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The Achilles Heel of Police Body-Worn Cameras: Understanding the Factors That Influence Variation in Body-Worn Camera Activation

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ABSTRACT

While body-worn cameras (BWCs) are increasingly becoming commonplace in police organizations, researchers and policymakers still know little about their implementation in the field and the factors related to their actual use. Using data collected from 146,601 incidents in Phoenix, Arizona, the present study examines the prevalence and correlates of BWC activation. In doing so, we examine the impact of incident-level factors, officer characteristics, neighborhood context, and changes in BWC activation policy on whether an officer who is assigned to wear a BWC activates their camera during a police-citizen contact. Cross-classified models are used to simultaneously assess the influence of factors at multiple levels of explanation. Our analysis suggests that a wide variety of individual, situational, organizational, and neighborhood factors are related to an officer’s decision to activate their camera. BWC policy that confines, structures, and checks officer activation has a robust impact on an officer’s decision to activate their BWC.

KEYWORDS

Police; body-worn camera; BWC; activation; compliance

Introduction

Over the last decade, police body-worn cameras (BWCs) have been rapidly adopted by police agencies across the United States (Lum et al., 2020). BWCs are intended to provide police organizations with the opportunity to increase the transparency of what has largely been considered to be low visibility decision-making. However, the positive impact of police BWCs depends on officers activating their cameras. For example, Hedberg et al. (2017) estimated that the presence of BWCs
reduced the chance of a complaint by about 62%, but full activation compliance would have resulted in a 96% reduction in complaints in their evaluation of BWC’s deployed by the Phoenix Police Department (PPD). A later study in Phoenix confirmed these findings, indicating that BWC activation significantly reduced the likelihood of a complaint beyond BWC assignment alone (Huff et al., 2020a). Ariel et al. (2016) reported similar results for use of force when using data from a diverse sample of police agencies worldwide. The lack of BWC evidence available for use in court has also been found to have a deleterious effect on prosecutor’s decisions to charge suspects and on conviction rates (Morrow et al., 2016).

Reviews of the research have also argued that when officers fail to activate their BWCs, it can result in a loss of police legitimacy in general and subvert an agency’s capacity to hold officers accountable (Lum et al., 2019; White & Malm, 2020). In Atlanta, for example, an audit of police BWC compliance reported that in the six month study period officers failed to activate their camera in two-thirds of the incidents where a BWC was required to be activated. City officials agreed that the problem could result in a loss of faith in the police (Deere, 2018). Similar results were reported in an audit conducted in the city of Minneapolis following the death of Justine Damond by Officer Noor who did not activate his BWC until after the shooting (Williams, 2017). The audit revealed that BWC footage was not available in over 25% of use of force incidents, which are required to be recorded (City of Minneapolis, 2017). The shooting, and the lack of BWC footage associated with the shooting, resulted in protests and the resignation of the chief of police (Wootson, 2017).

Unfortunately, little is known about how often the police comply with policies and procedures that require them to activate their BWC, and even less is known about the factors that influence their activation decisions. Recent research reports suggest that activation rates are often modest to low and vary greatly. For example, research in Mesa, Arizona has shown that officers activate their cameras in about 60% of required incidents (Ready & Young, 2015), compared to 54% in Long Beach, California (Lawrence et al., 2019), and 32% in Phoenix, Arizona in 2013–14 (Katz et al., 2015) and 70% in (PPD), 2018 (Huff et al., 2020a). The New Orleans Police Department, which is under a federal consent decree, have reported activation rates as high as 97 to 99% (Looney, 2016). There has been little research, however, examining the range of factors that might be responsible for this variation across individual officers or across police organizations (for exceptions see Adams et al., 2021; Lawrence et al., 2019).

1 A consent decree “is a police reform that results from a federal law suit and are supervised by a federal judge who can punish the police department if it does not implement the required reforms” (Walker & Katz, 2022: 584). Under a federal consent decree, NOPD was required to implement BWCs and ensure officers activated those cameras. Given the additional federal oversight in ensuring the required reform was implemented we might expect that activation rates would be higher among agencies operating under such a consent decree.
Prior research on police discretion has shown that officer-level factors (e.g. age, gender, years of experience) are significantly related to police decision-making. Namely, although all police officers have discretion, seminal studies in policing have identified variation in officer approaches to their work (Muir, 1977). Further, several meta-analyses and reviews have confirmed the importance of assessing the influence of officer-level factors on officer decision-making (Riksheim & Chermak, 1993). As such, it should not be surprising that early research on BWC activation compliance has suggested that there are notable differences at the officer level, and that officer-level factors might help explain differences in BWC activation compliance rates. Lawrence et al. (2019) examined BWC use in Anaheim, California, and reported substantial variation in activation rates between officers. The officer with the highest compliance rate activated their BWC about 71% of the time over the study period, compared to less than 5% for the officers with the lowest compliance rates. The authors estimated that about 30% of the variation in activation rates was at the officer level (Lawrence et al., 2019: 347).

Two prior studies conducted in Montreal, Canada, and Queensland, Australia, examined whether this variation might be explained by officer-level characteristics. Both studies similarly reported that female and older or more experienced officers were less likely to activate their BWC (Boivin & Gendron, 2021; Martain et al., 2020). Neither study speculated about why these characteristics might have impacted officer activation rates. However, Lawrence et al. (2019) reported that age and officer experience were unrelated to BWC activation in Anaheim. In addition to relying on demographic characteristics, Adams et al. (2021) examined the relationship between police officer’s and manager’s attitudes about BWCs and BWC activation over a 30-day period in an anonymized small to medium-sized police agency. They reported that officer demographic characteristics and attitudes about BWCs had little impact on activation compared to job function.

Other researchers have examined the role of officer familiarity with BWC technology. While some have posited that the longer an officer is assigned to wear a BWC and becomes more familiar with the technology, that they will be more likely to activate the BWC (Lawrence et al., 2019), others suggest that higher activation rates over time might be the result of officers increased understanding of the effectiveness of the technology (Adams & Mastracci, 2019). Lawrence et al. (2019) reported that during the first month BWCs were deployed in Anaheim, officers only activated their BWC about 4% of the time on average, but activation rates grew to about 54% within 6-months of deployment. Not as pronounced, similar results were observed in Australia (Martain et al., 2020). Conversely, in Phoenix, Katz et al. (2015) reported that activation rates declined precipitously over the study period, from about 42% two months after BWCs were deployed to about 13% ten months after their deployment.

A large body of policing research also indicates that incident-level characteristics exert strong influences on police use of discretion (Cooper et al., 2014). Officers are
expected to respond to a wide range of incidents, and officers might perceive some types of incidents as more critical to document using a BWC than others (Huff et al., 2021). A few studies have examined incident level characteristics and their impact on BWC activation. Some studies have reported that officers are more likely to activate their BWC in incidents involving serious offenses (Boivin & Gendron, 2021) than those involving less serious offenses (Lawrence et al., 2019), and others have noted that some offense types, such as domestic violence, are more likely to result in BWC activation than others (Katz et al., 2015).

How an incident comes to the attention of an officer also appears to influence the probability of activating a BWC. Incidents that involve proactive enforcement (i.e. field initiated stops) are less likely to result in BWC activation than reactive policing (e.g. responding to a call-for-service) (Lawrence et al., 2019). Likewise, incidents with a greater number of bystanders (Ready & Young, 2015) and officers (Boivin & Gendron, 2021) present are more likely to result in activation; as well as incidents with a suspect present (Boivin & Gendron, 2021; Young & Ready, 2015) or when an officer completes a crime report (Boivin & Gendron, 2021). Recent research suggests that these findings align with officer attitudes about the amount of discretion officers should be afforded with respect to activating BWCs as well as their perceptions about how frequently BWCs should be activated (Newell & Greidanus, 2017).

Police culture has also been found to influence officer discretion. Although individual police organizations have their own unique cultures, cultural variation can also emerge across smaller workgroups with distinct working contexts and cultural norms within a department (Ingram et al., 2013). In the case of BWCs, researchers have found that officer perceptions of this technology are related to the attitudes of their peers (Young & Ready, 2015). However, researchers have yet to examine differences in BWC activation across officers belonging to different units within an organization. Assessing differences in activation rates across subunits within an organization is important for identifying and addressing potential cultural barriers to the use of BWCs and for ensuring supervisors are effectively managing their employees to achieve compliance.

In addition to the above, organizational policies have long been viewed as one of the most appropriate mechanisms for regulating police discretion. Through delineating how officers should behave and how they will be held accountable for their actions, these policies are anticipated to influence and improve police behavior. Departmental level explanations include activation and reporting policies, auditing practices, organizational structure, and police culture. A long line of research has demonstrated the influence of organizational factors in police decision-making (Walker & Archbold, 2014); however, the body of literature on organizational factors and policies and their effect on BWC activation has only begun to emerge. White et al. (2018) examined BWC policies among more than 200 police agencies. They reported wide variation in “how departments address the activation issue, stemming from the varying degrees of discretion departments give their officers” (p. 10). In Mesa, Arizona, Young and Ready
(2018) reported that officers were more likely to activate their BWC under the department’s mandatory activation policy (79.5%) than when departmental policy permitted officer discretion (54%). Adams et al. (2021) similarly found that officers who routinely engaged in the types of incidents that involved mandatory BWC activations (e.g. arrests) also had higher rates of BWC activations. While not empirically examined yet, departmental auditing policies and disciplinary procedures might also play a role in increasing BWC compliance. For example, auditing that takes place by personnel within a specialized unit might possess greater skill and resources to ensure activation compliance than auditing conducted by patrol sergeants who have other responsibilities.

Finally, officer use of discretion has also been found to vary across different community contexts. In the case of BWC activation, officers may use BWCs to document their behaviors and the behaviors of the individuals they interact with in different ways, depending on the characteristics of the neighborhoods in which they work. This variation could lead to differential activation due to either a desire to document evidence in high crime neighborhoods or to avoid documenting officer behaviors in neighborhoods in which an officer might be tempted to misbehave. Some theories of police behavior posit that officer use of authority varies with crime across different contexts (e.g. Klinger, 1997), which could influence BWC activation if officers are attempting to document criminal behavior or circumstances that might justify an officer’s use of force. Officers might also be more likely to activate their BWC if they have increased concern about individuals in some neighborhoods complaining about the police or their behavior and desire to capture contacts between themselves and the public to reduce their risk of exposure to complaints. We are unaware of any prior research examining the specific impact of neighborhood factors on BWC activation.

Current Study

The present study seeks to address the gap in our understanding of BWC activation by bringing together data from a study of police BWCs in Phoenix, Arizona, using data obtained at the incident, officer, and neighborhood level to examine the following three issues. First, we examine the prevalence of BWC activation across different situations, officers, and neighborhood contexts. Second, we assess the impact of BWC activation policies on officer compliance through a natural experiment where officer discretion to activate their BWC was further confined by the police organization during the study period. Third, using multilevel modeling techniques, we examine the simultaneous impact of situational, officer, neighborhood, and policy effects on the likelihood of BWC activation.

This study addresses a crucial gap in the BWC literature. Namely, many researchers have examined the effects of BWCs on outcomes, including use of force, arrest, and citizen complaints, but researchers have not thoroughly examined whether BWCs are actually being used in these encounters. Further, researchers have yet to explore the factors that lead to activation compliance. Understanding whether officers comply with BWC activation policies and the factors that influence that compliance are
key considerations in understanding police discretion in the activation of BWCs and assessing the potential impact of BWCs on the outcomes of police-civilian contacts. These results also provide important policy implications for police agencies to maximize the benefits of BWCs for documenting civilian and officer behavior to enhance evidence and facilitate transparency and accountability.

Methods

Research Setting

Phoenix is the capital of Arizona and is one of the largest cities in the U.S. Phoenix has a population of about 1.7 million residents spread across more than 500 square miles. The median household income is $57,459, and 18% of residents live below the poverty line. In terms of racial/ethnic composition, 42.5% of residents are Non-Hispanic white, 42.6% are Hispanic, and 7.1% are Black (Population estimates, July 1, (PPD), 2019. QuickFacts Phoenix, Arizona, 2020). The PPD is responsible for providing police services to the city of Phoenix and is one of the largest police agencies in the country, employing about 3,000 sworn police officers across seven precincts.

In 2013, the PPD was the first agency to receive Bureau of Justice Assistance (BJA) funding to evaluate the impact of BWCs in a pilot study conducted in Maryvale, one of the seven Phoenix precincts (Katz et al., 2014). The PPD BWC policy was first developed and finalized in April 2013 as part of the pilot study. The BWC policy, which we refer to as a “time of contact” policy, required officers to activate their BWCs any time they arrived at a scene or engaged in an enforcement contact (Katz et al., 2014). This policy was later updated to require officers to activate their BWC upon receiving a call-for-service (PPD, 2018). We refer to this second policy as a “time of mobilization” policy. The second policy was announced to all officers using a department-wide email in August 2017 and went into effect in March, 2018. In essence, the revised policy requires officers to activate their BWC as soon as they receive a call for service in order to ensure that the full scope of a police-civilian interaction is recorded.

Data

The current study uses data collected as part of a second BWC evaluation in the PPD funded by the BJA. As part of this evaluation, BWCs were assigned to 153 Phoenix patrol officers in May 2017. Officers were randomly selected from six of the seven precincts in the PPD. The Maryvale precinct was excluded from the current evaluation because it served as the location for the 2013 pilot study of BWCs in Phoenix (Katz et al., 2014). The assignment of BWCs for the present study occurred during two phases. In the first phase, officers were randomly selected and asked to volunteer to wear a BWC (n = 47). These officers had the option to decline to wear a BWC (n = 96 officers declined; excluded from current analysis). In the second phase, officers were randomly selected and mandated to wear a BWC without the option to decline (n = 89). During the second phase, some officers were nonrandomly selected and were required
to wear a BWC by their precinct commander ($n = 17$). Precinct commanders provided multiple justifications for selecting these officers, with some commanders choosing “troublemakers” to receive BWCs and other commanders choosing their best officers to receive BWCs. Regardless of how a BWC was assigned to an officer, all BWCs used in the current study were deployed on May 24, 2017.

We collected several administrative datasets spanning from May 24, 2017 through November 23, 2018 as part of the study. Computer-aided-dispatch (CAD) data were collected from the PPD Crime Analysis and Research Unit (CARU). The CAD data contain a record of every police-citizen encounter over the study period and are used as the master data. We also collected arrest reports, use of force reports, citizen complaints, and personnel data from CARU, the Professional Standards Bureau of the PPD, and the City of Phoenix Human Resources Department. To identify those incidents that involved a BWC activation, we collected BWC metadata from the PPD Body-Worn Camera Unit. We additionally collected data from the 2016 5-year estimates provided by the American Community Survey of the U.S. Census to examine the influence of neighborhood context, including several measures that have been widely used across prior research (see seminal work by Land et al., 1990). Namely, we collected the percentage of residents living below the poverty line, receiving public assistance, female headed households, racial/ethnic populations, and total population.

**Dependent Variables**

We examine 146,601 individual police encounters involving officers who were assigned to wear a BWC at the time of the incident. The dependent variable is BWC activation. The BWC activation variable was created by merging the BWC metadata with the CAD data to identify those incidents that involved a BWC activation (0 = BWC not activated; 1 = BWC activated, 67.82%).

**Independent Variables**

We examine several independent variables at the incident, officer, neighborhood, and department levels. At the officer level, we include an independent variable for BWC volunteers in each model to control for differences in BWC assignment (0 = mandated to wear a BWC; 1 = volunteered to wear a BWC). We also include independent measures for officer gender (0 = female; 1 = male), race/ethnicity (0 = nonwhite; 1 = white), educational attainment (0 = less than a 4-year degree; 1 = 4-year degree or higher educational attainment), precinct assignment (a series of dummy variables), and the number of years an officer has served as a police officer (a continuous measure).

At the incident level, we include an independent variable that measures whether a call was self-initiated by the officer or was citizen-initiated either through the 911 system or through a citizen approaching an officer for assistance (0 = citizen-initiated contact; 1 = officer-initiated contact). We also included independent variables to account for the type of call an officer was responding to. We collapsed call types into the following categories: violent, property, subject/vehicle stop, and other offenses. Violent
offenses included, for example, assaults and fights (0 = non-violent; 1 = violent). Property offenses included such incidents as burglaries and thefts (0 = non-property; 1 = property). Subject/vehicle stops included traffic stops and pedestrian stops (0 = non-subject/vehicle stop; 1 = subject/vehicle stop). Other offenses are those that do not fit within these other categories, such as welfare checks (0 = non-other; 1 = other). We also account for the outcome of the incident. We include independent variables for arrest, use of force, and citizen complaint. The arrest variable was created by merging the arrest data with the CAD data to identify those incidents that resulted in an arrest (0 = no arrest; 1 = arrest). Our arrest variable includes all official arrests. These include those who were taken into custody as well as those released in the field. The use of force variable was created by merging the use of force reports with the CAD data to identify those incidents that involved officer use of force (0 = no use of force; 1 = use of force). Use of force reporting in the PPD varies by the type of force used and the outcome of the force incident. Use of force at the lower end of the continuum such as soft empty hand techniques, use of restraining devices, and chemical agents do not require a use of force report unless an injury occurs. Use of force reports are required to be completed if the officer uses an electric control device (ECD), intermediate control technique (e.g. hard empty hand, baton, flashlights, canines), carotid control technique, or deadly force (PPD, 2018). The citizen complaint variable was similarly created through merging the citizen complaint data with the CAD data (0 = no complaint; 1 = complaint).

We used census tracts to approximate neighborhoods, which also align with PPD beat boundaries. We include several independent variables to examine the influence of social disorganization, neighborhood racial/ethnic population distributions, violence, and population density, on activation compliance. Exploratory factor analysis was used to create a measure of disorganization at the census tract level from the following variables: % residents living below the poverty line, % unemployed, % receiving public assistance, % who have lived in their current residence for fewer than five years, % renters, and % female-headed households. Each of these measures loads sufficiently onto a single factor (factor loadings from 0.55 to 0.85; eigenvalue = 3.10; α = 0.78). We include separate measures of neighborhood percent Hispanic, percent Black, and population density. We created a violent crime rate at the census tract level by geocoding all of the violent crime incidents reported in the CAD data and spatially merging them with census tracts in ArcMap. We then created a rate by standardizing the number of violent crime incidents to 100,000 residents in each tract. Throughout this paper, we refer to this measure as the violent crime rate.

Finally, we include an independent variable related to BWC policy. The first policy period included incidents that occurred when PPD required a BWC to be activated at the “time of contact” between the officer and citizen (0 = incident occurred

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2 See the Methodological Appendix (supplementary materials) for further coding details
May 2017 through August 2017). The second policy period included incidents that occurred between the time the “time of mobilization” policy was announced and when the “time of mobilization” policy went into effect (1 = incident occurred August 2017 through February, 2018). The third policy period included all incidents that occurred after the “time of mobilization” policy went into effect (2 = incident occurred on or after March, 2018). This enabled us to examine activation compliance under different BWC activation policies.

Analytical Approach

We begin by presenting the descriptive statistics for the 146,601 incidents recorded in the study period. We additionally assess bivariate differences depending upon whether a BWC was activated during a specific encounter. Multicollinearity was examined to ensure that the correlations between the neighborhood-level predictors would not overinflate the standard errors and limit our ability to detect significant effects. The variance inflation factors and condition numbers did not indicate any cause for concern using traditional thresholds (Thompson et al., 2017).

Next, we use a series of logistic regression models to examine the influence of our independent variables of interest at each level of explanation on BWC activation compliance. We first examine the influence of situational characteristics on activation compliance. Then we examine the influence of officer characteristics on BWC activation. Next, we examine the influence of neighborhood-level factors on activation compliance. Finally, we examine whether activation compliance depends on which policy period an incident occurred within. This series of models allows us to examine the independent effects of factors at different levels of explanation on BWC activation.

Finally, due to the complex influences of our independent variables of interest on police discretion, we use cross-classified multilevel models that allow for the simultaneous assessment of factors at each of these levels of explanation – situational, officer, neighborhood, and policy period – on BWC activation while accounting for clustering that occurs within these levels. Essentially, these models address concerns that the immediate outcomes of incidents are clustered within the officers who respond to these events and the neighborhoods in which these incidents take place. Prior researchers have found that these models are useful in understanding influences on police decisions to arrest (Huff, 2021) and assessing the influence of BWCs on officer induced passivity (Wallace et al., 2018). This study examines whether officer decisions to activate their BWCs in individual incidents are related to immediate situational factors, which are cross-nested in responding officers, neighborhoods, and BWC policy periods, due to the fact that the same officers responded to multiple incidents within different neighborhoods and different BWC policy periods.

Results

Beginning with the descriptive and bivariate analyses shown in Table 1, there were notable relationships between BWC activation and factors occurring at each level
of explanation in our study. For instance, BWCs were activated in roughly 75% of violent and property-related incidents, but only about 60% of subject/vehicle stops and other call types (p<.001). BWC activation also varied across officer characteristics. Male and nonwhite officers activated their BWCs in about 70% of the incidents to which they responded (p<.001), a higher rate than female (59%; p<.001) and white (67%; p<.001) officers. BWC activation also varied across neighborhood characteristics and policy periods. For example, the mean neighborhood violence rate in incidents that did not result in BWC activation was 195.62, compared to 184.17 in incidents that did result in BWC activation (p<.001). This could be due to officers needing to act quickly in violent areas, which could inhibit the activation of a BWC if doing so would pose a safety risk for the officer or civilians. During the policy period requiring activation “at time of contact” officers only activated their BWC in about 40% of incidents, a significantly lower level of compliance compared to 73% of incidents following the announcement of a new policy requiring officers to activate their BWCs when they are mobilized to a call for service (p<.001). This level of compliance remained stable at 72% following the enactment of the new activation upon mobilization policy (p<.001, again using the “time of contact” policy as the reference category).

These findings indicate that factors at each hypothesized level of explanation are important for understanding variation in officer compliance with BWC activation policies. The influence of the BWC activation policy variables on the use of this technology in the field are particularly notable. Figure 1 further displays this pattern, showing a substantial increase in BWC activation compliance after the policy change to activation upon mobilization was announced in August 2017, which remained high after the policy change went into effect in March 2018.

Next, we examined the influence of factors at each of our hypothesized levels of explanation (i.e. incident, officer, neighborhood, and policy characteristics) on BWC activation independently using a series of logistic regression models. As shown in Table 2, Model 1, BWCs were significantly less likely to be activated during incidents initiated by the officer themselves, relative to incidents initiated by a civilian request for police services (OR = 0.61; p<.001). The type of incident was also associated with BWC activation, with officers being significantly more likely to activate their BWC during property offenses relative to violent offenses (OR = 1.07; p<.001) and significantly less likely to activate their BWC during subject/vehicle stops (OR = 0.74; p<.001) and other call types (OR = 0.61; p<.001). BWCs were also significantly more likely to be activated during incidents that resulted in arrest (OR = 1.69; p<.001) and those that resulted in an officer’s use of force (OR = 2.35; p<.001). Our analysis indicated that complaints were just as likely to be filed in incidents when a BWC was activated as to when it was not (OR = 1.05; p = .919).
Model 2 in Table 2 examines the relationship between officer-level factors and BWC activation, again revealing several notable findings. Male officers (OR = 1.87; p<.001) and college-educated officers (OR = 1.20; p<.001) were significantly more likely to activate their BWC relative to their female and less educated counterparts. White officers (OR = 0.75; p<.001) and those with fewer years of experience (OR = 0.99;
were significantly less likely to activate their BWCs than those who were nonwhite and more experienced. There was also notable variation in BWC activation across precinct assignments. Officers assigned to some precincts were significantly more likely to activate their BWCs and officers assigned to others were significantly less likely to activate their BWC, relative to those assigned to the Desert Horizon precinct. Officers who volunteered to wear a BWC were significantly less likely to activate their BWC, however, the effect size was small (OR= .97; p=.03).

Model 3 in Table 2 examines the influence of neighborhood-level factors on BWC activation. This model suggests that neighborhood characteristics have a limited influence on BWC activation, with social disorganization and neighborhood percent Black being statistically unrelated to the likelihood of activation. BWCs were somewhat less likely to be activated in neighborhoods with larger Hispanic, relative to white, populations (OR = 0.93; p =.016). Although the relationships between neighborhood levels of violence and population density were statistically significant (p<.001), the magnitude of these effects were negligible (OR = 1.00).

Table 2, Model 4 examines the influence of policy period on BWC activation, finding that BWCs were significantly and substantially more likely to be activated after the policy requiring activation upon being mobilized was announced in August 2017 (OR = 4.15; p<.001) and after this policy change went into effect in March, 2018 (OR = 3.95; p<.001). These findings are consistent with Figure 1 and suggest that the announcement of the policy change requiring activation upon mobilization immediately increased the likelihood of BWC activation, although it appears compliance with this revised policy might have leveled out over time. It is important to note that the adjusted R2 values across all of the models presented in Table 2 are relatively small, ranging
from 0.004 when focusing on neighborhood-level factors to 0.080 when accounting for BWC activation policy period. However, these values should be interpreted cautiously due to the use of logistic regression, which makes it more challenging to estimate the amount of variance explained than linear regression. Given that police decision making is influenced by a wide range of factors that operate at multiple levels of explanation, we suspect that the low explanatory power is due to the focus on factors occurring only at a single level of explanation in these models. To examine a more comprehensive model of factors that influence police decisions to activate their BWCs, we assess the potential for multilevel models to better explain activation.

Table 2. Logistic regression models predicting activation compliance.

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Coef.</th>
<th>SE</th>
<th>OR</th>
<th>p</th>
<th>Model 2</th>
<th>Coef.</th>
<th>SE</th>
<th>OR</th>
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<td>0.019</td>
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<td>1.075</td>
<td>&lt;0.001</td>
<td>Property</td>
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<td>0.018</td>
<td>1.867</td>
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</tr>
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Given our findings that situational, officer, neighborhood, and organizational policy changes all influenced the likelihood of an officer activating their BWC, we used cross-classified models to assess the simultaneous influence of these factors. We first examined an unconditional model to assess the variance components and establish that BWC activation is indeed significantly influenced by each level of explanation. These results indicate that BWCs were significantly associated with each factor, as shown in Model 1 of Table 3. As shown by the intra-class correlation coefficients, while little
variation in BWC activation was attributable to individual responding officers (ICC = .021), variation in activation was more strongly related to the neighborhood in which an incident occurred (ICC = .112) and the policy period an incident occurred within (ICC = .111).

We then estimated a fully conditional model including all of our independent variables of interest. Consistent with the logistic regression results, BWC activation was significantly associated with every situational factor examined, with the exception of citizen complaints. Male officers were again significantly more likely to activate their BWC relative to their female counterparts (OR = 1.80; p<.001) and compliance rates significantly varied across precincts. However, the influence of whether the officer volunteered to wear a BWC, race/ethnicity, educational attainment, and years of service became not statistically significant. At the neighborhood level, percent Hispanic was significantly and negatively associated with BWC activation (OR = 0.56; p<.001). Each unit increase in neighborhood percent Hispanic decreased the odds of BWC activation by 44%, holding all other variables constant. Population density was again significantly associated with BWC activation, although the magnitude remained negligible (OR = 1.00; p<.001). After the inclusion of the predictors at each level of explanation, the ICC’s for individual responding officers and neighborhoods decreased slightly, but the ICC for policy period increased from .111 to .132.

Discussion

While BWCs are increasingly becoming commonplace in police organizations across the United States, researchers and policymakers still know little about their implementation in the field and the factors related to their actual use. We examined the prevalence and correlates of BWC activation using data collected from 146,601 incidents in Phoenix, Arizona across different incident characteristics, officers, policy periods, and neighborhood contexts. Our goal was to understand the relative influence of these different factors on officer discretion to activate their BWC. We used cross-classified models to assess the simultaneous influence of these factors, and our results provide us with an increased understanding of how policymakers might focus their efforts to increase BWC activation.

Our findings suggest that departmental policy is perhaps the most important factor in determining BWC activation. BWC activation rates increased from about 40% to about 73% following the announcement and implementation of a BWC policy that required immediate BWC activation upon being mobilized for a call for service. Prior research has similarly demonstrated a robust relationship between administrative rulemaking and police behavior (Walker, 1993). Our findings show that the PPDs policy, which further confined and structured officer discretion by specifying that officers were required to activate their BWC when mobilized, had a significant and large effect on BWC activation, with the odds of BWC activation increasing by 315% after the policy change was announced and by 295% after the policy change went into effect, relative to the original BWC policy, which only required activation following arrival.
It is also important to note that the departmental policy requires lieutenants to randomly inspect six body-worn camera videos each month to ensure BWC activation compliance among their officers (PPD, 2019). This limited amount of review and oversight might be part of the reason that BWCs are not activated in approximately 27% of incidents. While systematic reviews of BWC policies suggest that most U.S. agencies with BWCs have a policy related to activation, these reviews have not examined administrative rules with great specificity on how they confine, structure, and check officer discretion (White et al., 2018; see also Saulnier et al., 2021). Our findings suggest that further research is needed on the specific policies and procedures that guide police discretion on BWC activation and how these policies and procedures impact officer activation rates.

In addition to BWC activation policies, the characteristics of individual incidents also influenced officer decisions to activate. Across models, officers were less likely to activate their BWC during incidents they initiated and during subject/vehicle stops. Given the potential for these stops to result in critical incidents, such as the proactive
traffic stop of Sandra Bland, which ultimately led to her suicide in a Texas jail, increased efforts to ensure compliance with activation policies during these types of interactions are needed. Further, BWCs were significantly more likely to be activated during incidents involving arrest and use of force, consistent with prior research (Adams et al., 2021). This is an encouraging finding as BWC footage of these encounters can be used to provide evidentiary value in court and to ensure transparency and accountability for officer use of force behaviors.

We found that individual officer-level factors also account for a substantial proportion of the variation in BWC activation compliance. Our results indicated that females were significantly less likely to activate their BWCs than males (58.76% versus 69.01%). Our findings are contrary to Mrozla and Hellwege (2020), who relied on organizational surveys of a nationwide sample of police agencies and reported that police agencies with higher proportions of female officers were significantly more likely to adopt BWCs. They interpreted their findings as suggesting that female police officers accept innovation and change, such as adopting BWCs. Our findings, however, along with others (Boivin & Gendron, 2021; Martian et al., 2020), suggest otherwise. While researchers in the past have not provided an explanation for this relationship, research by Rabe-Hemp (2008) reported that female officers are less comfortable with extreme, forceful behavior and are more comfortable with tempered, less forceful behavior. Female police officers might perceive the activation of BWCs as a more invasive and intrusive (i.e. extreme) behavior than male officers. It is also possible that female officers could perceive BWCs as limiting their ability to respond to incidents using alternatives to arrest or other discretionary resolutions. Future research is needed to understand whether mediating factors might influence the relationship between officer gender and BWC activation compliance.

We found that officer ethnicity, education, and tenure were not significantly related to BWC activation once situational, neighborhood, and policy-related factors were accounted for. As noted above, prior research by Boivin and Gendron (2021) suggested that officers with longer tenure were less likely to activate their BWC. Varied results might be the consequence of many factors, such as departmental differences in the average age of officers, prior experience with technology, and period effects related to officer culture. More importantly, our findings are somewhat unique in the broader context of previous research on the relationship between individual officer level factors and police behavior. Over the last few decades, a substantial body of literature suggests that many individual officer-level characteristics are associated with police behavior (Riksheim & Chermak, 1993). For example, prior research has shown that males are more likely to use force (Bolger, 2015), and college-educated and more tenured officers are less likely to use deadly force (McElvain & Kposowa, 2008). It is plausible that the agency’s BWC policy mitigates the influence of these factors, which on their own might only have a relatively modest effect on police behavior.
Of particular interest was our finding that officers who volunteered to wear a BWC were no more or less likely to activate their BWC than officers who were mandated to wear them. This finding is somewhat surprising. Prior research has reported that those who volunteer to wear a BWC are more likely to self-initiate contacts (Huff et al., 2020a; Wallace et al., 2018), write citations (Ready & Young, 2015), and make arrests (Huff et al., 2020a); and others have reported that BWC volunteers are less fearful of BWC evidence being used against them (Sousa et al., 2016). For these reasons, it might be expected that those who volunteer to wear a BWC might use the technology more than those who are mandated to wear them. Our findings, however, suggest that requiring officers to wear BWCs has a limited impact on their activation compliance in the field. Prior research examining officer perceptions of BWCs in

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*p <.001 bolded; Note: Coef. = coefficient; SE = robust standard errors; OR = odds-ratio; Var. Comp. = variance component; ICC = intra-class correlation coefficient; 146,601 incidents cross-nested in officers (n = 106), neighborhoods (n = 307), and policy periods (n = 3); violent calls and the Desert Horizon precinct were used as the reference categories.

Of particular interest was our finding that officers who volunteered to wear a BWC were no more or less likely to activate their BWC than officers who were mandated to wear them. This finding is somewhat surprising. Prior research has reported that those who volunteer to wear a BWC are more likely to self-initiate contacts (Huff et al., 2020a; Wallace et al., 2018), write citations (Ready & Young, 2015), and make arrests (Huff et al., 2020a); and others have reported that BWC volunteers are less fearful of BWC evidence being used against them (Sousa et al., 2016). For these reasons, it might be expected that those who volunteer to wear a BWC might use the technology more than those who are mandated to wear them. Our findings, however, suggest that requiring officers to wear BWCs has a limited impact on their activation compliance in the field. Prior research examining officer perceptions of BWCs in
Phoenix identified limited differences in factors that predicted officer resistance to BWCs or changes in perceptions of BWCs after utilizing this technology in the field (Huff et al., 2018; 2020b), further suggesting that anticipated differences in the impact of BWCs depending on the manner of assignment might be overstated. Namely, it appears that initial receptivity to BWCs might not have enduring implications for officer perceptions or the use of this technology. Adams et al. (2021) argue that police officers are principled agents and will use BWCs in relation to their job functions, regardless of their attitudes toward BWC technology.

Officer precinct assignment was also significantly related to BWC activation. For example, officers assigned to the Mountain View precinct activated their BWCs roughly 62% of the time compared to about 71% for those assigned to Black Mountain and Cactus Park precincts. These findings suggest that workgroup culture might impact BWC activation rates. Workgroup culture has long been shown to have an impact on police behavior. For example, Ingram et al. (2013) identified variation in complaint allegations and high use of force incidents for officers belonging to different workgroups. Some researchers have suggested addressing this potential problem through the use of “influencers” within workgroups. For example, in a study of BWC implementation in Mesa, Arizona, Young and Ready (2015, p. 258) noted that officers who “endorse and volunteer to use the technology at the outset” of the program can be successfully used to reframe the costs and benefits of BWCs to their workgroup. Alternatively, lower activation rates in some precincts might be related to factors associated with commanders and other police leaders within the precinct. Given the importance of lieutenants regularly reviewing officer BWC footage to ensure compliance within the PPD, it is possible that activation could be lower in precincts with less supervisory oversight, undermining built-in accountability mechanisms. Prior research has shown that executives and managers often signal their intentions about work quality to their employees to reduce information asymmetry and mitigate fears related to uncertainty (Connelly et al., 2011). Future research is needed to untangle these potential explanations and their influence on BWC activation.

The effects of neighborhood-level factors on BWC activations were somewhat modest. Disorganization, percent Black, and the violent crime rate were not significantly related to BWC activation. Population density was significantly related to BWC activation, but the effect size was small. Officers responding to incidents in densely populated areas might be aware that there are more residents in the area and that they could be observed or recorded by others, thereby increasing the potential for noncompliance to be identified.

Our results showed, however, that there is a strong and significantly negative effect of neighborhood percent Hispanic on BWC activation. Specifically, we found that there was a 44% reduction in the odds of BWC activation with every unit increase in neighborhood percent Hispanic. While there are several potential explanations for this finding, it could suggest police officers are less concerned about receiving a complaint
in “Hispanic” neighborhoods, and therefore could be less likely to be compliant with BWC activation policies. These findings are consistent with prior research that suggests that Hispanics are less likely to file a complaint against the police (Schaible et al., 2013), and when they do, the complaint is less likely to be sustained when compared to white complainants (Headley et al., 2020). However, it is important to point out that in the present study, we found that complaints were just as likely to be filled in incidents when a BWC was activated compared to when it was not, which suggests that officers do not activate their BWCs when they think a complaint is likely. As such, other factors might be responsible for the negative effect of neighborhood percent Hispanic on BWC activation, and further research is needed to understand this relationship.

Our results should be interpreted with caution. First, our findings are not generalizable to other agency contexts. Prior research has shown considerable variation in BWC activation rates, as well as a variety of factors that might be responsible for some of these differences. Additional research should be conducted in other agencies to further identify those factors that influence BWC activation compliance. This is especially important for issues surrounding agency variation in responses to non-compliance with BWC activation policy. PPD policy requires a written reprimand for first time noncompliance with BWC activation policy, with progressive disciplinary actions for each additional incident of non-compliance (Phoenix Police Department, 2021). Future research should examine how different responses (e.g. training, severity in discipline) impact BWC activation compliance.

The present study also did not include a number of factors that have been shown to have a significant and substantial impact on police discretion, such as the ethnicity, gender, or age of those who have contact with the police. Further examination of these factors, and their dyads, would elucidate our understanding of how police behavior varies with different populations and how this variation might impact police officers and citizens. Likewise, our findings do not reflect causal relationships due to the nature of our data. Researchers in the future should consider employing methods and data that determine the direct and indirect causal relationships. Last, the present study did not contain measures of police culture that might impact police officer decision-making. Prior research on police culture has shown it to be a powerful influence on police decision-making in general and police adoption of innovative practice in particular (Reuss-Ianni, 1983). Although we used officer precinct assignment as a proxy for cultural variation across different workgroups, more refined measures of culture are needed to better understand these relationships and the factors driving identified differences in activation compliance.

In conclusion, prior research has shown that BWCs can result in favorable outcomes because they will deter poor officer and civilian behavior and because they will enhance transparency and accountability. However, BWCs cannot achieve desired outcomes if they are not activated. Our analysis suggests that a wide variety of officer, situational, organizational, and neighborhood factors are related to an officer’s decision
to activate their camera, and that BWC policies that confine, structure, and check officer activation have a strong impact on an officer's decision to activate their BWC. Our findings also suggest that continuing to study the impact of BWCs on officer behavior without accounting for activation could result in misleading findings by either: (1) understating the potential impact of this technology (as evidenced by Hedberg et al., 2017; Huff et al., 2020a, 2020b) or (2) systematically biasing the findings surrounding the impact of BWCs on certain types of events, which might not be recorded (subject/civilian stops) despite the potential for these events to become contentious.³ The findings here, that BWCs are activated at different rates depending on different situations, officers, neighborhoods, and organizational policy structures, suggest that prior studies that do not account for these factors could suffer from omitted variables bias. Given the considerable financial costs associated with implementing and maintaining BWC programs and the ongoing push to deploy this technology in police departments throughout the nation, researchers and policymakers need to better understand the actual use of this technology and how that use might be biased across different types of factors. Through understanding the variation in BWC use and refining organizational policies to ensure BWCs are activated in the field, we can better maximize the utility of this technology for achieving favorable policing outcomes.

³ It is also worth noting that Ariel et al. (2016b) identified activation non-compliance due to supervision direction against a research protocol as a potential reason their earlier study found BWC’s increased odds of assault against officers.

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