ASSESSING THE EFFECTS OF BODY WORN CAMERAS ON PROCEDURAL JUSTICE IN THE LOS ANGELES POLICE DEPARTMENT

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This paper explores variations in procedural justice delivered in face to face encounters with citizens before and after the implementation of body worn cameras (BWC). The paper draws on recent advances in the measurement of procedural justice using systematic social observation of police in field settings in the Los Angeles Police Department. Data collected on 555 police-citizen encounters are examined in bivariate and multivariate models exploring the primary hypothesis that BWC affects procedural justice delivered by police directly and indirectly. Results indicate that significant increases in procedural justice during police-citizen encounters were directly attributable to BWC's effect on police behavior as well as indirect effects on citizen disrespect and other variables. The implications for policy include explicit measurement and monitoring of procedural justice or elements such as officer discourtesy in departments adopting BWC. Further research questions such as more detailed examination of citizens' behavior changes under BWC are also considered in the context of the findings.

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Understanding variations in procedural justice in face-to-face encounters between police and citizens has taken on added significance in light of shootings by police and as a focus of the *President's 21st Century Taskforce* recommendations (e.g., Worden and McLean, 2017). The widespread adoption of body worn cameras (BWC) has been an additional response to a crisis of legitimacy in contemporary policing with sparse information on its impact on everyday police encounters (Lum, 2015; Lum, Koper, Merola, Schere, Reioux, 2015; Miller, 2016). As yet, little research has been done on the effects of BWC on how police service is delivered, beyond examinations of complaints and use of force outcomes captured in organizational records (e.g., Ariel, Farrar and Sutherland, 2015). Recent results from surveys of citizens, however, indicate that perceived procedural justice is a more powerful influence on citizen satisfaction than the presence of cameras alone, largely because citizens are relatively poor reporters of whether cameras were used (McClure, Lawrence and Malm, 2017). Thus, a key question is, net of other variables, do BWC contribute to positive changes in procedural justice and its constituent elements delivered by officers? This research addresses that gap by exploring procedural justice as delivered by police officers in two divisions of the Los Angeles Police Department (LAPD) before and after the implementation of BWC using systematic social observation (SSO) data.

To accomplish this we first frame procedural justice research and key elements from that theoretical reference point as well as concurrent methodological advances and advantages in collecting data that capture what police do when interacting with citizens. Second, we consider the effects of BWC and major theoretical domains expected to impact procedural justice in police-citizen encounters. Third, we outline the research setting in LAPD and the data collection effort undertaken. Fourth we test a series of hypotheses using bivariate and multivariate models. Finally, we discuss the implications of those findings framed within concerns of police managers, policy-makers, and criminal justice theorists.

PROCEDURAL JUSTICE: THEORY AND METHODS

Procedural justice as posited by Tyler (2003; 2004; 2006) and his colleagues (Tyler and Fagan, 2006; Tyler and Huo, 2002; Tyler, Goff, MacCoun, 2015) is conceived of having two broad elements of quality decision-making and quality of treatment. Citizens prefer decisions that are fair, thoughtful, and feature their input and they likewise prefer decision processes that affirm their dignity and reflect concern about their well-being as expected from a trustworthy authority. Authorities whose decisions reflect procedural justice are posited to be more legitimate in the judgment of citizens and are more likely to elicit compliance and cooperation from them. Conversely authorities undermine support from citizens when their decisions indicate bias, treat citizens disrespectfully, or in a cavalier manner. Quality of decision-making and quality of treatment each have two identifiable subcomponents, for a total of four distinct elements that can be mapped onto police treatment of citizens in face-to-face encounters: Participation, Neutrality, Dignity and Respect, and Trustworthy Motives.

Participation reflects an officer's allowing citizen input into encounters by actively listening to information provided and asking him or her questions; *neutrality* reflects officer's display of decision making rooted in law, community concerns and <u>not</u> on personal characteristics of citizens. Together these reflect quality decision-making in that officers are using citizen

information as inputs, eliciting information, and demonstrating a transparency and fairness in coming to a decision in the presenting situation. The reverse of this, denial of citizen participation and voice, inattention, and bias would exemplify low quality decision-making and procedural injustice.

Dignity and respect are demonstrated in officers' displays of respect in forms such as positive body language, addressing citizens with respectful language ("sir", "ma'am"), and reflecting positive social status for the individual citizen. Conversely, dismissive statements, blatantly ignoring citizen's statements (eye rolls), or profanity directed towards a citizen, for example, represent disrespectful behavior, which can be active or passive (Mastrofski, Reisig, and McCluskey, 2002). *Trustworthy motives* are demonstrated when officers show care and concern as represented by efforts expended to assist citizens through referrals, reports, advice, and similar actions and inquiries regarding citizen wellbeing and needs. These two elements are indicators of the quality of treatment that citizens receive when encountering the police. Respect and care and concern are evidence of higher quality of treatment, whereas disrespect and lack of concern for the citizen are indicative of procedural injustice and low quality of treatment.

Within the burgeoning literature, procedural justice has been predominately examined as a psychological measure encompassing citizens' impressions of treatment by the police (Reisig, Bratton, and Gertz, 2007; Tyler, 2003, 2004; Tyler and Huo, 2002). However, citizen perceptions and assessments of police actions are affected by emotions, race, and context (Barkworth and Murphy, 2015; Braga, Winship, Tyler, Fagan, and Meares, 2014; Johnson, Wilson, Maguire, and Lowrey-Kinberg, 2017). Thus, citizen reports and evaluations of "what police do" in encounters are likely affected by substantial and systematic biases. Systematic social observation is preferred to capture police actions (Mastrofski, Parks, & McCluskey, 2010). This is especially true with regard to trying to predict changes in procedural justice as delivered by officers, which, as illustrated above, comprises a varied and complex set of police actions.

SSO METHODS AND PROCEDURAL JUSTICE

Recently, systematic social observation (SSO) has been used to measure and predict procedural justice in police citizen-encounters. The use of SSO was, in many ways, what pioneered the systematic study of police and their behavior (Reiss, 1971). Albert Reiss, Jr. and Donald Black (Reiss, 1971; Black and Reiss, 1967) studied police behavior in Boston, Chicago, and Washington, D.C. and were able to make comparisons of police actions across events by training observers to code elements of encounters according to a systematic protocol. One advantage this offered was the ability to measure what police did that did not result in official reports. Use of disrespect, discretion exercised to not make arrests or otherwise not take official reports, and even use of force were, at the time, unlikely to generate any data within the police organization and hence observation of police decisions from that perspective was censored. Put differently, we did not know what police chose not do and we knew little about non-legal actions such as counseling, helping, or referrals by police. SSO uncovered, described, and counted these actions and as it further developed in the 1970s in the context of the Police Services Study and the 1990s within the Project on Policing Neighborhoods, demonstrating its unique utility as a method to

capture police behaviors in face-to-face encounters (Mastrofski, Parks, & McCluskey 2010; Worden & McLean, 2014).

The application of SSO to the implementation of BWC could draw on a new strength (Jonathan-Zamir, Mastrofski, and Moyal 2015; McCluskey & Reisig, 2017; Mell, 2016; Worden & McLean 2017), which is the refinement of third-party measurement of police actions, consistent with the theoretical framework of procedural justice. More specifically, participation, neutrality, dignity and respect, and trustworthy motives have been shown to be amenable to definition and measurement within the SSO protocol. Initial research on citizen compliance, using SSO, demonstrated the utility of the method for capturing aspects of procedural justice (Mastrofski, Snipes, Supina, 1996; McCluskey, Mastrofski and Parks, 1999; McCluskey, 2003). Further use of the method and refinement of observation protocols has led to compilation of a validated formative measure of procedural justice (Jonathan-Zamir, Mastrofski and Moyal, 2015). Furthermore, analysis of procedural justice measured as an element of policing delivered to citizens, in turn appears to be predictable based on aspects of those encounters, the participants, and the context (Mastrofski and colleagues, 2016; Mell, 2016; McCluskey & Reisig, 2017; Worden & McLean, 2017). Below we turn to consideration of what may predict procedural justice in police-citizen encounters.

PREDICTING PROCEDURAL JUSTICE

Four research projects have endeavored to predict procedural justice displayed by police drawn from systematic social observations. Worden and McLean (2017) bifurcated the behaviors of police in their encounters with 411 citizens as representing procedural justice or (in)justice in SSO based on police dashboard camera audio and video from the Schenectady (NY) Police Department. Mell (2016) adapted Jonathan-Zamir, Mastrofski, and Moyal's (2015) formative measurement strategy, with a factor-score dependent measure, drawn from 500 videos of citizen encounters with Virginia Commonwealth University (VCU) campus police. Mastrofski et al. (2016) adopted the formative measure they developed to measure procedural justice using in-person observations of 524 police-citizen encounters across two anonymized suburban departments. Finally, McCluskey and Reisig (2017) adopted a composite factor score, developed from elements of procedural justice captured in data from the Project on Policing Neighborhoods, fielded in 1996-1997 in Indianapolis, IN and St. Petersburg, FL. That research involved a total of 939 suspects in encounters where police requested compliance and involved using detailed narrative accounts to construct measures and establish causal order.

Variations in method (video, in person, narrative reconstructions), measurement of procedural justice as a dependent variable (factor-score, additive scale, bifurcated measure), nature of the police organization (suburban, urban, campus police), and encounter types in the samples (suspect-only, all citizens encountered) make for problematic comparisons of procedural justice models. Put differently, caution should be taken in evaluating the results of these four studies for divergent or convergent findings. Furthermore, the models developed to predict procedural justice range from explaining 20% of the variance (Mastrofski and colleagues) to less than 10% of the variance in procedural justice delivered to citizens (Mell, selected domains).

Despite the variation and moderate to weak models generated in this literature, the estimates across the research allow for a sketch of variable domains that should be considered in estimating officers' delivery of procedural justice. Mastrofski and colleagues' (2016) nomenclature is used to describe the major domains used to model procedural justice: Citizen social status, Citizen behavior, Challenges to engaging in procedural justice, Procedural justice scripts, and BWC as important elements that may affect procedural justice delivery.

Citizens' deservingness of higher quality treatment, or moral worth, is arguably related to social status and behavioral displays. Citizen social status is indicated by age, wealth, gender, race and ethnicity, and more precisely, they are of interest in terms of how those attributes are interpreted when authorities make calculations of worthiness. Black's (2010) theory is a touchstone in this area as lower status is predicted to yield lower quality and quantity of law. More procedural justice is higher "quality" law in this calculation, thus we would expect social status to have significant impact. Indicators of social status including race, gender, and wealth, however, have yielded mixed results in predicting other kinds of police behaviors such as force, arrest, and report-taking (Skogan & Fydl, 2004). In the small body of literature analyzing the delivery of procedural justice, Worden and McLean's research indicates that black, and McCluskey and Reisig's indicate that minority suspects are counterintuitively recipients of higher levels of procedural justice compared to whites. Mell's research indicates females receive higher levels of procedural justice when compared to males. In work indirectly related to procedural justice, Mastrofski, Reisig, and McCluskey (2002) found disrespectful displays by police to be predicted by citizens' lower income status and in recent data coded from the Oakland (CA) Police Department's BWC, Voigt and colleagues (2017) found that black motorists were accorded less courtesy and more discourtesy than their white counterparts during traffic stops.

More proximal indicators of moral deservingness are the behaviors and transient statuses that a citizen may have in an encounter. This domain is strongly related to social interactionist theory and consideration of police-citizen contact as a dynamic transaction featuring verbal and behavioral exchanges that define and redefine patterns of communication (Tedeschi and Felson, 1994; Sykes and Brent, 1983). Citizens who are in the role of suspect, for example, are likely to be accorded lower levels of procedural justice than victims, as question patterns and tone are likely to vary as one or the other converses with police. Citizens who solicit police presence are likely to be accorded more procedural justice as they are direct requestors of service. Conversely, citizens who are disrespectful or physically resistant towards police are likely to be accorded lower quality of treatment compared to their business-like or courteous peers. Among the four existing SSO studies, suspects and third parties are recipients of significantly lower levels of procedural justice in Worden and McLean's and also in Mastrofski and colleagues' analyses. Citizen initiation of encounters predicted higher levels of procedural justice in the latter study as well, but not Mell's analysis, and the measurement differed in the two other studies which only captured proactive or reactive mobilization, neither of which yielded significant variation in procedural justice. Citizen disrespect significantly increased procedural injustice in Worden & McLean's research and reduced procedural justice in Mastrofski and colleagues' research. Passive resistance yielded higher levels of procedural injustice and defensive resistance lowered levels of procedural justice in Worden and McLean's study; none

of the other researchers captured a measure of resistance. Overall, citizen behavioral displays indicate a moderate and relatively consistent impact in modeling procedural justice.

Challenges to engaging in procedural justice are likely to reduce officers' use of procedural justice by reducing opportunities or the perceived effectiveness to apply its elements. One example of a challenge is a citizen's apparent use of alcohol, drugs, or being afflicted by mental or emotional distress. Research generally points to citizens affected by indicators of irrationality are more difficult, less compliant, and likely less attentive to officers' communication (McCluskey, 2003; McCluskey, Mastrofski, and Parks 1999; Muir, 1977). Similarly, citizens who are in conflict with others on the scene present difficulties for delivering procedural justice and managing that conflict. Finally, the sheer number of citizens on scene represents a difficulty in commanding officer attention and concern for safety (Muir, 1977). As such we surmise larger citizen audiences would reduce procedural justice and Mastrofski and colleagues' and McCluskey and Reisig's research confirmed that effect. Only McCluskey and Reisig's research found citizen's irrationality to be significantly related to lower levels of procedural justice, and neither of the studies measuring citizen's conflict with others found a significant relationship with procedural justice.

Scripts for handling situations are shorthand for types of encounters that police have with citizens. In particular, the traffic stop is an encounter amenable to "scripting" as evidenced by the Australian QSET study (Mazerolle, Antrobus, Bennett, and Tyler, 2013). There measurable experimental manipulation of police actions during road check point stops were confirmed via follow-up surveys. We thus expect that traffic stops, as compared with other less predictable encounters, will feature higher levels of procedural justice. This was confirmed in two of the four studies, however, Worden and McLean's research indicated that violent crime and interpersonal conflict calls yielded higher levels of procedural justice.

Against the backdrop of citizen characteristics, behaviors, challenges of the situation and amenability of the encounter to a script, the presence of body worn cameras (BWCs) is expected to change the delivery of procedural justice in police-citizen encounters via several possible mechanisms. First, there is the possibility that police will change their behaviors because of surveillance. Current evidence from BWC evaluations indicates that complaints and use of force, under certain conditions, decline after BWC are introduced (Ariel, Farrar and Sutherland, 2015; c.f., Ariel, Sutherland, Henstock, et al. 2016). This is suggestive that upon adopting BWC, police change behaviors and greater procedural justice may be mediating this effect on force and complaints. Second, citizens, under surveillance, may desist from negative behaviors and thus curtail police actions (e.g., reciprocating discourtesy) that undermine procedural justice. This latter argument is weakened by the apparent reality that citizens are poor at ascertaining whether police have cameras on, even when told they do, with as few as 28 percent of citizens realizing that cameras recorded encounters (McClure and colleagues, 2017; White, Todak, and Gaub, forthcoming) Regardless of the exact mechanism, the expectation for BWC from policy-makers touting its transparency and accountability, the quality of police-citizen interactions, net of other characteristics of the encounter, should increase appreciably. This is the primary hypothesis

tested below, using observational data from the Los Angeles Police Department (LAPD) prior to and subsequent to the adoption of the BWC.

SITE

Los Angeles, CA is the second largest city in the United States with a population of nearly four million residents distributed over 472 square miles. The Los Angeles Police Department (LAPD) is the third largest police force in the US with nearly 10,000 sworn and 2,800 civilian employees. Chief Charlie Beck oversees the department that is divided into 21 separate patrol divisions and four traffic divisions and organized into four bureaus, which cover the service area.

In 2013 and 2014 Steve Soboroff, then-President of the Los Angeles Board of Police Commissioners, led an effort to raise approximately $1.5 M to jump-start LAPD's deployment of BWCs. Before purchasing the cameras, the LAPD vetted vendors and equipment and developed appropriate policies and procedure for their use. LAPD staff conducted research on a number of BWCs on the market and looked at cameras that had a long battery life (10-12 hours), were easy to use, and addressed efficient storage of video footage. Costs of the cameras and storage were examined closely. Two cameras were selected for a field test, and a small sample of officers (n=32) tested them. Ultimately, one camera was selected and 800 were purchased through the Los Angeles Police Foundation.

In 2015 the LAPD began its initial deployment of body-worn cameras. Two Divisions began implementation in September 2015: Mission (9/4/2015) and Newton (9/18/2015) and are the focus of this study.

Newton and Mission Divisions are different in terms of the areas they serve and the crime levels they handle. Newton Division is part of Central Bureau and located in South Los Angeles. Smaller than Mission, it covers a 9-square mile area and is home to over 150,000 residents (LAPD, 2017a). Newton recorded 27 and 20 homicides and 690 and 848 robberies in 2015 and 2016, respectively (LAPD, 2017b). Over 40 gangs exist in Newton.

Mission Division is part of the Valley Bureau in the North Central area of Los Angeles, within an area that is almost three times the size of Newton (25.1 square miles). The population is about 50% higher than Newton with approximately 226,000 residents (LAPD, 2017c). Mission Division recorded fewer homicides and robberies than Newton (17 and 15 homicides and 285 and 420 robberies) in 2015 and 2016, respectively (LAPD, 2017d).

Despite their size differences (in area and population), the divisions are staffed by the same number of officers (nearly 300) and have a call load of approximately 100 per day (Justice & Security Strategies, Inc., 2014).

With regard to population characteristics, Newton and Mission are predominately Hispanic, with Newton having a higher rate of poverty.

METHODOLOGY

To examine the impacts of body-worn cameras on police-citizen interactions, staff conducted systematic social observations (SSOs) within two LAPD divisions prior to and following BWC

implementation.[1] In June 2015, eight observers were trained in a classroom setting on the SSO instruments, including discussions of coding protocols, group viewing of vignettes, and a series of field training rides. After finalizing all procedures and instruments, observers conducted the initial SSOs in August (Mission Division) and September (Newton Division) of 2015. Officers were randomly selected for observation in both divisions.

During the SSOs, observers followed a rigorous protocol governing data entry for all information collected. They used mobile hotspots and tablets to perform field coding via Qualtrics, an online survey software, for each encounter. Designed to capture individual citizen, event, and ride characteristics, surveys were completed both during and after each field observation. Additionally, observers composed detailed narratives describing each encounter that took place during the observations, making it possible to disentangle causal order among key police and citizen behaviors.

To obtain a random sample of officers for participation in the SSOs, staff secured a list of all eligible officers within the two divisions. This list contained all patrol officers as well as officers working in specialized units, and included all shifts (called "watches"). Officers were stratified by their assignment for random sample, and five officers within each stratum were identified as potential participants each shift.

Observers attended division roll calls for all watches, and notified the selected officers about the ride along. For each six-hour observation period, staff observed the interactions between the assigned officer (O1) and the citizens during each encounter. As LAPD employs two-person patrol cars, each SSO included the randomly selected primary officer (O1) and his/her partner (O2) for that shift.

The primary officer in the encounter refers to the officer who took the lead in the decision-making and had the most interaction with citizens. Typically, observers followed the interactions of O1; however, if O2 played the more significant role in a specific encounter, O2 would then serve as the primary officer for that encounter. If both officers displayed equal levels of decision-making and citizen engagement, observers were instructed to use the assigned O1 as the primary officer to follow for the encounter. LAPD tactics, such as roles in "contact and cover" allowed for observers to accurately determine which officer would take the decision-making lead prior to the commencement of citizen contact.

After the completion of Wave I data collection, observers returned approximately one year after implementation to conduct Wave II of SSOs in the same divisions and with the same officers.

[1] Traditionally, the LAPD does not allow observers to ride in two-officer patrol cars. LAPD policy indicates that ride-alongs are with sergeants or higher ranking officers only. Chief Charlie Beck wrote a special memorandum to Newton and Mission Division Captains that allowed observers to ride with patrol officers. While there may be concern that officers may have acted differently in the presence of the observers, because the observers rode with the same randomly selected officers before and after implementation of the BWCs, there is consistency in the way in which officers may have viewed and reacted to the observers.

The second wave began in June 2016 in Mission Division and during July and August 2016 in Newton Division. Using updated lists of all officers working within each division, observers repeated the same process. They coordinated and rode with the same officers that had previously participated in Wave I in order to examine the impact of the BWCs on those officers. While staff was able to ride with many of the original primary officers (O1), in some instances, those officers were not available because of department transfers, vacation, sick leave, or promotions. For these instances, observers then rode with other O1s or O2s who had previously completed a SSO during Wave I.

Throughout Wave I and Wave II of the SSOs, observers spent 725 hours riding with and collecting observational data on the encounters between officers and citizens. A total of 128 observations (72 from Wave I and 56 from Wave II) were completed between both Newton and Mission divisions. These observations included 514 encounters and involved coding the interactions of 1,022 citizens, 555 of which were deemed to be citizens who had full contact (not briefly encountered), including a minute of face-time or three verbal exchanges.

Protocol for SSO began with codebooks outlined extensive definitions of coding elements. Observers were trained on the instruments in a classroom setting, group viewing of vignettes, and discussion of coding protocols and field training rides. Additionally, observers used mobile hotspots to perform field coding integrated with Qualtrics software during encounters to capture citizen and event characteristics and revisited coding and narrative writing after completing observations.

MEASURES

Dependent Measure

Elements of procedural justice are captured in a series of binary elements that are observed and coded as aspects of police-citizen interaction. Table 1 presents the four procedural justice sub-elements and the items that comprise each. Officer interest in citizen information/viewpoint is measured on a 4-point scale from Dismissive to Active interest as a component of participation. Duration of officer respect toward the citizen is a 4-point scale from very little time to nearly all of the time during the encounter. The remainder of the elements in the list in Table 1 are coded as dummy or binary variables indicating "yes" (=1) the officer was observed doing this, or "no" (=0) the officer was not observed doing this. For example, in 89% of the encounters the officers asked for the citizen's viewpoint whereas in 7.6% of the encounters the officer showed disrespectful behaviors.

Each of these indicators of participation, neutrality, dignity, and trustworthy motives is of interest, however, analysis of individual items such as police disrespect will be reserved for separate analysis. Here the unit of interest is each of those four sub-elements and the composite of procedural justice they form in each encounter. Jonathan-Zamir, Mastrofski, and Moyal (2015) have created a weighting system for calculating a formative index of procedural justice that we will describe for each sub measure and the overall composite measure of procedural justice.

<<Table 1 About Here>>

Participation.

The measure of participation is formed by adding whether officers asked for information or viewpoint of the citizen (yes=1), added to the product of citizen provided viewpoint or information (yes=1) and multiplied by officer's interest in the information (0=Dismissive, 3=active). This measure ranges from 0 (very low) to 4 (very high) and has a mean of 3.36 and standard deviation of 1.18 for the entire sample of 555 cases.

Neutrality.

The composite measure of officer actions forming neutrality is a summative score of the following five items: officer indicated a desire to hear all viewpoints (coded 0 for cases where only one citizen was encountered), officer indicated no decision until all information was gathered, reverse coding of officer indicated personal characteristics influenced decision, officer explained why s/he became involved, officer explained why s/he chose to resolve the situation. This composite ranges from 1 (very low) to 5 (very high) with a mean of 3.33 and standard deviation of 1.26 for the sample.

Dignity and Respect.

Dignity and respect is composed of measures of disrespect and respect as well as the intensity of respect. Cases where officers display any disrespect are coded "0", cases where neither disrespect nor respect are displayed are coded "1", cases where respect is shown for very little time coded "2" for brief respect, if shown some of the time coded "3" for intermittent respect, if shown most of the time coded "4" for dominant respect, and if respectful nearly the entire encounter coded as "5" for nearly complete respect displayed. Dignity and respect ranges from 0 to 5 with a mean of 3.22 and standard deviation of 1.26 for the sample.

Trustworthy Motives.

Trustworthy motives comprise a count of the seven binary items in Table A that focus on officer's care and concern displayed toward the citizen. The items include officers asking about the citizen's well-being, comforting and reassuring the citizen, to providing advice to the citizen about the situation, and encouraging the citizen to seek additional assistance from police. This additive measure ranges from 0 to 6, with only 8 cases above 4. Consistent with Jonathan-Zamir and colleagues (2015), the measure is collapsed to range from 0-4, reflecting scores from very low (0) to very high (4) with a mean of 1.63 and standard deviation of 1.29 for the sample.

Procedural Justice Composite Measure.

As noted in the discussion of the theory behind procedural justice, the four dimensions measured above form the basis for the overall composite measure of procedural justice delivered by the lead police officer to a particular citizen encountered. The four measures are standardized on scales ranging from zero to 100, summed, and divided by 4 (the number of subscales) to produce a final measure that has a lower bound of 0 and upper bound of 100. In performing these transformations on the data from the LAPD BWC SSO project the 555 cases yield a measure that

ranges from 5 to 100 and has a mean of 63.9 and standard deviation of 18.8. This measure corresponds to a measure of procedural justice that maps onto the behaviors of police officers posited as the likely antecedents of the psychological measures of procedural justice captured in surveys of citizens who have encountered the police.

ANALYSIS PLAN

The logic of the analyses below flows from general to specific questions of change in procedural justice that may be related to introduction of BWC in Mission or Newton Divisions during 2015-16. Changes in procedural justice elements (participation, neutrality, dignity and respect, and care and concern) will be examined first pre- and post-BWC. Next analyses will be subdivided by division to determine if significant changes in procedural justice were detectable in both locations. A similar pattern will be used to explore the composite measure of procedural justice. Finally, a multivariate model based on current models drawn from research will explore if the BWC exercised a detectable influence outside of other encounter and citizen-level variables hypothesized to influence procedural justice.

Since the underlying measures of each procedural justice component approximates a continuous measure and the composite measure is a continuous measure of procedural justice, a t-test for differences in means is adequate to test the hypotheses regarding change pre- and post-BWC implementation. Given the findings that use of force and complaints have been, in some cases reduced, the expectation is that procedural justice, in the form of superior interpersonal treatment and interactions between police and citizens, may be the basis for such changes. If so, we would hypothesize higher levels of underlying procedural justice elements and a higher composite score observed after the implementation of BWC.

H_1: The level of *participation* exhibited by police in encounters with citizens will be higher after the BWC implementation.

H_2: The level of *neutrality* exhibited by police in encounters with citizens will be higher after the BWC implementation.

H_3: The level of *dignity and respect* exhibited by police in encounters with citizens will be higher after the BWC implementation.

H_4: The level of *care and concern* exhibited by police in encounters with citizens will be higher after the BWC implementation.

H_5: The level of overall *procedural justice* exhibited by police in encounters with citizens will be higher after the BWC implementation.

<<Table 2 About Here>>

The effects of BWC are compared across 221 post-implementation encounters with citizens contrasted with 334 encounters with citizens prior to the implementation of the BWC are presented in Table 2. The "Total Sample" columns in table 2 indicate that the post-implementation mean is significantly *higher* than the pre-implementation observations of that

measure. Put differently, with the exception of *Trustworthy Motives* as evidenced by care and concern, all of the measures indicate significant improvement in procedural justice. The statistical test reported in the table is a conservative 2-tailed t-test, further affirming that the findings are different from a chance pattern. With regard to the overall measure of procedural justice, the analysis indicates a significant ($t=-4.49$, $p<.001$) increase of 6.9 points in the measure after the BWC implementation. Stated differently, one could assert this is more than a 10% increase over the pre-implementation mean level of procedural justice displayed by officers.

Next Newton and Mission are examined separately in the columns to the right in table 2, to ascertain whether the results are consistent across both divisions. Convergent observations in the two sites would tend to further support the findings, whereas divergent findings of sufficient strength would serve to undermine the findings. Importantly the division of the sample will reduce statistical power and thus statistical significance might be reduced, even with similar observed mean differences.

The pattern of results for Newton Division, with 144 pre-BWC and 82 post-BWC observations, indicates that pre- and post-differences in trustworthy motives based in care and concern and dignity and respect are not statistically distinguishable from chance. Interestingly the mean for dignity and respect is 3.13 before and after the BWC implementation indicating no change whatsoever across samples. Participation, neutrality, and the overall composite measures of procedural justice exhibited significant increases after the implementation of the BWC in that division.

The comparisons in the Mission area are based on 190 pre- and 139 post-BWC observations of police-citizen interactions. The results show an increase in participation from 3.31 to 3.47, but the change does not reach conventional levels of statistical significance, even if one used a more liberal one-tail t-test. Similarly care and concern, as a reflection of trustworthy motives, do not exhibit significant differences and the measure shows a decrease of .09 on that aspect of procedural justice. Neutrality, dignity and respect, and the overall measure of procedural justice all exhibit significant and positive increases across the two periods. Overall, among the 10 hypotheses tested, six exhibited increases in procedural justice and its sub-elements that are statistically reliable. Trustworthy motives, as evidenced by items indicating care and concern, are not significant in any of the three contrasts offered here (Overall, Newton, Mission).

MULTIVARIATE ANALYSIS

One concern with any pre- and post-observation research result presented thus far is that police can "self-select" cases to handle proactively and this may be the source of difference. To account for the possibility of self-selecting types of citizen encounters (i.e., avoiding the harder encounter, or otherwise changing behavior) key elements of the police-citizen contact can be controlled, such as whether the mobilization was proactive or reactive, characteristics of the encounter, and the characteristics of the citizens contacted. The effect of the BWC presence in the post-implementation observations can be separated from those selection effects, to the extent multivariate models are properly specified.

Mastrofski, Jonathan-Zamir, Moyal, and Willis (2016) have developed recent models predicting police officers' displays of procedural justice and this model have been used as a template for fitting models against existing data (McCluskey & Reisig, 2017) and outlined previously.

The possibility under consideration is that direct effect of the BWC is mediated by other facets of the police-citizen encounter. Put differently, the BWC effects may be indirect inasmuch as other variables associated with police-citizen contacts may be more proximate to the displays of procedural justice observed here (for example, citizen role in the event, citizen intoxication, displays of disrespect, etc.).

<<Table 3 about here>>

Independent measures for the multivariate models reflect features of participants, their behaviors, and the nature of the encounter are drawn from four domains in the literature and are presented in Table 3, the last two columns report statistical tests of pre- and post-observation differences for each measure. Within the domains of citizen social status binary variables indicating black (11% of sample; 1=black; 0=other), Hispanic (64% of sample; 1=Hispanic; 0=other), citizen of other minority status (6% of sample; 1=yes, 0=other) are used as contrasts to white, non-Hispanics in multivariate models.

Citizens of lower wealth (26% of sample, 1=lower wealth, 0=middle or higher wealth) and citizens are grouped by age as those under 21 years of age contrasted with older citizens (13% of the sample; 1=under 21, 0=older). Citizens of Hispanic ethnicity made up a significantly greater proportion of post-BWC sample (68% vs. 61%; X^2=2.87, p<.05). Citizen behavior is measured with four binary variables. Suspects and disputants (48% of the sample; 1=yes, 0=otherwise) and third parties (26% of the sample; 1=yes, 0=otherwise) are captured in two dummy variables contrasted with victims. Third party (witnesses, bystanders) citizens had lower proportions in the post-BWC observations (20% vs. 31%; X^2=7.77, p<.05). Whether the citizen summoned the police encounter (30% of sample; 1=yes, 0=no) and citizen initiated disrespect (16% of sample; 1=disrespect initiated, 0=otherwise) are each captured with dummy variables and round out the variable in this domain. Citizen initiation of disrespect was reduced significantly in post-BWC observations (13% vs. 19%; X^2=5.6, p<.05).

Challenges that may inhibit procedural justice are measured by three variables. Lowered self-control, a summative index of citizen's lowered self-control from the effects of alcohol/drugs, apparent mental illness, or strong emotion, ranges from zero to three, with a mean level of .41. A t-test (t=1.98; p<.05) indicates that citizens in the pre-BWC condition had higher mean scores (.46 compared to .33) compared with citizens encountered during the BWC condition. The number of bystanders is a variable reflecting the count of citizens on scene conflict with other citizens on scene at the beginning of the encounter ranging from 1 to 40, with a mean of 4.4. Pre-BWC observations had a significantly higher mean (5.08) compared to the BWC condition mean level (3.41) of citizens' present at the beginning of encounters (t=3.8; p <.05). Citizens in conflict with others citizens on the scene of the encounter were captured by a dummy variable (12% of the sample; 1=yes in conflict, 0=otherwise).

Whether the event is amenable to "scripted" police interaction is captured in a dummy variable representing traffic encounters, as compared with others (16% of the sample; 1=traffic, 0=other problem type). Two control variables, reactive mobilization (77%, 1=reactive, 0=proactive) and division (1=Mission 0=Newton; 59% of citizens encountered by Mission officers). Finally, though not shown in table 3, the key independent variable of interest is whether the presence of BWC was influential. Post-BWC is captured by a dummy variable (1=post-BWC, 0=pre-BWC, 40% of encounters observed post-BWC) and is used to test the primary hypothesis below.

The relationships between pre- and post-BWC observations and the independent measures do not reflect a coherent set of hypotheses regarding how BWC are anticipated to affect characteristics of police-citizen encounters; rather they are offered here as cautions that the events police may encounter or choose to initiate are quite varied even within the same department. Furthermore, since more than three of every four citizens encountered were embedded in instances of reactive policing it could be surmised that changes in the mix of calls mobilizing police may be related to adoption of BWC. More precisely, one area where concern with BWC has proliferated: Whether police will change their level or mix of proactive and reactive encounters once BWC are adopted. That is not seen in the bivariate contrast reported here.

Another supposition is that citizens may become less likely to display disrespect when on camera, as part of the anticipated behavioral effects, which is confirmed in the data. That police encountered more Hispanic citizens, fewer citizens with third-party status as witnesses, citizens with less lowered self-control, and less numerous bystanders in the encounters observed under the BWC condition post-implementation are important differences to control in our multivariate analyses. Substantial variation across the encounters in terms of the five significant independent measures brings into question the bivariate results which may not be accurate in demonstrating changes in procedural justice directly attributable to the BWC. Stated differently, the BWC effect may be mediated by the characteristics of the encounter. A multivariate model, holding constant aspects of the encounters, would provide a robust test of whether police displays of procedural justice increased significantly under the BWC condition. The dependent measure in the analysis, procedural justice, approximates a continuous variable, so Ordinary Least Squares (OLS) regression will be used to test the hypothesis:

H_6: Encounters observed under the BWC condition will have higher levels of procedural justice, holding constant the variation in police-citizen encounters.

<<Table 4 about Here>>

OLS estimates allow for a model that holds constant the effects of independent variables and while testing whether the BWC intervention had a direct and significant effect, net of other variables. In examining the bivariate regression effect of BWC intervention (model not shown) the estimate indicated that with the 100-point procedural justice measure there was a 6.66 increase in procedural justice ($t=4.13$; $p<.01$) which is expected, as this is a calculation similar to those reported above. The multivariate test in Table 4 controls for the contours of the encounter. Significant variations in procedural justice are identifiable among those independent measures. Minority citizens (not black or Hispanic) contrasted with white citizen's experience nearly 9

more points on the procedural justice scale when compared with their white counterparts (t=2.53; p <.05). Citizen role of suspect (b=-4.58; t=-2.04, p<.05) or third party (b=-3.58; t=-1.72; 2-tailed p <.10) indicates a significant reduction of between 3.5 to 4.5 points on the procedural justice composite scale when compared with citizens in the role of victim (the contrast for these variables). Citizens who initiate disrespect experience an 8-point reduction in procedural justice as compared with their peers who are not disrespectful. Each citizen on scene at the beginning of the encounter is expected to decrease procedural justice displays by the lead officer by .4 points (t=2.73; p<.05). Finally, reactive mobilizations have procedural justice scores that are 8.45 points higher (t=3.96; p<.01) when contrasted with proactive officer initiated encounters. The overall fit of the model in table 4 indicates a weak to moderate explanatory power (Model F=6.2, 16 d.f.; R^2=.16; adjusted R^2=.13), which is very similar to that found in existing research predicting officer displays of procedural justice. Nevertheless, controlling for the 15 measures capturing elements of the encounter and citizen characteristics, the coefficient for post-BWC observations is statistically significant (t=3.13, p <.01), and indicates that after controlling for those other variables, there was still a nearly 5-point increase in the composite measure of procedural justice. Put differently, *the BWC, net of other effects, appears to have exercised a substantial direct impact on the procedural justice experienced by citizens*. Furthermore, by decreasing citizen disrespect, as demonstrated in Table 4, the BWC likely added substantially to indirect changes in the level of procedural justice. Exploration of that question and quantification of the effect is reserved for future analysis. Separate analyses (not shown) for the Mission and Newton Divisions indicate that only the former had a statistically significant increase in procedural justice after the adoption of the BWC (b=6.24; t=2.97; p<.01) whereas the fit in Newton was dominated by whether the event was reactive or not and the main effect of body cameras was positive but not statistically significant (b=2.25; t=.93, p=.36). Exploration of differences across divisions is, like the indirect effects mentioned above, reserved for future analysis.

POLICY IMPLICATIONS AND CONCLUSIONS

Body worn cameras are anticipated to have positive impacts on police-citizen encounters and early returns on use of force and complaints indicate an effect under certain conditions, consistent with those expected effects (e.g. Ariel, Farrar, and Sutherland 2015). The mechanism by which the effects occur (changes in organizational routine, citizen behavior, proactive engagement, productivity, or officer behaviors) are unclear. The current article examines procedural justice and its constituent elements as one conduit expected to deliver changes in police-citizen behavior under BWC conditions. Official records do not capture this outcome, thus systematic social observation was adopted to measure relevant aspects police-citizen interactions prior to and after the adoption of BWC in LAPD's Mission and Newton Divisions.

The results reported here confirm a statistically reliable change in the pattern of police delivery of procedural justice to citizens in the data that is pooled across the two divisions. Separate analysis indicates that the effect was large and significant in Mission and smaller, in the expected direction, but not significant in Newton, once control variables were included in models of procedural justice outcomes. One limitation of the study is that officer variables (sex,

race/ethnicity, length of service) are omitted and assumed to be equal across observations. This is a simplifying assumption supported by the larger body of police research (Skogan and Frydl, 2004) and research specifically on procedural justice which finds no significant officer-level influence on that outcome.

Nevertheless, this pattern of findings reinforces the need for exploring "soft" elements and typically unmeasured aspects of police-citizen interactions such as the level of procedural justice that is exhibited by police to capture the day-to-day impact of BWC on the nature and quality of police work. Comparisons of LAPD's procedural justice elements to VCU (Mell, 2016) and Everdene (Jonathan-Zamir, Mastrofski, and Moyal 2015) indicate, across almost all elements, a high level of procedural justice *prior* to BWC implementation. But that evaluation has pitfalls, because comparing across agencies confuses the mixture of context, organization, and problems. *What is striking is that there is a detectable increase in procedural justice in the LAPD from this relatively high starting point, which may be cause for optimism regarding BWC impacts across police organizations.*

Worden and McLean's (2017) research indicates that adopting procedural justice as part of an organizational mandate is difficult and evidence of implementation tenuous, perhaps because it is difficult to measure. However, in the age of the BWC, specifying some common tactics as part of an encounter script (Schulhofer, Tyler, Huq 2011) at least lends itself to the possibility of measurement. Thus, an avenue for explicit implementation and monitoring is available of announcing the presence of cameras, treating individuals with courtesy, and so on. LAPD's monitoring of cameras yielded detectable changes in all procedural justice elements except trustworthy motives, as measured by care and concern. In other words, police behavior moved towards procedural justice without training or explicit reference to measurement or consequences. In departments willing to do one or both we would expect positive results and departments at lower starting points of procedural justice currently delivered should see greater relative improvement.

Optimism is tempered, however, by several realities. First, citizens' perceptions of procedural justice are weakly related to what police do (Worden and McClean, 2017). Nevertheless, recognizing higher quality of service delivery is preferred, in the form of procedural justice, does not require citizens' affirmation. Second, video footage appears to have asymmetric propagation in public, thus negative incidents can overwhelm and undermine departmental legitimacy, and video footage of events perceived as negatively reflecting on departments can do great harm to legitimacy, morale, and trust. From an organizational standpoint, learning how to address such events is likely to lean heavily on arguments stemming from increasing procedural justice and fair policing and being able to use positive video as a response.

Indirect impacts of cameras should be considered as part of implementation and emphasized. The reduction of disrespectful citizen displays under the BWC condition is important and in need of further scrutiny. In fact, number of citizens and disrespect were two variables with significant differences across BWC conditions and both had significant direct impacts on procedural justice. Thus, cameras made encounters significantly "easier" on police in LAPD's two test divisions. Programs that experiment with the announcement of cameras, for example, could extend tests to

whether cooperation and lowered citizen disrespect can be reliably increased during police-citizen encounters.

Officer discourtesy, though subsumed in the composite measure, is an area that is expected to change under BWC and officer discourtesy is an important area of friction between police and communities worthy of greater scrutiny (Mastrofski and colleagues, 2002). Empirical tests focusing on that aspect of police behavior would illuminate whether the specific promise of BWC is realized and also provide a linkage to observed declines in complaints that tracks back to observable officer behavior.

The timing of the second wave of data collection, specifically in Newton, is also important to note. The Dallas police shooting in the summer of 2016 occurred during that phase of post-BWC implementation observations and observers were temporarily withdrawn from the field. It would be expected that the shootings and police responsivity might have changed, but we would argue that change would not likely be an increase in procedural justice. Put differently, the current results under those conditions, may understate the procedural justice effects from BWC.

Citizen compliance with police requests would be a third area of suggested research as this area of cooperation may be affected by the BWC presence. Finally, whether highly emotional citizens are calmed down by police (McIver and Parks, 1983) and whether calm citizens remain calm is an understudied area where police actions under BWC may be illuminated with SSO data.

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Table 1: Components of Procedural Justice Measured in Sample (N=555)

	Total Sample	Newton	Mission
	Values	N	%
Participation			
Officer asked for citizen information/viewpoint	Yes	555	89.0
Citizen provided information/viewpoint	Yes	555	90.3
Officer interest in citizen information/viewpoint	Dismissive	501	1.8
	Inattentive	501	1.6
	Passive	501	18.2
	Active	501	78.4
Neutrality			
Officer indicated... desire to hear all viewpoints (note, missing coded as zero)	Yes	555	48.3
...no decision until all information gathered	Yes	555	50.6
... personal characteristics (race, age, sex) influenced decision (reverse)	Yes	555	1.6
…explained why the police became involved	Yes	555	60.9
…explained why s/he chose to resolve situation	Yes	555	75.0
Dignity and respect			
Officer showed respectful behaviors toward citizen in encounter	Yes	555	93.2
Duration of respectful behaviors	Very little	516	16.9
	Some of the time	516	24.5
	Most of the Time	516	30.8
	Nearly all of the time	516	20.7
Officer showed disrespectful behaviors toward this citizen in encounter	Yes	555	7.6
Trustworthy motives: Showing care and concern (use of Qualtrics codes 1 or missing)			
Officer..asked about citizen's well-being	Yes	555	39.5
…offered comfort or reassurance to citizen	Yes	555	28.1
..provided or pmised to influence/control another person for citizen	Yes	555	6.5
…acted or promised to act on behalf of citizen w/ agency or organization	Yes	555	3.2
..provided/promised/arranged physical assistance for citizen	Yes	555	7.6
..provided/promised advice to handle the situation or problem	Yes	555	53.9
..encouraged citizen to seek additional police assistance for this or other problem	Yes	555	25.4

Table 2: Mean comparisons for procedural justice elements pre/post BWC (N=555)

Procedural Justice Element	Pre/ Post	Pre N=334 Post N=221 Mean	Std. Dev.	Pre N=144 Post N=82 Mean	Std. Dev.	Pre N=190 Post N=139 Mean	Std. Dev.
Participation	Pre	3.25	1.30	3.16	1.43	3.31	1.18
	Post	3.52*	0.95	3.61*	0.93	3.47	0.97
Neutrality	Pre	3.02	1.28	3.04	1.21	3.01	1.34
	Post	3.80*	1.08	3.56*	1.03	3.94*	1.09
Dignity & respect	Pre	3.11	1.49	3.13	1.49	3.09	1.49
	Post	3.38*	1.38	3.13	1.27	3.53*	1.42
Trustworthy Motives	Pre	1.63	1.27	1.60	1.23	1.65	1.30
	Post	1.62	1.33	1.72	1.36	1.56	1.32
Procedural Justice	Pre	61.12	19.97	60.60	19.29	61.52	20.51
	Post	68.04*	16.17	66.78*	16.69	68.78*	15.87

* p<.05, two-tailed T-test for mean differences pre/post

Table 3: Full sample independent predictors of procedural justice, with pre-post statistical contrasts (N=549)

Variable	Min	Max	Mean	Std. Dev.	T-test	Chi-square
Citizen Social Status						
Citizen Black (1=yes)	0	1	0.11	0.32		1.12
Citizen Hispanic (1=yes)	0	1	0.64	0.48		2.87
Citizen other minority (1=yes)	0	1	0.06	0.24		0.02
Citizen appears to be of lower wealth (1=yes)	0	1	0.26	0.44		1.28
Citizen is under age 21 (1=yes)	0	1	0.13	0.34		0.7
Citizen Behavior						
Citizen is Suspect or Disputant Role (1=yes)	0	1	0.48	0.50		0.08
Citizen Role is Third Party (Witness, bystander, etc.)	0	1	0.26	0.44		7.77*
Citizen summoned police to encounter (1=yes)	0	1	0.30	0.46		1.51
Citizen initiated disrespect* (1=yes)	0	1	0.16	0.37		5.6*
Challenges to engaging in procedural justice						
Lowered Self Control Alc/drug , Ment. Dis., emotional	0	3	0.41	0.79	1.98*	
Citizen was in conflict with another C on scene (1=yes)	0	1	0.12	0.33		0.74
Number of Citizens on scene @ beginning	1	40	4.41	5.50	3.8*	
Procedural Justice "Script"						
Traffic Problem @ beginning (1=yes)	0	1	0.16	0.37		0.26
Control Variables						
Reactive mobilization (1=yes)	0	1	0.77	0.42		0.58
Division (1=Mission)	0	1	0.59	0.49		1.89

*Denotes $p < .05$ pre/post contrast (two tailed for T-test, or Chi-square test > 3.84)

Table 4: OLS Regression estimates predicting procedural justice composite measure (N=549)

Variable	Coeff.	S.E.	Std. Beta	t-value	P*
Intercept	58.29	3.63		16.07	0.00
Citizen Social Status					
Citizen Black (1=yes)	3.40	2.95	0.06	1.15	0.25
Citizen Hispanic (1=yes)	1.90	2.04	0.05	0.93	0.35
Citizen other minority (1=yes)	8.96	3.54	0.12	2.53	0.01
Citizen appears to be of lower wealth (1=yes)	-2.31	1.92	-0.05	-1.20	0.23
Citizen is under age 21 (1=yes)	-0.18	2.32	0.00	-0.08	0.94
Citizen Behavior					
Citizen is Suspect or Disputant Role (1=yes)	-4.58	2.24	-0.12	-2.04	0.04
Citizen Role is Third Party (Witness, bystander, etc.)	-3.85	2.24	-0.09	-1.72	0.09
Citizen summoned police to encounter (1=yes)	0.54	2.01	0.01	0.27	0.79
Citizen initiated disrespect (1=yes)	-8.12	2.26	-0.16	-3.59	0.00
Challenges to engaging in procedural justice					
Lowered Self Control Alc/drug , Ment. Dis., emotional	-0.29	1.10	-0.01	-0.27	0.79
Citizen was in conflict with another C on scene (1=yes)	2.87	2.46	0.05	1.17	0.24
Number of Citizens on scene @ beginning	-0.40	0.15	-0.12	-2.73	0.01
Procedural Justice "Script"					
Traffic Problem @ beginning (1=yes)	3.46	2.44	0.07	1.42	0.16
Control Variables					
Reactive mobilization (1=yes)	8.45	2.14	0.19	3.96	0.00
Division (1=Mission)	1.98	1.62	0.05	1.22	0.22
BWC Intervention					
Post-BWC intervention (1=yes)	4.92	1.57	0.13	3.13	0.00

*two-tailed test p reported