**The Achilles Heel of Police Body-Worn Cameras:**

**Understanding the Factors that Influence Variation in Body-Worn Camera Activation**

**Methodological Appendix**

 The purpose of this appendix is to provide more detailed information about the methodologies used in our study of the relationship between situational, officer, neighborhood, and policy changes on body-worn camera (BWC) activation in the Phoenix Police Department (PPD). Like all research using administrative police data, a number of data modifications were necessary and methodological adjustments were made to account for changes that occurred within the PPD over the course of the evaluation. Below we provide supplemental information on four methodological issues related to measurement, coding data, and analytical techniques employed for the present study, including: (1) coding BWC activation policy, (2) coding offenses, and (3) Nagelkerke’s adjusted R2 and (4) data structure for multilevel cross-classified models.

**Coding BWC activation policy**

One of the most notable policy changes to occur during the study period was a revision to the BWC activation policy, which was revised from a “time of contact” policy to a “time of mobilization” police. The “time of contact” policy required BWC activation at the time the officer arrived on scene or during any enforcement contact – a relatively loose term that provided somewhat limited direction to officers who were generally expected to activate their BWC during all encounters with the public. This was replaced with a “time of contact” policy, which established a requirement to activate a BWC upon receipt of a call-for-service. The policy change was motivated by an officer involved shooting, in which one of the responding officers was wearing a BWC and had been present at the scene for over fifteen minutes prior to the shooting, but had not activated their BWC. As a result of this event, the modified policy was intended to further restrict officer discretion and remove any ambiguity surrounding when an officer should activate their BWC. To account for this substantial change in the policy surrounding BWC activation in our analysis, we specifically examine the influence of different policy periods (activate at contact, after the policy requiring officers to activate at mobilization was announced, and after activate at mobilization became effective).

**Coding offenses**

In addition, the individual radio codes provided in the CAD data represented hundreds of unique violations. In order to provide more meaningful and streamlined results, the individual codes were categorized into four broad offense types: violent offenses, property offenses, subject/traffic stops, and other offense types. Through reducing the original codes into these broader typologies, our results are more easily interpreted.

Violent offenses included domestic violence, assault, threat, armed robbery, aggravated assault, child abuse, homicide, robbery, kidnapping, sexual assault, sexual abuse, assault, misuse of a weapon, reckless endangerment, misuse of a weapon, cutting/stabbing, sexual abuse-adult, robbery home invasion, attempted kidnapping, sexual abuse child, attempted molestation, lure minor for sex, kidnapping sexually motivated, bomb threat, and conspiracy to murder.

Property offenses included trespassing, theft, criminal damage, burglary residential, burglary from vehicle, shoplifting, burglary commercial, auto theft, forgery, fraud, arson, purse snatching, stolen property, theft of license plate, forgery, counterfeit currency, theft of credit card, arson, identify theft, burglary of vending machine, theft of metal, internet computer crime, theft from vehicle, stolen property, financial exploitation of the elderly, nonsufficient funds heck, stolen police car, theft catalytic converter, and money laundering.

Subject/vehicle stop included vehicle stop, subject stop, accident no injuries, traffic hazard, accident with injuries, hit and run, illegal parking, drunk driver, speeding, and accident fatality.

Other offenses included check welfare, suspicious person, loud noise disturbance, civil matter, 911 hang up, unknown trouble, found property, neighbor dispute, unwanted guest, missing juvenile, judicial interference, loud party, open door, missing person, suicide attempt, recovery of vehicle, mentally ill person transport, sick person, harassment, PR contact, wagon wanted, incorrigible juvenile, injured animals. Misdemeanor warrant, marijuana report, loose animals, city ordinance offense, juveniles disturbing, drunk disturbing, indecent exposure, felony warrant, custodial interference, stolen bike, dangerous drugs, prowler, dead body, loss report, found missing person, graffiti, traffic control, found narcotics, urinating in public, overdose victim, loitering, prostitution, stalking, liquor violation, felony flight, truancy, underage liquor violation, sex offender registration violation, soliciting, prostitution-child, curfew violation, resisting arrest, and escape.

If an incident included more than one offense type, the most serious crime type was used to categorize the incident. If, for example, the incident included a violent and property offense it was coded as a violent offense. This was based on the offense code that was listed as the primary offense in the CAD data itself, which is completed by the responding officer, and was not modified by the research team.

**Nagelkerke’s adjusted R2**

In order to provide a comprehensive assessment of the factors related to BWC activation, we used both single level and multilevel models. The single level models are used to assess the influence of factors occurring at various unique levels of explanation on BWC activation while the multilevel models account for the simultaneous impact of factors at every level of explanation on BWC activation. For our series of single level logistic regression models predicting BWC activation due to factors occurring at separate levels of explanation, we use Nagelkerke’s adjusted R2 to assess the explanatory power of the variables included in each model (situational, officer, neighborhood, and BWC policy period) on BWC activation, relative to a null model that does not include predictors. Nagelkerke’s adjusted R2 is a pseudo measure used to approximate the coefficient of determination used in linear regression, adjusted to apply to a model estimated using maximum likelihood, such as logistic regression (Long, 1997). It is important to note that the substantive meaning of any pseudo-R2 applied to a logistic regression model is distinct from the R2 measure in linear regression and cannot be used to precisely establish the amount of variance in the dependent variable explained by the independent and control variables included in the model.

**Data structure for multilevel cross-classified models**

Our data structure for the multilevel analysis of BWC activation is represented by the following equation:

$Y\_{ijkl}=β\_{0}+\sum\_{q=1}^{Q}λ\_{q}S\_{qijk}+u\_{j}+u\_{k}+u\_{l}+e\_{ijkl}$

where $Y\_{ijkl}$ represents BWC activation (the dependent variable), $β\_{0}$is the intercept, $λ\_{q}$ is the effect of the *q*th predictor *S* for incident *i* nested within officer *j*, neighborhood *k,* and policy period *l*, $ u\_{j}$ is the random effect of the officer, $u\_{k}$ is the random effect of the neighborhood, $u\_{l}$ is the random effect of the policy period, and $e\_{ijkl} $is the residual. In essence, this model allows us to examine whether a BWC was activated in an individual incident, depending upon the characteristics of the responding officer, the surrounding neighborhood, and the policy period in which an incident took place while allowing for unique effects of individual officers, neighborhoods, and policies on BWC activation.