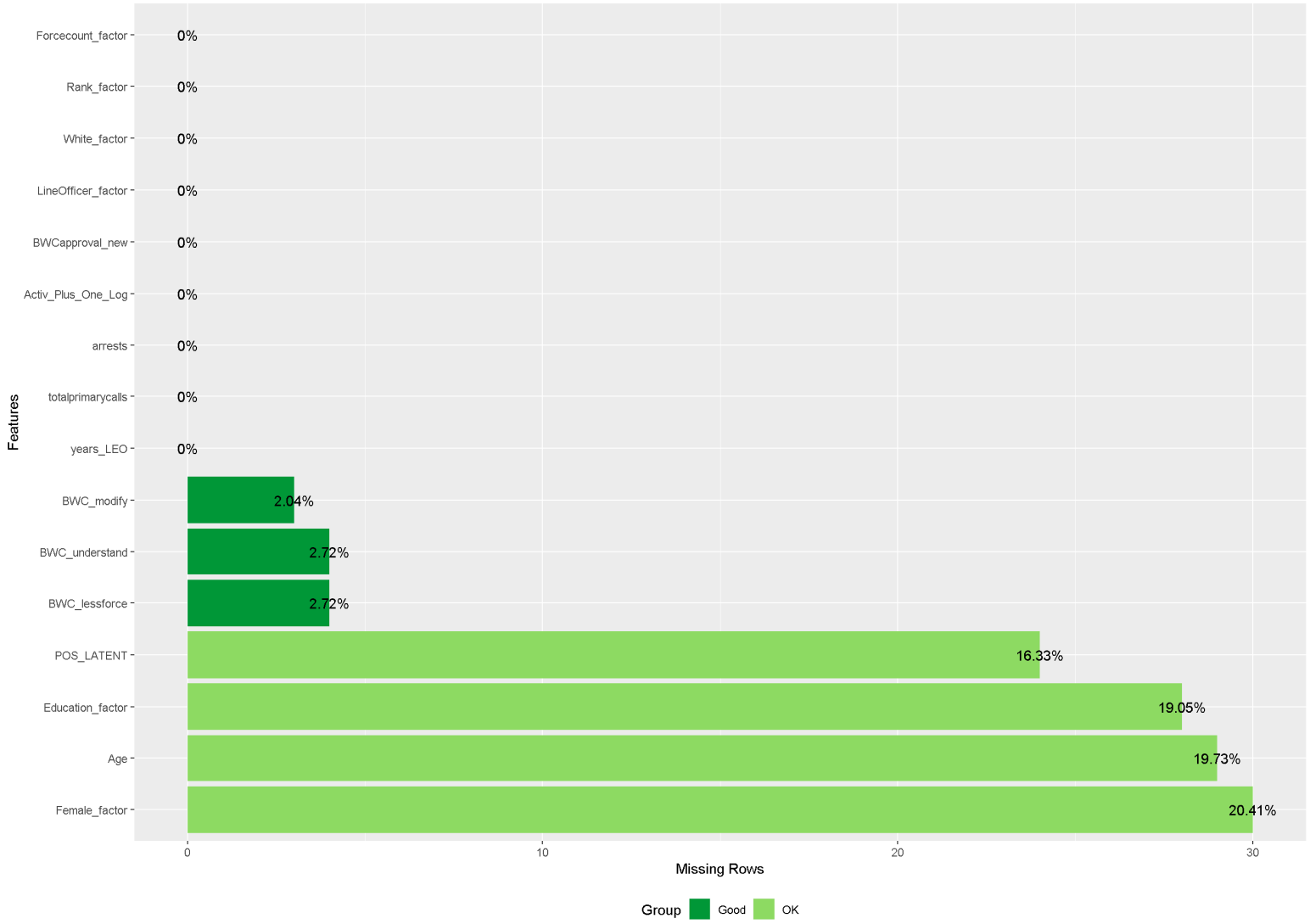
9. Appendix - Figures

9.1. Figure A1: Correlation Heat Map



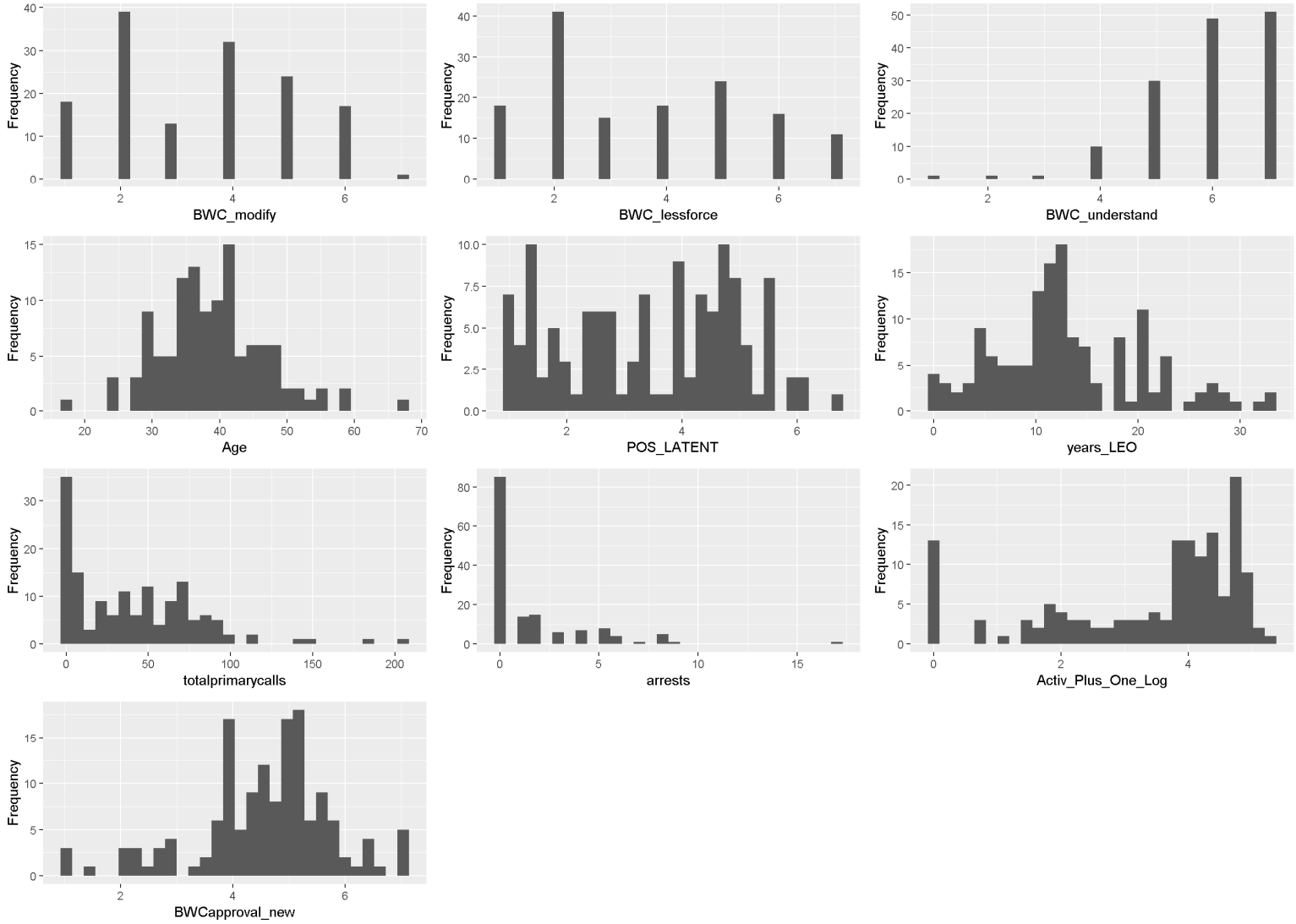
doi:10.20944/preprints201901.0061.v1

9.2. Figure A2: Data Missingness



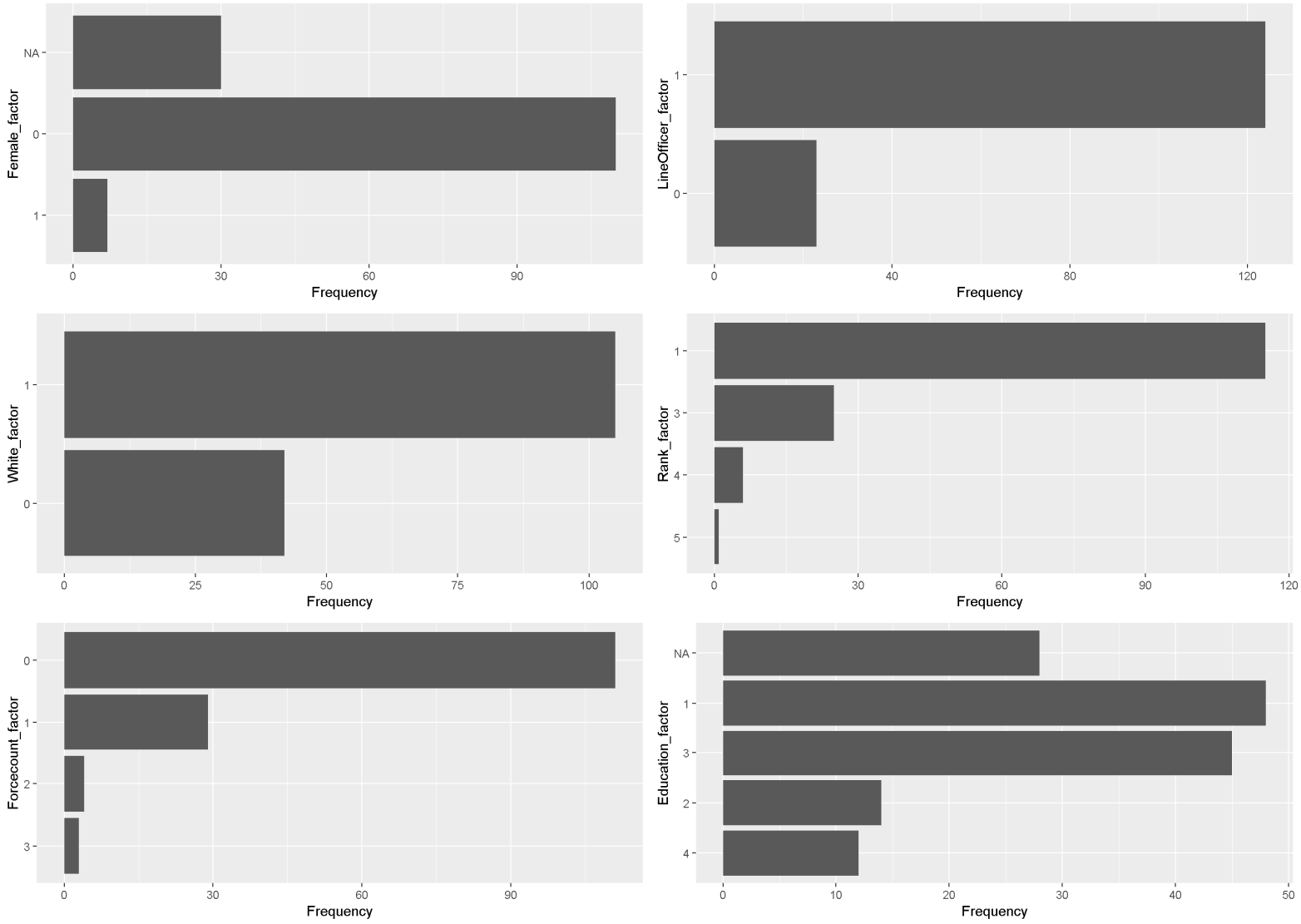
doi:10.20944/preprints201901.0061.v1

9.3. Figure A3: Continuous Variable Univariate Distribution



doi:10.20944/preprints201901.0061.v1

9.4. Figure A4: Discrete Variable Univariate Distribution



doi:10.20944/preprints201901.0061.v1

9.5. Individual Items Comprising Summed Constructs

A. *Perceived Organizational Support* ($\alpha = 0.959$)

"The law enforcement agency I work for…"

1. Values my contribution to its success.
2. Considers my best interests when it makes decisions that affect me.
3. Values my opinions.
4. Takes pride in my work accomplishments.
5. Cares about my general satisfaction at work.
6. Provides help and support when I have a problem.
7. Strongly considers my goals and values when making decisions that affect me.

B. *BWCs are Positive* ($\alpha = 0.883$)

1. My agency should adopt BWCs for all front-line police officers.
2. Wearing a BWC would change my behavior for the better.
3. Wearing a BWC would change other officers' behavior for the better.
4. BWCs would improve my evidence collection.
5. BWCs would improve my recollection of events.
6. Reviewing BWC video after an incident would help me become a better police officer.
7. Reviewing BWC video after an incident would help me identify ways to improve interactions with citizens.
8. Reviewing BWC video after an incident would help me identify issues I may need improvement on.

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