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The Influence of Defendant Race/Ethnicity and Police Body-Worn Cameras on Traffic Case Processing

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Abstract

The current study evaluates the impact of defendant race/ethnicity and police body-worn cameras (BWCs) on dismissals and guilty pleas in traffic violations. Despite the frequency of traffic violations and the potential for racial/ethnic bias in these incidents, researchers have yet to examine the outcomes of these violations in court. Research is also needed to assess the potential for BWCs to provide evidence and reduce charging disparities and differential pleas for minority defendants. Traffic violations processed in the Tempe, Arizona Municipal Court before and after BWC deployment were examined using logistic regression. Black and Hispanic defendants were less likely to have their violations dismissed than White defendants, regardless of the presence of a BWC. Hispanic defendants were significantly more likely to plead guilty to traffic violations than White defendants, and BWCs did not eliminate this disparity. BWCs did significantly reduce the likelihood of a guilty plea for Black and White defendants, but the finding was not robust to the inclusion of an interaction term between race and BWCs. BWCs did not significantly moderate the impact of defendant race/ethnicity on either dismissals or guilty pleas. Overall, the results suggest that BWCs have little impact on reducing racial/ethnic disparities in traffic violation processing.

Keywords

body-worn cameras, dismissals, guilty pleas, focal concerns, traffic, race/ethnicity

Despite heavy research attention to felony offenses, most cases processed in the U.S. court system involve misdemeanors. In fact, approximately 13 million Americans are charged with a misdemeanor each year (Natapoff, 2018). Roberts (2011, p. 277) notes that “the volume of misdemeanor cases nationwide has risen from five to more than ten million between 1972 and 2006. At the same time, violent crime and the number of felony cases across the country have decreased markedly.” Traffic violations specifically account for a large portion of these cases.

Though misdemeanor traffic violations are some of the most common cases processed in courts (Stevenson & Mayson, 2018), and account for the most frequent interaction between citizens and the criminal justice system as a whole (Davis et al., 2018), these incidents have received limited research attention. Researchers who have examined traffic violations predominantly assess racial profiling on the part of the police, and have shown that these interactions are fraught with the potential for racial/ethnic bias (Engel et al., 2002; Lundman & Kaufman, 2003; Warren et al., 2006). Though examining the initial traffic stop and interaction is important, understanding how these cases are ultimately processed through the court system is imperative to assessing the full impact of driver/defendant race/ethnicity on traffic violations.

Researchers often use the focal concerns perspective to examine the impact of legal (e.g., offense characteristics) and extralegal (e.g., defendant characteristics) factors on judicial decision-making (Kutateladze & Lawson, 2018; Steffensmeier et al., 1993; Steffensmeier et al., 1998). However, the lack of research on defendant race/ethnicity in misdemeanors, especially traffic cases, represents a gap in the literature. Police body-worn cameras (BWCs) are a recent development that could impact the factors that court officials consider in traffic cases by providing additional evidence of the offense. Unfortunately, only a handful of studies have investigated the influence of BWCs in court (Morrow et al., 2016; Owens et al., 2014; White et al., 2019; White et al., 2018). The extent to which BWCs affect the processing and adjudication of traffic violations specifically, remains unknown.

The current study seeks to address the aforementioned gaps in the traffic case processing and the BWC literature through an examination of traffic violations brought to the Tempe, Arizona Municipal Court, collected as part of a randomized controlled trial (RCT) of BWCs in the Tempe Police Department. We take advantage of this RCT to investigate three issues related to the adjudication of traffic violations. First, we explore the degree to which defendant race/ethnicity influences dismissals and guilty pleas. Second, we examine whether the introduction of BWCs affected the likelihood of dismissals and/or guilty pleas in traffic violations by defendant race/ethnicity. Last, we assess the potential for BWCs to mitigate the influence of defendant race/ethnicity on the adjudication of traffic violations.

Theoretical Framework

The focal concerns perspective posits that courtroom actors take three factors into consideration when pursuing charges or making sentencing decisions: (1) the defendant's blameworthiness/the harm caused (e.g., prior record); (2) the need to protect the community (e.g., incapacitate the offender); and (3) the practical considerations of the court actor's decisions (e.g., jail space; Steffensmeier et al., 2017; Steffensmeier et al., 1998). Scholars further propose that courtroom actors have bounded rationality (Albonetti, 1991) due to attempts to predict future offending with incomplete information. This can result in the utilization of perceptual shorthand, or stereotypes, to reduce uncertainty when making decisions about an individual's future

dangerousness (Steffensmeier & Demuth, 2001). This perceptual shorthand could stem from extralegal factors such as race/ethnicity, gender, or age (Farrell & Holmes, 1991; Hawkins, 1981; Steffensmeier et al., 2017, 1998). Prior research has confirmed that defendant race/ethnicity influences judicial decisions (Anderson & Spohn, 2010; Johnson, 2006; Kim et al., 2015).

Only a few studies examine the influence of evidentiary strength and extralegal factors on misdemeanor case outcomes. Kalven and Zeisel (1966) found that cases involving less severe offenses resulted in higher levels of juror discretion. This landmark study provided evidence of the liberation hypothesis, in that the more severe the crime, the more constrained by the law the jury felt (Leiber & Blowers, 2003). Spohn and Cederblom (1991) expanded this perspective to include judicial decision-making. The more serious offenses in their study (e.g., murder) involved less judicial discretion, as legal factors were the primary influence on decisions to incarcerate. When looking at less severe crimes (e.g., assault), more discretion was present, and extralegal factors, such as race, were more influential. Other scholars have similarly found that both legal and extralegal factors influence whether a case will be pursued in court (Adams & Cutshall, 1987; Jamieson & Blowers, 1993).

Following the liberation hypothesis and focal concerns perspectives, it becomes reasonable to anticipate that racial disparities might occur during “low information” misdemeanor offenses (Metcalfe & Chiricos, 2018). Indeed, Berdej ´o (2018) indicated that White defendants were 25% more likely than Black defendants to have their principal charge dropped or reduced. These considerations could also influence a defendants’ decision to plea. Guilty pleas account for a substantial portion of convictions (Natapoff, 2018; Painter-Davis & Ulmer, 2020). Metcalfe and Chiricos (2018) found that Black males were less likely to plea and were expected to receive a lower value for their plea, consistent with Adams and Cutshall’s (1987) finding that Black defendants were more likely to have a case go to trial.

Traffic Violations

In 2015, almost 9% of U.S. drivers experienced a traffic stop (Davis et al., 2018). Traffic violations make up over half of the legal violations processed in state courts each year; more than civil, criminal, domestic, and juvenile cases combined (Economos, 1953; Stevenson & Mayson, 2018). Though researchers have identified racial disproportionality in terms of police behavior in traffic stops (Pierson et al., 2019), less is known about the relationship between driver race/ethnicity and outcomes in court. This is an important oversight in the literature given the potential for lower courts to shape public perceptions of the criminal justice system (Brickey & Miller, 1975), especially as most of the defendants in traffic violations will not experience another court proceeding (Economos, 1953). Traffic courts operate with a prime concern for efficiency (Brickey & Miller, 1975), but have also been criticized for being overcrowded, resulting in long waits and limited judicial time to hear cases (Stone et al., 2014). Little is known about the influence of defendant race/ethnicity on the adjudication of traffic violations. There is

reason to believe that the low severity of traffic offenses, combined with judicial uncertainty about case processing, could result in differential court outcomes depending on defendant race/ethnicity.

Scholars have long argued that police officers, like courtroom actors, use a perceptual shorthand to guide their decisions based on stereotypes indicating which individuals are likely to be engaged in illegal behaviors (Skolnick, 1996). The term 'driving while Black' demonstrates this point, suggesting that driver race plays a fundamental role in police decisions to initiate a traffic stop (Lundman, 2010). Researchers consistently find that Black drivers experience higher rates of traffic stops, post-stop searches, and post-stop arrests compared to White drivers (Epp et al., 2014; Harris, 1999; Warren et al., 2006). Researchers have also found that Hispanic drivers are stopped, searched, and arrested more often than their White counterparts (Pierson et al., 2019; Rojek et al., 2004). Though police officers have attributed these disparities to deployment patterns (Withrow, 2004), race/ethnicity was a key component in "drug courier profiles" developed by the Drug Enforcement Administration (DEA) in the 1980s (Harris, 2002). Engel (2010, p. 2) notes:

In 1985 the DEA established "Operation Pipeline," a highway drug interdiction program designed to train federal, state, and local law enforcement officials on the indicators of drug trafficking activities of motorists. One of the alleged indicators of drug trafficking used in the training was the race/ethnicity of the driver.

Police officers conduct traffic stops for a variety of legal reasons, including moving and equipment violations (Epp et al., 2014; Miller, 2009). Moving violations involve drivers engaged in speeding, erratic lane changes, and other potentially dangerous driving behaviors. Equipment violations involve such things as non-functional lights, expired vehicle registration, and missing license plates. Equipment violations may be used for pretextual stops, a Supreme Court-approved tactic (*Wren v. United States*, 53 F.3d 371), whereby a minor infraction is used as an excuse to investigate the driver for other more serious offenses. Harris (1999, p. 302) describes how pretextual stops lead to racial bias in police traffic enforcement:

Few would contend that police discretion should be limitless. But this is exactly what the pretextual stop doctrine allows. Since everyone violates the traffic code at some point, it is not a matter of whether police can stop a driver, but which driver they want to stop. Police are free to pick and choose the motorists they will pull over, so factors other than direct evidence of law breaking come into play. In the "driving while Black" situation, of course, that factor is race.

Research has shown that minority drivers are disproportionately subjected to stops for equipment violations, presumably as part of pretextual stops; moving stops, on the other hand, are equally likely to involve minority and White drivers (Epp et al., 2014). The overrepresentation of minorities in equipment stops could be driven by racial bias

or by socioeconomic status, if minority drivers are more likely to drive vehicles that are older and in need of repair (see Engel & Calnon, 2004 for a similar discussion). Thus, it is important to account for the type of traffic stop when examining driver race/ethnicity and stop outcomes.

Body-Worn Cameras

Body-worn cameras have diffused rapidly in American police departments because of their perceived benefits. Though much of the focus has centered on their potential to increase transparency and to reduce violence between police and citizens (Lum et al., 2019; White & Malm, 2020), advocates also argue that the technology has significant evidentiary value in court (McCluskey et al., 2019; Todak et al., 2018; White et al., 2018). Only a handful of studies have investigated this issue, however, resulting in calls for increased research examining the impact of cameras on downstream criminal case processing (Merola et al., 2016; White et al., 2018).

Studies from the United Kingdom (UK) have generally found that BWCs lead to quicker resolution of cases and increase the likelihood of guilty pleas by 70-80% (Goodall, 2007). Morrow et al. (2016) found that domestic violence cases with BWC footage were significantly more likely to result in arrest, have charges filed, and end in either a guilty plea or a guilty verdict at trial in Phoenix (also see Owens et al., 2014). White et al. (2018) found that BWC deployment in Tempe was associated with a 6% increase in guilty pleas and an 8% decrease in adjudication time among misdemeanor cases. The introduction of BWCs into downstream criminal case processing may also generate collateral effects. In a survey of prosecutors and public defenders in three US counties, McCluskey et al. (2019) found that though both prosecutors and defense attorneys were generally supportive of BWCs, BWC footage was not reviewed in all cases in which it was available due to the time commitment associated with watching the video.

Current Study

We examine the influence of defendant race/ethnicity and BWCs on judicial decisions to dismiss and defendant decisions to plead guilty to traffic violations. The role of defendant race/ethnicity may be of most concern in misdemeanors, especially traffic violations, because of the history of racial bias in those cases and the high-volume, low-information environment in which these decisions are made. Further, the evidence generated by a BWC could reduce judicial discretion to dismiss charges and could increase guilty pleas. Thus, BWCs could result in more guilty outcomes (via plea or trial) due to the evidence of the offense being tangible in the courtroom. BWCs could also reduce judicial reliance on extralegal defendant characteristics, like race/ ethnicity, when processing traffic violations. We investigate the factors that influence dismissals and guilty pleas in traffic violations prior to and after the implementation of police BWCs in Tempe, Arizona.

Research Design and Methods

Tempe is located southeast of Phoenix, with a population of 178,339 residents. In terms of race/ethnicity, 57.7% of the residents are non-Hispanic White, 22.7% are Hispanic of any race, and 6.5% are Black (U.S. Census Bureau, 2017). In 2016, Tempe documented 902 violent crimes and 8,144 property crimes, for violent and property crime rates of 504.9 and 4,558.5 per 100,000 residents, respectively (Federal Bureau of Investigation, 2016). Both rates are well above the national average (386.3 and 2,450.7, respectively). The Tempe Police Department employed 200 patrol officers in 2016. BWCs were deployed as part of a 6-month RCT, in which officers received cameras in two phases: phase 1 (treatment, November 2015; $n = 101$ officers) and phase 2 (control, May 2016; $n = 99$ officers).

The Tempe Municipal Court handles all misdemeanor arrests made by Tempe officers. The Tempe Municipal Court has jurisdiction over civil and criminal traffic offenses, city ordinance offenses, and other misdemeanors within the city of Tempe (Tempe Municipal Court, 2019). The Tempe Police Department communicated with the Municipal Court during the planning phase of the BWC rollout, ensuring that court actors were aware of the implementation of BWCs and could begin developing policies and practices for incorporating BWCs into case processing (Todak et al., 2018). The authors obtained all violations processed in the Tempe Municipal Court from 11/1/2014 to 6/30/2017—representing one year before the start of the RCT and 19 months after BWC deployment. The data include 89,221 individual violations falling into 594 separate offense categories. It is important to note that a defendant could have been charged with more than one violation in an individual case. Given the focus of the current study, non-traffic violations were removed from the dataset. This resulted in a final sample of 50,877 traffic violations. Traffic violations in the current study were filed directly with the court by the officer who conducted the stop (without prosecutorial review or presence in traffic hearings). Defendants have the option to use an attorney or represent themselves. As such, this study represents an evaluation of judicial decisions to pursue charges and defendant decisions to plead guilty.

We separated traffic violations into moving and equipment violations, consistent with prior research. Moving violations include speeding, erratic lane changes, aggressive driving, and other similar violations (52.2% of traffic violations; $n = 26,573$). Equipment violations include faulty brake lights, broken windows, and expired plates (47.8% of traffic violations; $n = 24,304$). Given our focus on violation outcomes for minority drivers, we separately model outcomes for Black and Hispanic defendants, relative to White defendants. Most traffic violations involved White defendants (66.3%; $n = 33,749$), followed by Hispanic defendants (19.0%; $n = 9,671$), and Black defendants (14.7%; $n = 7,457$).

Dependent Variables

Our dependent variables are dismissals and guilty pleas. Dismissals are examined using a binary measure of judicial decision to dismiss the charge (dismissal = 1 [39.85%; $n = 20,277$]). This was the most common outcome for traffic violations during the study period. Guilty pleas were similarly examined using a binary measure of defendant decisions to plead guilty to the traffic violation (guilty plea = 1 [36.77%; $n = 18,707$]). Other outcomes include found guilty at trial (2.44%; $n = 1,243$), acquitted at trial (0.49%; $n = 247$), and other (20.45%; $n = 10,403$; e.g. defensive driving school, failure to appear, remanded to other courts, charges amended). The dismissal and guilty plea models compare the likelihood of a dismissal/guilty plea to all other possible violation outcomes. Recall that individual defendants could be charged with multiple violations as part of a single case. We specifically examine violation-level outcomes. As a result, a dismissal or a guilty plea is linked to the specific violation in question, which might or might not be part of a larger case involving other types of violations with different outcomes.

Independent and Control Variables

The data include a range of other variables for each traffic violation. First, we capture a set of violation characteristics, including defendant race/ethnicity (measured as separate binary variables for Black and Hispanic, using White as the reference category); violation type (a binary variable for equipment violations, using moving as the reference category); the presence of both a moving and an equipment violation in a case (a binary variable); the presence of a non-traffic related charge in a case (a binary variable); the total number of charges in a single case (a continuous variable); and defendant age (a continuous variable).

Second, we control for a series of officer characteristics, including sex, race/ethnicity, rank, length of police service, and the number of citizen complaints and use of force incidents an officer was involved in during the 6 months prior to receiving a BWC. These officer variables are included in the models given their importance in the literature on police decision-making in traffic stops (Engel et al., 2002; Rojek et al., 2004). Because police officers are the source of these violations, and some officers could produce cases with more evidence than others, it is important to account for officer characteristics when examining downstream case processing. In short, different officers could submit violations with varying levels of evidence. This evidence likely has a strong impact on judicial and defendant decision-making. Given that we do not have a direct measure of available evidence, controlling for officer characteristics could help tap into that construct.

To account for the presence of a BWC, we include a binary variable indicating whether the officer had a BWC during the traffic stop (BWC = 1 [56.31%; $n = 28,650$]). This variable is officer-specific based on each officer's BWC assignment date and the date of the traffic offense. Note that this measure reflects whether a BWC was present at the encounter—yes or no. The measure does not reflect whether the BWC was activated during the encounter. Our inability to capture whether there is actual BWC

footage of each encounter, or if this footage was used in court, represents a limitation in the study. However, the Tempe Police Department BWC policy mandates activation for all formal police-citizen encounters. The policy specifically states:

Officers shall use the BWC to record enforcement related contacts. The BWC should be activated prior to actual contact with the subject, or as soon as safely possible thereafter, and continue recording until the contact is concluded.

Enforcement related contacts include, but are not limited to traffic stops, field interviews, detentions, arrests, persons present at radio calls who are accused of crime, consensual encounters in which the officer is attempting to develop reasonable suspicion on the subject of the encounter, pursuits, critical incidents, and use of force incidents. (Tempe Police Department, 2016, pp. 7-8)

Given the mandatory language in the policy, we argue that the “BWC present” variable is a reasonable rough indicator of the availability of BWC evidence in a given case.

These data are used to examine three research questions:

1. Are violation characteristics associated with dismissals/guilty pleas by defendant race/ethnicity (Black and Hispanic, relative to White defendants)?
2. Does the presence of a BWC influence dismissals/guilty pleas by defendant race/ethnicity (Black and Hispanic, relative to White defendants)?
3. Does the presence of a BWC reduce the influence of defendant race/ethnicity on dismissals/guilty pleas (Black and Hispanic, relative to White defendants)?

We additionally control for violation month/year to account for potential variation in violation outcomes over time (a continuous variable ranging from 1 = November 2014 to 32 = June 2017).

Analytical Approach

We use a series of binomial logistic regression models to examine our research questions. We first run logistic regression models to predict dismissals/guilty pleas in traffic violations involving Black and Hispanic defendants, relative to White defendants, while controlling for characteristics of the violation and the involved officer. This first model examines the degree to which violation and officer characteristics are associated with judicial decisions to dismiss traffic violations and/or defendant decisions to plead guilty. Using a stepwise approach, we then add the BWC variable to the models, including all of the violation and officer characteristics. This second set of models will demonstrate whether BWCs directly influence violation outcomes. To address our third research question, we include interaction terms between defendant race/ethnicity and BWCs. The inclusion of these interaction terms enables us to examine whether BWCs moderate the influence of defendant race/ethnicity on dismissals and/or guilty pleas.

Results

Descriptive Results

Figure 1 shows the prevalence of traffic violations over the study period, by month. The monthly number of violations varied, from as low as 1,124 (November 2014) to a high of 2,697 (August 2016). Violations involving Black and Hispanic defendants represent about an equal proportion of violations, and both show a fairly steady trend over time. Figure 1 also shows moving and equipment violations, which follow similar patterns. Figure 2 shows the monthly rate of dismissals and guilty pleas (standardized per 100 violations), by defendant race/ethnicity. The monthly dismissal rate varied little, ranging from approximately 37 to 43 per 100 violations. The study period can also be divided into three sub-time periods: pre-RCT (November 2014–October 2015), RCT (November 2015–April 2016), and post-RCT (May 2016–June 2017). The monthly average dismissal and guilty plea rates varied little across the sub-time periods.

Table 1 shows frequencies for the traffic violations processed during the study period. Bivariate differences and effect sizes comparing Black and Hispanic defendants to White defendants are also presented. Note that many of the bivariate differences reach statistical significance because of the large number of violations. However, the percentage difference was often minimal, and the effect sizes were small (Cohen's $d < 0.2$). A little less than half (41.6%) of violations involving White defendants resulted in dismissal, though dismissals were significantly less likely for Black (36.8%) and Hispanic (36.1%) defendants. Slightly over a-third (36.1%) of White defendants plead guilty to traffic violations. Black defendants were significantly less likely to plead guilty than Whites (34.7%). Hispanic defendants were significantly more likely to plead guilty than Whites (40.7%).

A BWC was present in 54% of violations involving White defendants. BWCs were significantly more likely to be present in violations involving Black (59.0%) and Hispanic defendants (61.4%). In terms of violation type, 55.6% of White defendants were charged with moving violations and 44.4% were charged with equipment violations. Black and Hispanic defendants were significantly less likely to be charged with a moving violation (46.5% and 45.0%, respectively) and were significantly more likely to be charged with equipment violations (53.5% and 55.0%, respectively), compared to their White counterparts. Roughly half of the violations examined were part of cases that included both a moving and an equipment violation (42.0% for White, 48.2% for Black, and 52.5% for Hispanic defendants). Violations involving White defendants were significantly less likely to be part of cases that also included a non-traffic violation (9.8%), than Black (11.5%) and Hispanic (12.1%) defendants. White defendants were charged with a significantly lower number of violations (mean = 2.3), relative to Black (mean = 2.6) and Hispanic (mean = 2.8) defendants. White defendants were also significantly older (mean = 33.5), than their Black (mean = 31.4) and Hispanic (mean = 31.6) counterparts.

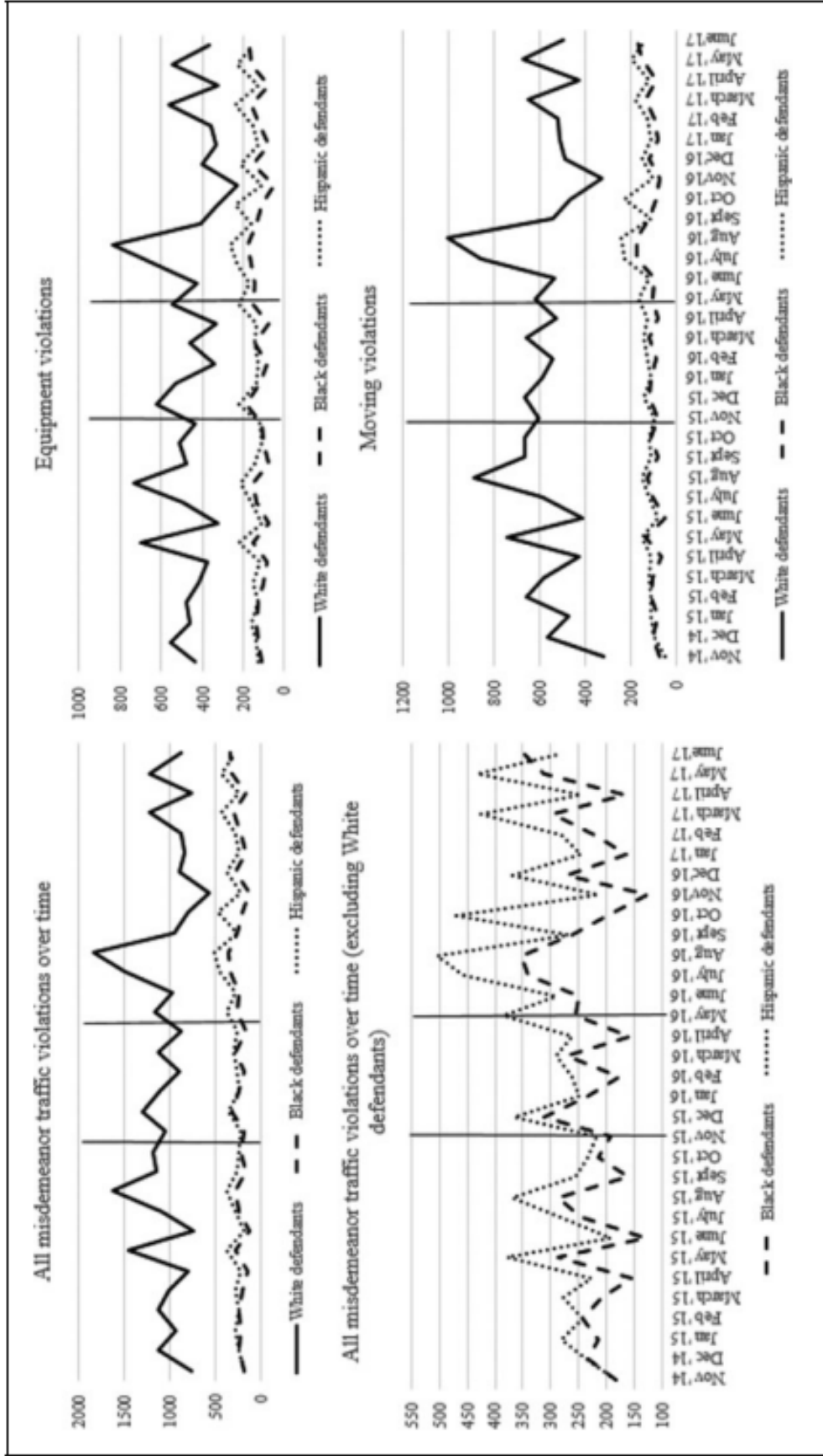


Figure 1. Traffic violations over time.

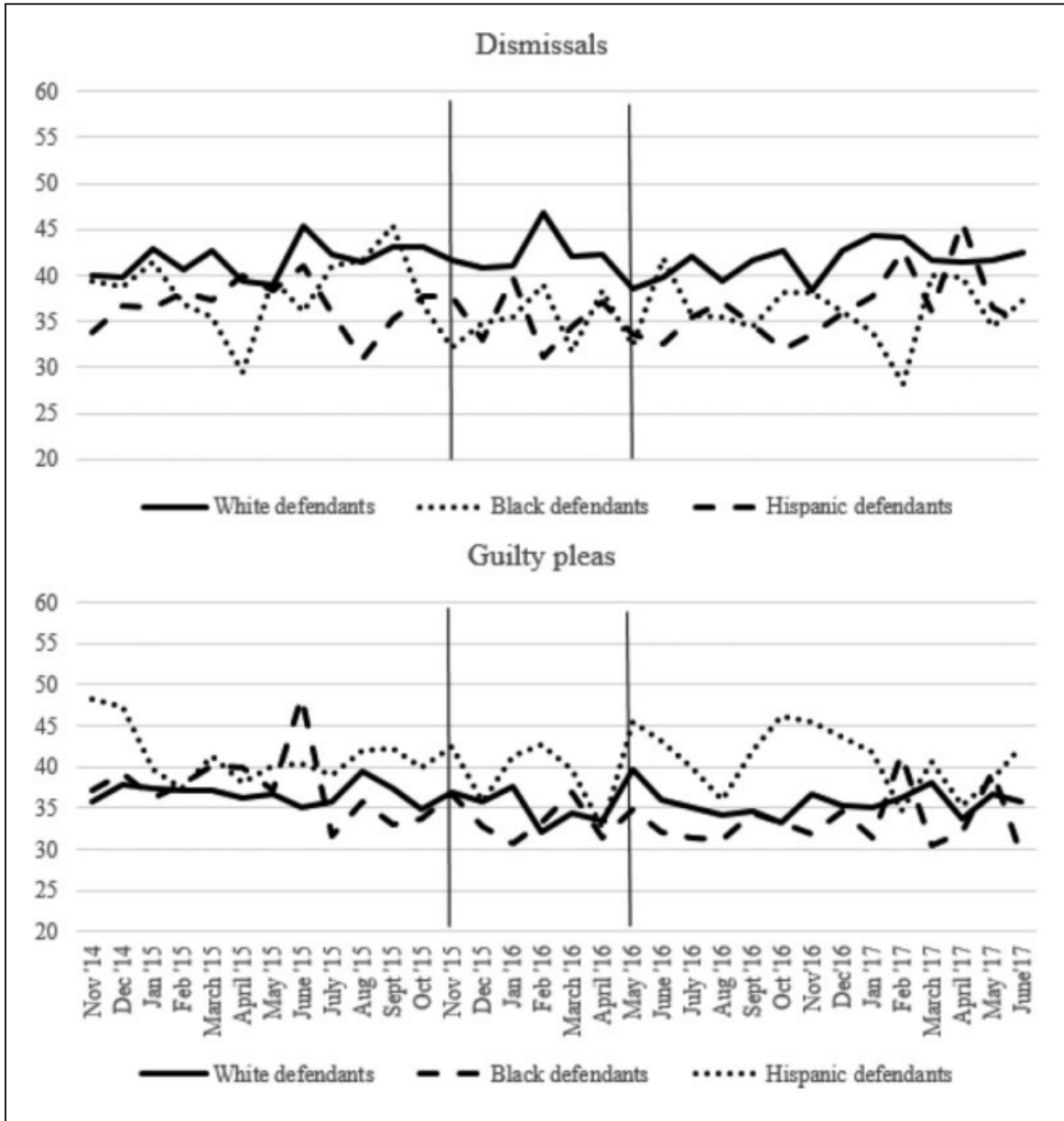


Figure 2. Traffic violation outcomes over time (standardized per 100 violations).

Table 1 also displays officer characteristics. Though there were some statistically significant differences between officers involved in violations against White, Black, and Hispanic defendants, the substantive differences were small (all $d < 0.2$). Most stops involving White defendants were conducted by male officers (87.2%) and White officers (80.2%). Similar trends emerged for Black and Hispanic defendants. Line-level officers produced the majority of violations involving defendants of all racial/ethnic groups. Officers involved in traffic violations against Black defendants had a significantly higher number of use of force incidents in the six months prior to the RCT (1.01 vs. 0.88 uses

of force for White defendants). Officers involved in traffic violations against Hispanic defendants had a significantly higher number of complaints in the 6 months prior to receiving a BWC (0.24 vs. 0.21 complaints for White defendants).

Table 1. Descriptive Statistics.

Variables	White Defendants		Black Defendants			Hispanic Defendants		
	(n = 33,749)		(n = 7,457)			(n = 9,671)		
	n	%	n	%	d	n	%	d
<i>Dependent variables</i>								
Dismissed	14,046	41.62	2,742	36.77**	0.10	3,489	36.08**	0.11
Plead guilty	12,184	36.10	2,587	34.69*	0.03	3,936	40.70**	-0.10
<i>Independent variable</i>								
Officer BWC	18,311	54.26	4,399	58.99**	-0.10	5,940	61.42**	-0.14
<i>Violation characteristics</i>								
Moving violation	18,751	55.56	3,470	46.53**	0.18	4,352	45.00**	0.21
Equipment violation	14,998	44.44	3,987	53.47**	-0.18	5,319	55.00**	-0.21
Case includes moving and equipment violation	14,158	41.95	3,596	48.22**	-0.13	5,073	52.46**	-0.21
Case includes non-traffic violation	3,291	9.75	856	11.48**	-0.06	1,170	12.10**	-0.08
# charges/case								
Mean (SD)	2.30 (1.59)		2.64 (1.62)**		-0.21	2.83 (1.91)**		-0.32
Defendant age								
Mean (SD)	33.47 (14.35)		31.40 (11.54)**		0.15	31.62 (11.79)**		0.13
<i>Officer characteristics</i>								
Male officer	29,417	87.16	6,395	85.76**	0.04	8,299	85.81**	0.04
White officer	27,080	80.24	5,915	79.32	0.02	8,057	83.31**	-0.08
Hispanic officer	5,882	17.43	1,376	18.45*	-0.03	1,386	14.33**	0.08
Black officer	640	1.9	124	1.66	0.02	164	1.7	0.01
Other race officer	147	0.44	42	0.56	-0.02	64	0.66**	-0.03
Line officer	32,434	96.1	7,078	94.92**	0.06	9,177	94.89**	0.06
Officer tenure (years)								
Mean (SD)	7.51 (4.75)		7.29 (4.82)**		0.05	7.77 (5.06)**		-0.05
Complaints								
Mean (SD)	0.21 (0.41)		0.22 (0.41)		-0.02	0.24 (0.43)**		-0.08
Use of force								
Mean (SD)	0.88 (1.82)		1.10 (2.07)**		-0.12	0.87 (1.76)		0.01

Note. All dummy variables coded 1 = yes; 0 = no; chi-square and t-tests used to compare Black and Hispanic defendants to White defendants; Cohen's d used for effect size; 23.4% of violations resulted in outcomes other than dismissal/guilty pleas, including violations in which defendants were found guilty, acquitted, remanded to another court, and so on.

**p < .01. *p < .05.

We also examined bivariate differences in our dependent variables and traffic offense categories within defendant racial/ethnic groups, split by the presence or absence of a BWC. As shown in Table 2, we found that White defendants were significantly less likely to plead guilty (35.6% vs. 36.7%; $p < .05$), were significantly more likely to be charged with a moving violation (57.1% vs. 53.7%; $p < .01$), and were significantly less likely to be charged with an equipment violation (42.9% vs. 46.3%; $p < .01$) when a BWC was present compared to violations that did not involve a BWC. Black defendants were also significantly less likely to plead guilty (33.3% vs. 36.7%; $p < .01$) and were significantly more likely to be charged with a moving violation (48.3% vs. 44.0%; $p < .01$) when the officer was assigned to wear a BWC. There were no significant differences in dismissals or guilty pleas for Hispanic defendants depending on the presence of a BWC, though Hispanic defendants were significantly more likely to be charged with a moving violation (46.0% vs. 43.3%; $p < .01$) and significantly less likely to be charged with an equipment violation (54.0% vs. 56.7%; $p < .01$) when the officer used a BWC.

Modeling Traffic Violation Dismissal

Table 3 shows the results from the logistic regression models predicting dismissals. Model 1 includes violation and officer characteristics, without the BWC variable. Black and Hispanic defendants experienced a significantly lower likelihood of dismissal ($p < .01$), consistent with the bivariate results. This finding answers the first research question. A handful of other variables emerged as significant, including violation type, suggesting that equipment violations were less likely to be dismissed than moving violations ($p < .01$). Violations that were part of cases that included both moving and equipment violations ($p < .01$) were also less likely to be dismissed. Violations that were part of cases that involved non-traffic offenses ($p < .01$) and defendants with higher numbers of charges per case ($p < .01$) were significantly more likely to be dismissed, indicating the possibility of charge bargaining. Older defendants were significantly more likely to have their violations dismissed ($p < .01$). Some officer characteristics were also associated with dismissals.

The second research question is addressed in Model 2, with the inclusion of the BWC variable. The presence of a BWC was not significantly associated with dismissals. Moreover, the presence of a BWC did not eliminate the direct influence of defendant race/ethnicity on dismissal (comparison of results among Model 1 and Model 2).

To assess our third research question, interactions between BWCs and defendant race/ethnicity were examined to assess potential moderating effects, as shown in Model 3. The direct effect of BWCs on dismissals remains statistically insignificant in both models. The direct effect of Black defendants on dismissals becomes statistically insignificant after including the interaction term (though Black defendants are still 8% less likely to have their cases dismissed than Whites). The main effect of Hispanic defendants remains significant ($p < .01$). Neither of the interaction effects between defendant race/ethnicity and BWCs were significant predictors of

Table 2. Bivariate Cross-Tabulations by Defendant Race/Ethnicity and BWC Presence.

Variables	White Defendants (n = 33,749)				Black Defendants (n = 7,457)				Hispanic Defendants (n = 9,671)			
	No BWC		BWC		No BWC		BWC		No BWC		BWC	
	n	%	n	%	n	%	n	%	n	%	n	%
<i>Dependent variables</i>												
Dismissed	6,447	41.76	7,599	41.50	1,164	38.06	1,578	35.87	1,381	37.01	2,108	35.49
Plead guilty	5,661	36.67	6,523	35.62*	1,123	36.72	1,464	33.28**	1,516	40.63	2,420	40.74
<i>Violation characteristics</i>												
Moving violation	8,293	53.72	10,458	57.11**	1,345	43.98	2,125	48.31**	1,617	43.34	2,735	46.04**
Equipment violation	7,145	46.28	7,853	42.89**	1,713	56.02	2,274	51.69	2,114	56.66	3,205	53.96**

Note. All dummy variables coded 1 = Yes; 0 = No; chi-square used to compare violations without BWCs to violations with BWCs. **p < .01, *p < .05.

dismissal. These findings suggest that BWCs could slightly reduce disparities in dismissals for Black defendants, but do not mitigate the influence of ethnicity for Hispanic defendants. The direct effect of BWCs and the interactions between BWCs and defendant race/ethnicity were insignificant in all of the dismissal models, suggesting limited impact of BWCs.

Table 3. Logistic Regression Models Predicting Dismissals.

Variables	Black and White Defendants			Hispanic and White Defendants		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
BWC present	–	0.95 (0.04)	0.97 (0.04)	–	0.92 (0.04)	0.94 (0.04)
Black defendant	0.85** (0.03)	0.85** (0.03)	0.92 (0.05)	–	–	–
Hispanic defendant	–	–	–	0.82** (0.03)	0.82** (0.03)	0.87** (0.04)
Equipment violation	0.21** (0.01)	0.21** (0.01)	0.21** (0.01)	0.21** (0.01)	0.21** (0.01)	0.21** (0.01)
Case includes moving and equipment violation	0.69** (0.02)	0.69** (0.02)	0.69** (0.02)	0.70** (0.02)	0.70** (0.02)	0.70** (0.02)
Case includes non-traffic violation	4.04** (0.27)	4.04** (0.27)	4.04** (0.27)	4.93** (0.33)	4.91** (0.33)	4.90** (0.33)
# charges/case	1.23** (0.02)	1.23** (0.02)	1.23** (0.02)	1.18** (0.02)	1.18** (0.02)	1.18** (0.02)
Defendant age	1.01** (0.00)	1.01** (0.00)	1.01** (0.00)	1.00** (0.00)	1.00** (0.00)	1.00** (0.00)
Male officer	0.90** (0.04)	0.91* (0.04)	0.91* (0.04)	0.92* (0.04)	0.92* (0.04)	0.92* (0.04)
Hispanic officer	0.85** (0.03)	0.86** (0.03)	0.86** (0.03)	0.86** (0.03)	0.87** (0.03)	0.87** (0.03)
Black officer	1.01 (0.09)	1.00 (0.09)	1.00 (0.09)	1.00 (0.09)	0.99 (0.09)	0.98 (0.08)
Other officer	1.10 (0.21)	1.10 (0.21)	1.10 (0.21)	1.08 (0.20)	1.09 (0.20)	1.09 (0.20)
Line officer	1.03 (0.07)	1.03 (0.07)	1.03 (0.07)	0.91 (0.07)	0.91 (0.07)	0.91 (0.07)
Officer tenure	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
Complaints	0.99 (0.03)	0.99 (0.03)	0.99 (0.03)	1.03 (0.03)	1.03 (0.03)	1.03 (0.03)
Use of force	1.01 (0.01)	1.01 (0.01)	1.01 (0.01)	1.01 (0.01)	1.01 (0.01)	1.01 (0.01)
Month/year	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
BWC x Black defendant	–	–	0.88 (0.06)	–	–	–
BWC x Hispanic defendant	–	–	–	–	–	0.91 (0.06)
Constant	0.78* (0.08)	0.77* (0.08)	0.76** (0.08)	0.95 (0.10)	0.93 (0.10)	0.92 (0.10)
Nagelkerke R ²	0.21	0.21	0.21	0.23	0.23	0.23
Observations	41,206	41,206	41,206	43,420	43,420	43,420

Note. Odds ratios; robust standard errors clustered by case are in parentheses.

White defendants, moving violations, and White officers are used as the reference categories.

**p < .01. *p < .05.

Modeling Guilty Pleas in Misdemeanor Traffic Violations

Table 4 shows the results from the models predicting guilty pleas, using the same modeling strategy. Starting with Model 1, there were no significant differences in guilty pleas between Black and White defendants. However, Hispanic defendants were significantly more likely to plead guilty than White defendants ($p < .01$). Several other variables emerged as significant in both models. Defendants were significantly more likely to plead guilty to equipment violations than moving violations ($p < .01$). Defendants were significantly less likely to plead guilty to violations that were part of cases that included both moving and equipment violations ($p < 0.01$), violations that were part of cases that involved non-traffic offenses ($p < .01$), and violations that were part of cases that involved higher numbers of charges ($p < .01$). Violations that resulted in guilty pleas were significantly more likely to involve Hispanic officers ($p < .01$ in the Black defendant models; $p < .05$ in the Hispanic defendant models).

Model 2 examines whether BWCs directly influenced a defendants' decision to plead guilty. In the model comparing Black and White defendants, all defendants were significantly less likely to plead guilty when the officer was using a BWC ($p < .01$). However, BWCs did not significantly influence guilty pleas in the model comparing Hispanic and White defendants. Moreover, comparing the results in Model 1 and Model 2 shows that the presence of a BWC did not eliminate the greater likelihood of guilty pleas for Hispanic defendants.

Model 3 includes interactions between BWCs and defendant race/ethnicity. The direct effect of BWCs becomes insignificant in the model comparing Black and White defendants and remains insignificant in the model comparing Hispanic and White defendants. The main effects of Black and Hispanic defendants remained unchanged. Neither of the interaction terms between defendant race/ethnicity and BWCs were significant predictors of guilty pleas. As such, these results suggest that BWCs were associated with a slightly lower likelihood of guilty pleas for all defendants in the direct effects model comparing Black and White defendants, but the effect was not robust after including the interaction term. BWCs have little impact on guilty pleas in the models for Hispanic and White defendants. In short, whether a police officer used a BWC did not substantially change violation outcomes for Hispanic defendants; however, there is some indication that BWCs reduced the likelihood of a guilty plea in one model comparing Black and White defendants, though this effect was not robust to the inclusion of an interaction term between defendant race and BWC presence. Nevertheless, this is an important finding given prior research indicating that minority defendants are more likely to plead guilty than Whites (Kutateladze & Lawson, 2018).

Discussion

The current study addresses two related gaps in the research on traffic case processing. The first involves the degree to which defendant race/ethnicity affects judicial and defendant decisions in traffic violations. The second involves the extent to

which police BWCs affect violation outcomes as a technology that potentially improves evidence and could reduce reliance on a perceptual shorthand grounded in extralegal factors, including defendant race/ethnicity.

Table 4. Logistic Regression Models Predicting Guilty Pleas.

Variables	Black and White Defendants			Hispanic and White Defendants		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
BWC present	–	0.92*	0.93	–	0.96	0.94
	–	(0.04)	(0.04)	–	(0.04)	(0.04)
Black defendant	0.98	0.98	1.02	–	–	–
	(0.03)	(0.03)	(0.05)	–	–	–
Hispanic defendant	–	–	–	1.32**	1.32**	1.25**
	–	–	–	(0.04)	(0.04)	(0.05)
Equipment violation	1.22**	1.22**	1.22**	1.25**	1.25**	1.25**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Case includes moving and equipment violation	0.77**	0.77**	0.77**	0.79**	0.79**	0.79**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Case includes non-traffic violation	0.34**	0.34**	0.34**	0.30**	0.30**	0.30**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
# charges/case	0.90**	0.90**	0.90**	0.90**	0.90**	0.90**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Defendant age	0.99**	0.99**	0.99**	1.00**	1.00**	1.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Male officer	1.08*	1.08*	1.08*	1.05	1.05	1.05
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Hispanic officer	1.10**	1.10**	1.10**	1.08*	1.08*	1.08*
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Black officer	0.84*	0.83*	0.83*	0.94	0.94	0.94
	(0.07)	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)
Other officer	0.96	0.96	0.96	1.02	1.03	1.03
	(0.15)	(0.16)	(0.16)	(0.15)	(0.15)	(0.15)
Line officer	0.94	0.94	0.94	1.01	1.01	1.01
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Officer tenure	1.00	1.00	1.00	1.00	1.00	1.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Complaints	1.06	1.06*	1.06*	1.04	1.04	1.04
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Use of force	1.00	1.00	1.00	1.00	1.00	1.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Month/year	1.00*	1.00	1.00	1.00	1.00	1.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
BWC × Black defendant	–	–	0.92	–	–	–
	–	–	(0.06)	–	–	–
BWC × Hispanic defendant	–	–	–	–	–	1.09
	–	–	–	–	–	(0.06)
Constant	0.98	0.95	0.95	0.88	0.87	0.88
	(0.09)	(0.09)	(0.09)	(0.08)	(0.08)	(0.08)
Nagelkerke R ²	0.05	0.05	0.05	0.06	0.06	0.06
Observations	41,206	41,206	41,206	43,420	43,420	43,420

Note. Odds ratios; robust standard errors clustered by case are in parentheses. White defendants, moving violations, and White officers are used as the reference categories.

**p < .01. *p < .05.

The examination of the racial/ethnic breakdown of defendants in misdemeanor traffic violations shows little evidence of racial disproportionality, compared to the population of Tempe. For example, approximately 66% of traffic violation defendants during the study period were White, 19% were Hispanic, and 15% were Black. This breakdown aligns reasonably well with the city population, which is about 58% White, 23% Hispanic, and 7% Black (overrepresentation of White and Black defendants in traffic violations). The finding that Black and Hispanic drivers were significantly less likely to have their violations dismissed than Whites could support the liberation hypothesis, in that judges could be influenced by extralegal characteristics in determining whether to dismiss these low severity traffic violations. Though Hispanic defendants were significantly more likely to plead guilty than Whites in the multivariate models, Black defendants were not.

The second set of findings involves the role of BWCs. Around 40% of traffic violations were dismissed and around one-third resulted in guilty pleas. The rollout of Tempe's BWC program did not appear to change these patterns over time. BWCs were present in approximately 56% of the violations examined. BWCs are intended to provide additional evidence that, hypothetically, would lead to fewer dismissals and more guilty pleas. BWC evidence could increase judicial knowledge about the blameworthiness of the defendant and alter the outcomes of these cases, as suggested in the focal concerns perspective. BWC footage could additionally provide judges with a direct glimpse into the reasons that officers stop defendants, which could influence dismissals if stops involving minority defendants are viewed as unwarranted. However, the results presented here do not bear out either of these hypothesized relationships. BWCs had limited impact on dismissals. The inclusion of the BWC variables in the regression models further failed to mitigate the direct effect of being Hispanic on dismissals. Though the direct effect of Black defendants became insignificant in the interaction model, the BWC itself was not significantly associated with dismissal. BWCs are similarly suggested to influence defendant decisions to plead guilty, because there is additional evidence of the offense. Counter to those expectations, there is some indication that BWCs reduced the likelihood of guilty pleas when comparing Black and White defendants. It is possible that defendants could view the BWC as providing evidence that a traffic stop was unjustified, thereby reducing their willingness to plead guilty. However, there were no significant interaction effects between BWCs and defendant/race ethnicity and the direct effect became insignificant after the interaction term was included in the model. As such, the influence of a BWC on violation outcomes does not vary depending on defendant race/ethnicity.

The current study suffers from a number of limitations. First, we solely examine traffic violations in one jurisdiction. The generalizability to other jurisdictions is not known. Second, BWCs were available for a relatively short period of time during the study period. The integration of BWCs in court could take longer to impact case processing. Further, because reviewing BWC footage is time-consuming, the impact of BWCs could be limited in traffic violations, which are considered low-stakes, and

perhaps not worthy of the time. It is possible that BWCs could be more influential on cases involving more serious offense types due to additional pressure to review all available evidence. Third, the variance explained in all of the models is low (pseudo R² from 0.05-0.23). Clearly, there are important predictors of case outcomes that were missing. For example, available evidence was not included in the models. Last, we were unable to specifically examine whether a BWC was activated or whether the footage was used in court. Though prior studies have identified some variation in activation across officers and over time (Lawrence et al., 2019), we suspect that activation compliance in Tempe was high given the manner in which the department deployed BWCs (e.g., followed best practices for planning and implementation) and the substantial officer support for the use of BWCs (White et al., 2018). Nevertheless, it was not possible to directly examine BWC activation or the use of BWC footage in this study.

Though beyond the scope of the present study, a better understanding of police use of BWCs during traffic encounters, as well as the impact of BWCs on officer decisions to initiate traffic stops in the first place, could further clarify the relationships we identified. It is possible that many traffic violations are not captured by BWCs because the violation occurs prior to activation. That is, an officer may observe a moving violation (e.g., speeding), pull the driver over, and then activate the BWC as the encounter begins. The interaction between the officer and citizen will be captured, but the moving violation will not. In such cases, the BWC provides little evidentiary value documenting the violation, though the violation would likely be captured using a dashboard mounted camera in the patrol car which could supplement the BWC footage. Given that these dashcams have been in use for decades, but do not appear to have eliminated disparities in police stops, it is important to evaluate the influence of new technologies (like BWCs) on traffic case processing in court. Unlike moving violations, equipment violations are more likely to be captured by the BWC because the officer can record the violation during the encounter (e.g., broken taillight). Therefore, BWCs could be more influential in some violations, relative to others. BWCs could also influence the types of traffic violations officers enforce. For instance, officers wearing BWCs could become more legalistic, which would result in stronger cases being submitted for judicial review. Submitting stronger cases could in turn reduce dismissals and increase guilty pleas. Alternatively, if BWC footage provides evidence that traffic stops involving minorities were less justified than those of Whites, BWCs could result in increased dismissals. Future research examining the influence of BWCs on officer-decision making in addition to court outcomes is needed to better understand the evidentiary value of BWCs.

Despite these limitations, the current study represents one of the first attempts to assess the relationship between defendant race/ethnicity and traffic violation outcomes. Much of the research on decision-making in traffic cases focuses on racial disparities in stops, with little consideration to how such cases are adjudicated. The current study suggests that racial disparities in traffic stops also persist in court outcomes: Black and Hispanic defendants are less likely to have their violations dismissed compared to White

defendants. Hispanic defendants are also more likely to plead guilty than White defendants. These results could support the liberation hypothesis proposition that extralegal factors have a strong impact on low severity offenses. The current study is also the first to explore the impact of BWCs on the relationship between driver race/ethnicity and traffic case outcomes, though we find limited evidence of impact. Nevertheless, given the high volume, low visibility, low information nature of such violations, and their potential to impact citizen perceptions of the police and court system (i.e., procedural justice and legitimacy), the potential for BWCs to improve courtroom decision-making in misdemeanor cases is an intriguing question deserving additional research attention.

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