RACIAL AND ETHNIC PROFILING IN MASSACHUSETTS: AN EXAMINATION OF POLICE POLICY AND PRACTICE

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by

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ABSTRACT OF DISSERTATION

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ABSTRACT

The use of extra-legal factors such as race and ethnicity in police decision-making impacts the public’s overall trust and confidence in the law and in the police as enforcers of the law. Because the police play a key role in ensuring the primacy of the rule of law, the practice of racial profiling can undermine the legitimacy of the law in American communities. Widespread recognition of the problem during the 1990s led several states to pass legislation banning the practice of racial profiling.

In Massachusetts, the legislature enacted a statute with the purpose of identifying the cities and towns in which racial profiling was occurring (2000 Mass. Acts Ch. 228). This study examines whether the enforcement of the law led to changes in police policies and practices and whether these changes have affected disparity for Black and Latino motorists across 202 municipalities and over time.

Characteristics of the municipalities in which police agencies operate and factors related to the structure of police organizations were examined as potential predictors of reform and disparate traffic outcomes. Building on research showing that the racial composition of a municipality where a traffic stop takes place influences police activity, the analyses confirmed that officers issued traffic citations at disparate rates to Black and Latino motorists more frequently in municipalities with relatively larger minority populations. In addition, levels of disparity increased over the study period in these municipalities.

Police forces with more diversity, a higher proportion of college educated officers, and a greater number of ranks were more likely to be associated with the
adoption of reforms. Although a majority of the agencies in the sample undertook a variety of reforms, they were not effective for reducing disparity. Instead, they appear to play a ceremonial role in terms of demonstrating agency concern about racial profiling. The findings raise questions about how to effectuate change in traditionally monolithic organizations that resist it.
DEDICATION

I dedicate this work to my dad who, as a little boy, was made to stay outside and wait while his playmates went inside for a snack because his father was Armenian. I also dedicate this research to the innumerable people whose lives are affected by racial and ethnic profiling.
ACKNOWLEDGEMENTS

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CHAPTER I

Introduction and Statement of Problem

Since the 1990s, researchers have tried to determine whether law enforcement officers target motorists for enhanced traffic enforcement based on the motorist’s race or ethnicity. This problem, known as racial profiling, is defined as “any police-initiated practice that relies on race, ethnicity, or national origin rather than the behavior of an individual or information that leads the police to a particular individual who has been identified as being, or having been, engaged in criminal activity” (Ramirez, McDevitt, & Farrell, 2000, p. 3).\(^1\) To study racial profiling, researchers have relied upon statistical analyses to calculate the rate at which motorists of different races are stopped and/or cited for traffic violations, searched, and arrested. Many of these studies have shown that motorists are more likely to be stopped, searched, cited, and arrested if they are Black or Latino rather than White (Skolnick, 2007; Engel & Johnson, 2006; Parker, MacDonald, Alpert, Smith, & Piquero, 2004). Other studies have found the opposite or mixed results (Engel, Calnon, Liu, & Johnson, 2004; Novak, 2004; Smith & Petrocelli, 2001).

In any case, police administrators and other public policy officials have taken steps, sometimes voluntarily and sometimes due to legal mandate, to address the

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\(^1\) Although it is less precise, the term “racial profiling” is used interchangeably with “bias-based policing” and “race-based policing” to describe situations in which “law enforcement inappropriately considers race or ethnicity in deciding with whom and how to intervene in an enforcement capacity” (Fridell, Lunney, Diamond, & Kubu, 2001, p. 5). Other researchers have avoided using the term because it has been defined as referring to law enforcement activities that are based solely on the race of the individual, because the word “profiling” refers to a legitimate police activity, and because it is politically and emotionally charged (e.g., Fridell, et al., 2001).
perception of disparate traffic enforcement. To date, researchers have not evaluated the effectiveness of police efforts to decrease levels of racial and ethnic disparity in traffic stops. This study examines whether the enforcement of a state law designed to address racial profiling led to changes in police policies and practices regarding racial profiling and whether these changes have affected the levels of disparity in traffic citations issued to Black and Latino motorists across jurisdictions in Massachusetts.

Police agencies spend a significant amount of time and resources enforcing traffic laws (Rowe, 2009). The goals of traffic enforcement are primarily to promote public safety by reducing the incidence of traffic accidents and to respond to public concern about traffic violations. Many stops clearly serve these legitimate purposes. Police departments and their administrators vary in terms of the importance they place on strict enforcement. Some departments view traffic enforcement as a way to demonstrate their usefulness to the community, while others use aggressive traffic enforcement to look for evidence of other offenses (Schafer & Mastrofki, 2005; Mastrofski, Ritti, & Hoffmaster, 1987). Traffic enforcement is also one of the areas of greatest discretion for police officers because it involves decision-making in situations where they receive the least amount of supervision (Ramirez et al., 2000).

Although traffic enforcement is a major component of policing, besides DUI enforcement, it received relatively scant attention by researchers before citizens and elected representatives began raising questions about racial profiling in the mid-1990s. At that time, news articles and other reports described motorists’ allegations of racial bias by state police in Maryland and New Jersey (e.g., Goldberg, 1999). Media attention grew as African Americans from all walks of life publicly shared their experiences of
“driving while black.” These allegations gave rise to a national debate about racial profiling, with law enforcement officers defending their actions and denying that they selectively enforced traffic laws.

Like most Americans, police officers consider themselves to be tolerant of others regardless of race or ethnicity. However tolerant an individual may be, researchers have found that many people carry internalized racist beliefs that are often based on stereotypes that manifest themselves in subtle ways without the person’s awareness (Gaertner & Dovidio, 1986; Sommers & Ellsworth, 2001). These beliefs are repressed because they are not generally socially acceptable, but studies show that this unconscious hostility can be expressed in subtle, indirect, and rationalized ways (Dovidio, Kawakami, & Gaertner, 2002; Hodson, Dovidio, & Gaertner, 2002; Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006). Therefore, it is possible that some police officers are not aware that they are stopping more drivers of color due to unconscious attributions about the dangerousness or criminal propensity of Blacks and Latinos.

As a result of media attention and the public’s recognition of racial profiling, efforts were initiated to monitor the police either pursuant to legislation, executive orders, court settlements, consent decrees, or through voluntary efforts or policy

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2 For example, in their study, Hodson et al. (2002) asked White college students who had been classified as being high or low on racial prejudice to make college admissions decisions about Black and White applicants. The highly qualified students of either race were admitted, but differences arose for applicants with mixed qualifications. Higher prejudice-scoring participants tended to weigh college board scores unusually low in importance when the Black applicant had high college board scores but weak scholastic achievement, and they tended to rank high school achievement lower in importance when Black applicants had strong scholastic achievement but weak college board scores. The authors concluded that the higher prejudice-scoring participants weighed application criteria in ways that systematically justified or rationalized the discrimination against Blacks (Hodson et al., 2002). The study’s results suggest that subtle discrimination occurs in ways that can be justified on the basis of factors other than race.
decisions. Most of these efforts involved the collection of traffic stop data. Consequently, during the past decade, studies have been conducted using these data to determine whether disparities existed. Social scientists recognize the inherent limitations of using rates of racial disparity in traffic stops and searches as an analytical technique for identifying intentional racial discrimination. As Engel (2008) cautioned, “stop-and-search rates alone should only be used to determine if there are racial or ethnic disparities, but not discrimination or bias” (p. 8).

The majority of Americans of all races believe that racial profiling during traffic stops is pervasive in the U.S.—92% of Blacks, 83% of Latinos, and 70% of Whites report that profiling is widespread—and disapprove of the practice (91% of Blacks, 77% of Latinos, and 71% of Whites) (Weitzer & Tuch, 2006). Distrust toward police is generated or aggravated when law enforcement is viewed as racialized and unfair. Citizens are less likely to cooperate with police investigations, report crimes, and consider police work as a career, thereby threatening the integrity and legitimacy of law enforcement. Therefore, identifying disparities is critical in terms of addressing the public perception that police departments use unfair traffic enforcement policies and practices.

**Quantifying racial profiling**

Various quantitative approaches with unique methodological limitations have been used to identify the existence of racial disparities in traffic stops, citations, and searches. Some of the studies’ limitations stem in part from their exploratory nature.
Often, data were collected during relatively short periods of time by officers under scrutiny. Therefore, completeness and accuracy of the data used in these studies is uncertain due to selection bias and officer error in completing forms (Smith & Alpert, 2002). Researchers typically did not have incident-level data on the officers’ intent in making a traffic stop, issuing a citation, and/or conducting a search (Greenleaf, Skogan, Wesley, & Lurigio, 2008). Most of these studies provided only descriptive statistics in their analyses and were not subject to peer review (e.g., see Alpert, Becker, Gustafson, Meister, Smith, & Strombom, 2006; Cordner, Williams, & Zuniga, 2000; Cox, Pease, Miller, & Tyson, 2001; Farrell, McDevitt, Bailey, Andresen, & Pierce, 2004; Farrell, McDevitt, Cronin, & Pierce, 2003; Missouri Attorney General’s Office, 2008; Minnesota, 2003; Schafer, Carter, Katz-Bannister, & Wells, 2006; Spitzer, 1999; San Jose Police Department, 1999; Young, 2009). In order to accurately measure the existence and prevalence of disparities, researchers must go beyond mere description in analyzing the extent to which Black and Latino drivers are stopped, searched, cited, or detained compared to White drivers.

**The benchmark problem**

A major question among researchers is the proper benchmark against which traffic stop data should be compared (Schafer et al., 2006). Benchmarks—or baselines—refer to the expected stop rate of motorists of color, assuming that police are not engaging in racial discrimination. Engel described the use of benchmarks as an attempt to “compare drivers who were actually stopped by police to drivers who were
eligible to be stopped by police” (Engel, 2008, p. 10). Researchers must use estimates of the driving population who are eligible to be stopped by the police because the expected rate of minority stops is unknown.

To make these estimates, some researchers have conducted stationary roadside observations and/or rolling observations to determine the proportion of motorists from each racial or ethnic group and to observe traffic law-violating behavior (Lamberth, 1997; Farrell et al., 2003; Fridell, 2004; Farrell & McDevitt, 2008). However, these methods are time-consuming and expensive. In addition, researchers have raised questions about the accuracy of this benchmarking method due to the impossibility of verifying observers’ perceptions of driver characteristics (Engel & Calnon, 2004). Therefore, in early studies, researchers simply used census data to determine whether certain drivers were stopped and searched at a disproportionate rate (Harris, 1999; Missouri Attorney General’s Office, 2000; Spitzer, 1999; San Jose, California, Police Department, 1999; Cordner et al., 2000; Smith & Petrocelli, 2001). But it is unclear if the residential population of a particular city or town is equivalent to its driving population. This approach was improved by adjusting the census data and calculating a driving population estimate (DPE) to better reflect the changing nature of those who drive in any given city or town (Farrell et al., 2003; Farrell et al., 2004).

To obtain the most complete and accurate comparison for traffic stop data, some studies have used multiple benchmarks, including census data, observations of roadway usage, and traffic-violating behavior (Engel & Calnon, 2004; Farrell et al., 2004). More recently, traffic crash data have been used to measure the driving population in a given
neighborhood or community with mixed results (Alpert, Dunham, & Smith, 2007). The veil-of-darkness method uses traffic stops made during the “intertwilight” period as a benchmark (e.g., Grogger & Ridgeway, 2006; Worden, McLean, & Wheeler, 2012). Intertwilight is defined as the period near the boundary of daylight and darkness. Based on the assumption that a police officer’s ability to detect a motorist’s race is impaired without the benefit of daylight, this baseline is thought to be race neutral. Some researchers have used internal benchmarking whereby officers are compared against others in their own departments working the same shift at the same location, for example. With “same race” benchmarks, the behavior of minority officers is compared to the behavior of White officers.

Engel (2008) suggests that comparing stop rates of motorists based on their race requires making the assumption that there are no differences in traffic law violating behavior across racial or ethnic groups. If people of different racial and ethnic groups violate traffic laws at different rates, the correct baseline should be all the drivers who are violating traffic laws rather than all the drivers on the road. To examine this question, a study of the Pennsylvania State Police attempted to identify differences in motorists’ traffic-violating behavior through stationary observations on sample roadways across the state (Engel & Calnon, 2004). Working in pairs, observers were required to make individual assessments of driver race and ethnicity. Only those observations where both assessments coincided were used in the study. Motorists were deemed to be speeding if they were traveling at least 10 miles per hour over the posted speed limit. The results of the observations conducted between May 2003 and April 2004 showed that Black motorists were stopped at higher rates than would be expected
if differences in speeding behavior accounted for differences in the rates of traffic stops (Engel, Calnon, Tillyer, Johnson, Liu, & Wang, 2005).

Other research has produced mixed results with studies finding that Blacks and Whites violated traffic laws at almost exactly the same rate (Harris, 1999) and another concluding that Black drivers, young drivers, and male drivers are more likely to speed at high rates in 65-mph speed zones (Lundman & Kowalski, 2009). The implication of research showing that members of different racial groups may violate speeding laws at different rates is that disparities in traffic citations may not be evidence of bias but instead evidence of differential risk for police enforcement due to motorists’ behavior. However, as previously mentioned, researchers do not have reliable information on the actual offending rates of different types of drivers in any given city or town. To date, all agree that it is difficult to draw conclusions about the reasons for the disparities as a clear benchmark for comparison remains elusive (Schafer et al., 2006).

Interpreting disparity

While many studies show that racial disparities exist in traffic enforcement, this body of research remains inconclusive with respect to their causes. Among the possible reasons for the existence of disparities, Engel and Johnson (2006) identified differences in consumerism and in recreational travel practices between Blacks and Whites as possible sources of misunderstanding and misperceptions between officers and motorists. For example, police are trained to expect drug smugglers to drive large luxury vehicles and to wear flashy clothes; simultaneously, survey research shows that
Blacks are more likely than Whites to drive large luxury vehicles and to wear expensive brand name clothing and shoes (Brown & Washton, 2002; Connors & Nugent, 1990; Remsberg, 1997). Rather than focusing on behavioral cues, these profiles rely on individual attributes and may tap into conscious or unconscious biases that affect police officers’ judgments of minority citizens (Feagin, 1991; Gaertner & Dovidio, 1986; Sommers & Ellsworth, 2001; Bowers, Steiner & Sandys, 2001; Dovidio et al., 2002; Richeson & Trawalter, 2005). Therefore, using these clues of drug smuggling activity can lead police to inaccurately predict criminal behavior in law-abiding Blacks—who fit the profile police are trained to look for—more often than in Whites (Engel, 2008; Engel & Johnson, 2006).

Multivariate analysis enables researchers to model police decision-making after traffic stops have occurred (Alpert et al., 2006), but it does not allow them to answer the question of whether police officers “rely on race, ethnicity, or national origin rather than the behavior of an individual” when they initiate and conduct traffic stops. The main obstacle facing researchers is the possibility of specification error caused by omitted variable bias. Unobserved variables may be excluded, and erroneous variables may be included. Key factors may not be available or quantifiable for inclusion in analyses of traffic stop data. Given that every possible explanation for the existence of racial or ethnic disparities cannot be included in the analysis, researchers are unable to conclude definitively whether police officers engage in racial profiling.

Notwithstanding their underlying causes, identifying racial disparities in traffic stops can highlight areas of concern in an agency’s traffic enforcement patterns and help
police administrators engage in more focused analysis to understand problems and find solutions. In particular, departments that measure disparity at different points in time can shift their focus from establishing the most accurate benchmark to identifying factors associated with change in disparity. Potential solutions for decreasing the levels of disparity have been advanced by police professionals and academics, and the adoption of these reforms may lead to changes in officer behavior that could translate into lower levels of disparity over time. To date, the extent to which police departments have undertaken reforms has not been studied, nor has their effectiveness in reducing disparities been evaluated empirically.

**Reforms to address racial profiling**

Developing solutions to address the problem of racial profiling requires data from which reliable decisions can be made. Traffic stops are the best source of data for understanding traffic enforcement patterns and gauging their effectiveness. By tracking the race or ethnicity of the motorists they stop, police can obtain the necessary information to determine whether motorists are being treated differently based on race or ethnicity.

Until recently, most police departments did not maintain traffic stop records. Therefore, police did not have the information they needed to monitor their traffic enforcement activities or reconfigure the deployment of resources let alone respond to concerns about racial profiling. As Schultz and Withrow (2004) found in reviewing race-based policing studies, “the information routinely gathered by most police
departments was not sufficient to respond to the standard questions of a race-based policing inquiry” (p. 474).

This began to change during the 1990s, when citizens and elected representatives voiced concerns about racial profiling. A consensus arose around the need to document traffic stop characteristics through data-collection programs that would provide an empirical basis for determining whether biased policing was occurring (Miller, 2007). Based on the philosophy that “you can’t manage what you don’t measure,” police departments across the country began to collect traffic stop data pursuant to legislation, executive orders, consent decrees, and through voluntary efforts, as mentioned earlier.

The U.S. Department of Justice and the Police Executive Research Forum (PERF) encouraged law enforcement agencies to collect data by supporting the development of resource guides (Fridell, 2005; Fridell et al., 2001; McMahon, Garner, Davis, & Kraus, 2002; Ramirez et al., 2000). Beyond collecting data, the authors of these manuals recommended that agencies address racial profiling more broadly and holistically by adopting a policy prohibiting racially biased policing, revising recruitment and hiring practices, analyzing traffic stop data, developing and delivering education and training programs related to racial bias in policing, and reaching out to minority communities.

In addition to sending the message to police officers and the public that discriminatory behavior will not be tolerated, policies prohibiting racial profiling were promoted as providing direction to officers about how to follow departmental mission statements regarding fairness in law enforcement. An important part of the strategy for
reducing racial profiling is to recruit and hire officers who can police in an unbiased manner and to establish a police workforce that reflects the racial and ethnic diversity of the community. Departments were encouraged to consider applicants’ attitudes and behavior toward members of other racial and ethnic groups in the hiring process and to broaden their recruiting practices to attract more minority applicants.

To achieve the promise of bias-free policing, according to the resource guides, chiefs are expected to set the tone by articulating and modeling the organization’s values, while middle managers and supervisors are responsible for conducting spot-checks and sampling in-car videotapes, radio transmissions, and computer communications records. Because police officers generally perform traffic enforcement duties independently or in pairs, monitoring their activity reports is a key factor in achieving equitable treatment of citizens. Analyzing traffic stop data was suggested as a method for holding officers accountable and demonstrating the agency’s commitment to responding to community concerns.

PERF recommended the development of both academy and in-service training with input from police personnel, community members, and professional educators. Training should convey that protecting citizens’ human and civil rights is a central component of the police mission rather than an obstacle to it. In terms of content, educational programs should include information about the “complexities and subtleties of racially biased policing” (Fridell et al., 2001, p. 8) as well as the consequences of racial profiling. Specific instruction should be provided about ways to reduce misunderstanding and conflict and the appropriate use of race in police decision-making.
Finally, an important theme underlying these recommendations was that police-citizen partnerships were necessary for addressing the problem of racial profiling. To become engaged and avoid the risk of alienating itself, police agencies can develop and maintain outreach to minority communities (Fridell et al., 2001). Despite our inability to understand the precise reasons for the existence of disparities, PERF recommended that “agency executives should lead their communities in discussions about racially biased policing and the perceptions thereof, and work with citizens to develop responses to both” (Fridell et al., 2001, p. 27).

Very little research has been conducted to show whether police departments have adopted these types of reforms. Schultz and Withrow (2004) studied fourteen agencies to determine if the data collection process influenced them to make internal agency changes. Among this small sample of agencies, the adoption of new or updated policies and training were the most commonly reported changes undertaken following findings of racial and/or ethnic disparity, but the authors characterized these reforms as symbolic and unlikely to affect the behavior of officers (Schultz & Withrow, 2004).

The only empirical study that has focused on the patterns of response by police departments in dealing with race-based policing is Miller’s (2009) investigation into the likelihood that agencies implemented anti-racial profiling policies and computerized data collection programs. Miller examined external environmental factors as well as internal organizational characteristics of 803 large law enforcement agencies. Like Schultz and Withrow (2004), he concluded that agencies adopted anti-profiling policies merely as symbolic measures. Neither study analyzed whether the adoption of racial profiling reforms had an effect on reducing levels of disparity for minority motorists.
Therefore, we do not know whether the promise of these reforms to reduce racial profiling actually led to more equitable traffic stop outcomes.

**Racial profiling in Massachusetts**

*State legislation*

Like twenty-five other state legislatures that passed laws to address the issue of racial profiling (IRJ, 2010), the Massachusetts legislature enacted Chapter 228 of the Acts of 2000 with the intent of identifying cities and towns in which racial and gender profiling was occurring. The law required the Executive Office of Public Safety and Security (EOPSS) to work with the state police and municipal police departments “to ensure that adequate efforts are being made to identify and eliminate any instances of racial and gender profiling by police officers in the performance of their official duties” (2000 Mass. Acts Ch. 228 § 2).

The department of state police and the Massachusetts Chiefs of Police Association were tasked with the development of policies and procedures on how to identify and prevent racial and gender profiling by police officers. Once approved by the Secretary of Public Safety in 2005, these policies and procedures were included in the new recruit basic training curriculum, any in-service training for veteran officers, supervisory training for superior officers, and dispatcher and communication officer training (2000 Mass. Acts Ch. 228 §3). The statute also called for a public awareness campaign including a mechanism for citizen complaints (2000 Mass. Acts Ch. 228 §4).
Finally, Chapter 228 provided for the statewide collection of data about all motorists who were issued citations in order to identify any racial or gender disparities. Under the law, the Registry of Motor Vehicles was required to collect data from any issued Massachusetts Uniform Citation regarding the following information: 1) identifying characteristics of the individuals who receive a warning or citation or who are arrested, including the race and gender of the individual, 2) the traffic infraction, 3) whether a search was initiated as a result of the stop, and 4) whether the stop resulted in a warning, citation, or arrest. The Registry of Motor Vehicles (RMV) was directed to maintain and report the statistical information monthly to the Secretary of Public Safety, who could then transmit it to the Attorney General (2000 Mass. Acts Ch. 228 § 8).

Following the data collection, the statute called for a university in the Commonwealth to conduct a study of the traffic stop data. Researchers at Northeastern University’s Institute on Race and Justice analyzed approximately 1.6 million traffic citations issued in Massachusetts between April 1, 2001 and June 30, 2003. In May 2004, they released the Massachusetts Report on Racial and Gender Profiling containing the results of their study, which identified four types of disparities: 1) citations issued to residents compared to the residential population in a municipality, 2) citations issued to all motorists compared to the driving population estimate in a municipality, 3) searches conducted during traffic stops, and 4) written warnings issued compared to citations. For each of these measures, the researchers had established a threshold above which policy makers could conclude that racial disparities were problematic. Across the multiple measures, they concluded that 249 agencies had
substantial racial disparities in one or more measures, and 92 agencies had minimal or no disparities (Farrell et al., 2004).

Legitimacy crisis

The extreme media attention surrounding the release of the report highlighted the fact that police practices resulted in different outcomes for individuals of different racial and ethnic backgrounds (Dedman, 2004; Buote, 2004). In fact, the media mistakenly characterized the report as “confirming” that municipal police agencies across the state discriminated against Black and Latino drivers (e.g., Dedman, 2004). At a press conference following the release of the report, then-Massachusetts Secretary of Public Safety Edward Flynn attempted to reassure the law enforcement community, as well as the general public, by stating that agencies with disparities had not been found guilty of racial profiling. Nevertheless, he urged police chiefs to provide an explanation for the disparities: “Every police chief owes that [to the community]. ... Nothing is more important than trust in police officers and in their use of their discretion” (Dedman, 2004a).

Under the statute, the Secretary of Public Safety was required to mandate additional data collection if the data “suggest that a state police barracks or municipal police department appears to have engaged in racial or gender profiling” (2000 Mass. Acts Ch. 228 § 10). Faced with accusations of racial profiling, Flynn, in consultation with then-Attorney General Tom Reilly, announced their decision that, for one year, the 249 identified police agencies would collect additional data on all traffic stops, not just
those resulting in a warning, citation, or arrest (2000 Mass. Acts Ch. 228 § 10). During the one-year period known as Phase II, police departments were expected to obtain more detailed information about the reasons for traffic stops, the location of stops, and the identity of officers making stops (2000 Mass. Acts Ch. 228 § 10). This information was intended to enable police and others to understand the stop-level and neighborhood-level factors that may influence the traffic-enforcement decisions of police officers and result in racially disparate stops.

In uncovering racial disparities in the rate of traffic citations and searches, the 2004 Report on Racial and Gender Profiling raised questions about the manner in which police in Massachusetts enforce traffic laws. At the foundation of this dissertation is the assertion that the release of the report gave rise to a legitimacy crisis in the state’s law enforcement community. According to Habermas (1973), a legitimation crisis is the questioning of the nature and efficacy of a regime in power that occurs when people lose faith in the values undergirding that system. When questions about the viability of the government increase and crisis develops, Habermas believes that citizens lose faith in the legitimacy of the system.

In fact, the press portrayed minority leaders as welcoming the decision for additional data collection and calling for sanctions against police departments showing evidence of bias. The Reverend Jeffrey Brown of the Union Baptist Church and the Boston Ten Point Coalition was quoted in a Boston Globe article as saying that “community residents want more law enforcement, but are afraid to ask for it, because

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3 Two of the agencies successfully appealed this decision and were not required to collect additional data.
they perceive that law enforcement is set against them” (Dedman, 2004a, p. B1). For some in the Black and Latino community, the 2004 report confirmed their everyday encounters with police, but many law enforcement officers felt publicly stigmatized by the media coverage of the report and the political reaction to it.

Response to the legitimacy crisis

Media attention on the issue of racial profiling has been shown to influence police to reform their traffic enforcement practices (Warren & Farrell, 2009; Warren & Tomascovic-Devey, 2009). Faced with the pressure to “do something,” the crisis may have provided the impetus necessary for some agencies to change. Although some police officials were described as defensive in the face of “failing grades,” others emphasized their desire to “do what’s right.” For example, Swampscott Police Chief Ronald Madigan was quoted stating: “If there’s a problem, I want to know about it. We abhor the notion that anyone may be engaged in racial profiling” (Buote, 2004). Despite their frustration with the news reports that condemned their departments, police chiefs reportedly called for state funding to train and discipline officers who enforce traffic laws selectively. In an article that appeared in the Boston Globe the day after the Report on Racial and Gender Profiling was released, a representative for the police chiefs association asserted that: “the state should pay for more training for all police officers” (Dedman, 2004a, p. B1).
As previously stated, during Phase II of the data collection process, two thirds of the state’s municipal police departments were mandated to obtain more detailed information about traffic stops conducted between July 2005 and August 2006. In contrast with some police chiefs who may have viewed the mandate as an opportunity to learn about best practices in traffic enforcement, others interpreted the mandate as a punitive measure and reacted defensively even going so far as to appeal Flynn’s decision. Therefore, it is possible that some agencies adopted reforms primarily to promote their image as even-handed enforcers of the law rather than to make real changes. Crank and Langworthy (1992) posit that agencies respond to legitimacy crises in a ceremonial manner. For example, some research has shown that reforms implemented to increase police accountability do not necessarily affect police practices and may not even be intended to improve officer performance (Weitzer & Tuch, 2006; Mastrofski et al., 1987).

According to Manning (1997), institutions present a front behind which they conceal the true nature of their activities. The public representation of the police is directed at an audience consisting of the powerful segments of society. In this performance, police administrators may be focused on rehabilitating the perception that their officers engaged in racial profiling but, behind the scenes, they are unlikely to change daily police work that they perceive as effective in terms of controlling those who threaten the ruling class (e.g., Crank & Langworthy, 1992; Fagan & Davies, 2000; Manning, 1997). Therefore, reforms to address racial profiling may not represent real accountability to the public. Instead, these measures may be symbolic despite the law
enforcement community’s rhetoric about its commitment to protecting the civil rights of all citizens.

Under Governor Romney’s administration, EOPSS did not require agencies to analyze the data they collected or report the results of the process, and Chapter 228 contains no sanctions for police agencies that did not comply. Given the law’s lack of an enforcement mechanism, adherence by police departments has been voluntary and has varied from municipality to municipality (Levenson, 2007; Dedman and Latour, 2003). In May 2007, incoming-Secretary of Public Safety Kevin Burke conducted a brief survey of law enforcement agencies across the state to ascertain whether agencies had collected and/or were currently collecting traffic citation data (EOPSS, 2007). Among the departments required to collect additional data in Phase II, 95% responded to the survey, 80% of which reported having completed the mandatory year of traffic stop data collection.

Although EOPSS provided support in the form of free software to allow departments to enter, analyze, and prepare reports on their data; training sessions; and technical assistance, the results of the survey suggested that police departments were not yet using the data to inform the development of policies and practices that could decrease disparity in traffic citations and searches. A majority of the agencies with significant levels of racial or ethnic disparity reported that they were not utilizing the data to the fullest extent (EOPSS, 2007). Specifically, 36% reported that they had not conducted any analysis of traffic stop data, and 55% reported conducting only some analysis (EOPSS, 2007).
The results of the EOPPS survey suggest that, less than one year after the end of Phase II, there was a great deal of variation in terms of agency compliance with the mandate to collect additional traffic stop data. Because the survey did not include questions about agency efforts to develop a policy, train officers, and engage the community in discussions about racial profiling, we do not know whether police departments adopted any of these recommended reforms. We are also unaware of the extent to which agencies sustained data collection programs over time and whether some agencies adopted reforms after the EOPSS survey was conducted. Finally, the survey does not allow us to determine whether agencies’ efforts have been effective in terms of reducing disparity for Black and Latino motorists in municipalities across the Commonwealth.

**Overview of the present study**

Very little is known about the adoption of reforms used to address racial and ethnic disparities in traffic enforcement and to ensure accountability on the part of police agencies identified as engaging in racially disparate traffic stop activities. Like all enforcement practices, traffic stops occur within a larger environmental and organizational context. There are interdependencies between the municipal environment, organizational characteristics of police departments, and the reforms they have undertaken to reduce racial profiling, but the nature of the relationships between each set of factors has been largely unaddressed in the literature. Among the many questions still needing answers are how the adoption of reforms varies across municipal
police departments and what factors facilitate or impede their adoption, whether these approaches are effective in terms of reducing racial and ethnic disparity in traffic stop outcomes, and what relationships exist between reforms and the external (municipal) and internal (organizational) characteristics of police departments.

A series of hypotheses were developed based on two theories that may explain the external and internal influences on agency-level change. The racial threat perspective suggests that external factors such as the racial composition of a municipality influence the adoption of reforms and their impact on traffic stop outcomes across municipalities and over time. Institutional theory was used to inform predictions about the effects of organizational factors on these outcomes.

This study fills a gap in the literature by exploring both sets of factors as predictors of racial profiling reforms across departments. It is the first study to examine whether reform efforts that are aimed at addressing the problem of racial profiling in traffic enforcement influence levels of disparity in traffic enforcement across multiple agencies, a departure from most prior research which is limited to single agencies. The findings are based on analyses of data from nearly two million traffic citations collected during two different time periods to measure both static disparity at one point in time and change in disparity following the adoption of reforms.

Whereas previous research has focused primarily on stop-level analyses, here, agency-level data were used to determine whether variation in an agency’s environment and structure accounts for differences in levels of disparity while controlling for many stop-level characteristics. Like other research on racial context and policing, the
municipality was selected as the unit of analysis in part because cities and towns are the political entities within which policy decisions regarding policing are made and implemented.

This study sought first to identify the reforms that were adopted by 202 municipal police departments in Massachusetts. Using logistic regression analysis, the study then tested a conceptual model that accounts for the influence of external municipal characteristics and internal organizational characteristics on the adoption of those reforms. Models were then estimated to test the impact of reforms as well as the municipal and organizational characteristics of police departments on levels of disparity across departments and change in disparity over time. Ordinary least squares (OLS) regression was used to analyze these models. It was generally predicted that reforms adopted by police departments would reduce disparity for Black and Latino motorists.

Following a review of the literature as it pertains to race, traffic enforcement, and police reform in chapter two, the data and methods used for this study are described in chapter three. The results are presented in the next three chapters, which explain variations in agency adoption of reforms (chapter four) and the effectiveness of those reforms at reducing disparity across municipalities (chapter five) and within the same municipality at two points in time (chapter six). Conclusions, limitations, and implications of the study can be found in chapter seven.
CHAPTER II

Theoretical Framework

Introduction

Empirical studies have shown that racial and ethnic disparities in traffic enforcement outcomes exist in many jurisdictions across the country (Lamberth, 1996; Cordner et al., 2000; Zingraff et al., 2000; Cox et al., 2001; Farrell et al., 2003; Alpert et al., 2006; Moon and Corley, 2007). Given the conceptual and methodological constraints involved in measuring disparity, a different approach for improving our understanding of racial profiling is to explore the reform efforts undertaken by police departments to address the disparities. For a variety of reasons described in the previous chapter, police agencies have taken steps to reduce the levels of disparity in traffic stop outcomes, but no research to date has examined the characteristics of police departments associated with implementing reforms effectively.

Given that police departments are open systems, their activities are influenced by the external or environmental context in which they operate as well as the internal structural features of the organization. Both external and internal characteristics have been shown to influence the adoption of reforms (King, 2000; Klinger, 2003; Schaefer Morabito, 2010) and affect officer- and agency-level decision-making (Langworthy, 1986; Maguire, 1997 and 2005; Maguire, Kuhns, Uchida, & Cox, 1997; Mastrofski, 1998; Wilson, 2006; Zhao, 1996). Here, disparity is conceptualized as an organizational
outcome that may be influenced by agency characteristics and by the adoption of reforms. Thus, the goal of this study is to identify the predictors of adopting reforms and analyze the impact of those predictors as well as the reforms themselves on patterns of disparity in traffic citations issued to Black and Latino motorists.

This investigation fills a gap in the literature by exploring the extent to which the racial threat perspective and institutional theory can explain what types of police departments adopted racial profiling reforms and whether those reforms were effective in terms of reducing disparity in traffic citations. It builds on prior research that has examined the association between external indicators of racial threat and police activity by considering important internal organizational factors as well as reforms aimed at promoting fairness in traffic enforcement practices. In the discussion that follows, racial and ethnic disparities in traffic stop outcomes are described as a function of the perceived threat posed by minority populations to the dominant group in a municipality and thus to the organizational goals of police institutions.

**Environmental influence: racial and minority group threat theory**

The conflict perspective is a theoretical model that has guided research on racial bias and crime. Its underlying premise is that the law and its enforcement agencies are tools of the dominant groups in society that serve to regulate and minimize threats to the status quo (Blalock, 1967; Eitle & Monahan, 2009; Hawkins, 1987; Turk, 1969). In general, people of color and the poor are labeled as dangerous, and police are expected to protect higher-status persons from those below them in the social hierarchy
(Petrocelli, Piquero, & Smith, 2003). Therefore, White residents’ fear of crime increases along with the size of the minority population in a municipality. This leads to more control of racial and ethnic minorities who are viewed as more deserving of punishment because they offend society’s and police officers’ standards of appropriateness (Black, 1976; Muir, 1977; Weitzer, 2010).

Scholars have relied on racial threat theory to explain variations in the use of formal and informal punitive actions to control members of minority groups. They have shown that deadly force (Chamlin, 1989; Jacobs & O’Brien, 1998), arrests (Crank, 1990; Liska & Chamlin, 1984), and hate crimes (Green, Strolovitch, & Wong, 1998) are used more frequently against minorities than Whites. Similarly, racial threat was found to be a significant predictor of drug arrest rates and traffic citation rates (Eitle & Monahan, 2009; Ingram, 2007). Therefore, researchers have concluded that officers may exert more authority in areas where they perceive that racial and ethnic minorities pose a criminal threat to the White elite and harsher sanctions may be needed to deter unlawful behavior (Schafer & Mastrofski, 2005; Terrill & Reisig, 2003), but the influence of racial and minority group threat on traffic enforcement practices is largely unexamined.

In addition to studies confirming that officers make decisions based on the racial composition of the neighborhood in which an incident arises, survey research shows that individuals’ fear of crime increases with the relative size of the minority population (Liska, Lawrence, & Sanchirico, 1982; Taylor & Covington, 1993). Most researchers have focused only on Black residents as potential threats (Ennis, Rios-Vagas, & Albert, 2010), but Eitle and Taylor (2008) recently examined the possibility that Latinos pose a
“new” threat to the interests of White citizens with Latinos outnumbering Blacks in more than half the U.S. urban centers and representing the fastest-growing population group in the United States. Consistent with minority group threat theory, they found that the relative size of the Latino population in a neighborhood was a significant contextual predictor of survey respondents’ fear of crime. The Latino threat was found independent of the percentage of Black residents in a neighborhood (Eitle & Taylor, 2008). Other researchers who focused on police stop and arrest practices have found that Latinos were stopped and searched more than their representation in the population would predict (Fagan & Davies, 2000; Walker, 2001). In light of some studies showing differences in perceptions about law enforcement between Whites, Blacks, and Latinos (Dunham & Alpert, 2001; Huo & Tyler, 2000; Weitzer, 2002), scholars have called for the inclusion of Latinos in research on racial profiling (Parker, Lane & Alpert, 2010; Reitzel, Rice, & Piquero, 2004).

Even where the increase in minority population over time is slow, police intensify social control measures against minority members in mixed-race communities because the opportunity for interracial conflict is greater in these communities (Sampson, 2004). Efforts to subdue the perceived threat posed by the growth in the Black population have been found to increase until the size of the Black population surpasses that of the White population (Stewart, Baumer, Brunson, & Simons, 2009). Once the tipping point is reached, social control measures begin to decelerate. Studies have shown that the relationship between the size of the minority population and social control measures becomes negative when the percentage of Blacks is greater than 40% of the population (Eitle & Monahan, 2009).
Beyond the tipping point, some researchers have even documented a condition of “benign neglect,” whereby law enforcement decreases to such an extent in majority Black neighborhoods that Black citizens complain of underpolicing (Black, 1976; Liska & Chamlin, 1984; Crank, 1990; Barlow & Barlow, 2000). Lower levels of Black-on-White crime may result in less pressure by Whites on law enforcement to reduce crimes perpetrated by Blacks. Given the lower status of Black crime victims, the state may expend fewer resources in imposing criminal sanctions on perpetrators of Black-on-Black crime (Eitle, D’Alessio, & Stolzenberg, 2002; Alpert, MacDonald, & Dunham, 2005). Similarly, the type of neglect described above suggests that police departments operating in municipalities with higher proportions of Black or Latino residents may not make it a priority to implement reforms aimed at addressing the problem of racial profiling.

Racial and minority group threat and the adoption of reforms

Only one study has examined the relationship between the racial composition of a municipality and the adoption of reforms designed to reduce the incidence of racial profiling. Miller (2009) investigated 803 large law enforcement agencies to determine whether environmental features and organizational characteristics of agencies are related to the likelihood that they would adopt anti-profiling policies and implement computerized data-collection programs. He characterized the two reforms at issue as “accountability mechanisms” (p. 16) that emphasize fairness and equal treatment and
predicted that the likelihood of adopting them would decrease as the relative size of the Black or Latino population increased.

Miller (2009) found some support for the threat perspective because the likelihood of a department having a computerized data collection program decreased when the size of the Black population grew to 20% of the jurisdiction’s population. This result suggests that, in areas where the perceived threat to White safety is higher, police were less likely to implement data-collection programs that constrain their discretion to control minority residents. Based on the idea that other anti-profiling reforms similarly constrain police by holding them accountable for treating minorities unfairly, we can expect that departments will be less likely to adopt them in municipalities with higher percentages of Black and Latino residents.

After reaching the tipping point when the percentage of Black or Latino residents surpasses the percentage of White residents, the likelihood of adopting an anti-profiling policy, a data-collection program, or other reforms should increase. As Miller (2009) explained, “support for the threat model in studies of accountability or due process innovations should be found in a U-shaped distribution” (p. 16) with the likelihood of reforms increasing once the proportion of the Black community is large enough to make its demands for more fairness into reality.

Having the resources to implement reforms may be another important factor for departments deciding whether to undertake such efforts. An agency’s ability to access financial and human resources relates to its external environment because agency budgets are often based on property values and priorities are influenced by the
concentrated disadvantage that exists in the municipality. Therefore, measures of a municipality’s property value and level of concentrated disadvantage were included as controls in this study to account for their effect on the likelihood of agencies adopting reforms.

*Racial and minority group threat and traffic stop outcomes*

Although adopting reforms is assumed to encourage police to enforce traffic laws more equitably, we do not know whether reforms have any effect on actual police practices. In municipalities where people of color present a threat to dominant group interests and police perceive the need to exert more formal authority, we can expect that traffic enforcement activities will increase. Like other methods of social control, traffic enforcement provides police with the opportunity to address illegal behavior and deter future violations. As mentioned previously, there is evidence that police issue more traffic citations in minority and mixed-race neighborhoods (Ingram, 2007; Smith, 1986). Research has shown that the racial composition of a neighborhood influences the number of traffic citations that officers issued during traffic stops independent of the characteristics of the encounter and of the driver (Greenleaf et al., 2008; Ingram, 2007); however, it is unclear whether higher traffic citation rates in these municipalities are associated with more or less unequal treatment for certain motorists.

Prior research suggests that police may make more pretext stops in neighborhoods and communities where higher-status people reside. Using the pretext of a traffic violation to stop a vehicle and investigate for possible criminal behavior may
serve to warn interlopers that they are unwelcome (Greenleaf, et al., 2008; Fagan & Davies, 2000; Gelman, Fagan, Kiss, 2007; Meehan & Ponder, 2002). For example, traffic officers working predominantly White beats have been found to disproportionately ticket Blacks in the more affluent areas of the city (Greenleaf et al., 2008). Similarly, an exploratory spatial analysis of police stops in the Miami-Dade area revealed a clustering of Black stops in areas where the White population is high. Other research has shown that being “out of place” is associated with a higher likelihood of arrest (Parker et al., 2004) and higher rates of police stops (Stults, Parker, & Lane, 2012). Therefore, harsher sanctions for Black and Latino motorists may be viewed as appropriate both in communities with higher percentages of Black and minority residents and in neighborhoods with more White residents who officers are protecting from outsiders.

There are mixed results among the few studies that have specifically tested racial threat theory to explain variation in traffic stops and searches. The Richmond, VA police were shown to search more but arrest fewer Black motorists in areas with a higher proportion of Black residents (Petrocelli et al., 2003). The study’s authors interpreted this finding as a possible indication that police conducted too many unsubstantiated searches of Black motorists, an explanation suggesting that bias-based decision-making by police was associated with concerns about racial threat. Similarly, New York City police were found to make more stops but fewer arrests in Black neighborhoods. Although the racial threat perspective was not specifically tested, these results are evidence of poor crime detection in Black neighborhoods and may indicate that officers
may stop motorists in these neighborhoods to maintain control over the Black population (Fagan, Geller, Davis, & West, 2010).

On the other hand, some findings do not support the racial threat perspective. For example, the relative size of the Black population did not influence traffic stop rates in Kansas City neighborhoods (Novak & Chamlin, 2008), and Black and Latino motorists were less likely to be stopped and searched in Portland, Oregon neighborhoods with higher percentages of minority residents (Renauer, 2012). Another study found that there were more traffic stops and searches in areas with larger Black populations, but the rate at which searches led to finding contraband was also higher, suggesting the stops were legitimate and not based on race (Roh & Robinson, 2009).

This body of research demonstrating the link between a neighborhood’s racial composition and traffic enforcement outcomes is still in its early stages, and there remains a gap in the literature regarding the effect of racial threat on disparity in traffic stop outcomes. Racial threat theory suggests that the racial composition of a municipality, a factor external to the police organization, may influence both the likelihood that agencies will adopt policies to control officer discretion in enforcing traffic laws (in a negative direction) and police behavior in issuing traffic citations fairly to motorists of all racial and ethnic backgrounds (in a positive direction). While external factors are viewed as important determinants of police activity, the policing literature also provides support for the effect of internal organizational factors on agency- and officer-level decision-making. To date, very little research on disparities in traffic
enforcement outcomes has considered how organizational structure may explain variation across agencies.

**Organizational influence: institutional theory**

Scholars describe police agencies as remarkably stable organizations that are notoriously difficult to change (Crank & Langworthy, 1992; Maguire, 1997; Manning, 1997; Mastrofski, 1990; Weitzer & Tuch, 2006; Wilson, 1968). Both agencies and their officers resist change (Brown, 1985; Lumb, 1995; Sherman, 1974; Skolnick & Bayley, 1986). The reluctance to alter agency goals, strategies, and policies perceived as effective can be explained using institutional theory because police administrators are typically focused on maintaining organizational legitimacy and the continued flow of resources (Crank & Langworthy, 1992; Schafer & Mastrofski, 2005).

Regardless of their beliefs about implementing anti-profiling reforms, some chiefs may not attempt to change their department’s current practices because traffic stops provide opportunities for police to “fish” for evidence of other offenses. Traffic stops serve as a mechanism for increasing arrest rates and other “stats” such as citations and written warnings, which are the most expedient indices of productivity (Schafer & Mastrofski, 2005; Manning, 1997). Although these “stats” tell us very little about actual crime, they have been mythologized as effective in combating the “war on drugs” (Engel, Calnon, & Bernard, 2002). Therefore, the organizational benefits derived from traffic enforcement make it unlikely that police agencies will change their policies and practices without a tremendous amount of external pressure (Maguire & Katz, 2002).
But this does not preclude police administrators from taking steps to appear responsive to public concerns.

In some cases, outside intervention by an authority can provide the impetus necessary for change. Progressive reforms that agencies have adopted due to external pressure include methods for holding police accountable and racial diversification of the force (Weitzer & Tuch, 2006). Although recent research indicates that media stories about racial profiling and the passage of legislation effectively reduced racial disparity in searches of drivers over time (Warren & Farrell, 2009; Warren & Tomascovic-Devey, 2009), reforms do not always result in actual changes to working practices let alone more equitable outcomes for citizens.

Researchers have identified a disconnect between police departments’ official statements about adopting reforms and their actual implementation (Schaefer Morabito, 2010; Wilson, 2006). In fact, officers may not be expected to follow formal agency policies in departments where police administrators focus on other indicators of agency legitimacy that are distinct from daily police work (Mastrofski et al., 1987). Therefore, many reforms have been characterized as merely symbolic and only loosely coupled with the operations of police organizations (Maguire, 1997). For example, scholars describe the practice of order maintenance policing (OMP) as providing law enforcement agencies with ceremonial evidence that they are doing something about crime despite the lack of empirical data showing its effectiveness (Crank & Langworthy, 1992; Fagan & Davies, 2000; Manning, 1997). Similarly, police departments may take steps to address the issue of racial profiling to enhance their organizational legitimacy.
by appearing responsive. Consequently, one of the goals of the present study was to
determine whether official statements about adopting reforms corresponded with agency
practice.

Another important aspect of reform relates to the organizational structure of the
agency undertaking new initiatives. Researchers have shown that an organization’s
structure is an important determinant of police activity (Dent & Goldberg, 1999; Eitle &
Monahan, 2009; Fyfe, 1982; He, Zhao, & Lovrich, 2005; Maguire, 1997; Mastrofski et
al., 1987; Slovak, 1986; Wilkinson & Rosenbaum, 1994; Wilson, 1968). Therefore,
community policing reformers have encouraged agencies to flatten chains of command,
increase civilianization, reduce reliance on specialized units and on formal policies and
procedures, and reduce the size of administrative components. In addition to differences
in external features of police departments, their structural characteristics may help to
explain variation in their adoption of racial profiling reforms and police behavior that
results in disparities for motorists of color.

Organizational structure and the adoption of reforms

Given the dearth of research that examines racial profiling policy, the community
policing literature is instructive in conceptualizing which organizational factors might
influence police departments to adopt racial profiling reforms. Community-oriented
policing (COP) is based on the philosophy that preventing crime and enforcing the law
can be best accomplished if the community and the police are co-producers of justice.
With an emphasis on building trust and respect between citizens and law enforcement,
the factors motivating agencies to address the problem of racial profiling may parallel those driving the community policing movement. While the scope and the effects of COP reforms have been studied quite extensively (McDonald, 2002; Reisig & Parks, 2004; Skogan & Hartnett, 1997; Wilson, 2006), less attention has been paid to the factors that influence their adoption and implementation. Therefore, this study may also contribute to the development of a framework for evaluating the adoption of community policing reforms.

First, a department’s size has been shown to predict the adoption of COP reforms. Some studies have found that larger agencies implemented COP to a greater extent than smaller ones (Maguire et al., 1997; Schaefer Morabito, 2010), while others have concluded that size is unrelated to the adoption of COP (Wilson, 2005). Schaefer Morabito (2010) examined the influence of organizational characteristics, among other factors, on the adoption of community policing reforms in 474 police jurisdictions of various sizes. She found that agency size was an important predictor of COP adoption and interpreted this finding as suggesting that larger agencies may have greater resources at their disposal. With more resources, larger agencies can hire new officers on a more regular basis and benefit from the influx of new ideas. Therefore, larger agencies may be characterized as more open to reform than their smaller counterparts.

Reducing the layers of hierarchy in a police department has been viewed as a prerequisite of COP implementation. Somewhat related to its size, an agency’s vertical differentiation is the distance between the bottom and the top in terms of salary and/or rank of police officers. Interestingly, departments with more ranks were not found to be
associated with a greater likelihood of COP adoption (Schaefer Morabito, 2010). The author interpreted this finding as partial confirmation that decreasing the number of ranks is important to the implementation of COP.

In contrast, the results of a vehicle pursuit policies study suggest that reform is more likely in departments with taller rank structures because they were more likely to have formal policies than departments with less vertical differentiation (Wells & Falcone, 1992). The divergent outcomes of these two studies may be explained by the different types of reforms at issue. Developing standard vehicle pursuit practices potentially involves different decision-making processes than reforms aimed at fostering trust between police and the community.

An important aspect of modern policing is the idea that a police force should be representative of the community it serves in terms of its racial and ethnic composition. The Department of Justice and PERF promote the racial and ethnic diversification of police departments to encourage respect and trust between police and citizens, which should lead to better policing. In addition, increasing racial and ethnic diversity is expected to send a message to the public about the department’s fairness and, in turn, enhance its legitimacy.

Beginning in the 1960s, police professionals have recommended raising the educational standards for employment in law enforcement. Some scholars believe that officers’ educational levels could impact their attitudes and beliefs and, in turn, their decision-making. Based on a national survey conducted in 1988, PERF suggested that the quality of policing could improve if officers were college educated because modern
police were required to be “better decision makers, more innovative, and more tolerant” (Rydberg & Terrill, 2010, p. 96).

To date, studies of both the racial diversity of agencies and educational level of officers have focused almost exclusively on their effects on police behavior. One exception is Miller’s (2009) study, which included a measure of personnel diversity among the predictors of agency reform and found that the likelihood of implementing a computerized data-collection program decreased as the racial and gender composition of the department increased. The author speculated that the result may signify that an agency with a more diverse force believes it has “done enough” and does not need to adopt a data-collection program to demonstrate its commitment to fairness. Of course, there may be other reasons why agencies with more minority officers may not have the financial resources to invest in a computerized data-collection program.

Both racial diversity and educational level can be viewed as indicators of an agency’s openness to new ideas and thus help to explain the adoption of reforms to address the issue of racial profiling. Despite the lack of scholarly research on the effects of diversity and education on the adoption of reforms, these two structural characteristics of police organizations were included in the analysis. Along with department size and vertical differentiation, the racial composition and educational level of a department may influence the behavior of police officers and thus have an effect on traffic enforcement outcomes for motorists of color.
Organizational structure and police behavior

In addition to their effect on police agencies adopting reforms, certain aspects of an organization’s structure are known to influence the behavior of officers. Department size and vertical differentiation have been found to predict arrest rates both separately and together as measures of bureaucratization. Generally, the conclusion that can be drawn from this body of research is that structurally complex agencies apparently reduce the influence of extralegal factors in police decision-making and increase the likelihood of accomplishing the agency’s goals. For example, several researchers have demonstrated that the probability of arrest is higher in larger departments (e.g., Brown, 1981; Smith & Klein, 1984) and in departments with more ranks (Crank, 1990). Likewise, a larger department with more ranks and occupational titles was discovered to have a higher probability of arrest when the three factors were combined, although each individual factor had no effect on the probability of arrest (Smith & Klein, 1984). More recently, in a study of 260 police departments, the researchers discovered that departments with more structural complexity had higher drug arrest rates. In other words, the complex structure of a police department translated into greater control over officer behavior (Eitle & Monahan, 2009).

The opposite effect has also been demonstrated, suggesting that officers working in large agencies with many ranks may have the most discretion to ignore agency policies (Smith, Visher, & Davidson, 1984; Mastrofski et al., 1987). Mastrofski et al. found that officers working in larger, more bureaucratized police departments were less likely to perform in accordance with agency policy on DUI arrests than those in smaller, less bureaucratized organizations (Mastrofski et al., 1987). They concluded that more
bureaucratic departments must decouple formal structure from daily tasks and suggested that this decoupling may be intentional to avoid “revealing the inadequacy of the structure for the accomplishment of agency goals associated with those tasks” (Mastrofski et al., 1987, p. 399).

The racial diversity and educational level of the police force also have been considered as potential predictors of police performance, although little is known about the effects of these agency characteristics on law enforcement outcomes. Researchers have found that officers’ race and educational level influence their attitudes and beliefs, but previous studies reveal no clear trends in terms of predicting officer behavior (Eitle & Monahan, 2009; Terrill, 2001). One study of career-ending misconduct among NYPD officers showed that higher proportions of minority officers in a department were associated with a decrease in involuntary separations in the department (Fyfe & Kane, 2005). The authors characterized their finding as improvement in the behavior of the entire police force, suggesting that officers working in more diverse departments perform at a higher level. Better performance may also mean more equitable treatment of motorists in municipalities served by departments with more minority officers.

There are inconsistent results among the small number of studies examining the aggregate effect of racial diversity on arrest rates at the departmental level. While one study showed that officers working in more diverse agencies were more likely to arrest both White and Black suspects (Eitle et al., 2002), another found a greater likelihood of arresting Whites only (Donohue & Levitt, 2001), and a third found no relationship between the racial composition of a police force and arrest rates (Slovak, 1986).
Other research attempting to understand the effect of officer characteristics, including race, at the individual—rather than the agency—level is also inconclusive. For example, a study of 2,673 traffic stops by the Richmond police found that the race of the officer did not significantly affect the likelihood of a motorist being stopped, searched, arrested, or warned (Smith & Petrocelli, 2001). Similarly, Novak (2004) demonstrated that minority officers in Overland Park, Kansas were no more likely than White officers to issue traffic citations. However, Black officers working in Black neighborhoods in Indianapolis and St. Petersburg were found to engage in supportive activities including behaving respectfully toward citizens (Sun & Payne, 2004). It is noteworthy that the types of police activity under examination in these studies vary from standard traffic enforcement activity (stopping, searching, issuing citations or warnings, and arresting) to interaction with citizens, suggesting that officer race may make a difference depending on the nature of that activity.

A related study considered the effect of an agency’s gender composition in determining what factors influence traffic stop outcomes for male and female drivers (Farrell, 2011). As expected, departments with a greater proportion of women among the sworn officers increased gender parity in traffic stop outcomes. Farrell’s (2011) discussion about the gender composition of agencies highlights the changes that can occur when a police force becomes more diverse.

Although an individual female police officer’s decisions may not differ significantly from her male colleagues when she represents the lone woman in a police station filled with male authorities, when agencies have substantially more female representation, the organizational structures become feminized, resulting in both male and female authorities having less reliance on patriarchal stereotypes (Sklansky, 2006; Perisie, 2009). Evidence of this effect is found in other institutional contexts such as courts, where increased
representation of minority groups among attorneys and judges has been found to reduce racial disparities in legal outcomes (King, Johnson, & McGeever, 2010; Ward, Farrell, & Rousseau, 2009). (Farrell, 2011, p. 6)

Similarly, where there are small numbers of minority officers on a police force, the minority officers are treated as “tokens” and must adapt to the dominant group’s norms. With greater numbers of officers from different racial backgrounds, minority officers may influence the culture of the entire department, which may have consequences for police behavior (Sherman, 1983). As previously mentioned, one of the strategies for addressing racial profiling promoted by the Department of Justice’s Office of Community Oriented Policing Services (COPS) involves recruiting and hiring individuals of different racial and ethnic backgrounds. Whether a police department’s traffic enforcement operations will be improved by greater racial diversity is a question that remains unanswered.

There is also a lack of empirically tested hypotheses regarding levels of higher education and police behavior, and there are mixed findings among the few studies attempting to show that the educational level of a police force has an effect on arrest rates or searches (Brandl, Stroshine, & Frank, 2001; Smith & Klein, 1984; Worden, 1989). The most consistent results reveal that better-educated officers are less likely to use physical force (Rydberg & Terrill, 2010), receive fewer citizen complaints (Kappler, Sluder, & Alpert, 1994), and use deadly force less often (Fyfe, 1988) than their less educated counterparts. In contrast, officers with fewer years of formal education are more likely to resort to forceful means (McElvain & Kposowa, 2008; Terrill & Mastrofski, 2002; Worden, 1996).
Rydberg and Terrill (2010) looked at the influence of higher education on police behavior by comparing three groups of officers: those with no college experience, those with some college experience but no baccalaureate degree, and those with a 4-year degree. They explored the relationship between higher education and three key police decision-making points: arrests, searches, and use of force and found that officers with some college education were significantly less likely to use force than non-college-educated officers during encounters with citizens. Consistent with previous studies, they found that college education did not significantly affect the decision to arrest or search a suspect. To explain the results, the authors speculated that “there is more room for officer education to have an impact on discretion with respect to force” (Rydberg & Terrill, p. 111) because the use of force is never required or prohibited in a police-citizen encounter. Therefore, the effect of officers’ educational levels may depend on the type of decision being made.

While the effect of education on police performance is still inconclusive, some research demonstrates that higher education may affect officer decision-making (Eitle & Monahan, 2009; Terrill, 2001). Arguably, a more highly educated police force would have more favorable attitudes toward racial and ethnic minorities than a less educated one. Consequently, officers working in departments with a higher average level of education may be more likely to discharge their traffic enforcement duties in a more equitable manner as compared to officers in agencies with lower levels of educational achievement, resulting in lower levels of disparity for Black and Latino motorists and a reduction of disparity over time.
Throughout the 20th century, police agencies developed into highly centralized, specialized, and formal organizations with tall hierarchies and large administrative units. This organizational structure stemmed in part from the advent of new technologies, increased demands from communities to broaden the scope of their services, and efforts to prevent corruption. But reformers have attempted to reverse the progression toward a more bureaucratic structure. The decentralization of operations is now viewed as necessary to produce more effective and responsive police organizations. In addition, efforts have been made to better serve citizens by recruiting and hiring more minority officers and increasing the educational achievement of officers. To date, the effect of these structural characteristics on police decision-making remains uncertain.

The inconsistent results of research that examines the effect of organizational characteristics on police behavior lend support to an institutional explanation. If an agency’s features offer the “veneer of accountability” (Mastrofski et al., 1987, p. 400), police do not need to reform their daily practices to satisfy their sovereigns. Thus, officers may continue to perform their duties undisturbed in departments whose organizational legitimacy depends on sovereigns who are unwilling to examine current practices. Institutional theory suggests that police departments need only appear responsive to the public to enhance their legitimacy as enforcers of democratic ideals. If the adoption of reforms is symbolic and only loosely coupled with officer performance, as some scholars argue, taking the recommended steps may not effectively decrease disparity for minority motorists.
Racial profiling reforms and police behavior

The most common agency approach for addressing racial profiling is to adopt a formal anti-profiling policy. Although the nature of police work gives officers the discretion to disregard the directives that flow from their administrators (Manning, 1997; DeJong, Mastrofski, & Parks, 2001), there is some evidence in the policing literature that the existence of clear policies can influence officer behavior (Eitle & Monahan, 2009; Fyfe, 1979; Skogan & Frydl, 2004). Different models have been used to explain the extent to which officers comply with departmental policies.

The rational model assumes that police officers perform in accordance with their superiors’ goals, and it is supported by studies of traffic enforcement, vice, field stops, and police violence (Mastrofski et al., 1987). The constrained rational model accounts for other forces—both internal and external to the department—that limit the chiefs’ capacity to influence officer behavior. For example, Gardiner (1969) attributed the variation he observed in the citation rates of four Massachusetts police departments to the type of traffic enforcement policy that was backed by police administrators. The two departments with the highest citation rates had the strictest enforcement policies, whereas those with the lowest citation rates had command personnel who did not push patrol officers to write tickets. In addition, officer behavior can be influenced through rewards for performing in accordance with agency policies (Bratten & Knobler, 1998; DeJong et al., 2001; Mastrofski, Ritti, & Snipes, 1994).

Reports from PERF and the International Association of Chiefs of Police (IACP) that highlight the enhancement of police legitimacy among the benefits of reform
suggest that agencies may adopt anti-profiling policies primarily for ceremonial purposes. Therefore, officers are not alone in their ability to obstruct the implementation of reforms. Police administrators can hide behind their agencies’ formal policies as proof of their “willingness to increase accountability in response to community demands that police not use race in criminal profiles” (Miller, 2007, p. 249). In these departments, the adoption of a policy is unlikely to influence officer behavior, and traffic enforcement outcomes for motorists of color are unlikely to change.

In addition to policies, police administrators have been encouraged to adopt data-collection programs and provide training to officers. As explained earlier, the goal of data collection is to learn about the patterns of racial and ethnic disparity in an agency’s traffic enforcement practices. This information can be analyzed and used as a management tool to identify, counsel, and monitor officers whose traffic stop practices deviate significantly from those of other officers. In other words, the data allows supervisors to hold officers accountable.

It is feasible that officer behavior would change in departments that hold officers accountable when they are found to disproportionately issue citations to Black and Latino motorists (EOPSS, 2008; Wilson, 1968). In fact, researchers and professional law enforcement groups (e.g., Commission on the Accreditation of Law Enforcement Agencies [CALEA], IACP, PERF) have recommended monitoring and addressing the behavior of police officers based on the recognition that unconscious bias may contribute to the disparities. Unaware of the implicit psychological mechanisms
influencing their decision-making, officers need clear performance guidelines and repercussions for failing to meet them in order to change their behavior.

In most cases, individual change is best facilitated through training. For example, previous research on policing suggests that the extent of training that officers received was a powerful predictor of changing officer behavior in making DUI arrests, but the effect of training was observed only in departments that actively encouraged and promoted DUI arrests as a department goal (Mastrofski & Ritti, 1996). Scholars of organizational behavior have shown that resistance to change is sited within the individual (Jones, Jimmieson, and Griffiths, 2005; Dent and Goldberg, 1999). A common approach for overcoming that resistance is to educate employees who become “change ready” when they hold positive views about the need for organizational change and believe that the change is likely to have positive implications for themselves and the wider organization (Jones et al., 2005).

**Conclusion**

No published research has analyzed the relationship between characteristics of the municipality, the police department, the adoption of reforms, and levels of racial and ethnic disparity in traffic enforcement. Only one study to date has attempted to understand the factors that influence the adoption of racial profiling reforms (Miller, 2009). It was limited to exploring the municipal and organizational characteristics that explained large agency adoption of two specific initiatives. Therefore, this is the first study to investigate whether external and internal features of the police department are related to the adoption of a variety of reforms, examine whether those features influence
the levels of disparity in traffic citations issued to Black and Latino motorists, and
determine the effect of reforms in explaining disparity across agencies and over time.

Taking into account factors relevant to police behavior, the analysis that follows
documents the prevalence of anti-profiling reforms adopted by municipal police
departments of all sizes across Massachusetts in the wake of media publicity about the
legitimacy of their operations. It also explores the factors that explain the adoption of a
variety of reforms. Furthermore, it responds to the recommendation that researchers rely
on theory to understand racial disparities in traffic enforcement and policing reform
(Engel et al., 2002; Wilson, 2006). The expectations stemming from racial threat theory
are that police departments serving municipalities with higher levels of racial threat are
less likely to adopt reforms to address the problem of racial profiling, more likely to
have higher levels of disparity for Black and Latino motorists at one point in time, and
more likely to experience increases in disparity over time.

Institutional theory predicts that the structural characteristics of police
organizations will also affect the likelihood of departments adopting reforms but these
reforms may be largely symbolic. Therefore, their adoption may not affect officer
behavior when performing traffic enforcement duties. Reforms may mediate the effect
of racial threat and organizational structure on disparity. For example, in their study of
drug arrest rates, Eitle and Monahan (2009) showed that written policies moderated the
effect of racial threat on the rate of drug arrests for Blacks. In addition, reforms may be
more or less effective when implemented in certain types of municipalities and certain
types of police organizations. Specifically, the effect of reforms may interact with racial
threat such that we may observe smaller decreases in disparity over time in municipalities with higher levels of racial threat than in municipalities with relatively smaller minority communities. The interaction between reforms and diverse police departments may reveal lower levels of disparity when reforms are adopted by departments with more minority officers than agencies with fewer officers of color.

The research questions and hypotheses are further developed in the next chapter, along with a description of the data and methods used to explore them.
CHAPTER III

Methods

Introduction

The general purpose of this study was to determine whether state legislation that is aimed at addressing the issue of racial profiling led municipal police departments to adopt reforms that changed traffic stop outcomes for Black and Latino motorists. While most research examining the problem of racial profiling has focused on traffic stop-level information, a few studies have begun to explore environmental- and organizational-level characteristics of police departments to better understand their traffic enforcement practices. Clearly, features of the driver and officer and the location, time, and reason for the stop are important factors, but learning about the patterns of disparity across police departments at one point in time and within each agency over a period of time is critical for policy makers and police executives interested in reducing disparity. Because policy decisions regarding traffic enforcement are made and implemented at the municipality level, the unit of analysis for this study was the municipality.

Building on prior research, the present study examined how police departments have responded to the problem of racial profiling and what responses are effective for reducing disparity in traffic stop outcomes. To date, a nationwide survey identified the types of reforms that law enforcement agencies have implemented to address the issue of bias-based policing (Fridell et al., 2001); a qualitative analysis of data collection
programs described the organizational and behavioral changes resulting from departmental data collection efforts (Schultz & Withrow, 2004); and an empirical study analyzed the characteristics of communities and police departments associated with the implementation of two specific reforms, namely anti-profiling policies and computerized data-collection programs (Miller; 2009). But, the effectiveness of such efforts in terms of affecting disparity remains unknown.

In order to conduct the current study, a survey was developed to determine which reforms municipal police departments have undertaken. Two sets of factors were considered as possible predictors of both reform and traffic enforcement outcomes for motorists of different racial and ethnic backgrounds: external municipal characteristics and internal organizational characteristics of municipal police departments. Each set of factors is described in detail in the sections that follow.

**Research questions**

Because traffic stops occur within a larger environmental and organizational context, the relationships between different sets of factors animate this research. The following questions are of particular interest: 1) How much does the adoption of reforms vary across municipal police departments, and are these variations related to the external and internal characteristics of municipal police departments? 2) What is the relationship between the adoption of reforms, municipal and organizational characteristics, and levels of racial and ethnic disparity in traffic citations across police departments at a particular point in time? 3) What is the relationship between the
adoption of reforms, municipal and organizational characteristics, and change in levels of disparity within police departments over a 5-year period?

**Hypotheses**

To answer the first question, a conceptual model was developed, which predicts that certain municipal (external) and organizational (internal) features of municipal police departments would be associated with the adoption of reforms.

![Figure 3.1 – Model 1](image-url)
The same external and internal characteristics associated with the adoption of reforms were expected to influence the way in which policing activities are conducted. In other words, the municipal and organizational characteristics of police departments may shape the patterns of disparity in traffic enforcement across multiple agencies. A second conceptual model posits that they would do this through the mediating effects of reforms. As shown in Figure 3.2, this model depicts the municipal and organizational characteristics of police departments as independent variables, reforms as intervening variables, and disparity in traffic stop outcomes (i.e., citations issued to motorists of different racial and ethnic groups) as dependent variables.

Figure 3.2 – Model 2

Municipality characteristics
- More racial threat
- More crime rate
- More concentrated disadvantage
- Higher property value

Organizational characteristics
- Larger department
- More vertical differentiation
- More diverse police force
- Higher educational level

Adoption of reforms
- Dept. has a policy
- Dept. collects data
- Dept. analyzes data
- Dept. provides comprehensive training
- Dept. participates in meetings with community

Control variables
- Traffic stop characteristics
- Agency characteristics

Level of disparity in traffic citations issued to Black / Latino motorists
Similarly, the model predicting change in disparity over time contains the municipal and organizational characteristics of police departments as independent variables and reforms as intervening variables. This dependent variable, described in more detail below, compares the level of disparity for Black or Latino motorists in a particular municipality at Time 1 (T1) and Time 2 (T2).

Figure 3.3 - Model 3
The specific hypotheses related to each of the research questions outlined previously are presented in Tables 3.1, 3.2, and 3.3.

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Multiple sources of data were used to understand what reforms have been adopted; the municipal and organizational factors that influenced their adoption; and the effects of municipal characteristics, organizational characteristics, and reforms on levels...

**Sources of data**

Multiple sources of data were used to understand what reforms have been adopted; the municipal and organizational factors that influenced their adoption; and the effects of municipal characteristics, organizational characteristics, and reforms on levels.
of racial and ethnic disparity across police departments and over time. The main sources of data are described in this section.

Traffic Stop/Racial Profiling Data Collection Survey

The survey instrument was a 6-page, 21-item, self-administered questionnaire containing a combination of multiple-choice and open-ended questions to be filled out by the police chief or a designee. Questions focused on the demographic characteristics of the police force, the educational level of officers, and whether the department had adopted specific reforms to address racial profiling. The survey was developed in consultation with Dr. Jack McDevitt, Director of the Institute on Race and Justice at Northeastern University, and Mr. Jack Collins, General Counsel of the Massachusetts Chiefs of Police Association.

Surveys were addressed to police chiefs and accompanied by a letter of support co-signed by the Secretary of Public Safety and Security for the Commonwealth of Massachusetts and the President of the Massachusetts Chiefs of Police Association. They were mailed to the 246 agencies found to have substantial racial disparities based on the results of the Massachusetts Report on Racial and Gender Profiling (Farrell et al., 2004). As was explained in chapter one, these agencies had been mandated to collect additional data on all traffic stops for one more year beyond the initial data collection period.
To ensure a sufficiently high response rate, the surveys and two reminder postcards were sent between August and October 2010. The survey was first mailed on August 2, 2010 with self-addressed stamped envelopes to facilitate return of the completed surveys. Reminder postcards were mailed to agencies that had not yet returned their completed surveys (on August 23, September 14, and October 8). In the initial wave, 88 agencies in the original sample list (36%) returned surveys; after the first reminder postcard, 36 more agencies responded, bringing the response rate to 50%; and by the end of September, 174 completed surveys had been returned (71% response rate). Beginning on October 25, follow-up telephone calls were made to non-respondents. These follow-up efforts were conducted so as to ensure that responses were obtained from similar proportions of departments located in municipalities of various sizes. In total, 202 agencies responded to the survey, corresponding to an 82% response rate. The survey instrument, letter of support, and cover letter are included in Appendix A.

*Institute on Race and Justice (IRJ) at Northeastern University*

Traffic citation data were obtained for each of the 202 agencies at two different points in time. For Time 1 (the 27-month period from April 1, 2001 through June 30, 2003), the source of the data is the *Massachusetts Report on Racial and Gender Profiling* (Farrell et al., 2004). The Registry of Motor Vehicles (RMV) had collected the data in compliance with the state statute and sent it to the Institute on Race and Justice (IRJ) at Northeastern University (2000 Mass. Acts Ch. 228 §§8 and 10). When
the RMV sent data for a 27-month period (rather than 12 months), a decision was made in consultation with the Executive Office of Public Safety and Security and the Racial and Gender Profiling Working Group that the IRJ would analyze all the citations “to provide communities with the most information that was possible to assess any potential disparities in traffic citations” (Farrell et al., 2004, p. 1).4

Because the data were obtained from the IRJ’s report, they were already aggregated to the municipality level and included measures of the proportion of citations issued to drivers of each race, sex, and age group; the proportion of citations issued to non-resident and out-of-state drivers; the proportion of citations issued for speeding violations; the proportion of drivers who were searched; and the proportion of citations issued at night (between 7 p.m. and 6 a.m.).

The IRJ also provided the data set containing nearly one million traffic citations issued by police officers statewide during the 12-month period from January 1 through December 31, 2008 (Time 2). The time period was selected because it was the most current data the RMV could provide. The expectation was that there would be a delay between the adoption and implementation of reforms and changes in traffic citation outcomes. This data set included the race (as perceived by the officer), gender, and age of the driver, whether a search was conducted, the date and time of the stop, and whether the driver was a resident of the municipality and state in which the stop occurred. The

4 The Massachusetts Racial and Gender Profiling Working Group consisted of members and representatives of the community as well as law enforcement. They met with IRJ researchers on a regular basis throughout the data analysis process leading up to the release of the Massachusetts Racial and Gender Profiling Final Report to “discuss difficult statistical questions, express their concerns and the concerns of the community, and where necessary to raise issues so that this report could be as fair and useful to both community members and police as possible” (Farrell et al., 2004, p. i).
data were aggregated to determine the frequency distribution in each municipality at Time 2 for the same measures previously constructed at Time 1.

*United States Census*

The United States Census was the source for most of the municipality variables. The percentage of Black and Latino residents in each municipality was determined using the most recent data from the 2010 decennial census. Although the traffic citation data were for 2008, corresponding census information about the residential population was incomplete. Demographic data for only 14 Massachusetts municipalities were available for 2008 via the American Community Survey (ACS), which is an ongoing survey that samples a small percentage of the population annually. However, due to small sample sizes, the ACS has a high margin of error. Therefore, a decision was made to use the more reliable data from the 2010 census.

Data from the 2000 decennial census were obtained to create a measure of concentrated disadvantage for each municipality. Based on the assumption that police departments respond to the socioeconomic conditions in their municipalities through processes that take time, the measure of concentrated disadvantage was constructed to reflect the conditions that existed in the municipalities in the sample before the start of data collection for the initial study (which began in 2001). It included 1) the poverty rate (percentage of the population living below the poverty level in 1999), 2) the percentage of residents who were unemployed (in 2000), and 3) the percentage of households headed by a single female (ages 15–64) with children under 18 (in 2000).
Federal Bureau of Investigation’s (FBI) Uniform Crime Report

Information about violent and property crime in each municipality was obtained from the FBI’s 2008 Uniform Crime Report (UCR). The UCR is an annual publication that includes the volume and rate of crimes reported to law enforcement for more than 17,000 communities across the United States. Because the traffic citation data were for 2008, crime data for the same year should best reflect the extent to which police were required to focus on investigatory and crime control duties as opposed to simple traffic enforcement.

Massachusetts Department of Revenue

The “cherry sheets” issued by the Revenue Commissioner was the source of information about the taxable property value in each municipality. Cherry sheets notify municipalities of estimated state aid to be paid and charges to be assessed over the next fiscal year. Again, because the traffic citation data were for 2008, property values for the same year were used to establish potential revenue pressure for each municipality.

Law Enforcement Management and Administration Statistics

The Bureau of Justice Statistics of the United States Department of Justice uses a 62-question survey to obtain information about agency personnel, operations, specialized units, community policing, emergency preparedness, equipment, policies, and procedures. According to the Bureau of Justice Statistics website: “Data are obtained on the organization and administration of police and sheriffs’ departments, including agency responsibilities, operating expenditures, job functions of sworn and civilian employees, officer salaries and special pay, demographic

5 Approximately 3,000 law enforcement agencies are surveyed
nationally every three to four years. The sample includes all law enforcement agencies employing 100 or more sworn officers and a nationally representative sample of smaller agencies. Information about the racial composition and educational level of officers for ten agencies was obtained from the Law Enforcement Management and Administration Statistics (LEMAS) because those data were missing from the *Traffic Stop/Racial Profiling Data Collection Survey.*

**Massachusetts Department of Transportation**

The traffic volume in each municipality was determined based on data from the Highway Division of MassDOT, which conducts an annual traffic counting program using automatic traffic recorders located on various roadways throughout the state. The Statewide Traffic Data Collection section of the Highway Division identifies locations within each city and town that are considered to be representative of the traffic volume in that municipality. A potential flaw of this data-collection method is the possibility of uneven distribution of data-collection locations within each municipality. However, the measure of traffic volume was used for comparative purposes in the present study. Given that the flaws in the data-collection method are consistent across municipalities, the measure provides a good comparator that is not intended to be exact.
Other sources

Other sources of data used for these analyses include the *Compensation and Benefits Survey of Police Personnel* and the annual *Massachusetts Municipal Directory*. Both sources are publications of the Massachusetts Municipal Personnel Association. The 2007 edition of the *Compensation and Benefits Survey of Police Personnel*, a biennial survey, provided information regarding the number of ranks as well as the number of officers holding each rank in each police department. The identity of the police chief for each municipality in Massachusetts was obtained from the annual Massachusetts Municipal Directory for fiscal years 2001–2002 through 2008–2009. Finally, agency websites and print communications were used to locate lists of the officers on the force as well as their rank within the department for some of the agencies whose data were missing from the *Compensation and Benefits Survey*.

Variables

Dependent Variables

Reform policies and practices

Five dependent variables were used to examine the first research question regarding the external and internal characteristics of agencies that explain the adoption of reforms to address racial profiling by municipal police departments. These were drawn from questions contained in the *Traffic Stop/Racial Profiling Data Collection Survey*, which asked respondents to indicate whether their department adopted specific
reform policies and practices. The five variables measured whether the department 1) has adopted a Policy & Procedure or a similar document (General or Special Order, Rule & Regulation, or Standard Operating Procedure) on racial profiling or biased policing, 2) is currently collecting data regarding the race of motorists who are issued traffic citations, 3) has conducted any analysis of traffic stop data demographics, 4) has provided comprehensive training regarding traffic stop data collection or analysis or bias-based policing to different members of the department, and 5) has participated in meetings with members of the community to discuss the issue of racial profiling and/or data collection.

Except for the data-collection variable that described the department’s current activity, the other dependent variables measured whether the department adopted the reform at some point in time. Because all survey participants were mandated to collect additional data in 2004, the expectation was that agencies still collecting data in 2010 when the survey was administered would demonstrate a higher level of commitment to addressing the problem of racial profiling.

Most of the survey questions required the respondent to indicate whether the department had engaged in each activity. Responses were coded 0 for “no” and 1 for “yes.” Due to the small sample size and the problem of having only a few municipalities in each category, a decision was made to group the responses related to the agencies’ training efforts to increase the robustness of the analyses’ results. Thus, the variable labeled “comprehensive training” was derived by distinguishing the agencies that provided more than one type of training to more than one group of officers.
from those that did not. Respondents were asked to specify what groups of officers received training (entire department, supervisors only, members of the patrol division only), and what type of training was provided (roll call, in-service training, police academy, specialized off-site training with an outside agency). For example, an agency providing “comprehensive training” could have offered in-service training for the entire department as well as off-site training for patrol officers or supervisors. In contrast, an agency that reported training the entire department at roll call would be characterized as providing “minimal” training. To keep the survey at a reasonable length, it did not include questions about the substance of policies or training, although it is likely that agencies vary in these respects.

*Level of racial and ethnic disparity in traffic citations issued in 2008*

The second set of dependent variables was a measure of the racial and ethnic disparity in traffic citations issued to motorists in each municipality during calendar year 2008. The level of disparity was calculated based on the benchmark known as the Driving Population Estimate (DPE). This benchmark was used in the original study that led to the IRJ’s 2004 report (Farrell, et al.) and is used here for the sake of consistency.

The DPE measures the estimated percentage of drivers of each race and ethnicity in the municipality where the citation was issued. It was originally calculated using research from the field of transportation planning to identify factors that “push” drivers out of surrounding municipalities and “draw” drivers into target cities from surrounding communities. The DPE was calculated using census data for residents of each
municipality who are 18 years of age or older. The same formulas developed for the original study were used here to calculate the DPE with updated census data to reflect the change in demographics from 2000 to 2010. A detailed explanation of the DPE is included in Appendix B.

There are various approaches to measuring the level of disparity: through absolute percentage differences, relative percentage differences, disparity indexes, and ratios of disparity (Fridell, 2004). While each is a legitimate approach, differing measures of disparity can produce different results for the same data. For the sake of consistency with the previous study, the level of disparity was measured by calculating the absolute difference in percentages between those cited by police and the benchmark population (Farrell, et al., 2004). In other words, the level of disparity is the difference between the percentage of traffic citations issued to motorists in each racial and ethnic category and the percentage of each racial and ethnic category that constitutes the DPE in the municipality.

Change in disparity between Time 1 (T1) and Time 2 (T2)

Finally, the third set of dependent variables was a measure of the change in levels of disparity over time. The same DPE benchmarks that were created in the

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6 It is possible that changes in some cities/towns with respect to one or more of the factors listed in Appendix B may have affected their actual “draw” power between 2003 and 2008.

7 Sets of regressions were run with different measures of the outcome variable: level of disparity. The first measure was calculated as the absolute percentage difference and the second measure was the ratio of disparity. A likely explanation for which the results did not track each other is that measures of disparity are not very stable when the percentages of Black drivers in the benchmark population and/or in the population of cited drivers are very high or very low (Fridell, 2004). In many Massachusetts municipalities, the percentages of Black and Latino drivers are very low.
original study were used to facilitate comparison of the levels of disparity between Time 1 (T1) and Time 2 (T2). The change measure is the absolute difference in disparity between T1 and T2 and is calculated by subtracting the percent of disparity found at Time 1 from the percent of disparity found at Time 2. It is described as a change in percent. For example, the level of disparity for Black motorists in Boston was 18.3% at T1 and 23.0% at T2. Therefore, the change in level of disparity (23.0–18.3) is 4.7, indicating that disparity increased over time.

**Independent Variables**

*Municipality variables*

The first set of predictors included demographic and socioeconomic characteristics of the 202 sample municipalities. They are referred to collectively as “municipality characteristics” and consist of the racial composition, crime rate, concentrated disadvantage, and property value, as described below.

Many researchers have used the relative size of the Black population as an indicator of racial threat because it has been associated with many types of formal social control of Blacks from arrest rates to police use of deadly force and the death penalty, as explained in the previous chapter (Parker, Stults, & Rice, 2005). Consistent with that research, the percentage of the population which is Black in each municipality was used in this study as a predictor of Black racial threat (Stolzenberg, D’Alessio, & Eitle, 2004; Parker et al., 2005; Stewart et al., 2009).
Research showing that respondents’ fear of crime was positively associated with the relative size of the Latino population suggests that Latinos, like Blacks, are perceived as threatening to the interests of White citizens (Eitle & Taylor, 2008). Therefore, the percentage of each municipality’s population that is Latino was used as a predictor of Latino racial threat. Both variables—percent Black residents (percent Black) and percent Latino residents (percent Latino)—were obtained from the 2010 census, which is the closest in time to the 2008 traffic citation data.

The racial/minority group threat measure serves as an indicator of the status quo at a particular point in time. To uncover more subtlety as to how racial threat influences formal mechanisms of control and because this study attempted to identify change in disparity over time, a measure of demographic change over time was included in the first models. The variable was calculated as the difference between the percentage of residents identified as Black (or Latino, measured separately) in the 2000 decennial census and in the 2010 census in the sample municipalities.8

In addition, an admittedly imperfect indicator of the perceived threat posed by Black individuals in each municipality was used. Ideally, a measure of Black-on-White crime would be used to test the threat of Black crime hypothesis (Eitle et al., 2002; Stewart et al., 2009). Because those data are not available for the municipalities in the study, the percentage of non-White arrestees was used to measure crime committed by members of racial and ethnic minority groups. These variables were entered separately in the regression models because they represent separate—albeit related—concepts. After running the first series of regressions, a decision was made to drop these two racial threat variables from the analysis. In particular, growth of the Black population between 2000 and 2010 and percent non-White arrestees were correlated with the percentage of Black residents in a municipality (percent Black) at $r = .682, p < 0.000$ and $r = .807, p < 0.000$, respectively. Due to multicollinearity, these variables did not enhance the model. In more than half of the municipalities in Massachusetts, the U.S. Census for 2000 indicated that the relative size of Black (and Latino) population was less than 1% of the total number of residents. During the past decade, more than two thirds of the municipalities experienced between 0 and 1% growth in Black population. Only eleven of the 202 study municipalities saw growth of more than 2% in the size of the Black population. Of those, nine municipalities experienced an increase of 2–7% in the size of the Black population and in two municipalities, the number of Black residents grew more than 10%. For Latinos, one-third of the municipalities in the sample experienced between 0 and 1% growth between 2000 and 2010; 44% of the municipalities experienced growth of 1 to 1.9%; 16.3% experienced growth of 2 to 5% in the Latino population; 3.5% of the municipalities (n = 7) saw growth of 5 to 10% and 3.0% (n = 6) saw more than 10% growth in the Latino population. The measures of the percentage increase in the

---

8 In addition, an admittedly imperfect indicator of the perceived threat posed by Black individuals in each municipality was used. Ideally, a measure of Black-on-White crime would be used to test the threat of Black crime hypothesis (Eitle et al., 2002; Stewart et al., 2009). Because those data are not available for the municipalities in the study, the percentage of non-White arrestees was used to measure crime committed by members of racial and ethnic minority groups. These variables were entered separately in the regression models because they represent separate—albeit related—concepts. After running the first series of regressions, a decision was made to drop these two racial threat variables from the analysis. In particular, growth of the Black population between 2000 and 2010 and percent non-White arrestees were correlated with the percentage of Black residents in a municipality (percent Black) at $r = .682, p < 0.000$ and $r = .807, p < 0.000$, respectively. Due to multicollinearity, these variables did not enhance the model. In more than half of the municipalities in Massachusetts, the U.S. Census for 2000 indicated that the relative size of Black (and Latino) population was less than 1% of the total number of residents. During the past decade, more than two thirds of the municipalities experienced between 0 and 1% growth in Black population. Only eleven of the 202 study municipalities saw growth of more than 2% in the size of the Black population. Of those, nine municipalities experienced an increase of 2–7% in the size of the Black population and in two municipalities, the number of Black residents grew more than 10%. For Latinos, one-third of the municipalities in the sample experienced between 0 and 1% growth between 2000 and 2010; 44% of the municipalities experienced growth of 1 to 1.9%; 16.3% experienced growth of 2 to 5% in the Latino population; 3.5% of the municipalities (n = 7) saw growth of 5 to 10% and 3.0% (n = 6) saw more than 10% growth in the Latino population. The measures of the percentage increase in the
The curvilinear aspect of racial threat described in chapter two was tested using the quadratic terms of \textit{percent Black} and \textit{percent Latino} (Eitle et al., 2002; Stults & Baumer, 2007; Stewart et al., 2009). A preliminary analysis revealed that both \textit{percent Black} and its square and \textit{percent Latino} and its square were highly correlated and created a high degree of collinearity in the models. To address the problem of collinearity, the analyses were run first with \textit{percent Black} and then again with \textit{percent Black squared} but \textit{percent Black} excluded from the model (see Eitle et al., 2002; Stults & Baumer, 2007; Stewart et al., 2009 for similar modeling). The models were run separately with \textit{percent Latino} and then again with \textit{percent Latino squared} but \textit{percent Latino} excluded from the model.

Next, an additive measure of violent and property crime was included in the analysis to control for the level of crime in each municipality. This variable—\textit{crime rate per 10,000 residents}—was included in the analysis based on two assumptions. First, traffic enforcement practices may depend in part on the extent to which police are performing investigatory and crime control duties as opposed to simple traffic enforcement, and second, crime control may divert resources away from traffic enforcement.

Given our understanding that police exert higher levels of social control in communities with higher levels of disadvantage, a measure of \textit{concentrated disadvantage} was included in the analysis (Klinger, 1997; Smith, 1986). It was derived through a principal-components analysis using three indicators: 1) poverty (percent of

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Black and Latino populations during the ten-year period did not provide additional information as they were almost equivalent to the \textit{percent Black} and the \textit{percent Latino} variables that were included in the models.
the population living below the poverty level in 1999), 2) the percentage of unemployed residents (in 2000), and 3) the percentage of households headed by a single female (ages 15–64) with children under 18 years of age (in 2000) (eigenvalue 1.987, sum of squares loading 66.22%),\(^9\) variables identified in prior research as good indicators for that construct (Sampson, Raudenbush & Earls, 1997; Terrill & Mastrofski, 2002; Stolzenberg et al., 2004; Parker et al., 2005). The three variables have relatively high internal consistency (alpha = 0.724), especially given that the principal components analysis consisted of a small number of variables (Warner, 2008).

Furthermore, municipalities that rely on revenue from traffic citations may pressure police departments to generate a certain number of citations. Therefore, differences in revenue pressure between departments in municipalities across the state were taken into consideration. This variable—“property value squared”—was measured as the quadratic term of the property value per capita for each municipality in 2008.

**Organizational variables**

Because agency characteristics have been shown to affect the adoption of reforms as well as enforcement practices, another set of predictors used in these models were structural features of the police organizations in the 202 sample municipalities (Mastrofski et al., 1987; Fyfe, 1982). The size and vertical differentiation of the department, as well as the racial composition and educational level of the force, were included in the analysis.

\(^9\) The Kaiser-Meyer-Olking statistic is significant at 0.558, \(p<0.000\).
The *size of the department* refers to the total number of sworn officers, including the chief. It does not include civilian employees of the department (Brown, 1981; Mastrofski et al., 1987; Schaefer Morabito, 2010; Smith & Klein, 1984). *Vertical differentiation* —or “height”—refers to the total number of ranks from the entry-level officer to the police chief (Eitle & Monahan, 2009; Langworthy, 1986; Maguire, 1997; Wilson, 1968). While many departments have fewer ranks, some had as many as seven: police officer, sergeant, lieutenant, captain, district chief, deputy chief, and chief.

Additionally, the racial composition and educational level of the police force were included in the analysis. *Racial composition* was measured as the percentage of sworn police officers who are members of racial or ethnic minority groups. Although information regarding the effect of officer race on law enforcement outcomes is sparse, a more racially diverse department may vary in terms of the adoption of reforms and have different traffic stop outcomes than an agency that consists of primarily White officers (Terrill, 2001).

There is a similar lack of information regarding the effect of higher education on officer job performance. However, as explained in chapter two, some studies demonstrate that higher education may affect officer decision-making, and scholars have speculated that a more educated police force may have more favorable attitudes toward racial and ethnic minorities than a less educated one (Eitle & Monahan, 2009; Rydberg & Terrill, 2010; Terrill, 2001). These differences may explain variations in agency adoption of racial profiling reforms. In this study, the educational level of a police force refers to the *percentage of officers in the department who completed college*. This
operationalization was used due to the high percentage of officers with 4-year degrees in Massachusetts (73.2% of the 202 police departments reported that 50% or more of their officers have earned college degrees). Dummy variables were used in the regression models: “0” for departments where none of the officers have earned a 4-year college degree, “1” for those with fewer than 50% who have obtained a college degree, “2” signifying that 51–75% of the officers completed college, and “3” representing departments reporting that more than 75% of their officers have earned college degrees.

**Control variables**

Of primary interest is whether municipal and organizational factors influenced the adoption of reforms, levels of disparity in traffic citations issued in 2008, and change in disparity over time. To maintain an appropriately specified model, the analysis also included variables found to be significant in previous research.

**Traffic stop variables**

The patterns of stop activity in each agency may influence the adoption of reforms as well as aggregate levels of disparity across police departments at one point in time and in each agency over a period of time. Therefore, the analyses account for stop-level factors that have been shown to affect the level of racial disparity in traffic citations, specifically motorist gender and age. For example, the first study of racial and gender profiling in Massachusetts found differences in traffic stop outcomes for women compared to men and for young motorists compared to older ones (Farrell et al., 2004).
These differences can be related to variations in the agencies’ “goals, operating philosophies, and organizational culture” (Batton & Kadlec, 2004). To control for possible effects of these variables, the percentage of citations issued to males and females and people in different age categories were included in the analyses by aggregating to the municipality level (< 25 years old, 26–50 years, 51–75 years, 75+ years).

In addition, research shows that police officers are more likely to cite motorists who reside outside the city and state where the violation occurred and may use residency as a pretext for stopping certain motorists (Novak, 2004; Schafer & Mastrofski, 2005). Therefore, for each municipality, the percentage of citations issued to motorists who reside outside the municipality where they were cited, as well as the percentage of citations issued to out-of-state motorists, were included as control variables.

Finally, other contextual factors shown to affect levels of racial disparity in traffic citations were included in the analysis to control for their effects (Engel & Calnon, 2004; Ingram, 2007). These variables were aggregated to the municipality level, and they measured the proportion of citations issued: for various types of traffic violations (speeding, other moving violations, DUI, equipment violations, registration and license violations), at night (7 p.m. to 6 a.m.), or after a search was conducted.

**Agency variables**

Research suggests that the strength of a department and the aggressiveness of its traffic enforcement could be positively associated with increased traffic enforcement, which could affect traffic stop outcomes (Eitle & Monahan, 2009). To account for their
effects, measures of departmental strength and supervision were included as control variables. Reflecting the department’s capacity for social control, departmental strength was calculated as the number of sworn police officers per 10,000 residents in each municipality (Parker et al., 2005; Stolzenberg et al., 2004). Aggressiveness of traffic enforcement was determined by calculating the rate of citations issued per traffic volume count. Because counts were not available for 2008 for each of the sample municipalities, an average of the daily traffic volume counts for the years 2004 through 2008 was calculated as an indicator of the traffic volume. The number of citations issued by police in a particular municipality during calendar year 2008 was divided by the average daily traffic volume for that municipality.

An organization’s leadership is another factor that can influence officers’ behavior in the field. Depending on the chief’s commitment to fairness in traffic enforcement, he or she has the ability to influence officer performance through personal example, written and verbal directives, and by establishing criteria for rewards or reprimands. A department that changed its leadership following the release of the 2004 Report on Racial and Gender Profiling may have increased the likelihood of adopting reforms if the previous chief was not committed to addressing the problem of racial profiling. On the other hand, agencies experiencing a high level of administrator turnover during the study period may be less likely to have adopted and implemented reforms. Therefore, a measure of stability is included in the analysis. It corresponds to the number of police chiefs who led the department between 2001 and 2008. A score of one on the number of chiefs variable signifies that the same person served as police chief throughout the relevant period.
In addition to the chief, first-line supervisors are known to motivate officers to perform in accordance with organizational policy (DeJong et al., 2001). Officers who receive a strong message from their first-line supervisors about a departmental goal to reduce racial disparities in traffic citations are therefore more likely to perform accordingly. Because information was not available regarding officers’ first-line supervisors, the supervisory ratio was included in the analysis to indicate the extent to which officers were supervised and perhaps the amount of discretion they had in performing their traffic enforcement duties. This variable was measured as the ratio of officers below the rank of sergeants to sergeants in each department (Crank, 1990).

Changing the supervisory ratio has been used by reformers as a strategy to gain control over the misuse of street-level discretion (Wilson & McLaren, 1977). Decreases in supervisory ratio are consistent with police professionalism and may correspond to increased traffic enforcement activity (Crank & Wells, 1990). However, the number of supervisory personnel compared to officers does not necessarily provide insight into the extent to which officers were motivated to perform. As we know from earlier research, police officers are motivated to perform in accordance with organizational policy when they believe they will be rewarded for compliance (Engel, 2002; Van Maanen, 1983, 1985).

Descriptive statistics including the mean, standard deviation, and range for each variable were obtained and can be found at Table 3.4.
Table 3.4 – Descriptive statistics for all the study variables

<table>
<thead>
<tr>
<th>Control variables</th>
<th>N</th>
<th>%</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver race (% White)</td>
<td>202</td>
<td>85.95</td>
<td>11.38</td>
<td>42.30</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Driver sex (% Male)</td>
<td>202</td>
<td>69.16</td>
<td>5.01</td>
<td>57.00</td>
<td>82.70</td>
<td></td>
</tr>
<tr>
<td>Driver age (% &lt; 25 years old)</td>
<td>202</td>
<td>34.22</td>
<td>6.74</td>
<td>16.00</td>
<td>48.40</td>
<td></td>
</tr>
<tr>
<td>Out-of-residence driver</td>
<td>202</td>
<td>73.93</td>
<td>14.75</td>
<td>36.90</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Out-of-state driver</td>
<td>202</td>
<td>8.71</td>
<td>8.21</td>
<td>0.00</td>
<td>37.50</td>
<td></td>
</tr>
<tr>
<td>% citations issued for speeding</td>
<td>201</td>
<td>20.43</td>
<td>17.15</td>
<td>0.60</td>
<td>72.70</td>
<td></td>
</tr>
<tr>
<td>% citations issued at accident</td>
<td>201</td>
<td>7.58</td>
<td>5.20</td>
<td>0.00</td>
<td>26.60</td>
<td></td>
</tr>
<tr>
<td>% drivers searched</td>
<td>202</td>
<td>2.20</td>
<td>2.68</td>
<td>0.00</td>
<td>16.10</td>
<td></td>
</tr>
<tr>
<td>% citations issued at night (7pm-6am)</td>
<td>202</td>
<td>39.10</td>
<td>11.41</td>
<td>13.3</td>
<td>65.20</td>
<td></td>
</tr>
<tr>
<td>Strength of the department</td>
<td>194</td>
<td>21.06</td>
<td>10.85</td>
<td>6.07</td>
<td>76.63</td>
<td></td>
</tr>
<tr>
<td>Aggressiveness of traffic enforcement</td>
<td>202</td>
<td>0.02</td>
<td>0.02</td>
<td>0.00</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>Number of chiefs</td>
<td>202</td>
<td>1.80</td>
<td>0.82</td>
<td>1.00</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>Supervisory ratio</td>
<td>202</td>
<td>4.17</td>
<td>2.26</td>
<td>0.00</td>
<td>12.00</td>
<td></td>
</tr>
<tr>
<td>Municipality variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Black residents</td>
<td>202</td>
<td>2.52</td>
<td>4.30</td>
<td>0.10</td>
<td>37.10</td>
<td></td>
</tr>
<tr>
<td>% Latino residents</td>
<td>202</td>
<td>4.72</td>
<td>8.15</td>
<td>0.80</td>
<td>73.80</td>
<td></td>
</tr>
<tr>
<td>Crime per 10,000 residents</td>
<td>195</td>
<td>211.50</td>
<td>129.60</td>
<td>14.40</td>
<td>651.50</td>
<td></td>
</tr>
<tr>
<td>Concentrated disadvantage</td>
<td>202</td>
<td>-0.01</td>
<td>0.96</td>
<td>-1.44</td>
<td>3.56</td>
<td></td>
</tr>
<tr>
<td>Property value in 2008</td>
<td>202</td>
<td>392,436.75</td>
<td>958,462.30</td>
<td>47,830.86</td>
<td>3,372,681.81</td>
<td></td>
</tr>
<tr>
<td>Organizational variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of department</td>
<td>202</td>
<td>43.75</td>
<td>64.55</td>
<td>2.00</td>
<td>476.00</td>
<td></td>
</tr>
<tr>
<td>Vertical differentiation</td>
<td>202</td>
<td>4.15</td>
<td>1.01</td>
<td>2.00</td>
<td>7.00</td>
<td></td>
</tr>
<tr>
<td>Racial composition</td>
<td>195</td>
<td>5.10</td>
<td>7.94</td>
<td>0.00</td>
<td>40.30</td>
<td></td>
</tr>
<tr>
<td>% college graduates</td>
<td>194</td>
<td>51-75%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reform variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. has a policy</td>
<td>192</td>
<td>72%</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. collects race data</td>
<td>197</td>
<td>56%</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. analyzes race data</td>
<td>196</td>
<td>26%</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. provides any training</td>
<td>199</td>
<td>77%</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. provides comprehensive training</td>
<td>199</td>
<td>49%</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. meets with community</td>
<td>199</td>
<td>18%</td>
<td>0.00</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disparity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of disparity w/ DPE – Black</td>
<td>202</td>
<td>3.38</td>
<td>4.20</td>
<td>-1.70</td>
<td>31.90</td>
<td></td>
</tr>
<tr>
<td>Level of disparity w/ DPE – Latino</td>
<td>202</td>
<td>1.36</td>
<td>4.22</td>
<td>-7.40</td>
<td>29.20</td>
<td></td>
</tr>
<tr>
<td>Change in disparity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in disparity (2003-2008) – Black</td>
<td>202</td>
<td>-0.12</td>
<td>1.82</td>
<td>-5.50</td>
<td>6.90</td>
<td></td>
</tr>
</tbody>
</table>

Valid N (listwise)                              159
The sample

The survey sample was drawn from the 246 municipal police departments found to have substantial racial disparities based on the results of the IRJ’s statewide study (Farrell et al., 2004). A broad sampling of departments was needed in order to have enough variation and enough cases to get reliable estimates of traffic citation patterns across police departments at one point in time and within each agency over a period of time (Wells & Falcone, 1992). Using a sample calculator, a representative and reliable sample was determined with a confidence level of 95% and a confidence interval of ±3. At least 82% (n = 202) of the population of 246 agencies needed to respond to provide sufficient statistical power to detect significant effects in the analyses (Warner, 2008).

Data screening and diagnostic tests

Missing data were infrequent throughout the survey, as shown in Table 3.4. Specifically, 4.95% (n = 10) of the departments did not report whether they adopted a Policy & Procedure or a similar document on racial profiling; 2.5% (n = 5) did not answer the question: “Is your department currently collecting information regarding the race and gender of motorists on all traffic stops?”; 3.0% (n = 6) did not respond to the question: “Has your department conducted any analysis of your traffic stop data demographics?”; and 1.5% (n = 3) failed to indicate whether their department had provided training to officers or whether they had participated in meetings with members of the community to discuss traffic stop data collection or racial profiling.
The small percentage of missing data points regarding the reforms that agencies adopted increases the analyses’ reliability. Cases with missing data were omitted, and the analyses were run on the remaining cases (listwise deletion). Although listwise deletion reduces the size of the dataset, all correlations are calculated using the same set of participants (Warner, 2008). All of the findings presented include non-missing cases.

Traffic citation data for the calendar year 2008 (Time 2) were screened, and cases were deleted if they were missing information about the driver’s race, sex, age, or zip code, the license plate number, or the type of violation for which the citation was issued.\textsuperscript{10} The decision to delete these cases was based on the prior study and the importance of these variables in understanding disparity in traffic stop outcomes. For example, without the zip code, it was impossible to determine whether a motorist was a resident of the municipality or state. License plate numbers were used to identify drivers who were issued more than one traffic citation during the same traffic stop so the same person would not be counted twice.

Although 11.5\% of the cases had no information regarding whether a search was conducted, they were included in the analyses to provide an accurate comparison to the prior study (Farrell et al., 2004). In order to correspond with the Census Bureau’s demographic data, only citations issued to drivers over 18 years of age were included. The final data set for Time 2 contained 333,129 traffic citations issued from January 1 to December 31, 2008.

\textsuperscript{10} Chi square calculations were computed to determine whether differences between the cases with and without missing data are statistically significant. The critical value for chi-square at the 0.05 probability level and with 1 degree of freedom = 3.84. There are a number of cases (municipalities) for which equal distribution in the two groups cannot be assumed.
As previously mentioned, the data were aggregated to determine the frequency
distribution in each municipality at Time 2 for the same measures constructed at Time 1:
the proportion of citations issued to drivers of each race, sex, and age group; the
proportion of citations issued to non-resident and out-of-state drivers and to drivers who
were searched; the proportion of citations issued for speeding violations; and those
issued at night (between 7 p.m. and 6 a.m.).

Prior to conducting the data analysis, diagnostic tests were run to identify
outliers among the predictor variables.11 Next, bivariate analyses identified correlations
among the predictors and the key dependent variables.12 This was done to gain a
preliminary understanding as to how each set of independent variables was related to the
outcomes of interest. It also served as a way to diagnose potential issues of
multicollinearity among the variables. The correlations among all of the independent,
mediator, and dependent variables are presented in Tables 3.5 and 3.6. To determine the

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11 Outliers are said to be influential if removing them from the prediction equation results in a large
change in the coefficient (Agresti & Finlay, 1997). Therefore, regressions were run using each of the
independent variables and all the key dependent variables first with, then a second time without the
outliers. In most cases, the coefficients did not change. In a small number of cases, a coefficient that had
been statistically significant when the outliers were included became not significant when the outliers
were excluded from the regression equation. Different ways of handling outliers are: 1) excluding them
from the analyses, 2) trimming the data by dropping the top and bottom scores, 3) recoding the most
extreme scores at each end of the distribution to have the same value as the next highest—or lowest—
score, and 4) modifying the entire distribution by taking the log of the score (Warner, 2008). For this
study, extreme outliers were identified and scores were recoded to have the same value as the next highest
score. Extreme outliers are defined as 1% of the scores (i.e., 2 of 202) at the top (or bottom) of the
distribution for each variable. This was done for the concentrated disadvantage variable and for the
following organizational variables: size of department, racial composition, strength of the department,
aggressiveness of traffic enforcement, supervisory ratio. In addition, all of the control variables had
extreme outliers that were recoded.

12 The level of concentrated disadvantage was moderately correlated with the crime rate in a municipality
\( r = 0.650, p < 0.000 \). The percentage of Black residents (percent Black) was moderately correlated with
the size of the police department, \( r = .476, p < 0.01 \), and strongly correlated with the racial composition
of the department, \( r = 0.715, p < 0.000 \). Lastly, driver age is moderately correlated with the percentage of
citations issued at night, \( r = 0.528, p < 0.000 \).
severity of multicollinearity among the variables, the value of the variance inflation factor (VIF) was checked for each ordinary least squares (OLS) regression. This collinearity statistic was below 6.0, which is within acceptable range (UCLA, 2011). Finally, prediction errors for each of the dependent variables revealed normal distributions. Statistical significance was set at $p < 0.05$ for all tests. All statistics were run on the Statistical Package for Social Science (SPSS) version 19.0.

**Analytic Strategy**

To test the hypotheses previously described, this study employed bivariate logistic regression and OLS regression. The data analysis was conducted in three parts, each corresponding to a research question. A set of hierarchical logistic regression models was used to answer the question about which municipal and organizational factors shape the probability that police departments will adopt the five reforms described earlier. Logistic regression analyses can explain agency adoption of racial profiling reforms because the dependent variables are dichotomous (Warner, 2008). Each of the five dependent variables refers to whether a police department adopted a specific reform (coded as 0 = no and 1 = yes). Coefficients that express the effects of the independent variables on the log of the odds ratio are reported.

OLS regression analysis was used to examine the relationships between the predictors and the outcome variables in connection with research questions 2 and 3. One set of analyses estimated levels of disparity in traffic citations issued to motorists at Time 2, controlling for contextual variables. The final set of analyses examined the
predictors of change in disparity—if any—between Time 1 and Time 2, using the same controls. Both sets of OLS regression analyses explored levels of disparity for motorists of different racial categories and for the larger group of “non-Whites.” The “non-White” group consisted of members of all racial and ethnic categories except Whites and is admittedly a simplistic measure that may not capture nuances between the various groups. However, given the small number of citations issued to motorists of color in some municipalities, grouping them facilitated performing statistical analyses (Fridell, 2004).  

The independent variables were added to the models in blocks to determine the variance accounted for by the various blocks of indicators. The blocks of predictors consisted first of the municipal characteristics, and then the organizational characteristics of the police agencies, and finally the reform variables were incorporated into the complete model. Based on research showing that police innovation is multidimensional, each of the five reform variables was included individually in the regression models (King, 2000). The same sets of analyses were performed for the models that estimated the effect of the predictors on change in disparity over time (between T1 and T2) corresponding to research question 3.

The “causal” model represents a theory that external municipal and internal organizational characteristics may have direct effects on levels of disparity at one point in time and change in disparity over time but that these effects may be partially mediated

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13 Due to the very large outliers among the dependent variables that correspond to the level of disparity for Asian and Native American motorists, the analyses were conducted only with regard to Black, Latino, and non-White motorists. Therefore, three sets of models were used to estimate the levels of disparity observed in 2008 and three more sets estimated the change in disparity between Time 1 and Time 2.
by the adoption of reforms to address racial profiling. The analyses previously described were used to identify any direct effects of municipal and organizational variables on the outcome variables and any mediation of those effects by the reform variables. Interaction terms were introduced to investigate whether the relationships between reforms and levels of disparity varied by the percentage of Blacks (or Latinos) residing in a municipality or by the racial composition of the police force. Only a few racial profiling studies to date have investigated the effect of interaction terms on traffic stop outcomes (Tillyer & Hartley, 2010).

The effects of municipal and organizational variables were expected to be less important in explaining variation in levels of disparity and change in disparity among agencies that adopted reforms. In accordance with Baron and Kenny’s (1986) guidelines, partial mediation exists when the effect of the independent variables on the dependent variable is reduced when the mediators are added to the analysis. Complete mediation occurs when the independent variables predict both the mediators and the dependent variable separately and the effect of the independent variables on the dependent variable disappears when the mediators are added to the analysis (Baron and Kenny, 1986).

The results of the analyses outlined above are presented in the next three chapters. First, the reforms that municipal police departments adopted are identified and the factors associated with their adoption are explored in chapter four. Following that analysis, the effectiveness of reforms is evaluated in two ways. In chapter five, the effects of three sets of factors related to police agencies on levels of disparity in traffic citations issued to motorists in 2008 are examined. Finally, the findings presented in
chapter six demonstrate the influence of the same sets of predictors on change in
disparity within each agency between 2003 and 2008.
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|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

Table 3.5: Correlations between study variables (Black disparity)
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<thead>
<tr>
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<td>% Latinx students</td>
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<tr>
<td>% Black students</td>
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<td>% Hispanic students</td>
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<td>% Asian or Pac Island student</td>
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<td>% American Indian or Alaska Native student</td>
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<td>% Less than high school graduate students</td>
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<td>% College graduate</td>
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<td>% Doctorate</td>
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**Correlation is significant at the 0.01 level (2-tailed). † Correlation is significant at the 0.05 level (2-tailed).**
CHAPTER IV

Reform Policies and Practices

Introduction

Nearly fifteen years ago, with police agencies nationwide facing accusations of discrimination against racial and ethnic minorities, a consensus emerged around the idea that agencies should take steps to address racial profiling (Engel, 2010). In response to this larger social change and supported by police leaders and the social science community, the U.S. Department of Justice’s Office of Community Oriented Policing Services funded the development of a resource guide for law enforcement agencies. The Police Executive Research Forum (PERF) prepared a report based on a survey of 2,251 state and local law enforcement agencies that contained recommendations it characterized as “promising agency responses to ‘racial profiling’” (Fridell et al., 2001, p. 22).

The hope was that law enforcement agencies across the country would translate the report’s recommendations into action and initiate reform measures “tailored to the community’s unique needs” (Fridell et al., 2001, p. ix). As described in chapter one, the suggested agency responses included the adoption of formal policies prohibiting racial profiling, the development and implementation of protocols for collecting and analyzing data on traffic stops and searches, the development and implementation of academy and in-service training on racial profiling and data collection, and the initiation of or participation in meetings with community members on the issue of racial profiling and data collection (Fridell et al., 2001). The adoption of these reforms was expected to result in changes in traffic enforcement practices and ultimately reduce levels of disparity for drivers of color.
At the same time, policy-makers in Massachusetts provided the impetus for reform by passing the “Act Providing for the Collection of Data Relative to Traffic Stops” in August of 2000 (2000 Mass. Acts Ch. 228). The law required police departments to collect data about the race of individuals who were issued traffic citations for a specific period of time and undertake other remedial measures for the purpose of eliminating racial profiling. When the Executive Office of Public Safety and Security (EOPSS) conducted a brief survey to assess the status of police departments’ data collection and analysis efforts, the results revealed that 52% of the municipal agencies in the present study’s sample were collecting data in 2007 and 60% of the agencies had analyzed or were analyzing traffic stop data at that time (EOPSS, 2007). We do not know what factors explain agency adoption of these reforms or whether any departments took additional steps to reduce the incidence of racial profiling because the EOPSS survey did not elicit responses regarding formal policies, training for officers, or participation in community meetings.

There is disagreement in the literature about the source of change in police departments. Racial threat theory and institutional theory suggest that factors external and internal to the organization generate conditions that influence its behavior. In particular, the racial threat perspective predicts that the racial composition of a municipality shapes police decision-making. Building on prior research that demonstrates the influence of racial threat on various police outcomes, Miller’s (2009) study was the first to test the theory in the context of anti-profiling reform efforts. He found that adopting a formal anti-profiling policy was not affected, but the likelihood of a department implementing a computerized data-collection program was influenced by increases in the relative size of the Black population in a municipality. Specifically,
when the proportion of Black residents reached 20%, police departments became less likely to adopt data-collection programs.

Miller interpreted these results as being consistent with racial threat theory based on the logic that agencies would be less willing to temper their use of social control mechanisms in municipalities with high levels of racial threat. He reasoned that “support for the threat model in studies of accountability or due process innovations should be found in a U-shaped distribution” (Miller, 2009, p. 17). Relying on this logic, the prediction here is that the likelihood of adopting reforms will decrease in municipalities with relatively large Black or Latino communities until a “tipping point” is reached and the proportion of Black or Latino residents is so large that it will be associated with an increase in agency adoption of measures to control officer discretion in issuing traffic citations inequitably.

Institutional theory predicts that internal structural characteristics of police departments will also influence the adoption of racial profiling reforms. In fact, Miller’s (2009) study determined that the adoption of reform was driven more by organizational characteristics than external community factors. According to Crank and Langworthy (1992), organizational structures reflect the assumptions about what a department “should look like to sovereigns,” while the efficiency and effectiveness of a department are secondary concerns (p. 344). Therefore, police departments whose structures reflect a concern about public opinion may be more likely to adopt racial profiling reforms.

Although there are inconsistent findings in the literature, prior research indicates that the size of an organization and the resources at its disposal influence the adoption and implementation of new practices (Maguire et al., 1997; Rogers, 2003).
The study of community policing reforms found that a department’s size—perhaps a proxy for its capacity—was the predominant factor in explaining the adoption of reforms (Schaefer Morabito, 2010). The number of ranks in a department is also understood to influence the implementation of new policies and practices, but empirical support for this proposition is difficult to find (Rosenbaum & Lurigio, 1994). Likewise, the racial composition and educational level of a police force are expected to be associated with the adoption of reform measures, although the small number of studies examining these two factors has produced unclear results (Eitle, Stolzenberg, & D’Alessio, 2006; Fyfe & Kane, 2005; Smith & Petrocelli, 2001). As indicators of an agency’s responsiveness to its sovereigns, however, these measures are likely to be associated with reform.

Building on the work of Miller (2007), who investigated large agency adoption of two reforms, the present study analyzed the factors that explained the adoption of several reforms across agencies of varying sizes within one state following the passage of a law mandating change. This chapter explores the adoption of reforms designed to address racial profiling in municipal police departments in Massachusetts by attempting to answer the following research questions:

1-A) What proportion of municipal police departments have adopted reforms to address racial profiling?

1-B) What external municipal characteristics and internal organizational characteristics of police departments are associated with the adoption of those reforms?

The expectations were that police departments operating in more racially diverse municipalities would be less likely to adopt reforms to address racial profiling until the
minority population reaches a certain size when the likelihood of adopting reforms would increase. Likewise, departments serving municipalities with higher levels of crime and concentrated disadvantage would be less likely to undertake reforms. Department size, vertical differentiation, racial and ethnic diversity, and the educational level of the police force were hypothesized to be positively associated with reforms to reduce racial profiling (see detailed description of hypotheses in Table 3.1).

**Sample**

The sample departments can be described in terms of the size of the population which they serve. Table 4.1 shows that a majority of the sample agencies (n = 145 or 71.7%) are located in small cities and towns with fewer than 25,000 residents according to the 2010 Census. Only 17.8% of the study’s municipalities have between 25,000 and 49,999 residents, 8.4% have between 50,000 and 99,999 residents, and 2.0% are large cities with more than 100,000 residents. This distribution mirrors the size of communities in Massachusetts.

<table>
<thead>
<tr>
<th>Population of municipality (according to the 2010 Census)</th>
<th>Proportion of sample municipalities</th>
<th>Proportion of all municipalities in MA</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10,000 residents</td>
<td>36.6%</td>
<td>49.0%</td>
</tr>
<tr>
<td>10,000-24,999 residents</td>
<td>35.1%</td>
<td>30.5%</td>
</tr>
<tr>
<td>5,000-49,999 residents</td>
<td>17.8%</td>
<td>13.4%</td>
</tr>
<tr>
<td>50,000-99,999 residents</td>
<td>8.4%</td>
<td>5.7%</td>
</tr>
<tr>
<td>100,000+ residents</td>
<td>2.0%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Total</td>
<td>202</td>
<td>351</td>
</tr>
</tbody>
</table>
Dependent variables

Five dependent variables were used to test the study hypotheses. They are dummy variables (1 = yes) that measure whether the department 1) has adopted a policy or a similar document (General or Special Order, Rule & Regulation, or Standard Operating Procedure) on racial profiling or biased policing, 2) is currently collecting data regarding the race of motorists who are issued traffic citations, 3) has conducted any analysis of traffic stop data demographics, 4) has provided comprehensive training regarding traffic stop data collection or analysis or bias-based policing to different members of the department, and 5) has participated in meetings with members of the community to discuss the issue of racial profiling and/or data collection.

Independent variables

The independent variables are external characteristics of the municipalities in which police departments operate and internal structural characteristics of police organizations. Descriptive statistics for both sets of variables are included in Table 4.2.

There is a great deal of variation in terms of the size of the population of color among the 202 municipalities in the study. While the mean for the whole sample is quite low—percentage of Black residents is 2.52 and percentage of Latino residents is 4.72—there are municipalities whose population consists of as many as 37.1% Black residents and 73.8% Latino residents.

Other external factors known to affect the adoption of reforms, such as the crime rate and the level of concentrated disadvantage, were included in the analysis. The mean
crime rate for the municipalities in the sample is 211.50 per 10,000 residents ranging from a low of 14.4 to a high of 651.5 per 10,000 residents. The measure of concentrated disadvantage is a factor score with a range of 5 units and a minimum of -1.44, a maximum of 3.56, and a mean of -0.01. Because revenue pressure has been shown to increase traffic citation rates in some municipalities (Makowsky & Stratmann, 2009), differences in their level of economic need might influence agency adoption of reforms. Therefore, as previously explained, the quadratic term of the property value per capita for each municipality in 2008 was included as a measure of its economic need. The mean property value is $392,436.75, ranging from approximately $50,000 to over $3 million.

Agencies in this study vary in size from 2 to 476 officers, with a mean of approximately 44 officers and four ranks per department. In the average department, 5.1% of the officers are members of racial minority groups and between 51% and 75% are graduates of 4-year colleges.

As explained in chapter three, the analyses account for stop-level factors that have been shown to affect the level of racial disparity in traffic citations, other contextual factors relating to the stop, and measures of departmental strength and supervision. Descriptive statistics for all of these control variables are included in Table 3.4.
Table 4.2 – Descriptive statistics – Independent variables

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<tr>
<th>Independent variables</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Minimum</th>
<th>Maximum</th>
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<td>Municipality characteristics</td>
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<tr>
<td>% Black residents</td>
<td>202</td>
<td>2.5</td>
<td>4.3</td>
<td>0.1</td>
<td>37.1</td>
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<tr>
<td>% Latino residents</td>
<td>202</td>
<td>4.7</td>
<td>8.2</td>
<td>0.8</td>
<td>73.8</td>
</tr>
<tr>
<td>Crime per 10,000 residents</td>
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<td>211.5</td>
<td>129.6</td>
<td>14.4</td>
<td>651.5</td>
</tr>
<tr>
<td>Concentrated disadvantage</td>
<td>202</td>
<td>-0.01</td>
<td>0.96</td>
<td>-1.44</td>
<td>3.56</td>
</tr>
<tr>
<td>Property value in 2008 (x 10,000)</td>
<td>202</td>
<td>3,924.4</td>
<td>9,584.6</td>
<td>478.3</td>
<td>33,726.8</td>
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<td>Organizational characteristics</td>
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<tr>
<td>Size of department</td>
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<td>43.8</td>
<td>64.6</td>
<td>2.0</td>
<td>476.0</td>
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<td>Vertical differentiation</td>
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<td>2.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Racial composition</td>
<td>195</td>
<td>5.1</td>
<td>7.9</td>
<td>0.0</td>
<td>40.3</td>
</tr>
<tr>
<td>% college graduates</td>
<td>194</td>
<td>2.0</td>
<td>0.9</td>
<td>0.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Strength of department</td>
<td>202</td>
<td>21.1</td>
<td>10.9</td>
<td>6.1</td>
<td>76.6</td>
</tr>
<tr>
<td>Aggressiveness of traffic enforcement</td>
<td>194</td>
<td>0.02</td>
<td>0.02</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Number of chiefs</td>
<td>202</td>
<td>1.8</td>
<td>0.8</td>
<td>1.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Supervisory ratio</td>
<td>202</td>
<td>4.2</td>
<td>2.3</td>
<td>0.0</td>
<td>12.0</td>
</tr>
</tbody>
</table>

Findings

The analysis that follows is divided into two parts. The first describes the distribution of reforms adopted by municipal police departments in Massachusetts. In the second part, the analysis turns to the municipal and organizational factors that shape the probability of a police department adopting reforms.

Adoption of reforms in Massachusetts

Overall, close to three-quarters (71.9%) of the agencies reported that they have a policy that prohibits racial profiling. More than half of the agencies (55.8%) responded that they were currently (in 2010) collecting data about the race of drivers who were cited for traffic violations, but only one-quarter of the agencies (25.5%) indicated that
they analyze those data. While more than three-quarters of the sample departments (76.9%) provided some training to members of the department, half of them (49.2%) reported that the training was comprehensive, and a majority reported that the entire department was trained.

Only 17.5% of the agencies reported that their department had participated in meetings with members of the community to discuss the issue of racial profiling. Participation in this type of meeting was lowest among agencies located in the smallest municipalities with fewer than 10,000 residents. In fact, 4.1% of the police departments in these municipalities indicated they had participated in community meetings, a difference found to be statistically significant using a 95% confidence interval.

Table 4.3 indicates what reforms were adopted by survey respondents. Tables 4.4 and 4.5 show which officers received training and what type of training was provided. Given that survey respondents were instructed to “check all that apply,” their answers are not mutually exclusive and do not add up to 100%.
Table 4.3 – Traffic Stop / Racial Profiling Data Collection Survey responses regarding reforms adopted by size of population in 2010 (n = 202)

<table>
<thead>
<tr>
<th>Reforms</th>
<th>Total</th>
<th>Munic. w/ &lt;10,000 residents (N = 74)</th>
<th>Munic. w/ 10,000-24,999 residents (N = 71)</th>
<th>Munic. w/ 25,000-49,999 residents (N = 36)</th>
<th>Munic. w/ 50,000-99,999 residents (N = 17)</th>
<th>Munic. w/ 100,000+ residents (N = 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does dept. have a policy?</td>
<td>71.9%</td>
<td>69.0%</td>
<td>71.0%</td>
<td>78.1%</td>
<td>76.5%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Does dept. collect race data?</td>
<td>55.8%</td>
<td>58.3%</td>
<td>49.3%</td>
<td>55.6%</td>
<td>68.8%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Does dept. analyze race data?</td>
<td>25.5%</td>
<td>23.6%</td>
<td>17.4%</td>
<td>37.1%</td>
<td>41.2%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Does dept. provide any training?</td>
<td>76.9%</td>
<td>69.4%</td>
<td>81.4%</td>
<td>83.3%</td>
<td>76.5%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Does dept. provide comprehensive trng?</td>
<td>49.2%</td>
<td>37.5%</td>
<td>50.0%</td>
<td>69.4%</td>
<td>52.9%</td>
<td>50.0%</td>
</tr>
<tr>
<td>Does dept. participate in mtgs w/ comm'y?</td>
<td>17.6%</td>
<td>4.1%</td>
<td>12.9%</td>
<td>42.9%</td>
<td>35.3%</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

Table 4.4 - Proportion of officer groups trained (n = 153)

<table>
<thead>
<tr>
<th>Officers receiving training since 2004 (categories are not mutually exclusive)</th>
<th>Proportion of municipal police departments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire department</td>
<td>55.4%</td>
</tr>
<tr>
<td>Supervisors only</td>
<td>26.0%</td>
</tr>
<tr>
<td>Patrol division only</td>
<td>5.4%</td>
</tr>
<tr>
<td>Other</td>
<td>7.9%</td>
</tr>
</tbody>
</table>

Table 4.5 - Type of training provided (n = 153)

<table>
<thead>
<tr>
<th>Type of training since 2004 (categories are not mutually exclusive)</th>
<th>Proportion of municipal police departments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll call</td>
<td>44.1%</td>
</tr>
<tr>
<td>In-service</td>
<td>44.1%</td>
</tr>
<tr>
<td>Police academy</td>
<td>19.8%</td>
</tr>
<tr>
<td>Off-site</td>
<td>21.3%</td>
</tr>
</tbody>
</table>
Figure 4.1 shows which reforms were implemented and how those reforms vary by department size using the categories of agency size from the PERF study. Within the present study’s sample, 154 departments are small (1–49 officers), 43 are mid-size (50–249 officers), and only 5 are large (250+ officers). Again, the smallest agencies were significantly less likely to participate in community meetings than their large agency counterparts (at a 95% confidence level).

Figures 4.2 through 4.5 illustrate the differences between results obtained by PERF in 2000 and those obtained in the present study ten years later. Comparing the results provides some insight into the reforms that have been adopted in police
departments during the past decade although, admittedly, the comparison is not a perfect one. PERF conducted a national survey (n = 2,251), whereas the present study surveyed police departments in one state (n = 202). The functions of the surveyed agencies vary because PERF included among its participants other types of law enforcement agencies (e.g., sheriffs, state police) in addition to municipal police departments. We do not know what reforms, if any, police departments in Massachusetts had undertaken in 2000 and to what extent they mirrored the efforts of law enforcement agencies nationwide at that time. Likewise, no recent data exist regarding the reforms that police agencies across the country had adopted by 2010 when the current survey was conducted in Massachusetts. Therefore, we cannot be certain that any differences observed between the two sets of responses are attributable to differences within one state or to change over time. As such, comparisons are drawn cautiously.

Overall, Figure 4.2 illustrates that a much higher proportion of departments of all sizes were engaged in various reform activities in Massachusetts in 2010 than ten years earlier nationally. For example, in 2000, 15% of small departments, 35% of mid-size departments, and 52% of large departments across the country had a policy that prohibited racial profiling, whereas in 2010 in Massachusetts, 71% of small departments, 78% of mid-size departments, and 60% of large departments had policies. The proportions of small, mid-size, and large agencies that reportedly collected race data during traffic stops were 9%, 21%, and 28%, respectively in 2000 nationwide and 54%, 57%, and 100% in 2010 in Massachusetts (see Figure 4.3). The Law Enforcement Management and Administrative Survey (LEMAS) conducted in 2003 also provides information about different types of police agencies across the country. Data from LEMAS

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14 The Law Enforcement Management and Administrative Survey (LEMAS) conducted in 2003 also provides information about different types of police agencies across the country. Data from LEMAS
2000, approximately 9% of small agencies, 18% of mid-size agencies, and 32% of large agencies provided training about bias-based policing. Ten years later in Massachusetts, 75.5% of small agencies, 81.4% of mid-size agencies, and 80% of large agencies reported that they provided training to their officers. Finally, Figure 4.5 shows that, across the country in 2000, the proportions of small, mid-size, and large departments participating in community outreach were 7%, 20%, and 31%, respectively. In Massachusetts in 2010, 9.3% of small agencies, 44.2% of mid-size agencies, and 40% of large police departments participated in community outreach.

Figure 4.2 – Agency responses regarding adoption of policy prohibiting racial profiling by agency size

Figure indicates that, as of 2000, a majority of police departments (69.7%) had adopted a policy addressing racial profiling, and approximately half (47.6%) were collecting traffic stop data.
Figure 4.3 – Agency responses regarding collection of data on the race of motorists stopped/cited by agency size

Figure 4.4 – Agency responses regarding officer training on the issue of racial profiling by agency size
PERF’s study revealed that, in 2000, agency responses varied significantly by department size, with a tiny fraction of small departments adopting reforms. Only 15% of small departments had anti-profiling policies compared to 35% of the mid-size agencies and 52% of the large agencies. Whereas fewer than 10% of small agencies had implemented other reforms, at least twice as many mid-size agencies across the country collected data, provided training, and participated in meetings with the community.

In contrast, the results of the present study show that similar percentages of small and mid-size departments in Massachusetts engaged in the same types of reforms. For example, 70.7% of small departments in Massachusetts and 77.5% of mid-size agencies adopted policies. Likewise, just over half of the small and mid-size police departments reported that they collected traffic stop data in 2010 (54% and 57%, respectively), and almost equal percentages of agencies of all sizes in Massachusetts provided training for their officers (75.5% of small agencies, 81.4% of mid-size agencies, and 80% of large agencies).
Predictors of reform

To determine how much the adoption of reforms in Massachusetts agencies varies according to the municipal and organizational characteristics of the departments, logistic regression models were estimated as explained in chapter three. Along with the control variables, the two blocks of variables were introduced into the models separately: the municipal characteristics followed by the organizational characteristics (including the agency control variables). Only the full models are reported.

Initially, the effects of municipal and organizational characteristics were run on a combined measure of reform, but the results were not significantly different than those derived from the five individual models. The results of the regression analyses on the combined measure of reform are not presented. Separate models were used to test for the curvilinear prediction of the threat hypothesis. Because no support was found for the curvilinear relationship between the percentage of Black (and Latino) residents and the adoption of reforms, the results of those models are not presented.

Tables 4.6 and 4.7 show the results of the five models that seek to explain the adoption of a policy, data collection, data analysis, provision of comprehensive training

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15 The combined measure was derived using principal components analysis and was only moderately internally consistent with loadings for each variable on the combined factor score between $\alpha = 0.51$ and 0.70. Neither the municipal nor the organizational variables were associated with the combined measure so it was removed it from the models. Another attempt was made to combine/reduce the number of reform variables by creating dummy variables representing: departments that only adopted a policy and have not adopted any other reforms, departments that adopted a policy plus one or more reform(s), and departments with no policy that have adopted one or more other reform(s). The results were very similar to those predicting the individual policies and practices and did not provide any additional information. Furthermore, when predicting levels of disparity (research question 2) and the change in levels of disparity over time (research question 3), none of these variables had a significant effect on the outcomes and there were only small changes—if any—in the coefficients of the other independent variables when the new variables were included in the models. These results suggest that the reforms are not elements of a singular coherent approach for addressing racial profiling. Instead, police departments opted to adopt some—but not all—of the recommended reforms.
to officers, and participation in meetings with the community. The models were run first
with percent Black residents as the threat variable and then with percent Latino
residents. Although the size of the Latino population in a municipality was not found to
influence the adoption of reforms, it is important to note that almost identical effects
were observed among the other variables when percent Black residents was replaced by
percent Latino residents in each of the models.

The first model in Table 4.6 shows the results of the logistic regression that
predicted the likelihood of a municipal police department having adopted a policy to
address racial profiling. Contrary to the hypothesis, the percent Black residents term
was positively associated with changes in the log likelihood of an anti-profiling policy
(OR = 1.36, p < .05). This result indicates that the log likelihood of having a policy was
significantly increased in municipalities with higher percentages of Black residents.

With the exception of concentrated disadvantage, which is positively associated
with increases in participation in community meetings (OR = 3.06, p < .05), the other
external municipality factors, i.e., the percentage of Latino residents, the crime rate, and
the property value, were not associated with the adoption of any reforms to address bias-
based policing (see Tables 4.6 and 4.7).
Table 4.6 - Factors influencing the adoption and/or implementation of reforms (with Black racial threat)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Does the department have a policy?</th>
<th>Does the department collect race data?</th>
<th>Does the department analyze race data?</th>
<th>Does the dept. provide comp. training?</th>
<th>Does dept. meet with community members?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Odds ratio, 95% CI</td>
<td>Odds ratio, 95% CI</td>
<td>Odds ratio, 95% CI</td>
<td>Odds ratio, 95% CI</td>
<td>Odds ratio, 95% CI</td>
</tr>
<tr>
<td>Traffic stop variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver race – % white</td>
<td>1.11** 1.04-1.18</td>
<td>1.03 0.97-1.08</td>
<td>1.02 0.95-1.08</td>
<td>1.01 0.96-1.06</td>
<td>1.05 0.97-1.14</td>
</tr>
<tr>
<td>Driver sex – % male</td>
<td>0.99 0.90-1.10</td>
<td>0.97 0.89-1.05</td>
<td>0.94 0.85-1.04</td>
<td>1.05 0.97-1.15</td>
<td>1.18* 1.00-1.39</td>
</tr>
<tr>
<td>Driver age – % &lt; 25 years old</td>
<td>0.95 0.87-1.03</td>
<td>1.04 0.98-1.12</td>
<td>0.98 0.90-1.05</td>
<td>0.99 0.92-1.06</td>
<td>0.83** 0.73-0.94</td>
</tr>
<tr>
<td>% Out-of-residence</td>
<td>0.97 0.93-1.02</td>
<td>1.04* 1.01-1.08</td>
<td>1.01 0.97-1.05</td>
<td>0.96* 0.93-0.99</td>
<td>0.98 0.94-1.02</td>
</tr>
<tr>
<td>% Out-of-state driver</td>
<td>1.02 0.95-1.08</td>
<td>0.98 0.93-1.03</td>
<td>1.01 0.95-1.08</td>
<td>1.04 0.98-1.09</td>
<td>0.86 0.74-1.00</td>
</tr>
<tr>
<td>% drivers cited for speeding</td>
<td>1.00 0.97-1.03</td>
<td>1.00 0.98-1.03</td>
<td>0.99 0.96-1.01</td>
<td>1.02 0.99-1.04</td>
<td>1.02 0.97-1.06</td>
</tr>
<tr>
<td>% motorists searched</td>
<td>1.09 0.89-1.33</td>
<td>0.84 0.70-1.01</td>
<td>0.80 0.58-1.10</td>
<td>0.96 0.82-1.11</td>
<td>1.03 0.84-1.27</td>
</tr>
<tr>
<td>% citations issued at night</td>
<td>0.92** 0.87-0.97</td>
<td>0.98 0.95-1.03</td>
<td>0.99 0.94-1.04</td>
<td>0.97 0.93-1.01</td>
<td>0.97 0.90-1.03</td>
</tr>
<tr>
<td>Municipality variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Black residents</td>
<td>1.36* 1.02-1.80</td>
<td>1.11 0.96-1.29</td>
<td>1.15 0.98-1.37</td>
<td>1.02 0.87-1.20</td>
<td>0.99 0.81-1.20</td>
</tr>
<tr>
<td>Crime rate / 10,000 residents</td>
<td>1.00 1.00-1.01</td>
<td>1.00 1.00-1.00</td>
<td>1.00 1.00-1.01</td>
<td>1.00 0.99-1.00</td>
<td>1.00 1.00-1.01</td>
</tr>
<tr>
<td>Concentrated disadvantage</td>
<td>1.20 0.57-2.53</td>
<td>0.76 0.42-1.40</td>
<td>0.87 0.42-1.77</td>
<td>0.81 0.43-1.52</td>
<td>3.06* 1.12-8.34</td>
</tr>
<tr>
<td>Property value per capita</td>
<td>1.00 1.00-1.00</td>
<td>1.00 1.00-1.00</td>
<td>1.00 1.00-1.00</td>
<td>1.00 1.00-1.00</td>
<td>1.00 1.00-1.00</td>
</tr>
<tr>
<td>Organizational variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of department</td>
<td>0.97*** 0.95-0.99</td>
<td>1.01 1.00-1.03</td>
<td>1.00 0.99-1.01</td>
<td>0.99** 0.97-1.00</td>
<td>0.97*** 0.95-0.98</td>
</tr>
<tr>
<td>Vertical differ.</td>
<td>2.27** 1.23-4.21</td>
<td>1.30 0.77-2.20</td>
<td>1.35 0.75-2.45</td>
<td>2.22** 1.29-3.82</td>
<td>3.42** 1.32-8.91</td>
</tr>
<tr>
<td>Racial comp.</td>
<td>1.19** 1.05-1.35</td>
<td>0.98 0.92-1.05</td>
<td>1.01 0.94-1.09</td>
<td>1.13** 1.04-1.23</td>
<td>1.32*** 1.16-1.49</td>
</tr>
<tr>
<td>% college grad.</td>
<td>2.08** 1.23-3.51</td>
<td>1.32 0.88-1.99</td>
<td>2.13** 1.24-3.64</td>
<td>2.25** 1.43-3.65</td>
<td>2.90* 1.18-7.15</td>
</tr>
<tr>
<td>Agency control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. strength</td>
<td>1.02 0.95-1.10</td>
<td>0.99 0.95-1.04</td>
<td>1.02 0.96-1.08</td>
<td>1.09* 1.01-1.18</td>
<td>1.01 0.94-1.09</td>
</tr>
<tr>
<td>Aggressiveness</td>
<td>0.91 0.73-1.12</td>
<td>0.97 0.89-1.29</td>
<td>0.95 0.77-1.17</td>
<td>1.02 0.84-1.23</td>
<td>1.04 0.81-1.33</td>
</tr>
<tr>
<td>Number of chiefs</td>
<td>0.93 0.51-1.72</td>
<td>0.71 0.44-1.13</td>
<td>0.38** 0.20-0.72</td>
<td>0.96 0.57-1.60</td>
<td>1.32 0.61-2.84</td>
</tr>
<tr>
<td>Supervisory ratio</td>
<td>0.89 0.71-1.12</td>
<td>0.98 0.81-1.18</td>
<td>0.79 0.60-1.04</td>
<td>0.93 0.76-1.14</td>
<td>1.04 0.75-1.43</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.41</td>
<td>-1.86</td>
<td>6.66</td>
<td>-4.48</td>
<td>-17.63</td>
</tr>
<tr>
<td>Pseudo R-sq.</td>
<td>0.36</td>
<td>0.22</td>
<td>0.31</td>
<td>0.32</td>
<td>0.52</td>
</tr>
<tr>
<td>Chi square</td>
<td>46.78**</td>
<td>29.79</td>
<td>41.33**</td>
<td>47.66***</td>
<td>65.21***</td>
</tr>
<tr>
<td>N = 167</td>
<td>N = 170</td>
<td>N = 169</td>
<td>N = 172</td>
<td>N = 173</td>
<td>116</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001
Table 4.7 - Factors influencing the adoption and/or implementation of reforms (with Latino racial threat)

* p<0.05; ** p<0.01; *** p<0.001

Associations were found between the internal organizational variables and three reforms: adopting a policy, providing training to officers, and participating in community meetings. Except for department size, which had a negative association with...
the adoption of several reforms, increases in the number of ranks, racial composition, and percentage of college graduates were associated with increases in the log likelihood of departments adopting those reforms. In addition, the percentage of college graduates in a department was positively associated with agencies analyzing their traffic citation data (see Tables 4.6 and 4.7).

To facilitate the interpretation of these results, predicted probabilities of reforms being adopted were calculated for each predictor whose association with a reform is significant. Those with the largest effect sizes are presented in Figures 4.6 through 4.11. The predicted probability of adopting a reform is shown at different contrast points on each independent variable when all other variables are set to their means. Contrast points are measured based on their distance, calculated as multiples of the standard deviation, from the mean.

Figure 4.6 shows that the relative size of the Black population in a municipality affects the probability that agencies adopt a policy. The y axis represents the probability of a department having a policy (ranging from 0 to 100) and the x axis represents the percentage of Black residents in each municipality. In the sample municipalities, the percentage of Black residents ranges from 0 to 37%, with an average of only 2.5% and a standard deviation of 4.3. Therefore, the probability curve illustrates the positive effect

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16 When department size is entered alone in the model, the effect is positive, but it is not significantly associated with the likelihood of adopting a policy. When vertical differentiation and % college graduates are added into the model, department size remains non-significant. It is when racial composition is included that the association between department size and policy adoption becomes significant and negative. Department size and racial composition are moderately correlated at r = 0.549, p < 0.01.

17 Predicted probabilities were calculated as p = 1/1+(e-(B1Xi +B0)).
of increased racial threat (from 0 to 36.9%) on the likelihood that the department adopted a policy.

Figure 4.6
Probability that department has a policy based on percentage of Black residents in the municipality

Departments in municipalities with no Black residents had a 76.5% probability of adopting a policy to address racial profiling. The probability increases to 87.5% in municipalities where 2.5% of the population is Black, the mean in this sample, and to 96.3% where 6.8% of the population is Black, i.e., one standard deviation above the mean. Once the proportion of Black residents reaches 15.4% (three standard deviations above the mean), there is a 100% probability that a department has a policy. In interpreting these results, it is important to note that very few municipalities have large Black populations: only 13 cities have more than 6.8% Black residents, and there are four cities in the sample with more than 15% Black residents. Overall, most
municipalities, whether racially diverse or not, have a high probability of the department adopting a formal policy.

The other municipality characteristic with a significant relationship to a reform is the level of concentrated disadvantage. Figure 4.7 shows the probability that a department participates in meetings with members of the community to discuss the issue of racial profiling based on concentrated disadvantage in the municipality. As previously explained, levels of concentrated disadvantage were measured using factor scores that include measures of poverty, unemployment, and female-headed households. The mean value of concentrated disadvantage in the sample municipalities is -0.01. The values on the x axis represent the level of concentrated disadvantage, ranging from two standard deviations below the mean (-1.93) to four standard deviations above the mean (3.83), which corresponds to the variation in concentrated disadvantage across the sample municipalities. The values on the y axis represent the probability that a department participates in meetings with members of the community.

Although factor scores are more difficult to interpret, Figure 4.7 illustrates a clear upward trend. In municipalities with the lowest levels of disadvantage, there is less than a 1% probability that the police department participates in meetings with the community. The probability increases to 4.5% in municipalities with average levels of disadvantage. Where concentrated disadvantage is one standard deviation above the mean, the probability increases to 12.1%; at two standard deviations above the mean, the probability is close to 30%; and in communities with the highest level of disadvantage (three standard deviations above the mean), there is a 54.1% probability that the police department participates in meetings with community members. Few municipalities have
levels of concentrated disadvantage reaching as high as two and three standard deviations above the mean (n = 13 and n = 4, respectively), which means that agencies in most municipalities have a relatively low probability (< 12%) of participating in community outreach.

Figures 4.8 through 4.10 illustrate the significant relationships between each organizational characteristic (number of ranks, racial composition, and percentage of college graduates) and reforms. For each organizational predictor, the reform with the largest effect size is presented. Departments with more ranks were more likely to be associated with adopting a policy (OR = 2.27, p < .01), providing comprehensive training (OR = 2.22, p < .01), and participating in meetings with members of the community (OR = 3.42, p < .01) than departments with fewer ranks.

In Figure 4.8, the x axis represents the number of ranks in the sample agencies ranging from two to seven and the y axis represents the probability of a department
participating in community outreach. The upward sloping line shows that departments with only two ranks have a significantly lower probability of being associated with participation in community meetings (0.3%) than those with more ranks. Departments with four ranks, the mean for this sample, have a 4% log likelihood of participating in community outreach. Agencies that have five ranks are one standard deviation above the mean and have a 12% log likelihood of meeting with community (n = 51). The probabilities increase to 32% for departments with six ranks (n = 15) and 61% for those with seven ranks (n = 3). Therefore, given that fewer than 10% of the agencies have six or more ranks, the overwhelming majority of agencies have a fairly small probability of participating in community meetings (< 12%).

A more racially diverse police force also had a higher log likelihood of adopting a policy (OR = 1.19, p < .01), providing comprehensive training to members of the
department (OR = 1.13, p < .01), and participating in meetings with members of the community (OR = 1.32, p < .001) than a less racially diverse one. As shown in Figure 4.9, the probability of participating in community meetings is lower in departments that do not employ minority officers than in departments with minority officers. In this figure, the x axis represents the proportion of officers who are members of racial and ethnic minorities. In the sample agencies, the racial composition ranges from 0 to 40% of the force with a mean of 5.1% minority officers.

Figure 4.9
Probability that dept participates in meetings with community based on racial composition of the force

Where there are no minority officers in an agency, the probability of participating in community outreach is 1%. That probability increases to 4.5% in departments with 5.1% minority officers, 29.1% in departments with 13% minorities (i.e., one standard deviation above the mean), and 78.2% where 20% of the force consists of racial and ethnic minorities, i.e., two standard deviations above the mean.
When the proportion of minority officers reaches close to 30%, the log likelihood is 88.5% that the department participates in community meetings. Again, for a large majority of agencies (90%), the probability of participating in community outreach is very low.

Departments with a higher proportion of officers who earned a 4-year college degree were associated with the greatest number of reforms. Specifically, they were more likely to adopt a policy (OR = 2.08, p < .01), analyze the data on the race of motorists who were cited (OR = 2.13, p < .01), provide comprehensive training to members of the department (OR = 2.29, p < .01), and participate in meetings with members of the community (OR = 2.90, p < .05) than departments with fewer college graduates on the force. This predictor had the largest effect size on departments providing comprehensive training. Figure 4.10 illustrates the probability that departments provide comprehensive training based on the percentage of college graduates on the force. The mean proportion of college graduates is 51% to 75% of the force. The values along the x axis represent the proportion of the officers on the force who earned a 4-year college degree ranging from 0 to more than 75%.

The figure shows that the probability of a department providing comprehensive training increases when departments have more college graduates on the force. For example, departments with no college graduates have a log likelihood of 14.6% of providing comprehensive training to their officers; that likelihood increases to 28.2% in departments where less than half of the force has a 4-year college degree, 47.3% among the departments with 50 to 75% college graduates, and 67.2% in departments where more than 75% of the force has a college degree. Overall, in more than three-quarters of
the sample agencies, the probability that comprehensive training is provided is greater than 50%.

![Probability that department provides comprehensive training to officers](image)

**Figure 4.10**

Probability that dept provides comprehensive training based on percentage of college graduates on the force

**Discussion**

This chapter set out to identify what reforms were adopted by municipal police departments and to examine the municipal and organizational characteristics associated with the adoption of five specific reforms. Policy adoption, data collection, and training for officers were the most popular reforms among municipal police departments in Massachusetts, with a majority of departments of all sizes engaging in these activities. In fact, the rate of adoption of these popular reforms did not vary significantly across departments. The proportion of small agencies was only slightly lower than the proportion of large and mid-size agencies adopting the same reforms.
Prevalence of reforms across municipal police departments

An interesting finding is that small police departments lagged much further behind their larger agency counterparts with respect to adopting the least popular and perhaps most challenging reforms: analyzing data and participating in community meetings. The low rate of adoption of these two reforms may be related to a lack of resources and/or technical expertise and a failure of agencies to undertake “real” reform, explanations that will be discussed in greater detail below. Although police departments may be involved in more community outreach generally than they were in the past, they may not have engaged the community in discussions specifically pertaining to the problem of racial profiling.

The fact that training was the most commonly reported reform may indicate that responding to the issue of racial profiling is relatively new for police departments that are still focused on educating themselves. It is possible that the availability of resource guides may have encouraged police administrators to learn about racial profiling and may explain, in part, the high rate of training observed in 2010. In addition to the PERF report, police departments in Massachusetts had access to technical assistance guides developed by the Institute on Race and Justice at Northeastern University as well as new training materials approved by the state’s Secretary of Public Safety and Security.

It is important to note that the measure of training may provide an incomplete picture of the efforts police departments have undertaken. Because it is a combined measure, it does not distinguish the various ways in which agencies trained their officers. Furthermore, because the survey did not ask for details about the nature of the individual reforms, we do not know what topics were emphasized or what factors were
considered in deciding to train officers. This type of information could help to better understand how training was implemented in different agencies.

**Effect of racial threat on the adoption of reforms**

The results of the logistic regression models provide limited support for the research expectations associated with the influence of municipal and organizational characteristics of police departments on adopting reforms. The analysis revealed that, overall, external municipal characteristics were only weakly associated with departments adopting reforms. The proportion of Black residents in a municipality was related to only one of the reforms examined in this study.

Specifically, the results showed an association between municipalities with larger Black populations and departments adopting a formal policy prohibiting racial profiling. This finding is contrary to the racial threat prediction that increases in the percentage of Black residents would be negatively associated with reforms. That the relative size of the Black population was positively associated with the adoption of an anti-profiling policy may be a function of a better-organized Black community in municipalities with higher proportions of Black residents. In these municipalities, the Black community may be more effective at advocating in favor of police efforts that benefit its members such as formalizing policies to increase officer accountability in the performance of their traffic enforcement duties. However, this interpretation is undermined by two facts. First, at the highest level of racial threat (percent Black squared), there was no significant relationship between the size of the minority
community in a municipality and the adoption of a policy, and second, racial threat was not associated with the adoption of any other reform examined in this study.

A better explanation relates to the high probability of agencies adopting formal policies in most municipalities, whether they are racially diverse or not. The probability of having a policy ranges from a 77% log likelihood in municipalities with no Black residents to 87.5% in municipalities with the average-size Black population (i.e., 2.5% Black residents) to 96% in municipalities with a Black population that is one standard deviation above the mean (i.e., 6.8% Black residents). This lack of variation across municipalities may also explain the inconsistency between this study’s finding and Miller’s (2007), where no association was found between the percentage of Black residents in a municipality and the adoption of a policy. It may also provide evidence that adopting an anti-profiling policy is symbolic and does not represent change in the face of pressure from residents, a question that is explored further in chapters five and six. Although racial threat has been shown to affect the individual-level behavior of officers in the context of a traffic stop, it may not be as relevant in terms of influencing agency adoption of certain types of reforms. It is reasonable to speculate that, in Massachusetts municipalities with low levels of racial threat, racial profiling is not a priority unless and until an incident occurs that brings the issue to light.

The relative size of the Black population was not associated with the adoption of the other reforms, nor did the percentage of Latino residents in a municipality influence the likelihood of agencies adopting any of the five reforms. Perhaps the lack of findings indicates that the pressure to reform originates from outside the municipality rather than
from within. Social and political pressure have been shown to influence police behavior during traffic stops (Warren & Tomascovic-Devey, 2009; Warren & Farrell, 2009) and are likely to be very important in explaining the adoption of racial profiling reforms. State agencies, the media, and leaders from surrounding communities may be responsible for pushing police departments to implement changes.

This explanation finds support in the “race out of place” perspective, which recognizes the effect of racial incongruity on police behavior. The theory is that police suspicion is drawn to individuals who “do not belong” or do not fit what is usual or expected in a particular neighborhood (Renauer, 2012). For example, researchers have shown that Black and Latino drivers were less likely to be stopped and searched in Black and Latino neighborhoods, whereas White drivers were more at risk (Novak & Chamlin, 2008). The presence of White drivers in Black neighborhoods may have appeared unusual to police, thereby raising their suspicions and increasing stop, search, and arrest rates for Whites, but Black drivers in Black neighborhoods was normal. Conversely, Stults et al. (2012) found that there were increased traffic stop rates for Black drivers in largely White areas of Miami-Dade County (see also Renauer, 2012; Stewart et al., 2009). Perhaps it is these individuals, stopped for being “out of place” when driving in predominantly White neighborhoods, who have urged leaders in their own communities, as well as the state government and the media, to exert pressure on police departments in White municipalities to undertake reforms.

It is interesting that the proportion of Latino residents had no effect on the adoption of reforms. This finding may reflect the fact that Latinos experience racial profiling to a lesser extent than Black motorists. This possibility will be explored in the
next chapter through an analysis of levels of disparity. That analysis may help to determine whether differences in disparity between Black and Latino motorists in Massachusetts coincide with other research which demonstrates that Latinos’ perceptions of racial profiling differs from those of Blacks (Cheurprakobkit, 2000; Dunham & Alpert, 2001; Huo & Tyler, 2000; Reitzel et al., 2004; Weitzer, 2002).

Effect of organizational characteristics on the adoption of reforms

Internal organizational characteristics were more strongly associated with departments adopting reforms than municipal factors. Unlike previous research showing that larger agencies implemented COP to a greater extent than smaller ones (Maguire et al., 1997; Schaefer Morabito, 2010), here, larger departments had a slightly lower probability of adopting reforms. However, agencies with taller rank structures were more likely to be associated with reforms. This result is consistent with the hypothesis and with the findings of a study of vehicle pursuit policies showing that departments with more ranks were more likely to have formal policies than those with less vertical differentiation (Wells & Falcone, 1992). Likewise, the agencies with more racial diversity and more college graduates on the force had a significantly higher probability of being associated with reforms.

In this sample, the racially integrated departments (at or above the mean) with higher proportions of college-educated officers (more than 50% of the force) and a greater number of ranks (at least four) tend to be mid-sized agencies. These agencies are also located in municipalities with slightly higher levels of disparity. In contrast with
small agencies, mid-size agencies may be well positioned to undertake reforms due to the availability of resources. They may also have the opportunity to hire new officers on a more regular basis and benefit from the influx of new ideas. Therefore, they may be characterized as more open to reform than their smaller counterparts.

More racial diversity and a higher college graduation rate among officers were associated with the adoption of multiple reforms, specifically anti-profiling policies, training, and community outreach. The existence of these relationships may signify a greater effort within these types of departments to increase police accountability in traffic enforcement practices. As such, these findings support the contention that a more racially diverse and highly educated police force may treat racial and ethnic minorities more equitably than agencies with predominantly White officers with less formal education (Eitle & Monahan, 2009; Rydberg & Terrill, 2010; Terrill, 2001).

Diverse departments may facilitate efforts to reduce racial profiling by weakening the political solidarity of the police (Sklansky, 2006). Racial diversity within police departments has changed their internal dynamics by fragmenting the traditionally White male police force and challenging that police subculture. With the segmentation of the police and the reduction of its solidarity, officers working in racially diverse agencies may have more freedom to support anti-profiling reforms without fear of being stifled by their fellow officers. Increasing diversity within departments also has led to more collaboration between police and outside organizations, perhaps allowing officers to embrace reforms to improve police accountability to members of the minority
community. According to Sklansky (2006), this social realignment is the “most important effect of the profession’s growing diversity” (p. 1234).

An interesting finding is that only the percentage of college graduates on a police force was associated with the likelihood of departments analyzing traffic citation data, arguably the most difficult reform to implement. It is likely that, within a more highly educated police force, officers may have the knowledge to conduct the agency’s data analysis or understand its importance, thereby facilitating an agency decision to hire an outside consultant, for example. The difference in the proportion of departments that analyzed their traffic citation data (25.5%) in contrast with those that collected data (55.8%) and provided training to officers (76.9%) supports the argument that a lack of technical knowledge—or a lack of resources to afford technical assistance—may be partially to blame for the low rate of data analysis among agencies. In fact, more than half of the agencies surveyed by EOPSS in 2007 indicated that training and technical assistance would be useful to support their agencies’ efforts to address racial profiling (EOPSS, 2007).

The racial composition and educational level of a police department may signal a department’s concern about organizational legitimacy and susceptibility to public opinion (Miller, 2009). Therefore, in more diverse and highly educated departments, police leaders who were disturbed about their agencies’ results in the 2004 Massachusetts Report on Racial and Gender Profiling may have adopted reforms to bolster their image. In other words, the associations observed between agency
characteristics and the adoption of reforms may reveal a certain organizational “perviousness” that makes some police departments sensitive to outside influences.

In a study of the implementation of hate crime policies, an agency’s perviousness was described as the degree to which it is exposed to external conditions and amenable to addressing external demands for change (Jenness & Grattet, 2005). The researchers counted the number of groups with which an agency meets regularly to determine its perviousness to community pressure. Groups included neighborhood associations, tenants’ associations, youth service organizations, advocacy groups, business groups, religious groups, and school groups. Their analysis demonstrated that agencies responded differently to environmental influences depending upon their perviousness, which suggests that a particular nexus between community and agency factors affects police departments’ susceptibility to reform.

The adoption of racial profiling reforms also may be associated with organizational perviousness, but more research must be conducted to better understand the receptivity of municipal police departments in Massachusetts to social and political pressure. Among these forces is the adoption of the state law itself, a factor that was not directly explored in this study. It is possible that the passage of the Massachusetts law mandating agencies to collect data for a specified period of time helps to explain why over half the departments in the sample collected traffic citation data.

Other factors that were not considered in this study may be responsible for the adoption and implementation of reforms. The specific individuals responsible for the adoption of reforms are likely to account for some of the variation across agencies. For example, Willis, Mastrofski, and Weisburd (2007) suggested that a particularly
entrepreneurial police leader created the conditions for the NYPD’s adoption of COMPSTAT (short for computer statistics). Here, we are not aware to what extent and how individual leaders have spearheaded their departments’ anti-profiling reform efforts. In addition, as previously discussed, the availability of resources and technical assistance to analyze traffic citation data, provide training, and participate in community meetings may be important in explaining reform.

Changing police organizations is notoriously challenging (Sherman, 1974; Weitzer & Tuch, 2006). This study draws on research examining both external and internal factors that influence organizational change. The results reveal that racial threat theory may not be an appropriate framework for understanding the adoption of certain kinds of reforms. While external characteristics generally were not associated with the adoption of reforms, some internal characteristics may be important to their adoption. These findings coincide with previous research that uncovered relationships between organizational factors and police reforms (Miller, 2009; Schaefer Morabito, 2010; Wells, Falcone, & Rabe-Hemp, 2003). They demonstrate that organizational structures reflect the need for agencies to maintain their legitimacy, a consideration that is unrelated to their effectiveness. Thus, adopting reforms may be symbolic and may not represent a real effort to change.

We do not know whether the reforms that were adopted were implemented in a superficial manner. Agencies that were resistant to change can appear to address concerns about racial profiling without actually changing their traffic-enforcement practices (Manning, 1997; Mastrofski & Ritti, 1996; Miller, 2009). What was reported as reforms may have amounted to simply putting in writing a policy against profiling,
hastily reminding patrol officers at roll call about that policy, and accepting an isolated invitation to attend a community meeting. To date, no research had attempted to determine whether the adoption of reforms is associated with changes in officer performance of their traffic-enforcement functions. Therefore, the effect of reforms on increasing fairness in traffic stop outcomes has remained unknown. The following chapters describe analyses that explore whether these reforms are effective ways of reducing disparity in traffic citations issued to motorists of different racial and ethnic groups.
Chapter V

Levels of Racial and Ethnic Disparity in Traffic Citations issued in 2008

Introduction

Having undertaken reforms to reduce racial profiling, municipal police departments may want to know whether their efforts had the desired results. By analyzing the influence of reforms on agency-level patterns of disparity, this study seeks to understand whether adopting reforms changed police behavior. The associations found in the previous chapter demonstrate that internal characteristics of police agencies can promote changes in policies and practices, but external municipal factors are only weakly related to the adoption of reform. It remains unknown whether these factors influence disparity in traffic enforcement outcomes and whether reforms are effective in terms of decreasing disparity for Black and Latino motorists.

In other research, police performance has been evaluated based on measures of crime, disorder control, citizen satisfaction, use-of-force, and citizen complaints against police (Mastrofski & Willis, 2010). For this study, the standard of police performance is the level of disparity in the traffic citations issued to Black and Latino motorists in 2008. As previously explained, the level of disparity compares the proportion of motorists of a particular racial or ethnic group who were cited by police during a traffic stop to the proportion of motorists of the same racial or ethnic group among the driving population in the same municipality. It is essentially an indicator of the fairness or degree to which traffic enforcement represents traffic or traffic violation.
It is important to note that we do not know to what extent the subset of traffic law violators was representative of the general driving population. Nevertheless, the measure of disparity enabled two types of comparisons to be made: one that examines differences between departments at one point in time and the other that looks at the same departments at different points in time. These two outcomes will be analyzed in this chapter and the next. First, we explored the relationships between three sets of explanatory variables and the levels of racial and ethnic disparity in traffic citations issued by municipal police officers in 2008.

Two sets of predictors, the characteristics of the municipality and the police organization, were used in chapter four to explain the adoption of reforms aimed at addressing racial profiling. Here, in addition to assessing the influence of those variables on disparity, the effect of the reforms on disparity was analyzed. As described in the previous chapter, the reforms consist of adopting a policy that prohibits racial profiling, collecting and analyzing traffic stop data, providing training to members of the department, and participating in meetings with community members. They were included in the analyses as five separate predictors because results of earlier models using a combined measure of reform revealed that most police departments adopted some—but not all—of the recommended reforms.

Drawing on the literatures on racial threat and organizational theory, the analyses presented in this chapter seek to explain the agency-level patterns of disparity in traffic citations issued to Black and Latino motorists. No other study has specifically analyzed levels of racial and ethnic disparity following the adoption of racial profiling reforms, but other research comparing disparity in multiple departments suggests that disparity
for Black and Latino motorists will vary across police departments (e.g., Farrell, 2011). Likewise, studies of community-oriented policing indicate that the effect of reforms on disparity could vary from one department to another because the way in which each agency implements the various reforms is likely to differ (Klinger, 2003; Skogan & Frydl, 2004).

The racial threat perspective has been used to explain why the size of the Black or Latino population in a municipality influences the level of control exerted by police over Blacks and Latinos (Eitle & Taylor, 2008; Eitle & Monahan, 2009; Kubrin & Stewart, 2006). Police control individuals who are viewed as threats to the social order through formal and informal means, including the use of force and arrests. Traffic enforcement policies and practices provide police with another mechanism to dominate people of color. In fact, the first study of racial profiling in Massachusetts revealed that higher percentages of Black and Latino motorists were cited for traffic violations than their proportions among the driving population would suggest (Farrell, et al., 2004). Therefore, the factor associated with the racial threat hypotheses—the relative size of the minority community—was expected to explain differences in levels of disparity for Black and Latino motorists across the sample municipalities.

The effect of racial threat on disparity may be mediated by an agency’s adoption of formal policies and other reforms based on prior research that shows that written policies moderated the effect of racial threat on arrest rates for Blacks (Eitle & Monahan, 2009). The level of racial threat in a municipality may also interact with the adoption of reforms to explain variation in levels of disparity. Prior studies have shown that there are limits to influencing officer behavior (Manning, 1997; DeJong et al., 2001). Here, it
was hypothesized that the demographic composition of the municipality may constrain agency attempts to implement reforms that could change traffic enforcement practices that result in disparity. Based on Miller’s (2009) finding that police departments in municipalities with greater proportions of Black residents were less likely to implement data collection programs, we can infer that police departments in these types of municipalities would be associated with less effective reforms as well. Therefore, the effect of reforms on reducing disparity may be less significant in municipalities with higher levels of racial threat than in municipalities with a smaller proportion of Black or Latino residents.

At the same time that factors external to the organization play a role in shaping officers’ behavior, internal characteristics of police agencies are also known to influence their activities (Alpert, et al., 2005; Crank, 1990; Engel, 2002; Langworthy, 2002; Smith, 1984; Wilson, 1968). In particular, agency size and vertical differentiation have been shown to affect arrest rates but, as we saw in chapter two, findings have been mixed. Some studies have demonstrated a positive relationship between agency size and arrest rates (e.g., Brown, 1981; Smith & Klein, 1984) while others have found that the probability of arrest decreased as the size of the department increased (e.g., Mastrofski et al., 1987).

Likewise, research has shown that the number of ranks in a department is associated with higher arrest rates (Crank, 1990) while other studies have found no relationship between a department’s vertical differentiation and the probability of arrest (Smith & Klein, 1984; Smith, Visher, & Davidson, 1984). Here, larger agencies with more ranks were expected to have lower levels of disparity because prior research has
shown that more organizational control was associated with decreased police activity and an increased likelihood of accomplishing agency goals (Eitle & Monahan, 2009; Mastrofski et al., 1987).

Police activity also may be associated with the racial integration and educational achievement of officers on a police force (Slovak, 1986). Scholars have examined both the individual-level effects of officer race and the aggregate effect of an agency’s racial diversity on police behavior. To date, no significant differences between individual officers of different racial backgrounds have been found with regard to their traffic enforcement activities (Novak, 2004; Smith & Petrocelli, 2001), and the research on agency-level effects has produced inconsistent results in predicting arrest rates (Donohue & Levitt, 2001; Eitle, Stolzenberg, & D’Alessio, 2005; Slovak, 1986).

A related study showed that the aggregate effect of gender representation in a department was associated with greater gender parity in traffic enforcement outcomes (Farrell, 2011). Like other diverse and open workplaces, bias is less likely to exist in agencies with an integrated workforce. Therefore, in the present study, departments with a higher proportion of minority officers were expected to have more racial parity, i.e., lower levels of disparity in traffic citations issued to Black and Latino motorists.

In light of the recommendation of academics and police professionals to increase the racial composition of agencies as a means of achieving reductions in disparity, the interaction of an agency’s racial composition and each reform was explored. It was hypothesized that the effect of adopting formal policies and other anti-profiling reforms on reducing disparity would be greater when adopted by departments with more racial diversity than those with smaller proportions of minority officers.
Departments with a higher proportion of college-educated officers also were expected to have lower levels of disparity. There is support in the literature for the proposition that the educational level of a police force has an effect on arrest rates (Brandl et al., 2001; Worden, 1989), and a recent study demonstrated that officers with some college education were significantly less likely to use force than non-college-educated officers during encounters with citizens (Rydberg & Terrill, 2010). This finding suggests, as other scholars have argued, that a more highly educated police force may treat minority motorists more fairly than a less educated one (Eitle & Monahan, 2009; Terrill, 2001).

Finally, given what we know about the implementation of other types of reforms, the adoption of racial profiling reforms may mediate the effect of agency characteristics on officer performance of traffic enforcement functions (Mastrofski & Willis, 2010). Therefore, this chapter attempts to answer the following research questions:

2-A) Do certain municipal characteristics, organizational characteristics, and reforms influence the level of disparity in traffic citations issued to Black and Latino motorists across municipalities?

2-B) Do certain reforms mediate the effects of municipal and organizational characteristics on the level of disparity in traffic citations issued to Black and Latino motorists?

2-C) Do certain reforms interact with the proportion of Black and Latino residents to affect the level of disparity in traffic citations issued to Black and Latino motorists?
2-D) Do certain reforms interact with the proportion of minority officers to affect the level of disparity in traffic citations issued to Black and Latino motorists?

It was hypothesized that levels of disparity would vary according to the type of municipality in which the police department operated, the organizational characteristics of the police department, and the adoption of reform policies and practices, controlling for relevant stop characteristics. The specific hypotheses are presented in greater detail in Table 5.1.

<table>
<thead>
<tr>
<th>Table 5.1 - Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• More racial diversity in a municipality will be associated with more disparity.</td>
</tr>
<tr>
<td>After a “tipping point” is reached, more racial diversity will be associated with less disparity.</td>
</tr>
<tr>
<td>• A larger department size will be associated with less disparity.</td>
</tr>
<tr>
<td>• A department with more ranks will be associated with less disparity.</td>
</tr>
<tr>
<td>• A more racially diverse police force will be associated with less disparity.</td>
</tr>
<tr>
<td>• A more highly-educated police force will be associated with less disparity.</td>
</tr>
<tr>
<td>• Adoption of reforms will be associated with less disparity.</td>
</tr>
<tr>
<td>• Adoption of reforms will mediate the effects of municipal and organizational characteristics on levels of disparity.</td>
</tr>
<tr>
<td>• The effect of adopting reforms on reducing disparity will be smaller in municipalities with more racial threat compared to municipalities with a smaller proportion of Black or Latino residents.</td>
</tr>
<tr>
<td>• The effect of adopting reforms on reducing disparity will be greater when adopted by departments with more racial diversity on the force than by agencies with less racial diversity.</td>
</tr>
</tbody>
</table>

Descriptive statistics of the levels of disparity

The level of disparity in traffic citations issued to motorists of different racial and ethnic groups in 2008 varied widely across the 202 municipalities in the sample. As previously explained, disparity was measured by calculating the absolute difference between the percentage of traffic citations issued to motorists in each racial and ethnic category and the percentage of each racial and ethnic category that constitutes the
Driving Population Estimate (DPE) in the municipality. In Table 5.2, the average level of disparity is reported for motorists of each group. The mean level of disparity was highest for Black motorists (M = 3.4) and lowest for Asian American motorists (M = -1.7). For Latino motorists, the mean level of disparity was 1.4, and for Native American motorists, it was -0.2.

The negative values for Asians and Native Americans indicates that, on average across departments, there were fewer Asian and Native American motorists who were cited compared to their proportion of the driving population. These percentages are difficult to interpret because, with a few notable exceptions, most municipalities in Massachusetts have very small percentages of Asian and Native American residents.\(^\text{18}\) Only the analyses of disparity for Black and Latino motorists are presented and discussed.

<table>
<thead>
<tr>
<th>Level of disparity with the DPE benchmark</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>White motorists</td>
<td>-0.2</td>
<td>11.4</td>
<td>-31.2</td>
<td>93.4</td>
</tr>
<tr>
<td>Black motorists</td>
<td>3.4</td>
<td>4.2</td>
<td>-1.7</td>
<td>31.9</td>
</tr>
<tr>
<td>Latino motorists</td>
<td>1.4</td>
<td>4.2</td>
<td>-7.4</td>
<td>29.2</td>
</tr>
<tr>
<td>Asian American motorists</td>
<td>-1.7</td>
<td>1.8</td>
<td>-9.4</td>
<td>3.3</td>
</tr>
<tr>
<td>Native American motorists</td>
<td>-0.2</td>
<td>1.7</td>
<td>-23.3</td>
<td>0.9</td>
</tr>
</tbody>
</table>

\(^{18}\) In more than 90% of the sample municipalities, less than 5% of the population is Asian American and in 99% of the municipalities, less than 1% of the residents are Native Americans. To facilitate performing the statistical analyses, traffic citations issued to members of all racial and ethnic groups except Whites were combined into a “non-White” group. The results of analyses of disparity for non-White motorists did not provide additional clarification or consistency to the findings. This may be due to the fact that disparity for motorists of each racial and ethnic group was different in most municipalities and often went in opposite directions. Those unique effects would be lost if all minorities were combined together in one large group.
Table 5.3 illustrates the variation in disparity across municipalities. The data reveal a stark difference in levels of disparity for Black and Latino motorists: whereas disparity was low for Latinos in nearly all municipalities, the majority of municipalities had higher levels of disparity for Blacks. The first row in the table indicates that fewer Black motorists were cited than their proportion of the driving population (disparity < 0) in 6.5% of the sample municipalities (n = 13). In contrast, Latinos were cited less than their proportion of the driving population in nearly half of the municipalities in the sample (n = 86). The level of disparity was below 3.0 for Black motorists in more than half the municipalities (n = 119), but it was between 1.0 and 3.9 in the majority of the cities and towns in the sample (n = 109). For Latino motorists, the level of disparity was below 3.0 in almost 80% of the municipalities (n = 158). These data can be interpreted in different ways. For example, Latinos may be less likely to be viewed as “out of place” by the police when driving in predominantly White municipalities; they could violate traffic laws less frequently; or they may not be readily identified as Latino.

<table>
<thead>
<tr>
<th>Level of disparity</th>
<th>No. of municipalities</th>
<th>% of municipalities</th>
<th>Cumulative %</th>
<th>No. of municipalities</th>
<th>% of municipalities</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.0</td>
<td>13</td>
<td>6.5%</td>
<td>6.5%</td>
<td>86</td>
<td>43.0%</td>
<td>43.0%</td>
</tr>
<tr>
<td>0.0</td>
<td>3</td>
<td>1.5%</td>
<td>8.0%</td>
<td>4</td>
<td>2.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>0.1 - 0.9</td>
<td>19</td>
<td>9.5%</td>
<td>17.5%</td>
<td>31</td>
<td>15.5%</td>
<td>60.5%</td>
</tr>
<tr>
<td>1.0 - 1.9</td>
<td>47</td>
<td>23.5%</td>
<td>41.0%</td>
<td>18</td>
<td>9.0%</td>
<td>69.5%</td>
</tr>
<tr>
<td>2.0 - 2.9</td>
<td>37</td>
<td>18.5%</td>
<td>59.5%</td>
<td>19</td>
<td>9.5%</td>
<td>79.0%</td>
</tr>
<tr>
<td>3.0 - 3.9</td>
<td>25</td>
<td>12.5%</td>
<td>72.0%</td>
<td>9</td>
<td>4.5%</td>
<td>83.5%</td>
</tr>
<tr>
<td>4.0 - 4.9</td>
<td>21</td>
<td>10.5%</td>
<td>82.5%</td>
<td>10</td>
<td>5.0%</td>
<td>88.5%</td>
</tr>
<tr>
<td>5.0 - 5.9</td>
<td>12</td>
<td>6.0%</td>
<td>88.5%</td>
<td>5</td>
<td>2.5%</td>
<td>91.0%</td>
</tr>
<tr>
<td>6.0 - 6.9</td>
<td>6</td>
<td>3.0%</td>
<td>91.5%</td>
<td>3</td>
<td>1.5%</td>
<td>92.5%</td>
</tr>
<tr>
<td>7.0 - 7.9</td>
<td>6</td>
<td>3.0%</td>
<td>94.5%</td>
<td>4</td>
<td>2.0%</td>
<td>94.5%</td>
</tr>
<tr>
<td>8.0 - 8.9</td>
<td>0</td>
<td>0.0%</td>
<td>94.5%</td>
<td>0</td>
<td>0.0%</td>
<td>94.5%</td>
</tr>
<tr>
<td>9.0 - 9.9</td>
<td>2</td>
<td>1.0%</td>
<td>95.5%</td>
<td>3</td>
<td>1.5%</td>
<td>96.0%</td>
</tr>
<tr>
<td>10.0 - 19.9</td>
<td>5</td>
<td>2.5%</td>
<td>98.0%</td>
<td>7</td>
<td>3.5%</td>
<td>99.5%</td>
</tr>
<tr>
<td>20.0 - 29.9</td>
<td>3</td>
<td>1.5%</td>
<td>99.5%</td>
<td>1</td>
<td>0.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>30.0 +</td>
<td>1</td>
<td>0.5%</td>
<td>100.0%</td>
<td>0</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Tables 5.4 and 5.5 display the levels of disparity in municipalities of various sizes, as determined by their population in the 2010 census. For example, half of the smallest municipalities, i.e., those with fewer than 25,000 residents, had levels of disparity below 3.0 for Black motorists (n = 46), and 80% had levels of disparity below 3.0 for Latino motorists (n = 58). Among the medium to large municipalities with more than 50,000 residents, disparity was higher for Black motorists than it was for Latino motorists. Black motorists experienced levels of disparity below 5.0 in 13 of the 21 cities and above 10.0 in four of the cities of this size. For Latino motorists, disparity was below 5.0 in 16 medium to large cities and above 10.0 in only two of those cities. Importantly, in at least 40% of municipalities of all sizes, disparity for Latino motorists was below zero, whereas for Black motorists, negative disparity was observed in less than 10% (only 6.5%) of the municipalities in the sample.

Table 5.4 - Levels of disparity for Black motorists by size of municipality

<table>
<thead>
<tr>
<th>Level of disparity</th>
<th>&lt;10,000 residents</th>
<th>10,000-24,999 residents</th>
<th>25,000-49,999 residents</th>
<th>50,000-99,999 residents</th>
<th>100,000+ residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.0</td>
<td>8.3%</td>
<td>5.6%</td>
<td>5.6%</td>
<td>5.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>0.0</td>
<td>1.4%</td>
<td>2.8%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>0.1 - 0.9</td>
<td>6.9%</td>
<td>9.9%</td>
<td>13.9%</td>
<td>11.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1.0 - 1.9</td>
<td>25.0%</td>
<td>18.3%</td>
<td>30.6%</td>
<td>23.5%</td>
<td>25.0%</td>
</tr>
<tr>
<td>2.0 - 2.9</td>
<td>22.2%</td>
<td>21.1%</td>
<td>13.9%</td>
<td>5.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>3.0 - 3.9</td>
<td>15.3%</td>
<td>15.5%</td>
<td>2.8%</td>
<td>11.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>4.0 - 4.9</td>
<td>6.9%</td>
<td>11.3%</td>
<td>16.7%</td>
<td>11.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>5.0 - 5.9</td>
<td>4.2%</td>
<td>8.5%</td>
<td>2.8%</td>
<td>5.9%</td>
<td>25.0%</td>
</tr>
<tr>
<td>6.0 - 6.9</td>
<td>2.8%</td>
<td>1.4%</td>
<td>2.8%</td>
<td>11.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>7.0 - 7.9</td>
<td>2.8%</td>
<td>2.2%</td>
<td>2.8%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>8.0 - 8.9</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>9.0 - 9.9</td>
<td>2.8%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>10.0 - 19.9</td>
<td>0.0%</td>
<td>1.4%</td>
<td>5.6%</td>
<td>5.9%</td>
<td>25.0%</td>
</tr>
<tr>
<td>20.0 - 29.9</td>
<td>1.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>5.9%</td>
<td>25.0%</td>
</tr>
<tr>
<td>30.0+</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.5%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total N</strong></td>
<td>72</td>
<td>71</td>
<td>36</td>
<td>17</td>
<td>4</td>
</tr>
</tbody>
</table>

19 A limitation of using Census measures to calculate the benchmark driving population is the likelihood that the census underreports undocumented individuals. This may suppress the percentage of Latinos who actually drive in a municipality, which would artificially inflate the level of disparity for Latino motorists.
Table 5.5 - Levels of disparity for Latino motorists by size of municipality

<table>
<thead>
<tr>
<th>Level of disparity</th>
<th>&lt;10,000 residents</th>
<th>10,000-24,999 residents</th>
<th>25,000-49,999 residents</th>
<th>50,000-99,999 residents</th>
<th>100,000+ residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.0</td>
<td>43.1%</td>
<td>43.7%</td>
<td>38.9%</td>
<td>47.1%</td>
<td>50.0%</td>
</tr>
<tr>
<td>0.0</td>
<td>2.8%</td>
<td>0.0%</td>
<td>5.6%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>0.1 - 0.9</td>
<td>18.1%</td>
<td>15.5%</td>
<td>16.7%</td>
<td>5.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1.0 - 1.9</td>
<td>5.6%</td>
<td>14.1%</td>
<td>8.3%</td>
<td>5.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2.0 - 2.9</td>
<td>11.1%</td>
<td>7.0%</td>
<td>11.1%</td>
<td>11.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>3.0 - 3.9</td>
<td>5.6%</td>
<td>4.2%</td>
<td>2.8%</td>
<td>0.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>4.0 - 4.9</td>
<td>6.9%</td>
<td>5.6%</td>
<td>0.0%</td>
<td>5.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>5.0 - 5.9</td>
<td>1.4%</td>
<td>2.8%</td>
<td>2.8%</td>
<td>5.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>6.0 - 6.9</td>
<td>0.0%</td>
<td>1.4%</td>
<td>2.8%</td>
<td>5.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>7.0 - 7.9</td>
<td>1.4%</td>
<td>2.8%</td>
<td>2.8%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>8.0 - 8.9</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>9.0 - 9.9</td>
<td>0.0%</td>
<td>1.4%</td>
<td>2.8%</td>
<td>0.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>10.0 - 19.9</td>
<td>4.2%</td>
<td>1.4%</td>
<td>2.8%</td>
<td>11.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>20.0 - 29.9</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.8%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>30.0 +</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total N</td>
<td>72</td>
<td>71</td>
<td>36</td>
<td>17</td>
<td>4</td>
</tr>
</tbody>
</table>

A key research question is whether variation in levels of disparity across municipalities is related to the municipalities’ racial composition in ways suggested by racial threat theory. The bivariate analyses in this study make it possible to compare the levels of disparity for Black and Latino motorists in municipalities of different sizes. Overall, these statistics demonstrate that Latino motorists had different experiences than their Black counterparts in many sample municipalities. This result is interesting in light of the growing impact of Latinos in the United States who now number 50.5 million, amounting to 16.3% of the total population (U.S. Census, 2010). In Massachusetts, the Latino population accounted for all of the state’s population growth between 2000 and 2010 (Passel, Cohn & Lopez, 2011).

Beyond that, these results are difficult to interpret because there is little consensus in the literature regarding what is an acceptable level of disparity (Fridell et al., 2001). Given that this study used the same benchmark that was developed by Farrell
et al. (2004) and because of the possibility of measurement and other errors, it follows that no threshold was selected here above which departments would be deemed to have engaged in racial profiling. As explained previously, there are many possible causes of disparity that cannot be teased apart, so it is impossible to identify what amount of disparity is due to bias on the part of the police (Fridell, 2004). Additional research is needed to learn more about the reasons for the existence of disparity.

Furthermore, the bivariate analysis cannot control for differences in municipalities’ rates of crime, concentrated disadvantage, and levels of affluence or for variations in police departments’ structure that may be related to disparity. Therefore, the analysis described in the next section, which adjusted for these differences, provide a much more rigorous assessment of the link between external and internal factors, reforms, and disparity. In particular, the regression models facilitated an examination of the effects of municipal, organizational, and reform variables on disparity in traffic citations issued to Black and Latino motorists in 2008.

Analysis of the research questions and hypotheses

To answer the research questions and test the hypotheses outlined above, multivariate OLS regression analysis was used to identify the unique contribution of each explanatory variable on the outcome of interest. Prior to running the regressions, diagnostic tests identified outliers among the predictor variables and correlations among the predictors and the key dependent variables. As explained in chapter three, these tests provided a preliminary understanding regarding the relationships between variables as
well as information to diagnose potential issues of multicollinearity among the variables.\textsuperscript{20}

The descriptive statistics for the explanatory variables are presented in chapter four. Table 5.2 contains the descriptive statistics for the two dependent variables at issue in this chapter: the level of disparity in traffic citations issued to Black (M = 3.38, SD = 4.20) and Latino motorists (M = 1.36, SD = 4.22) during calendar year 2008.

Each set of independent variables was entered into the analysis in sequence, allowing the significance of each block of factors on levels of disparity to be examined separately. Like the models in chapter four, the models here include averaged characteristics of traffic stops and agencies as controls for each municipality.\textsuperscript{21} The first model was run with only the control and municipality variables that describe the external environment in which police agencies operate. They were entered first because of the importance of racial threat in explaining different policing outcomes. Model two incorporates the internal organizational characteristics of police departments that are known to shape police activity. A block of variables consisting of the five reforms is added in the third model to test for the effect of agency policies and practices on traffic stop outcomes. Reforms were included as possible mediators to better explain the relationship between municipal and organizational characteristics on disparity.

\textsuperscript{20} The level of \textit{concentrated disadvantage} was moderately correlated with the \textit{crime rate} in a municipality \((r = 0.650, p < 0.000)\). The percentage of Black residents (% \textit{Black}) was moderately correlated with the \textit{size of the police department}, \(r = .476, p < 0.01\), and strongly correlated with the \textit{racial composition} of the department, \(r = 0.715, p < 0.000\). Lastly, \textit{driver age} is moderately correlated with the percentage of \textit{citations issued at night}, \(r = 0.528, p < 0.000\).

\textsuperscript{21} One characteristic of stops that was included in the logistic regression models in chapter four is omitted here. “Driver Race White,” which refers to the percentage of drivers who were issued citations in a particular municipality and who were White, is not included in the regression models in chapters five and six.
Direct effects of predictors on levels of disparity

The first set of predictors—the municipal characteristics—included measures of racial threat, the crime rate, concentrated disadvantage, and property value. In step one of the analysis, as expected, the percentages of Black or Latino residents in a municipality were significant predictors of disparity for Black or Latino motorists. With the control variables taken into account, disparity for Black motorists was 0.67 higher for every 1% increase in the proportion of Black residents \((B = 0.67, p < 0.001)\), and disparity for Latino motorists was 0.54 more for every 1% increase for Latino residents \((B = 0.54, p < 0.001)\).\(^{22}\)

Higher crime rates were associated with higher levels of disparity for Black motorists \((B = 0.19, p < 0.01)\) but not for Latino motorists. This result is consistent with prior research which shows that police use formal social control to a greater extent in high-crime neighborhoods (Stewart et al., 2009; Terrill, Paoline, & Manning, 2003; Terrill & Reisig, 2003). For example, a study of traffic enforcement patterns in Richmond, Virginia showed that the total number of traffic stops was significantly higher in areas with higher crime rates, which may be due to officer perception of the danger that exists in those neighborhoods (Petrocelli et al., 2003).

Officer perception also may vary based on the level of poverty or affluence in a municipality. Here, lower levels of disparity for Latino motorists were observed in municipalities with more concentrated disadvantage \((B = -0.30, p < 0.01)\), demonstrating

---

\(^{22}\) Standardized beta coefficients are reported.
that police may treat Latinos more fairly in these communities than they do when they encounter them in more affluent areas. This result suggests, as others have shown, that police respond differently depending on the type of municipality or neighborhood in which a traffic stop occurs (e.g., Ingram, 2007; Meehan & Ponder, 2002; Petrocelli et al., 2003; Weitzer, 2010). On the other hand, the level of concentrated disadvantage was not a significant predictor of disparity for Black motorists, and the property value had no statistically significant effect on disparity for motorists of both minority groups, which indicates that the level of poverty or affluence were not important factors in predicting disparity.

The next block added to the regression models was the set of indicators of the police organization’s structure: the size and vertical differentiation of the department as well as the racial composition and percentage of college graduates among officers on the force. None of the organizational characteristics were associated with disparity for Black or Latino motorists. Finally, the reforms adopted to address racial profiling were included as the third block of variables. None of the reforms had a significant effect on disparity for Black or Latino motorists.

In the full model, consistent with the racial threat prediction, there were higher levels of disparity for Black and Latino motorists in municipalities with relatively larger Black and Latino populations. The effect of racial threat was stronger when the size of the Black population was larger ($B = 0.77, p < 0.001$) than when the size of the Latino population was larger ($B = 0.58, p < 0.001$). For every 1% increase in the relative size
of the Black or Latino population, the level of disparity for Black motorists was 0.77 higher and 0.58 higher for Latino motorists.

In other words, a municipality with 2.5% Black residents, which is the mean for the municipalities in the sample, had a level of disparity of 3.4 for Black motorists. In cities or towns where Black residents account for 6.8% of the population, which is one standard deviation (S.D. = 4.30) above the mean, disparity for Black motorists was 6.7, and in municipalities whose Black population is two standard deviations above the mean, i.e., 11.1% Black residents, the level of disparity for Black motorists increased to 10.0. For Latino motorists, disparity was 1.4 in municipalities with 4.7% Latino residents, 6.1 in municipalities with 12.9% Latino residents, one standard deviation (S.D. = 8.15) above the mean, and where the Latino population reached two standard deviations above the mean, i.e., 21.0%, disparity rose to 10.8.

Contrary to expectation, however, when the models were run with a squared racial threat term, the results did not reveal a curvilinear relationship between racial threat and disparate traffic outcomes. Formal control continued to increase in municipalities where the relative size of the Black—or Latino—population was larger, but unlike other studies testing racial threat theory, it did not tip and change signs at a given point. Instead, in the full model, the percent Black squared coefficient (\(B = 0.52, p < 0.001\)) was smaller than the percent Black coefficient but still positively related to levels of disparity for Black motorists. The effects were similar for percent Latino squared (\(B = 0.32, p < 0.01\)) and percent Latino. These results may reflect the fact that
Black and Latino populations are quite small in most municipalities in Massachusetts and have not yet reached the point at which levels of disparity would decrease.

Table 5.6 – Regression analyses predicting levels of disparity with DPE benchmark for Black motorists in 2008

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td><strong>Traffic stop variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver sex – % male</td>
<td>0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Driver age -- % &lt;25 years</td>
<td>0.13</td>
<td>0.04</td>
</tr>
<tr>
<td>Out-of-residence driver</td>
<td>0.23**</td>
<td>0.02</td>
</tr>
<tr>
<td>Out-of-state driver</td>
<td>-0.08</td>
<td>0.03</td>
</tr>
<tr>
<td>% drivers speeding</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>% drivers searched</td>
<td>0.04</td>
<td>0.09</td>
</tr>
<tr>
<td>% citations issued night</td>
<td>-0.02</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Municipality variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Black residents</td>
<td>0.67***</td>
<td>0.06</td>
</tr>
<tr>
<td>Crime rate / 10,000 residents</td>
<td>0.20**</td>
<td>0.00</td>
</tr>
<tr>
<td>Concentrated disadvantage</td>
<td>-0.10</td>
<td>0.35</td>
</tr>
<tr>
<td>Property value per capita</td>
<td>0.07</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Organizational variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of the department</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Vertical differentiation</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Racial composition</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>% college graduates</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Agency control variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength of dept.</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Aggressiveness of dept.</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Number of chiefs</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Supervisory ratio</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Reform policies &amp; practices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. has a policy</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dept. collects race data</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dept. analyzes race data</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dept. has compr. training</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dept. mtgs w/ community</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Constant</td>
<td>-8.43*</td>
<td>3.78</td>
</tr>
</tbody>
</table>

* p<0.05; **p<0.01; ***p<0.001
Adj. $R^2 = 0.45***
Adj. $R^2 = 0.47***
Adj. $R^2 = 0.42***

N = 193
N = 173
N = 158

---

Models were tested with the log function for those variables without normal distributions.
Overall, only the municipal characteristics explained differences in levels of disparity for motorists in the sample. In fact, the predictive quality of the full models is almost identical to that of the block of municipality variables, explaining 42% of the variance in disparity for Black motorists and only 16% of the variance for Latinos, as shown in Table 5.8. These results raise questions about the influence of other variables not accounted for in the model that may be responsible for explaining differences in disparity across municipalities.
Mediation and interaction effects of reforms on levels of disparity

The adoption of racial profiling reforms was expected to mediate municipal and organizational factors in explaining police performance. Baron and Kenney’s (1986) guidelines were followed, and a single reform was shown to mediate the effect of concentrated disadvantage on disparity for Latino motorists, a finding that may be spurious or a statistical artifact.\(^{24}\)

The regression models were run with interaction terms to test the hypothesis that the effectiveness of reforms would vary depending on the level of racial threat in a municipality and the level of racial diversity of a police department. As explained in

\(^{24}\) Mediation occurs when the independent variable predicts both the mediator and the dependent variable and the effect of the independent variable on the dependent variable becomes smaller (or disappears) when the mediator is added to the analysis (Baron & Kenny, 1986). As reported above and in chapter 4, the first two criteria for mediation were met. A higher level of concentrated disadvantage in a municipality was associated with both the mediator (department participates in community meetings) and the level of disparity for Latino motorists \(B = -0.30, p < 0.01\). The effect of the municipality’s concentrated disadvantage on the level of disparity for Latino motorists which was statistically significant at step 2, \(p = .05\), was no longer statistically significant at step 3 when the reform was added to the model.
chapter three, interactions were calculated for each of the five reforms and *percent Black residents, percent Latino residents*, and the racial composition of the police force by multiplying the two coefficients (Allison, 1999). Regressions were run with each individual interaction term entered separately along with the blocks of predictors described earlier.

Due to the sample size (n = 202) and the large number of predictors (n = 24), the model’s power to test these hypotheses is low. Although a few interaction terms had significant effects on disparity, results must be interpreted cautiously because there are so few cases within each tested category. For example, only seven departments in municipalities with high levels of racial threat (>10%) analyzed their traffic citation data, and ten departments in municipalities with moderate levels of racial threat (>5%) did so. Small numbers of departments in municipalities with varying levels of racial and minority group threat adopted other reforms. Likewise, agencies whose police force is racially diverse (>10%) that have adopted reforms range from 12 to 30. Therefore, only the interaction effects that are consistent with each other and with other results in this study are described below, with the caveat that conclusions are being drawn tentatively.

Despite the lack of direct effects of reforms on disparity, the results of the interactions provide some—admittedly tenuous—support for the prediction that the size of the Black (or Latino) population would condition the association between the reforms and disparity. In addition, the effects of some reforms were greater in municipalities whose police department was more diverse than in those with fewer officers of color on
the force. The results of the models with interaction terms that had a significant effect on disparity are presented in Tables 5.9 and 5.10.

Table 5.9 – Regression analyses predicting levels of disparity for Black motorists with interaction terms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level of disparity for Black motorists</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traffic stop variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver sex – % male</td>
<td></td>
<td>-0.05</td>
<td>0.06</td>
<td>-0.03</td>
<td>0.05</td>
<td>-0.03</td>
<td>0.06</td>
<td>-0.04</td>
<td>0.06</td>
</tr>
<tr>
<td>Driver age - % &lt;25 years old</td>
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<td>0.11</td>
<td>0.05</td>
<td>0.12</td>
<td>0.04</td>
<td>0.12</td>
<td>0.05</td>
<td>0.12</td>
<td>0.05</td>
</tr>
<tr>
<td>Out-of-residence driver</td>
<td></td>
<td>0.17*</td>
<td>0.02</td>
<td>0.17*</td>
<td>0.02</td>
<td>0.22**</td>
<td>0.02</td>
<td>0.27**</td>
<td>0.03</td>
</tr>
<tr>
<td>Out-of-state driver</td>
<td></td>
<td>-0.06</td>
<td>0.04</td>
<td>-0.04</td>
<td>0.03</td>
<td>-0.07</td>
<td>0.04</td>
<td>-0.09</td>
<td>0.04</td>
</tr>
<tr>
<td>% drivers speeding</td>
<td></td>
<td>0.06</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.02</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>% drivers searched</td>
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<td>0.05</td>
<td>0.11</td>
<td>0.06</td>
<td>0.09</td>
<td>0.04</td>
<td>0.10</td>
<td>0.04</td>
<td>0.11</td>
</tr>
<tr>
<td>% citations issued night</td>
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<td>0.03</td>
<td>0.03</td>
<td>0.01</td>
<td>0.03</td>
<td>0.01</td>
<td>0.03</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Municipality variables</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black residents</td>
<td></td>
<td>-0.70***</td>
<td>0.01</td>
<td>2.05***</td>
<td>0.17</td>
<td>1.14***</td>
<td>0.10</td>
<td>0.84***</td>
<td>0.09</td>
</tr>
<tr>
<td>Crime rate / 10,000 residents</td>
<td></td>
<td>0.13</td>
<td>0.00</td>
<td>0.17*</td>
<td>0.00</td>
<td>0.17*</td>
<td>0.00</td>
<td>0.17</td>
<td>0.00</td>
</tr>
<tr>
<td>Concentrated disadvantage</td>
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<td>-0.15</td>
<td>0.41</td>
<td>-0.07</td>
<td>0.35</td>
<td>-0.15</td>
<td>0.40</td>
<td>-0.14</td>
<td>0.43</td>
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<tr>
<td>Property value / capita</td>
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<td>0.00</td>
<td>-0.04</td>
<td>0.00</td>
<td>-0.04</td>
<td>0.00</td>
<td>-0.01</td>
<td>0.00</td>
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<td><strong>Organizational variables</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of the department</td>
<td></td>
<td>-0.06</td>
<td>0.01</td>
<td>0.05</td>
<td>0.01</td>
<td>-0.09</td>
<td>0.01</td>
<td>0.02</td>
<td>0.01</td>
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<td>Vertical differentiation</td>
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<td>0.06</td>
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<td>0.06</td>
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<td>Racial composition</td>
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<td>-0.15</td>
<td>0.05</td>
<td>-0.14</td>
<td>0.04</td>
<td>-0.13</td>
<td>0.05</td>
<td>-0.08</td>
<td>0.06</td>
</tr>
<tr>
<td>% college graduates</td>
<td></td>
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<td>0.33</td>
<td>0.09</td>
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<td>0.10</td>
<td>0.31</td>
<td>0.08</td>
<td>0.33</td>
</tr>
<tr>
<td><strong>Agency control variables</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength of department</td>
<td></td>
<td>0.15</td>
<td>0.03</td>
<td>0.11</td>
<td>0.03</td>
<td>0.09</td>
<td>0.03</td>
<td>0.06</td>
<td>0.03</td>
</tr>
<tr>
<td>Aggressiveness of dept</td>
<td></td>
<td>-0.12</td>
<td>0.12</td>
<td>-0.05</td>
<td>0.11</td>
<td>-0.07</td>
<td>0.12</td>
<td>-0.09</td>
<td>0.13</td>
</tr>
<tr>
<td>Number of chiefs</td>
<td></td>
<td>-0.01</td>
<td>0.34</td>
<td>-0.03</td>
<td>0.30</td>
<td>-0.03</td>
<td>0.34</td>
<td>-0.03</td>
<td>0.36</td>
</tr>
<tr>
<td>Supervisory ratio</td>
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<td>-0.06</td>
<td>0.14</td>
<td>-0.07</td>
<td>0.12</td>
<td>-0.05</td>
<td>0.13</td>
<td>-0.02</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>Reform policies &amp; practices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Department has a policy</td>
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<td>-0.17*</td>
<td>0.72</td>
<td>0.02</td>
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<td>0.01</td>
<td>0.64</td>
<td>0.03</td>
<td>0.69</td>
</tr>
<tr>
<td>Department collects data</td>
<td></td>
<td>-0.07</td>
<td>0.60</td>
<td>0.27***</td>
<td>0.64</td>
<td>-0.09</td>
<td>0.57</td>
<td>-0.09</td>
<td>0.61</td>
</tr>
<tr>
<td>Department analyzes data</td>
<td></td>
<td>-0.18*</td>
<td>0.69</td>
<td>-0.13*</td>
<td>0.59</td>
<td>0.03</td>
<td>0.75</td>
<td>-0.05</td>
<td>0.81</td>
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<td>Dept has comp training</td>
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<td>0.60</td>
<td>-0.03</td>
<td>0.51</td>
<td>-0.01</td>
<td>0.58</td>
<td>-0.02</td>
<td>0.62</td>
</tr>
<tr>
<td>Dept meets with community</td>
<td></td>
<td>0.02</td>
<td>0.80</td>
<td>-0.02</td>
<td>0.70</td>
<td>0.08</td>
<td>0.78</td>
<td>0.07</td>
<td>0.83</td>
</tr>
<tr>
<td><strong>Interaction terms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Black2 * policy</td>
<td></td>
<td>1.55***</td>
<td>0.20</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>% Black res * collection</td>
<td></td>
<td>---</td>
<td>---</td>
<td>-1.43***</td>
<td>0.17</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>% Black res * data analysis</td>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-0.50***</td>
<td>0.12</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Racial comp * data analysis</td>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>-0.22*</td>
<td>0.08</td>
<td>---</td>
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</tr>
<tr>
<td>Constant</td>
<td></td>
<td>-3.26</td>
<td>4.69</td>
<td>-5.53</td>
<td>4.05</td>
<td>-6.27</td>
<td>4.53</td>
<td>-6.52</td>
<td>4.84</td>
</tr>
</tbody>
</table>

*p < 0.05; ** < 0.01; ***p < 0.001
Adj. R² = 0.48***
Adj. R² = 0.61***
Adj. R² = 0.51***
Adj. R² = 0.44***

N = 158 N = 158 N = 158 N = 158
Collecting and analyzing traffic citation data appears to be more effective for reducing disparity for Black motorists in municipalities with a relatively larger Black population than in those with fewer Black residents. The results in Table 5.9 show the regression of disparity on many variables including the percentage of Black residents in the municipality (percent Black residents), dummy variables for each reform (e.g., collects data = 1, does not collect data = 0), and the product of the two (percent Black residents x data collection).

The fact that the product term ($B = -1.43, p < 0.001$) is significant indicates that the effect of data collection on disparity depends on the percentage of Black residents in the municipality. The main effect of data collection ($B = 0.27, p < 0.001$) is the effect of data collection when percent Black residents is zero. The effect of data collection on disparity in municipalities with different proportions of Black residents is calculated as: $0.27 + (-1.43 \times \text{percent Black residents})$ (Allison, 1999). Using this formula, we see that disparity for Black motorists is lower by 1.2 where an agency collects data in a municipality with 1% Black residents, by 6.88 where an agency collects data in a municipality where 5% of the population is Black, and by 14.0 where 10% of the population is Black compared to municipalities with no Black residents where disparity is approximately zero (0.27).

The same is true when departments analyzed their traffic citation data, although the interaction effect is not as large. In municipalities with no Black residents, data analysis had no effect on disparity ($B = 0.03$). When data analysis was conducted in municipalities with a small Black population (e.g., percent Black = 1%), disparity for
Black motorists was only barely lower, but in municipalities with a large Black population (e.g., percent Black = 10%), the level of disparity was lower by 5.0.

Likewise, performing data analysis appeared to be more effective for reducing disparity for Black motorists where agencies employed more minority officers than those with fewer minority officers. For example, where data analysis was conducted, the level of disparity was almost unchanged in departments with only 1% minority officers but lower by 2.0 in departments with a large minority force (10%) compared to those with no minority officers. This effect was observed even though the sample includes predominantly White police departments with an average of only 5.1% of the officers belonging to a racial or ethnic minority group.

There is a wide distribution in the data in terms of the racial composition of agencies, ranging from 0 to 40.3% minority officers. While nearly half of the agencies do not have minority officers, 20% of them (N = 42) employ at least 10% minority officers. When comparing the more diverse departments to those with less minority representation on the force, we see no difference in the level of disparity for Latinos. In both types of agencies, disparity was below 4.0 in close to 85% of the agencies with and without diversity on the force and the mean level of disparity was 1.5 in both types of agencies. However, for Black motorists, disparity was below 4.0 in only half of the diverse departments but three quarters of the agencies with less than 10% minority officers on the force. In addition, the average level of disparity was greater among the agencies with more minority representation (M = 5.6) than those with less diversity (M

25 The percentage of minority officers is moderately correlated with the relative size of the minority population in a municipality ($r = .63, p < .01$).
= 2.8). This result indicates that the effect of racial composition described earlier is not robust. Although traffic stop data analysis appeared to be more effective in terms of reducing disparity for Black motorists when performed in more racially diverse agencies than in departments with fewer minority officers, upon closer investigation, this was not borne out by the analysis.

Table 5.10 – Regression analyses predicting levels of disparity for Latino motorists with interaction terms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Traffic stop variables</th>
<th>Level of disparity for Latino motorists</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>Std. Error</td>
</tr>
<tr>
<td>Traffic stop variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver sex - % male</td>
<td>0.14</td>
<td>0.08</td>
</tr>
<tr>
<td>Driver age - % &lt;25</td>
<td>0.05</td>
<td>0.07</td>
</tr>
<tr>
<td>Out-of-residence driver</td>
<td>0.08</td>
<td>0.03</td>
</tr>
<tr>
<td>Out-of-state driver</td>
<td>-0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>% drivers speeding</td>
<td>0.09</td>
<td>0.02</td>
</tr>
<tr>
<td>% drivers searched</td>
<td>0.10</td>
<td>0.14</td>
</tr>
<tr>
<td>% citations at night</td>
<td>-0.07</td>
<td>0.04</td>
</tr>
<tr>
<td>Municipality variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Latino residents</td>
<td>0.71</td>
<td>0.07</td>
</tr>
<tr>
<td>Crime / 10,000 res.</td>
<td>-0.15</td>
<td>0.00</td>
</tr>
<tr>
<td>Concentrated disad.</td>
<td>-0.21</td>
<td>0.65</td>
</tr>
<tr>
<td>Prop. value/capita</td>
<td>0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Organizational variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of dept.</td>
<td>0.15</td>
<td>0.01</td>
</tr>
<tr>
<td>Vertical differentiatio</td>
<td>0.11</td>
<td>0.50</td>
</tr>
<tr>
<td>Racial composition</td>
<td>-0.05</td>
<td>0.06</td>
</tr>
<tr>
<td>% college graduates</td>
<td>0.05</td>
<td>0.44</td>
</tr>
<tr>
<td>Agency control variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength of dept.</td>
<td>-0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>Aggress. of dept.</td>
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<td>0.18</td>
</tr>
<tr>
<td>Number of chiefs</td>
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<td>0.48</td>
</tr>
<tr>
<td>Supervisory ratio</td>
<td>-0.01</td>
<td>0.18</td>
</tr>
<tr>
<td>Reform policies &amp; practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. has a policy</td>
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</tr>
<tr>
<td>Dept. collects data</td>
<td>0.02</td>
<td>0.82</td>
</tr>
<tr>
<td>Dept. analyzes data</td>
<td>0.09</td>
<td>0.93</td>
</tr>
<tr>
<td>Dept. provides trng</td>
<td>0.03</td>
<td>0.81</td>
</tr>
<tr>
<td>Dept. meets comm’y</td>
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<td>1.10</td>
</tr>
<tr>
<td>Interaction terms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Latino * policy</td>
<td>-0.27</td>
<td>0.09</td>
</tr>
<tr>
<td>% Latino * collection</td>
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<td>---</td>
</tr>
<tr>
<td>% Latino * analysis</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>% Latino * comm’y</td>
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<td>---</td>
</tr>
<tr>
<td>Racial comp * policy</td>
<td>---</td>
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</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001

Adj. R² = 0.18** Adj. R² = 0.19** Adj. R² = 0.18** Adj. R² = 0.26*** Adj. R² = 0.19**

N = 158 N = 158 N = 158 N = 158 N = 158

159
The effects of three reforms—adopting a policy, collecting data, and participating in community meetings—appear to be greater in terms of reducing disparity for Latino motorists in municipalities with larger Latino populations than in all White or predominantly White municipalities. The most important of these reforms for Latino motorists is community outreach. The interaction effect signifies that in municipalities with police departments that participated in community meetings, there were lower levels of disparity where the size of the Latino population was greater than in municipalities with fewer Latino residents. When agencies participated in community outreach, the level of disparity was lower by 6.0 where 10% of the residents are Latinos compared to municipalities with no Latino residents. Finally, adopting a policy was associated with disparity that was lower by 7.0 when adopted by a more diverse police agency (with 10% minority officers) in comparison with a department without minority representation on the force.

**Discussion**

This study extends research on disparity in traffic stop outcomes by examining levels of disparity in traffic citations issued by officers in 202 Massachusetts municipal agencies that vary in terms of their external municipal characteristics, internal organizational structure, and reform efforts to address racial profiling. While previous research demonstrates that police treat Black and Latino motorists more harshly than Whites in the context of traffic stops, to date, few studies have examined the factors that explain these disparities across multiple police departments. Here, in addition to discovering the municipal and organizational characteristics that influence disparity, the
effectiveness of reforms was evaluated for reducing disparity in traffic citations issued to Black and Latino motorists.

Comparing experiences of disparity between Black and Latino motorists in 2008

The results of the bivariate analyses revealed contrasting experiences for Black and Latino motorists. First, disparity was higher for Black motorists in municipalities with higher percentages of Black residents, but the same was not true for Latinos in municipalities with large Latino populations. In addition, “negative disparity” was observed in nearly half of the sample municipalities where police issued proportionally fewer traffic citations to Latino motorists compared to their representation among those driving in the municipality. For Black motorists, this negative disparity was observed in less than 10% of the sample municipalities. While it is possible that negative levels of disparity represent a certain degree of underreporting of traffic enforcement activities by police officers who knew they were being monitored, there has been no empirical evidence of officer “reactivity” to the data-collection and racial-profiling efforts of their departments (Schultz & Withrow, 2004).

Together, these results suggest that Latinos may experience racial profiling to a lesser extent than Black motorists do, a finding that confirms prior empirical research (Cheurprakobkit, 2000; Dunham & Alpert, 2001; Reitzel et al., 2004; Weitzer, 2002). A recent study also concluded that the experiences of Black and Latino drivers differ from each other in terms of traffic stop outcomes (Tillyer & Engel, 2010). The analysis of traffic stop data from a Midwestern state police agency showed that young Black male
drivers were more likely to be warned and less likely to be cited compared with similarly situated drivers of different ages, races, and genders whereas no effects were discovered for young Latino males.

A national survey revealed perceptual discrepancies between Blacks and Latinos with approximately one-quarter (26%) of Latino respondents but as many as 43% of Black participants reporting that they had been stopped by the police “just because of” their race or ethnic background (Weitzer & Tuch, 2006). The most recent Police-Public Contact Survey, a nationally representative survey of nearly 60,000 residents conducted by the Bureau of Justice Statistics, indicated that White (8.4%), Black (8.8%), and Latino (9.1%) drivers were stopped by police at similar rates in 2008, but a greater percentage of Black (4.7%) than White and Latino (2.4% and 2.6%, respectively) drivers was arrested during a traffic stop (Eith & Durose, 2011).

The results of the survey also showed that 82.5% of Latino drivers and 86.3% of White drivers who were stopped by police believed the reason for stopping them was legitimate, but only 73.8% of Black drivers believed police had a legitimate explanation for stopping them. More specifically, among drivers stopped for speeding, 78.7% of Black drivers, compared to 88.7% of Latino and 91.8% of White drivers, felt the stop was justified, and among traffic stops for vehicle defects, only 60.7% of Black but 84.3% of Latino and 86.8% of White drivers reported that they felt they were stopped for a valid reason (Eith & Durose, 2011).

In addition, previous research demonstrates that Latinos’ perceptions of the police are more favorable than those of Blacks. According to Hagan, Shedd, and Payne
(2005), “Latinos occupy a disadvantaged middle ground where they are a less comprehensive and intensive focus of criminalization efforts than African Americans, but more at risk than Whites” (p. 384). One explanation for this middle-ground status is based on the history of Latinos who have been voluntarily incorporated into U.S. society to a greater extent than many Black Americans whose integration was largely involuntary (Weitzer, 2010). Perhaps because of their divergent histories, the images of Latinos presented in the media are not as “closely associated with criminal activity” as those of Blacks (Tillyer & Engel, 2010, p. 18). Another explanation is that increased contact between members of different racial or ethnic groups may reduce hostility and intergroup conflict. For example, the level of residential integration of Latinos in White communities in Miami-Dade County may explain the nearly identical rates of police stops of Latinos and Whites found in those communities (Stults et al., 2012).

Some researchers have cautioned that measures of Latino traffic stops and searches may not be reliable because officers may not be able to distinguish Latino drivers (Renauer, 2012; Roh & Robinson, 2009). This point is significant because officers are required to identify the race of motorists they stop, although they may be unable to see the characteristics that make many people Latino. Furthermore, the Massachusetts uniform citation contains one box for police officers to record the race of the motorist. Because there is no requirement that officers identify motorists’ ethnicity, all Latinos are coded in the data as belonging to the “Hispanic” race. Therefore, it is impossible to distinguish Black Latinos from White Latinos who were issued traffic citations. This limitation in the data makes it difficult to draw conclusions about the significance of the findings regarding Latino motorists.
A final difference between Blacks and Latinos found in the present study is the extent to which the models explained the variation in disparity that was observed across police agencies. The study variables provided a more robust understanding of the disparities that existed for Black than Latino motorists. Differences in municipality characteristics accounted for a significant amount (42%) of the variance in disparity for Black motorists, whereas they explained only 15% of the difference for Latinos. Although the organizational characteristics added very little explanatory power to any of the models, more of the variance in disparity was attributable to organizational structure for Black (15%) than Latino motorists for whom organizational characteristics did not explain any of the variation (see Table 5.6). This finding points to a need for more research that explores differences across racial and ethnic groups given that distinct municipal and organizational characteristics are important in understanding the variation in disparity for the two groups of motorists.

**Effect of racial threat on disparity**

The key finding that emerged from the multivariate models is that, controlling for other factors, the percentages of Black or Latino residents in a municipality are the sole factors that influenced disparity for Black and Latino motorists. Consistent with racial threat theory, disparity was higher in municipalities with larger minority populations. Organizational characteristics and reform efforts were found to have no direct effects on levels of disparity.
This result confirms prior research showing that police exhibit higher rates of formal social control in communities with larger Black and Latino populations. It demonstrates that issuing traffic citations at disparate rates to motorists of different racial and ethnic groups is another type of activity that police engage in more frequently in communities of color than in predominantly White communities. In other words, it is another indicator of heightened control over minority populations. The effect was observed in municipalities with relatively large Black populations and was similarly present when the proportion of Latino residents increased.

While this finding lends support to the notion that place matters when explaining traffic citation practices, what remains unclear is why officers enforce traffic laws differently in certain municipalities. Given the limitations of the data, we can only speculate. One possibility is that police decision-making was biased. This explanation was suggested by the authors of a study finding that police conducted more searches but made fewer arrests of Black motorists in areas of Richmond that have more Black residents (Petrocelli et al., 2003). Alternatively, officer decision-making may change when they are deployed in more racially diverse municipalities because of the strained relationship between the police and residents or because social conditioning creates internalized beliefs about the criminality of Blacks and Latinos, which cause officers to react differently when they patrol areas that are branded as dangerous (Meehan & Ponder, 2002; Smith & Alpert, 2007). Yet another explanation is that traffic enforcement patterns may be related to police deployment in response to community desires for safety (Renauer, 2012).
Data and methodological limitations prevent us from determining why higher levels of disparity are observed in municipalities with more racially diverse populations. Therefore, additional research is needed. In particular, qualitative studies could explore in greater detail the factors involved in agency decision-making about police deployment and officer decision-making in enforcing traffic laws in different types of municipalities.

Interestingly, the results of the present study did not reveal the curvilinear relationship that others have found when the size of the minority population reaches a point beyond which formal control rates decrease. Instead, levels of disparity continually increased along with the size of the Black or Latino community. The reason for this is unclear but may be related to the fact that, in Massachusetts, there are very few areas where the Black or Latino populations are completely segregated from Whites. In fact, there are only two majority-minority municipalities in Massachusetts where more than half the residents are members of racial or ethnic minority groups. Therefore, even when people of color have reached majority status in a municipality, they may still be living among Whites who retain political clout in terms of influencing the police about the need to control Blacks and Latinos.

One example is Lawrence, where 73.8% of the residents are Latino and where the first Latino mayor was elected in 2010. In Chelsea, the city manager, deputy manager, and police chief are White, as is the majority of the city council, despite the fact that its population is 62.1% Latino. Likewise, both Randolph and Brockton, cities with the largest Black populations in the state (37.1% and 29.8%), have predominantly White leadership. In other states where minority populations are geographically isolated
from White neighborhoods, social control efforts may be reduced because Blacks or Latinos are less threatening to Whites’ interests when there is greater physical distance between them (Kent & Jacobs, 2005).

Effects of reforms on disparity

In addition to having direct effects on disparity, the results show that a municipality’s racial composition interacted with certain reforms to affect disparity for Black and Latino motorists. Again, it is important to note that these findings are not robust because the small sample size means that there are only a few municipalities in each category. First, collecting and analyzing traffic citation data were both associated with reduced levels of disparity for Black motorists depending on the percentage of Black residents in the municipality. The effects were more significant in municipalities where the relative size of the Black population was larger than in those with fewer Black residents. Likewise, data collection was more effective for reducing disparity for Latino motorists in municipalities with relatively large Latino communities compared to those with small Latino populations.

Together, these findings indicate that police behave more fairly when their departments are engaged in proactive reforms such as traffic stop data collection and analysis in municipalities with higher proportions of minority residents than in those with smaller minority populations. We can assume that departments that expended the resources to properly collect and understand their traffic citation data were motivated to improve their traffic enforcement practices, but we do not know their reasons for doing so. The motivation may have derived from pressure—both direct and indirect—from
the minority community. In municipalities with a large proportion of minority residents, police agencies may have faced organized groups of citizens demanding more fairness in traffic enforcement. Concern about public perception also could have increased agencies’ interest in achieving real reform. Another possibility is that the data collection and analysis measures used in this study are indicative of—or proxies for—other factors that were not included in the analysis.

Collecting and analyzing traffic citation data are the means by which departments and individual officers can be held accountable because they provide empirical evidence about the patterns of disparity in traffic stops they conduct. With this information, problem areas or officers can be identified and decisions can be made about modifying existing policies and practices, providing additional training to officers, disciplining officers, and engaging the community in discussions about racial profiling (Tillyer, Engel, & Cherkauskas, 2010). Therefore, data collection and analysis can prove useful for improving decision-making about allocating departmental resources. However, implementing these reforms requires a substantial effort on the part of a police agency (Fridell et al., 2001). Politically, individuals both inside and outside a department must be persuaded that the effort is worthwhile and will not become a burden.

PERF and others recommend that a task force be convened that consists of officers, citizens, and researchers to develop a collection and analysis plan (Fridell et al., 2001; Tillyer et al., 2010). The department may need to obtain the assistance of independent consultants and analysts in order to make decisions about why the data are being collected, when and how it should be collected, and what information should be
collected. Field testing is recommended before implementing data collection programs system-wide. For purposes of conducting the analysis, a benchmark (or benchmarks) must be identified to evaluate the initial decision to stop a vehicle, and post-stop outcomes must be reviewed (Tillyer et al., 2010). Finally, there must be a determination about the way in which results of the analysis will be used.

At the end of the process, police departments that follow these recommendations are likely to have established explicit performance measures for officers engaged in traffic enforcement. Having identified performance measures, these agencies may now have the means to manage officer performance more effectively than those that do not have clear standards. This, in turn, may explain the lower levels of disparity observed where departments collected and analyzed data in more racially diverse municipalities.

Although this explanation is plausible, conclusions about the reasons for the observed effects cannot be drawn because the data used in this study do not include information about the extent to which agencies followed the recommendations previously described. Survey respondents merely indicated whether their agencies had collected and analyzed traffic citation data. Therefore, more research is needed to ascertain how they implemented these reforms.

Scholars have argued that a less monolithic and paternalistic police culture may provide room for different approaches to law enforcement (Farrell, 2011; Sklansky, 2006). For example, the measure used in this study to assess officer behavior is an indicator of the fairness of traffic enforcement practices which is different than most police performance standards. Due to priorities traditionally given to law enforcement and crime control, officers are generally evaluated based on arrest rates and other
measures of disorder control (Willis, Mastrofski, & Kochel, 2010). Consequently, we do not know whether officers working in more diverse agencies typically perform their duties more fairly than their counterparts in predominantly White agencies.

We can speculate that an organizational openness that characterizes racially diverse departments may increase the likelihood that a department will implement concrete measures “that help police departments make sense of their environment as well as their officers’ encounters with the environment” (Miller, 2009, p. 19). Agencies may experience a change in internal dynamics when they diversify their force that could provide the impetus for adopting disparity as a performance measure. Sklansky (2006) described in positive terms a breaking down of the police subculture in agencies with more diversity. Previously thought to reduce the esprit de corps necessary for effective policing, more racial integration did not diminish the performance of police operations. Instead, Sklansky found that increased diversity changed officers’ attitudes and behavior through one-on-one interactions between officers of different racial backgrounds, the development of separate trade groups for Black, Latino, and female officers, and “social fragmentation” within police ranks notorious for their solidarity (Sherman, 1974).

Scholars have also argued that minority officers have “special competencies” in terms of obtaining cooperation from Black citizens and having greater credibility within the Black community. It is these special competencies that may counteract the effect of race within formerly White police departments. But, although some studies demonstrate that Black officers perform differently than White officers in certain respects (Donohue & Levitt, 2001; Kelly & West, 1973; Reiss, 1967), others show that, by traditional performance measures, they behave in much the same way as their White counterparts.
(Sklansky, 2006). As we have seen, the results in the literature are mixed in terms of explaining the likelihood of arrest by officers working in more racially diverse agencies (Donohue & Levitt, 2001; Eitle et al., 2005), and no significant differences have been found between individual officers of different racial backgrounds with regard to their traffic enforcement activities (Novak, 2004; Smith & Petrocelli, 2001).

Despite the lack of clarity in the literature, professional police organizations have emphasized the importance of developing a diverse workforce in response to the problem of racial profiling (e.g., Fridell et al., 2001). In departments with very few minority officers, it is likely that they must adapt to the dominant group’s norms but it was expected that more integrated departments would have lower levels of disparity which represents less racial profiling of minority motorists. However, the analysis did not confirm this expectation. In addition to the possibility that the small sample size prevents us from observing an effect, we can conclude that it is only in police departments with a “critical mass” of minority officers that the dominant culture could be altered so that it prioritizes using a non-traditional performance measure such as fairness in traffic enforcement outcomes (Weitzer, 2010). Here, that critical mass was not reached in many agencies.

Clearly, limitations of the data and the small sample prevent us from drawing definite conclusions. We do not know how and why data analysis was performed in some departments or why some reforms had effects on disparity for Black but not Latino motorists and vice versa. More research must be conducted with a larger sample of
agencies to confirm that analyzing traffic citation data increases fairness and thus improves the effectiveness of traffic-enforcement practices.

Conclusion

In this chapter, levels of disparity were compared across 202 police agencies that were mandated to collect additional data and take remedial measures to address the problem of racial profiling. The purpose of the comparison was to evaluate the effectiveness of the policies and practices undertaken to reduce disparity in traffic citations issued to Black and Latino motorists. While previous research has explored the municipal and organizational characteristics that influence traffic enforcement, the links between reforms and these two sets of factors had not yet been considered.

The findings described in this chapter increase our understanding of the municipal and organizational characteristics that affect disparity in traffic enforcement outcomes and the ways in which reforms interact with them. In particular, this study extends the literature on racial threat by demonstrating that the racial and ethnic composition of a municipality explains part of the variation in traffic stop outcomes for Blacks and Latinos. It also adds to the literature on the effects of workplace diversity on performance.

By examining differences between departments at one point in time, the associations we see may not provide a clear picture of the effects of racial profiling reforms. It is possible that agencies observed to have low levels of disparity may have been among those that decided not to adopt any reforms following the release of the 2004 report because they considered the disparity to be at an acceptable level.
other hand, agencies observed to have high levels of disparity in 2008 may have effectively implemented reforms and reduced levels of disparity that were even higher at the start of the study period. Due to this limitation and in order to better understand the value of adopting reforms, this evaluation now shifts its focus to the change in disparity that has occurred within the same department at two different points in time.
Chapter VI
Change in Levels of Racial and Ethnic Disparity in Traffic Citations issued over time

Introduction

The literature on racial profiling has focused primarily on identifying the prevalence of racial and ethnic disparities in traffic enforcement. In practice, the emphasis has shifted from determining whether disparities exist to how to reduce or eliminate them. Therefore, many police agencies have adopted reform policies and practices for the purpose of reducing levels of disparity. They have been encouraged to do so by professional police organizations such as the Police Executive Research Forum and the Commission on Accreditation for Law Enforcement Agencies.

In Massachusetts, the Executive Office of Public Safety and Security supported the efforts of police departments that were mandated to collect additional traffic citation data beginning in 2005 and undertake remedial measures. These reforms had not yet been evaluated in terms of their effectiveness for reducing disparity. Thus, this study contributes to the literature by improving our understanding of the effect of implementing reforms on traffic enforcement outcomes.

Some researchers have begun to examine certain aspects of racial profiling reforms. Schultz and Withrow (2004) studied police departments that implemented data-collection programs and found little change in the organization’s structure and no evidence that officers reacted by issuing fewer traffic citations. Warren and
Tomaskovic-Devey (2009) and Warren and Farrell (2009) found that the social and political environment in which a police department operates affects police search practices over time. However, we remain unaware of the influence of agency reforms on changing officer behavior over time. And, while we know that other reforms such as community policing initiatives can have a favorable impact on the perceptions of police and police interactions with citizens, research demonstrates that reforms do not impact police performance if they are adopted as symbolic measures of goodwill (Mastrofski & Willis, 2010).

Whereas the analyses presented in the previous chapter identified the factors that influenced disparity across the sample agencies at one point in time, the analysis described in this chapter examined the change in disparity in each municipal police department between 2003 and 2008. As we saw earlier, these departments differed from one another in the extent to which they adopted reforms to address racial profiling. By including variables relating to characteristics of the municipality and the organizational structure, the models described in this chapter allowed us to analyze the factors that were effective in terms of lowering levels of disparity in different types of municipalities and police organizations.

The results of the analyses described herein contribute to the discussion “over what to practically do” about bias-based policing (O’Reilly, 2002, p. 232) by showing what approaches may be effective for reducing disparity for Black and Latino motorists, even if only marginally. Change in levels of disparity was measured using the same Driving Population Estimate (DPE) benchmarks that were created by researchers at Northeastern University’s Institute on Race and Justice for the original study (Farrell et
al., 2004). To determine the level of disparity in each municipality, Farrell and her colleagues calculated the difference between the percentage of traffic citations issued to motorists in each racial and ethnic category and the percentage of each racial and ethnic category within the DPE for the municipality. The same formulas developed for the original study were used to calculate the DPE with updated census data to reflect the change in demographics from 2000 to 2010.

As explained in chapter three, Time 1 (T1) is the 27-month period from April 1, 2001 to June 30, 2003, and Time 2 (T2) is the 12-month period from January 1, 2008 to December 31, 2008. In the present study, change in disparity is the absolute difference in disparity between Time 1 and Time 2. In other words, it is calculated by subtracting the disparity found at Time 1 from the disparity found at Time 2 and is described as a change in percent. For example, if the level of disparity for Black motorists in Boston was 18.3% at Time 1 and 23.0% at Time 2, the change between Time 1 and Time 2 is 4.7 (23.0 - 18.3), which means that the level of disparity increased over the study period.

Differences in change in disparity over time were expected to vary based on the level of racial threat in each municipality in accordance with the racial threat perspective. As previously explained in chapter five, police are known to use traffic enforcement practices to maintain control in certain communities, depending on the proportion of Black or Latino residents in those communities. Therefore, increases in the relative size of the minority population in a municipality during the study period were predicted to be associated with higher levels of disparity over time. Measures of change in levels of racial threat between 2000 and 2010 were initially included in the models, but because they were almost equivalent to the percent Black and the percent
Latino variables, they did not provide additional information. Therefore, as described in chapter three, they were removed from the analyses.

Although there has been growth in the Latino population in many Massachusetts municipalities, most cities and towns have small minority communities. The U.S. Census for 2000 indicates that the relative size of the minority population was less than 1% of the residents in more than half of the municipalities in Massachusetts. Between 2000 and 2010, the Latino population has grown more than any other segment of the state’s population. Close to half (44%, n = 89) of the sample municipalities experienced growth of 1.0 to 1.9% and 16.3% (n = 33) saw a 2.0 to 5.0% increase in Latino residents. A few municipalities (3.5%, n = 7) experienced growth of 5.0 to 10.0% and 3.0% (n = 6) saw more than 10.0% increase in the Latino population. Only one-third of the municipalities in the sample experienced between 0 and 1.0% growth.

In contrast, the Black population has remained much more stable since 2000, with more than two thirds of the municipalities experiencing very low growth in their Black population (0 to 1.0%). Only 11 of the 202 sample municipalities saw growth of more than 2.0% in the number of Black residents. Of those, nine municipalities experienced an increase of 2.0 to 7.0% in the size of their Black population, and in two municipalities the number of Black residents grew more than 10.0%. Overall, the proportions of Black and Latino residents in the sample municipalities are low.

The structural characteristics of the police organization that are known to influence police activity also were expected to affect change in police activity over time. It was hypothesized that a department’s size and vertical differentiation, as well as the racial composition and educational level of its force, would be associated with decreases
in disparity between Time 1 and Time 2. The control variables were measured at a single point in time and are not measures of change based on the assumption that police respond to conditions inside and outside their departments through processes that take time.

Agency-level patterns of disparity were analyzed at two different points in time to determine the influence of the five reforms. The success of the individual reforms in reducing disparities was expected to vary depending on the level of racial threat in a municipality and the level of racial and ethnic integration within the police force. Therefore, this chapter attempts to answer the following research questions:

3-A) Do certain municipal and organizational characteristics influence the change in disparity between Time 1 and Time 2?

3-B) Does adopting reforms influence the change in disparity from T1 to T2?

3-C) Do reforms mediate the effects of municipal and organizational characteristics on the change in disparity from T1 to T2?

3-D) Do certain reforms interact with other variables to influence the change in disparity from T1 to T2?

In general, it was hypothesized that change in disparity would vary according to the type of municipality in which the police department operated, the organizational characteristics of the police department, and the adoption of reforms, controlling for relevant stop and agency characteristics. The hypotheses are presented in greater detail in Table 6.1.
Descriptive statistics of the change in levels of disparity

Among the 202 municipalities in the sample, change in disparity between T1 (2001–2003) and T2 (2008) varied widely. In Table 6.2, the change in levels of disparity is reported for Black and Latino motorists and for the larger group of non-Whites, which includes Asian and Native Americans. Negative values indicate a decrease in disparity, whereas positive values indicate an increase from T1 to T2. Disparity was lower at T2 than at T1 for motorists from every group except Native Americans, for whom the level of disparity changed very little (M = 0.04). The mean change was greatest for Latinos (M = -2.31%) and lowest for Black motorists (M = -0.12%). The difference in change between these two groups is statistically significant. Asian Americans experienced a mean decrease of 1.51% between T1 and T2. For the larger group of non-White motorists, the decrease in disparity was 4.3% during the study period.

Table 6.1 - Hypotheses

<table>
<thead>
<tr>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• More racial diversity in a municipality will be associated with an increase in disparity between T1 and T2.</td>
</tr>
<tr>
<td>• After a “tipping point” is reached, more racial diversity will be associated with a decrease in disparity between T1 and T2.</td>
</tr>
<tr>
<td>• A larger department size will be associated with an increase in disparity between T1 and T2.</td>
</tr>
<tr>
<td>• A department with more ranks will be associated with an increase in disparity between T1 and T2.</td>
</tr>
<tr>
<td>• A more racially diverse police force will be associated with a decrease in disparity between T1 and T2.</td>
</tr>
<tr>
<td>• A more highly-educated police force will be associated with a decrease in disparity between T1 and T2.</td>
</tr>
<tr>
<td>• Adoption of reforms will be associated with a decrease in disparity between T1 and T2.</td>
</tr>
<tr>
<td>• Adoption of reforms will mediate the effects of municipal and organizational characteristics on changing disparity between T1 and T2.</td>
</tr>
<tr>
<td>• Adoption of reforms will reduce the influence of racial threat on a municipality’s change in disparity between T1 and T2.</td>
</tr>
<tr>
<td>• Adoption of reforms will magnify the influence of a department’s racial composition on change in disparity between T1 and T2.</td>
</tr>
</tbody>
</table>
Table 6.2 – Change in levels of disparity for motorists of each racial and ethnic group (N = 200)

<table>
<thead>
<tr>
<th>Motorists’ racial / ethnic group</th>
<th>Average disparity at Time 1 (Apr. ’01- June ’03)</th>
<th>Average disparity at Time 2 (Jan. – Dec. 2008)</th>
<th>Average change in disparity between T1 and T2</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>3.50</td>
<td>3.38</td>
<td>-0.12</td>
<td>1.82</td>
<td>-5.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Latino</td>
<td>3.67</td>
<td>1.36</td>
<td>-2.31</td>
<td>3.45</td>
<td>-13.7</td>
<td>11.3</td>
</tr>
<tr>
<td>Asian American</td>
<td>-0.15</td>
<td>-1.65</td>
<td>-1.50</td>
<td>1.46</td>
<td>-7.4</td>
<td>3.3</td>
</tr>
<tr>
<td>Native American</td>
<td>-0.22</td>
<td>-0.18</td>
<td>0.04</td>
<td>0.75</td>
<td>-2.4</td>
<td>9.8</td>
</tr>
<tr>
<td>Non-White</td>
<td>5.41</td>
<td>1.11</td>
<td>-4.30</td>
<td>5.40</td>
<td>-23.2</td>
<td>11.8</td>
</tr>
</tbody>
</table>

Figure 6.1 shows the percentage of municipalities in which Black and Latino motorists experienced a decrease, an increase, and no change in disparity during the study period. No change is defined as less than 1% change in disparity between T1 and T2. For Black motorists, one-quarter of the municipalities fall within this category, and 14% experienced no change in disparity for Latino motorists. A higher percentage of municipalities experienced decreases in disparity for Latino (73%) compared to Black motorists (33%), whereas increases in disparity for Black motorists were observed in a greater proportion of municipalities (43%) than for their Latino counterparts (17%).

Figure 6.1 – Percentage of municipalities with differences in change in levels of disparity between T1 and T2 for Black and Latino motorists
Another way to present these data is by looking at change in disparity in municipalities of different sizes. Tables 6.3 and 6.4 show the change over time for Black and Latino motorists in four categories of municipalities: those with fewer than 10,000 residents, between 10,000 and 24,999 residents, between 25,000 and 49,999 residents, and more than 50,000 residents. Within each size category, the largest group of municipalities experienced no change in disparity for Black motorists and lower levels of disparity for Latino motorists between T1 and T2.

<table>
<thead>
<tr>
<th>Change in disparity for Black motorists between T1 and T2</th>
<th>Total N</th>
<th>&lt;10,000 residents</th>
<th>10,000-24,999 residents</th>
<th>25,000-49,999 residents</th>
<th>50,000+ residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5.0 to -5.9%</td>
<td>1</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>-4.0 to -4.9%</td>
<td>0</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>-3.0 to -3.9%</td>
<td>8</td>
<td>5.4%</td>
<td>2.8%</td>
<td>2.8%</td>
<td>4.8%</td>
</tr>
<tr>
<td>-2.0 to -2.9%</td>
<td>16</td>
<td>5.4%</td>
<td>7.0%</td>
<td>13.9%</td>
<td>9.6%</td>
</tr>
<tr>
<td>-1.0 to -1.9%</td>
<td>42</td>
<td>13.5%</td>
<td>29.6%</td>
<td>16.7%</td>
<td>23.8%</td>
</tr>
<tr>
<td>No change (-0.9 to 1.0%)</td>
<td>88</td>
<td>43.2%</td>
<td>43.7%</td>
<td>52.8%</td>
<td>35.3%</td>
</tr>
<tr>
<td>1.0 to 2.0%</td>
<td>24</td>
<td>20.3%</td>
<td>8.5%</td>
<td>0.0%</td>
<td>14.3%</td>
</tr>
<tr>
<td>2.1 to 3.0%</td>
<td>15</td>
<td>12.2%</td>
<td>5.6%</td>
<td>2.8%</td>
<td>4.8%</td>
</tr>
<tr>
<td>3.1 to 4.0%</td>
<td>3</td>
<td>0.0%</td>
<td>0.0%</td>
<td>8.3%</td>
<td>0.0%</td>
</tr>
<tr>
<td>4.1 to 5.0%</td>
<td>2</td>
<td>0.0%</td>
<td>1.4%</td>
<td>0.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>5.1 to 6.0%</td>
<td>2</td>
<td>0.0%</td>
<td>1.4%</td>
<td>0.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>6.1 to 7.0%</td>
<td>1</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Total N</td>
<td>202</td>
<td>74</td>
<td>71</td>
<td>36</td>
<td>21</td>
</tr>
</tbody>
</table>

More municipalities in each category saw decreases in disparity, with the exception of the smallest municipalities (with fewer than 10,000 residents), where approximately one-third of the municipalities (32.5%) experienced increases only for Black motorists. In contrast, for Latinos, higher levels of disparity at T2 than T1 were observed in very few (20%) municipalities in each size category. The data indicate that a wider range of change was observed for Latino (minimum = -13.7; maximum = 11.3)
compared to Black motorists (minimum = -5.5; maximum = 6.9). This may be related to the recent growth in the Latino population discussed previously.

Table 6.4 - Change in levels of disparity between T1 and T2 for Latino motorists by size of municipality

<table>
<thead>
<tr>
<th>Change in disparity for Latino motorists between T1 and T2</th>
<th>Total N</th>
<th>&lt;10,000 residents</th>
<th>10,000-24,999 residents</th>
<th>25,000-49,999 residents</th>
<th>50,000+ residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10.0%</td>
<td>3</td>
<td>2.7%</td>
<td>1.4%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>-9.0 to -9.9%</td>
<td>5</td>
<td>2.7%</td>
<td>1.4%</td>
<td>2.8%</td>
<td>4.8%</td>
</tr>
<tr>
<td>-8.0 to -8.9%</td>
<td>6</td>
<td>1.4%</td>
<td>1.4%</td>
<td>5.6%</td>
<td>9.5%</td>
</tr>
<tr>
<td>-7.0 to -7.9%</td>
<td>8</td>
<td>2.7%</td>
<td>4.2%</td>
<td>8.3%</td>
<td>0.0%</td>
</tr>
<tr>
<td>-6.0 to -6.9%</td>
<td>4</td>
<td>1.4%</td>
<td>2.8%</td>
<td>2.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td>-5.0 to -5.9%</td>
<td>10</td>
<td>2.7%</td>
<td>4.2%</td>
<td>8.3%</td>
<td>9.6%</td>
</tr>
<tr>
<td>-4.0 to -4.9%</td>
<td>11</td>
<td>4.1%</td>
<td>7.0%</td>
<td>5.6%</td>
<td>4.8%</td>
</tr>
<tr>
<td>-3.0 to -3.9%</td>
<td>24</td>
<td>10.8%</td>
<td>14.1%</td>
<td>11.1%</td>
<td>9.6%</td>
</tr>
<tr>
<td>-2.0 to -2.9%</td>
<td>27</td>
<td>10.8%</td>
<td>14.1%</td>
<td>19.4%</td>
<td>9.6%</td>
</tr>
<tr>
<td>-1.0 to -1.9%</td>
<td>49</td>
<td>27.0%</td>
<td>22.5%</td>
<td>22.2%</td>
<td>23.8%</td>
</tr>
<tr>
<td>No change (-0.9 to 1.0%)</td>
<td>31</td>
<td>18.9%</td>
<td>16.9%</td>
<td>11.1%</td>
<td>9.5%</td>
</tr>
<tr>
<td>1.1 to 2.0%</td>
<td>11</td>
<td>9.5%</td>
<td>4.2%</td>
<td>0.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>2.1 to 3.0%</td>
<td>3</td>
<td>1.4%</td>
<td>2.8%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>3.1 to 4.0%</td>
<td>3</td>
<td>1.4%</td>
<td>1.4%</td>
<td>0.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>4.1 to 5.0%</td>
<td>1</td>
<td>1.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>5.1 to 6.0%</td>
<td>2</td>
<td>0.0%</td>
<td>1.4%</td>
<td>0.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>6.1 to 7.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>7.1 to 8.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>8.1 to 9.0%</td>
<td>1</td>
<td>1.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>9.1 to 10.0%</td>
<td>1</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>4.8%</td>
</tr>
<tr>
<td>&gt; 10.0%</td>
<td>1</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.8%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total N</strong></td>
<td><strong>202</strong></td>
<td><strong>74</strong></td>
<td><strong>71</strong></td>
<td><strong>36</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

Tables 6.5 and 6.6 show the change in disparity for Black and Latino motorists according to the relative size of the Black and Latino populations in the sample municipalities. As illustrated in Table 6.5, nearly half of the municipalities with small Black populations (< 5% Black residents) experienced no change, and one-third experienced decreases in disparity for Black motorists from Time 1 to Time 2; more than half (60%) of the municipalities with more than 5% Black residents experienced an increase in disparity during the study period. These results suggest that lower levels of racial threat in a municipality were associated with less change in disparity for Black
motorists and, conversely, higher levels of threat were related to increases in disparity over time.

Table 6.5 – Change in levels of disparity between T1 and T2 for Black motorists by size of Black population in the municipality

<table>
<thead>
<tr>
<th>Change in disparity for Black motorists between T1 and T2</th>
<th>Total N</th>
<th>Size of Black population in sample municipalities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.1 - 0.9%</td>
</tr>
<tr>
<td>-5.0 to 5.9%</td>
<td>1</td>
<td>0.0%</td>
</tr>
<tr>
<td>-4.0 to -4.9%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>-3.0 to -3.9%</td>
<td>8</td>
<td>2.6%</td>
</tr>
<tr>
<td>-2.0 to -2.9%</td>
<td>16</td>
<td>7.9%</td>
</tr>
<tr>
<td>-1.0 to -1.9%</td>
<td>42</td>
<td>15.8%</td>
</tr>
<tr>
<td>No change (-0.9 to 1.0%)</td>
<td>88</td>
<td>51.3%</td>
</tr>
<tr>
<td>1.1 to 2.0%</td>
<td>24</td>
<td>14.5%</td>
</tr>
<tr>
<td>2.1 to 3.0%</td>
<td>15</td>
<td>6.6%</td>
</tr>
<tr>
<td>3.1 to 4.0%</td>
<td>3</td>
<td>0.0%</td>
</tr>
<tr>
<td>4.1 to 5.0%</td>
<td>2</td>
<td>1.3%</td>
</tr>
<tr>
<td>5.1 to 6.0%</td>
<td>2</td>
<td>0.0%</td>
</tr>
<tr>
<td>6.1 to 7.0%</td>
<td>1</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total N</td>
<td>202</td>
<td>76</td>
</tr>
</tbody>
</table>

The results presented in Table 6.6 reveal a similar pattern, but the picture is not as clear. The level of disparity for Latino motorists remained constant in one-third of the municipalities with small Latino populations (< 5% Latino residents), and a majority experienced decreases in disparity from T1 to T2. However, fewer municipalities with larger Latino communities (> 5% Latino residents) saw increases in disparity with only 15% of these ethnically diverse municipalities experiencing more disparity at T2 than at T1. Again, lower levels of threat appear to be related to less change in disparity.
Table 6.6 – Change in levels of disparity between T1 and T2 for Latino motorists by size of Latino population in the municipality

<table>
<thead>
<tr>
<th>Change in levels of disparity 2003-08 for Latino drivers</th>
<th>Total N</th>
<th>Size of Latino population in sample municipalities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.1 - 0.9% 1.0 - 4.9% 5.0 - 9.9% 10.0 - 14.9% 15.0% +</td>
</tr>
<tr>
<td>&lt; 10.0%</td>
<td>3</td>
<td>0.0% 1.9% 0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>-9.0 to -9.9%</td>
<td>5</td>
<td>0.0% 1.9% 0.0% 28.6% 0.0%</td>
</tr>
<tr>
<td>-8.0 to -8.9%</td>
<td>6</td>
<td>0.0% 1.3% 14.3% 0.0% 8.0%</td>
</tr>
<tr>
<td>-7.0 to -7.9%</td>
<td>8</td>
<td>0.0% 3.2% 9.5% 0.0% 8.0%</td>
</tr>
<tr>
<td>-6.0 to -6.9%</td>
<td>4</td>
<td>0.0% 1.9% 4.8% 0.0% 0.0%</td>
</tr>
<tr>
<td>-5.0 to -5.9%</td>
<td>10</td>
<td>0.0% 4.5% 4.8% 14.3% 8.0%</td>
</tr>
<tr>
<td>-4.0 to -4.9%</td>
<td>11</td>
<td>0.0% 6.4% 0.0% 14.3% 0.0%</td>
</tr>
<tr>
<td>-3.0 to -3.9%</td>
<td>24</td>
<td>0.0% 13.5% 14.3% 0.0% 0.0%</td>
</tr>
<tr>
<td>-2.0 to -2.9%</td>
<td>27</td>
<td>16.7% 14.1% 4.8% 14.3% 8.0%</td>
</tr>
<tr>
<td>-1.0 to -1.9%</td>
<td>49</td>
<td>50.0% 23.7% 33.3% 0.0% 16.0%</td>
</tr>
<tr>
<td>No change (-0.9 to 1.0%)</td>
<td>31</td>
<td>33.3% 16.7% 14.3% 14.3% 0.0%</td>
</tr>
<tr>
<td>1.1 to 2.0%</td>
<td>11</td>
<td>0.0% 5.8% 0.0% 14.3% 8.0%</td>
</tr>
<tr>
<td>2.1 to 3.0%</td>
<td>3</td>
<td>0.0% 1.9% 0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>3.1 to 4.0%</td>
<td>3</td>
<td>0.0% 1.3% 0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>4.1 to 5.0%</td>
<td>1</td>
<td>0.0% 0.6% 0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>5.1 to 6.0%</td>
<td>2</td>
<td>0.0% 0.6% 0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>6.1 to 7.0%</td>
<td>0</td>
<td>0.0% 0.0% 0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>7.1 to 8.0%</td>
<td>0</td>
<td>0.0% 0.0% 0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>8.1 to 9.0%</td>
<td>1</td>
<td>0.0% 0.6% 0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>9.1 to 10.0%</td>
<td>1</td>
<td>0.0% 0.0% 0.0% 0.0% 8.0%</td>
</tr>
<tr>
<td>&gt; 10.0%</td>
<td>1</td>
<td>0.0% 0.0% 0.0% 0.0% 8.0%</td>
</tr>
<tr>
<td>Total N</td>
<td>202</td>
<td>6 156 21 7 12</td>
</tr>
</tbody>
</table>

The descriptive statistics for all of the explanatory variables (municipality characteristics, organizational characteristics, and reforms) are presented in chapter four.

**Analysis of the research questions and hypotheses**

The multivariate models analyzed the relationships between each set of factors and change in disparity in traffic citations issued to Black and Latino motorists over
time. As in the previous chapter, hierarchical block regression was used because it allows the significance of each set of factors to be examined separately. Again, municipal characteristics were entered first, followed by organizational characteristics and the five different reforms. Tables 6.7 and 6.8 present the results of the regression analyses that predict the change in disparity between T1 and T2 in the sample municipalities.

Direct effects of predictors on change in levels of disparity

The first set of predictors—the municipal characteristics—included measures of racial threat, the crime rate, concentrated disadvantage, and property value. In step 1 of the analyses, the percentages of Black or Latino residents in a municipality were significant predictors of increasing disparity from T1 to T2 for Black \((B = 0.33, p < 0.05)\) and Latino motorists \((B = 0.42, p < 0.05)\). Therefore, accounting for the control variables, the increase in disparity was 0.33 and 0.42, respectively, for every 1% increase in the percentage of Black and Latino residents. For example, in a municipality with the average level of disparity at T1 \((M = 3.50)\), a 1% increase in the size of the Black population corresponded with an increase to 3.83 at T2 for Black motorists. For Latino motorists, the level of disparity at T1 \((M = 3.67)\) increased to 4.09 at T2 in a municipality with a 1% larger Latino population.

\(^{26}\) Standardized beta coefficients are reported.
Table 6.7 – Regression analyses predicting change in levels of disparity between T1 and T2 for Black motorists

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td><strong>Stop-level variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver sex – % male</td>
<td>-0.11</td>
<td>0.03</td>
<td>-0.12</td>
</tr>
<tr>
<td>Driver age – % &lt;25 years</td>
<td>0.04</td>
<td>0.02</td>
<td>-0.01</td>
</tr>
<tr>
<td>Out-of-residence driver</td>
<td>0.03</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Out-of-state driver</td>
<td>0.05</td>
<td>0.02</td>
<td>0.09</td>
</tr>
<tr>
<td>% drivers speeding</td>
<td>0.13</td>
<td>0.01</td>
<td>0.12</td>
</tr>
<tr>
<td>% drivers searched</td>
<td>0.07</td>
<td>0.05</td>
<td>0.11</td>
</tr>
<tr>
<td>% citations issued night</td>
<td>0.06</td>
<td>0.01</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>Municipality variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Black residents</td>
<td>0.33***</td>
<td>0.03</td>
<td>0.33**</td>
</tr>
<tr>
<td>% Black² †</td>
<td>0.30***</td>
<td>0.00</td>
<td>0.29**</td>
</tr>
<tr>
<td>Crime rate / 10,000 residents</td>
<td>0.04</td>
<td>0.00</td>
<td>0.06</td>
</tr>
<tr>
<td>Concentrated disadvantage</td>
<td>0.01</td>
<td>0.19</td>
<td>-0.05</td>
</tr>
<tr>
<td>Property value per capita</td>
<td>0.07</td>
<td>0.00</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Organizational variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of the department</td>
<td>---</td>
<td>---</td>
<td>0.29*</td>
</tr>
<tr>
<td>Vertical differentiation</td>
<td>---</td>
<td>---</td>
<td>-0.15</td>
</tr>
<tr>
<td>Racial composition</td>
<td>---</td>
<td>---</td>
<td>-0.09</td>
</tr>
<tr>
<td>% college graduates</td>
<td>---</td>
<td>---</td>
<td>-0.06</td>
</tr>
<tr>
<td>Agency control variables:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strength of dept.</td>
<td>---</td>
<td>---</td>
<td>-0.06</td>
</tr>
<tr>
<td>Aggressiveness of dept.</td>
<td>---</td>
<td>---</td>
<td>-0.04</td>
</tr>
<tr>
<td>Number of chiefs</td>
<td>---</td>
<td>---</td>
<td>-0.12</td>
</tr>
<tr>
<td>Supervisory ratio</td>
<td>---</td>
<td>---</td>
<td>-0.02</td>
</tr>
<tr>
<td><strong>Policies &amp; practices</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dept. has a policy</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dept. collects race data</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dept. analyzes race data</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dept. has compr. training</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Dept. mtgs w/ community</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Constant</td>
<td>0.85</td>
<td>2.07</td>
<td>2.98</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001

Adj. R² = 0.10** Adj. R² = 0.10** Adj. R² = 0.10*

† entered separately

N = 195        N = 175        N = 160
Table 6.8 – Regression analyses predicting change in levels of disparity between T1 and T2 for Latino motorists

In these models, unlike those predicting disparity across municipalities at one point in time, the quadratic terms of the racial and minority group threat variables were nearly identical to the percent Black and percent Latino coefficients, which suggests that the level of disparity remained stable over time in municipalities with relatively larger

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step 1</th>
<th></th>
<th>Step 2</th>
<th></th>
<th>Step 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stop-level variables</strong></td>
<td></td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>Driver sex – % male</td>
<td>-0.04</td>
<td>0.05</td>
<td>0.03</td>
<td>0.06</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Driver age -- % &lt;25 years</td>
<td>0.18*</td>
<td>0.04</td>
<td>0.13</td>
<td>0.05</td>
<td>0.09</td>
<td>0.05</td>
</tr>
<tr>
<td>Out-of-residence driver</td>
<td>-0.06</td>
<td>0.02</td>
<td>-0.18</td>
<td>0.02</td>
<td>-0.23*</td>
<td>0.03</td>
</tr>
<tr>
<td>Out-of-state driver</td>
<td>0.08</td>
<td>0.03</td>
<td>0.07</td>
<td>0.03</td>
<td>0.06</td>
<td>0.04</td>
</tr>
<tr>
<td>% drivers speeding</td>
<td>0.14</td>
<td>0.02</td>
<td>0.08</td>
<td>0.02</td>
<td>0.09</td>
<td>0.02</td>
</tr>
<tr>
<td>% drivers searched</td>
<td>0.14*</td>
<td>0.10</td>
<td>0.08</td>
<td>0.10</td>
<td>0.13</td>
<td>0.11</td>
</tr>
<tr>
<td>% citations issued night</td>
<td>-0.20</td>
<td>0.02</td>
<td>-0.19*</td>
<td>0.03</td>
<td>-0.16</td>
<td>0.03</td>
</tr>
<tr>
<td><strong>Municipality variables</strong></td>
<td></td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>% Latino residents</td>
<td>0.42***</td>
<td>0.04</td>
<td>0.42***</td>
<td>0.04</td>
<td>0.48***</td>
<td>0.05</td>
</tr>
<tr>
<td>% Latino²</td>
<td>0.40***</td>
<td>0.00</td>
<td>0.39***</td>
<td>0.00</td>
<td>0.43***</td>
<td>0.00</td>
</tr>
<tr>
<td>Crime rate / 10,000 residents</td>
<td>-0.06</td>
<td>0.00</td>
<td>-0.09*</td>
<td>0.00</td>
<td>-0.11</td>
<td>0.00</td>
</tr>
<tr>
<td>Concentrated disadvantage</td>
<td>-0.16</td>
<td>0.41</td>
<td>-0.15</td>
<td>0.46</td>
<td>-0.16</td>
<td>0.48</td>
</tr>
<tr>
<td>Property value per capita</td>
<td>-0.05</td>
<td>0.00</td>
<td>-0.07</td>
<td>0.00</td>
<td>-0.11</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Organizational variables</strong></td>
<td></td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>Size of the department</td>
<td>---</td>
<td>---</td>
<td>0.11</td>
<td>0.01</td>
<td>-0.03</td>
<td>0.01</td>
</tr>
<tr>
<td>Vertical differentiation</td>
<td>---</td>
<td>---</td>
<td>-0.14</td>
<td>0.34</td>
<td>-0.13</td>
<td>0.37</td>
</tr>
<tr>
<td>Racial composition</td>
<td>---</td>
<td>---</td>
<td>0.04</td>
<td>0.04</td>
<td>0.12</td>
<td>0.05</td>
</tr>
<tr>
<td>% college graduates</td>
<td>---</td>
<td>---</td>
<td>-0.05</td>
<td>0.29</td>
<td>-0.05</td>
<td>0.33</td>
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<td>Agency control variables:</td>
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<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>Strength of dept.</td>
<td>---</td>
<td>---</td>
<td>0.14</td>
<td>0.03</td>
<td>0.16</td>
<td>0.03</td>
</tr>
<tr>
<td>Aggressiveness of dept.</td>
<td>---</td>
<td>---</td>
<td>0.04</td>
<td>0.13</td>
<td>0.04</td>
<td>0.13</td>
</tr>
<tr>
<td>Number of chiefs</td>
<td>---</td>
<td>---</td>
<td>0.06</td>
<td>0.33</td>
<td>0.09</td>
<td>0.35</td>
</tr>
<tr>
<td>Supervisory ratio</td>
<td>---</td>
<td>---</td>
<td>-0.19*</td>
<td>0.13</td>
<td>-0.17</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>Reform policies &amp; practices</strong></td>
<td></td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>Dept. has a policy</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.05</td>
<td>0.68</td>
</tr>
<tr>
<td>Dept. collects race data</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.17</td>
<td>0.60</td>
</tr>
<tr>
<td>Dept. analyzes race data</td>
<td>---</td>
<td>---</td>
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<td>---</td>
<td>0.06</td>
<td>0.69</td>
</tr>
<tr>
<td>Dept. has compr. training</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>-0.08</td>
<td>0.61</td>
</tr>
<tr>
<td>Dept. mtgs w/ community</td>
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<td>---</td>
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<td>---</td>
<td>-0.13</td>
<td>0.82</td>
</tr>
<tr>
<td>Constant</td>
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<td>3.89</td>
<td>0.28</td>
<td>4.46</td>
<td>-0.69</td>
<td>4.81</td>
</tr>
</tbody>
</table>

* p<0.05; ** p<0.01; *** p<0.001

Adj. $R^2 = 0.12**
Adj. $R^2 = 0.14**
Adj. $R^2 = 0.16**

† entered separately

N = 193
N = 173
N = 158
minority populations. None of the other municipal characteristics were significantly related to changes in disparity between T1 and T2. As shown in Table 6.9, the municipality characteristics explained only 9% and 7% of the variance in change in disparity for Black and Latino motorists, respectively.

The next block added to the regression models were indicators of the police organization’s structure: the size and vertical differentiation of the department and the racial composition and percentage of college graduates among officers on the force. Only the size of the department had an effect on levels of disparity over time ($B = 0.29$, $p < 0.01$) with larger police departments associated with more disparity for Black motorists at T2 than T1, but that effect was no longer observed in the full model. The organizational variables account for even less variance than the municipality characteristics. Together, they explain 10% and 14% of the difference in change over time for Black and Latino motorists, respectively, as indicated in Table 6.9.

<table>
<thead>
<tr>
<th>Blocks of predictor variables</th>
<th>Change in disparity between T1 – T2 for:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Black motorists</td>
<td>Latino motorists</td>
</tr>
<tr>
<td></td>
<td>Adjusted R-square</td>
<td>Adjusted R-square</td>
</tr>
<tr>
<td>Traffic stop and agency control variables</td>
<td>-0.01</td>
<td>0.05*</td>
</tr>
<tr>
<td>Municipality variables</td>
<td>0.09***</td>
<td>0.07**</td>
</tr>
<tr>
<td>Organizational variables</td>
<td>0.07**</td>
<td>0.02</td>
</tr>
<tr>
<td>Reform policies &amp; practices</td>
<td>0.01</td>
<td>-0.02</td>
</tr>
<tr>
<td>Full model</td>
<td>0.12**</td>
<td>0.16**</td>
</tr>
</tbody>
</table>

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Finally, the third block of variables represented the reforms that departments undertook to address racial profiling. As a block, controlling for the other blocks of variables, the reforms were not significant in explaining any of the variance in the change in disparity over time. However, as was hypothesized, individual reforms had direct effects—albeit small ones—on change in disparity for Black motorists. In particular, agencies that analyzed their traffic citation data and participated in meetings with community members had slightly lower levels of disparity at T2 than T1. For example, a municipality’s level of disparity that was at the mean at T1 (M = 3.50) decreased to 3.31 at T2, where the agency analyzed its traffic citation data or participated in community meetings.

At first glance, these findings appear inconsistent with those observed in the models that explain disparity at one point in time. In the previous chapter, we saw that none of the reforms had a direct effect on disparity for Black and Latino motorists. However, there were significant interactions between these very same reforms (data analysis and community outreach) and the size of the minority population in a municipality as well as an interaction between agencies conducting data analysis and the racial composition of the police force.

Overall, the models were less effective at explaining change in disparity from T1 to T2 than disparity at one point in time. Table 6.9 shows that, for Black and Latino motorists, respectively, the complete models explain only 12% and 16% of the variance in change in disparity over the 5-year study period. Nevertheless, support was found for
the racial threat hypothesis and for the effectiveness of two reforms for reducing disparity for Black motorists.

Mediation and interaction effects of reforms on change in disparity between T1 and T2

Adopting reforms was expected to mediate the effects of municipal and organizational characteristics on changing disparity from T1 to T2, but contrary to the hypothesis, no mediation effects were found. In addition, the effectiveness of reforms in terms of reducing disparity was expected to vary depending on the level of racial threat in a municipality and on the racial diversity of a police force. Therefore, as explained in chapter three, interactions were calculated for each of the five reforms and percent Black residents, percent Latino residents, and percent minority officers on the force. Regressions were run with each individual interaction term entered separately along with the blocks of predictors previously described. The explanation for calculating and interpreting interaction effects is included in chapter five. Only the results of models that included interaction terms that had a significant effect on change in disparity over time are reported in Tables 6.10 and 6.11.

The interactions between the reform variables and the racial threat variables provided mixed support for the prediction that the size of the Black (or Latino) population would condition the association between adopting reforms and change in disparity. The effects of participating in community outreach and providing training to officers depended on the percentage of Blacks or Latinos residing in the municipality. In addition, there was an interaction between two reforms (community outreach and data
collection) and the racial composition of the police force in their effects on change in disparity between T1 and T2.

It is important to note, however, that given the small sample size, these findings are not robust, and conclusions must be drawn tentatively. For example, there are fewer than 20 municipalities with different sizes of minority populations whose police department participated in community outreach. Likewise, the number of racially diverse agencies (> 10% minority officers) that have adopted reforms ranges from 12 to 30, depending on the reform. More research needs to be conducted with a larger sample size to determine whether the findings observed here are representative of the types of departments to which the results would be generalized.

Nevertheless, some of the results may be meaningful when considered together with other findings. In particular, the interaction effect between community outreach and the relative size of the minority population is consistent with the main effect of community outreach on reducing disparity for Black motorists over time. The interaction indicates that participating in community meetings is associated with greater reductions in disparity from T1 to T2 when that reform is adopted in municipalities with higher percentages of Black residents than in municipalities with fewer Black residents (see Table 6.10). In other words, community outreach efforts by the police have virtually no effect on reducing disparity in municipalities with no Black residents ($B = -0.03$), but in moderately diverse municipalities (5% Black residents), disparity was 1.68 lower at T2 than T1 and, in highly integrated cities or towns (10% Black residents), disparity was 3.33 lower at T2 compared to T1.
Likewise, disparity for Latino motorists decreased more from T1 to T2 when the police department participated in community outreach in more ethnically diverse municipalities than in those with fewer Latino residents. Again, this result is not very meaningful on its own but may have some significance when considered with other findings. In particular, the results of the models presented in chapter five showed an interaction between percent Latino and community outreach in their effects on disparity for Latino motorists. Here too, community outreach was associated with decreases in disparity. For example, in municipalities where 1% of the population was Latino, disparity was 0.59 lower at T2 than T1 where the police department participated in meetings with the community and, as the relative size of the Latino population increased to 3%, 5%, and 10%, reductions in disparity were observed, i.e., 1.91, 3.23, and 6.53 lower in 2008 than at T1. It is noteworthy that participating in community outreach was associated with a sharper decline in disparity for Latino than Black motorists in more ethnically diverse municipalities.

In considering the effect of community outreach, the assumption is that police officers who are better acquainted with the residents in their municipality are less likely to use citations as punitively as they would if they were not familiar to them. Although the literature is silent on this point, it is possible that police participation in community meetings may also result in improved driving behavior by residents in the neighborhoods where such meetings take place. This question could be explored further by studying the nature of the community outreach efforts.
Models were tested with the log function for those variables without normal distributions.

Table 6.10 – Regression analyses predicting change in levels of disparity for Black motorists with interaction terms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Change in disparity for Black motorists</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traffic stop variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver sex – % male</td>
<td></td>
<td>-0.11</td>
<td>0.03</td>
<td>-0.13</td>
<td>0.03</td>
<td>-0.13</td>
<td>0.03</td>
</tr>
<tr>
<td>Driver age - % &lt;25 years old</td>
<td></td>
<td>-0.05</td>
<td>0.03</td>
<td>-0.04</td>
<td>0.03</td>
<td>-0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>Out-of-residence driver</td>
<td></td>
<td>0.07</td>
<td>0.01</td>
<td>-0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Out-state driver</td>
<td></td>
<td>0.06</td>
<td>0.02</td>
<td>0.10</td>
<td>0.02</td>
<td>0.08</td>
<td>0.02</td>
</tr>
<tr>
<td>% drivers speeding</td>
<td></td>
<td>0.04</td>
<td>0.01</td>
<td>0.07</td>
<td>0.01</td>
<td>0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>% drivers searched</td>
<td></td>
<td>0.10</td>
<td>0.06</td>
<td>0.12</td>
<td>0.06</td>
<td>0.11</td>
<td>0.06</td>
</tr>
<tr>
<td>% citations issued night</td>
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<td>0.02</td>
<td>0.11</td>
<td>0.02</td>
<td>0.10</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Municipality variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>% Black residents</td>
<td></td>
<td>---</td>
<td>---</td>
<td>0.20</td>
<td>0.05</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>% Black²</td>
<td></td>
<td>0.53***</td>
<td>0.00</td>
<td>---</td>
<td>---</td>
<td>0.19</td>
<td>0.00</td>
</tr>
<tr>
<td>Crime rate / 10,000 residents</td>
<td></td>
<td>0.10</td>
<td>0.00</td>
<td>0.07</td>
<td>0.00</td>
<td>0.07</td>
<td>0.00</td>
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<tr>
<td>Concentrated disadvantage</td>
<td></td>
<td>-0.03</td>
<td>0.22</td>
<td>-0.06</td>
<td>0.22</td>
<td>-0.05</td>
<td>0.22</td>
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<tr>
<td>Property value per capita²</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
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<td></td>
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<td>0.00</td>
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<tr>
<td>Vertical differentiation</td>
<td></td>
<td>-0.19</td>
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<td>-0.16</td>
<td>0.19</td>
<td>-0.16</td>
<td>0.19</td>
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<tr>
<td>Racial composition</td>
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<td>-0.24</td>
<td>0.03</td>
<td>-0.23</td>
<td>0.03</td>
</tr>
<tr>
<td>% college graduates</td>
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<td>0.00</td>
<td>0.17</td>
<td>-0.03</td>
<td>0.17</td>
<td>-0.05</td>
<td>0.17</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>0.02</td>
<td>-0.02</td>
<td>0.02</td>
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<td>0.02</td>
</tr>
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<td>-0.04</td>
<td>0.07</td>
<td>-0.03</td>
<td>0.07</td>
</tr>
<tr>
<td>Number of chiefs</td>
<td></td>
<td>-0.14</td>
<td>0.19</td>
<td>-0.16</td>
<td>0.19</td>
<td>-0.15</td>
<td>0.19</td>
</tr>
<tr>
<td>Supervisory ratio</td>
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<td>0.07</td>
<td>0.01</td>
<td>0.07</td>
<td>0.02</td>
<td>0.07</td>
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<td>0.07</td>
<td>0.35</td>
<td>0.07</td>
<td>0.35</td>
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<td>-0.03</td>
<td>0.36</td>
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<tr>
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<td>-0.18*</td>
<td>0.36</td>
</tr>
<tr>
<td>Department has compr. training</td>
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<td>0.32</td>
<td>0.01</td>
<td>0.32</td>
<td>0.02</td>
<td>0.32</td>
</tr>
<tr>
<td>Department meets w/ comm’y</td>
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<td>0.52</td>
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<td>-0.16</td>
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<td></td>
<td></td>
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<td></td>
</tr>
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<td>% Black * meetings</td>
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<td>---</td>
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<td>Racial composition * collection</td>
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</table>

*p < 0.05; ** p < 0.01; *** p < 0.001

Adj. R² = 0.14**
N = 160

Adj. R² = 0.13**
N = 160

Adj. R² = 0.14**
N = 160

---

27 Models were tested with the log function for those variables without normal distributions.
In contrast with community outreach efforts, which had the effect of reducing disparity, departments that provided comprehensive training to officers experienced the opposite effect in municipalities with higher proportions of Latino residents (see Table 6.11). In municipalities where 1% of the population is Latino, disparity for Latino motorists remained essentially stable between 2003 and 2008. However, disparity was

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
<th>Beta</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic stop variables</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driver sex – % male</td>
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<td>0.06</td>
<td>0.02</td>
<td>0.06</td>
<td>0.06</td>
<td>0.06</td>
<td>0.04</td>
<td>0.06</td>
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<td></td>
</tr>
<tr>
<td>Driver age - % &lt;25 years old</td>
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<td>0.05</td>
<td>0.13</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td>0.12</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out-of-residence driver</td>
<td>-0.23*</td>
<td>0.02</td>
<td>-0.22*</td>
<td>0.02</td>
<td>-0.23*</td>
<td>0.02</td>
<td>-0.23*</td>
<td>0.02</td>
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</tr>
<tr>
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<td>0.06</td>
<td>0.04</td>
<td>0.05</td>
<td>0.04</td>
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<td>0.02</td>
<td>0.09</td>
<td>0.02</td>
<td>0.07</td>
<td>0.02</td>
<td>0.06</td>
<td>0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% drivers searched</td>
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<td>0.11</td>
<td>0.12</td>
<td>0.10</td>
<td>0.11</td>
<td>0.10</td>
<td>0.12</td>
<td>0.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% citations issued night</td>
<td>-0.15</td>
<td>0.03</td>
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<tr>
<td>% Latino residents</td>
<td>0.37***</td>
<td>0.05</td>
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<td></td>
<td>0.44***</td>
<td>0.05</td>
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<td>% Latino²</td>
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<tr>
<td>Crime rate / 10,000 residents</td>
<td>-0.16</td>
<td>0.00</td>
<td>-0.17</td>
<td>0.00</td>
<td>-0.08</td>
<td>0.00</td>
<td>-0.11</td>
<td>0.00</td>
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<td>Concentrated disadvantage</td>
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<td>0.48</td>
<td>-0.16</td>
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<td>-0.09</td>
<td>0.44</td>
<td>-0.14</td>
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<td>Property value per capita</td>
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<td>Size of the department</td>
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<td>0.01</td>
<td>0.09</td>
<td>0.01</td>
<td>-0.13</td>
<td>0.01</td>
<td>0.01</td>
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<td>Vertical differentiation</td>
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<td>0.36</td>
<td>-0.15</td>
<td>0.36</td>
<td>-0.09</td>
<td>0.36</td>
<td>-0.13</td>
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<td>Racial composition</td>
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<td>0.05</td>
<td>0.10</td>
<td>0.05</td>
<td>0.10</td>
<td>0.05</td>
<td>-0.03</td>
<td>0.06</td>
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<tr>
<td>% college graduates</td>
<td>-0.05</td>
<td>0.32</td>
<td>-0.04</td>
<td>0.32</td>
<td>-0.05</td>
<td>0.32</td>
<td>-0.06</td>
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<td>Strength of department</td>
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<td>0.03</td>
<td>0.16</td>
<td>0.03</td>
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<td>0.03</td>
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<td>Aggressive department</td>
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<td>0.13</td>
<td>-0.02</td>
<td>0.13</td>
<td>0.06</td>
<td>0.12</td>
<td>0.03</td>
<td>0.13</td>
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<tr>
<td>Number of chiefs</td>
<td>0.08</td>
<td>0.35</td>
<td>0.08</td>
<td>0.34</td>
<td>0.11</td>
<td>0.34</td>
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<td>Supervisory ratio</td>
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<td>0.14</td>
<td>-0.16</td>
<td>0.13</td>
<td>-0.13</td>
<td>0.13</td>
<td>-0.18</td>
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<td>Reforms</td>
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<tr>
<td>Department has a policy</td>
<td>0.05</td>
<td>0.67</td>
<td>0.07</td>
<td>0.66</td>
<td>0.05</td>
<td>0.66</td>
<td>0.08</td>
<td>0.68</td>
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<tr>
<td>Department collects data</td>
<td>0.17*</td>
<td>0.60</td>
<td>0.15</td>
<td>0.59</td>
<td>0.17*</td>
<td>0.59</td>
<td>0.19*</td>
<td>0.60</td>
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<tr>
<td>Department analyzes data</td>
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<td>0.68</td>
<td>0.06</td>
<td>0.67</td>
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<td>Department has comp. trng</td>
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<td>0.67</td>
<td>-0.17</td>
<td>0.65</td>
<td>-0.08</td>
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<td>Department meets comm’y</td>
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<td>0.81</td>
<td>-0.12</td>
<td>0.79</td>
<td>0.07</td>
<td>1.07</td>
<td>-0.31</td>
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<td>Interaction terms</td>
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<tr>
<td>% Latino * training</td>
<td>0.23*</td>
<td>0.06</td>
<td>0.27**</td>
<td>0.06</td>
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<tr>
<td>% Latino * meetings</td>
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<td>Racial comp. * meetings</td>
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<tr>
<td>Constant</td>
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<td>4.78</td>
<td>0.73</td>
<td>4.69</td>
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<td>4.66</td>
<td>0.12</td>
<td>4.75</td>
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*p < 0.05; ** p < 0.01; ***p<0.001

Adj. R² = 0.18** Adj. R² = 0.21*** Adj. R² = 0.21*** Adj. R² = 0.19**

N = 160 N = 160 N = 160 N = 160
0.52, 0.98, and 2.13 higher at T2 than T1 in municipalities with 3%, 5%, and 10% Latino residents. Although the increases are relatively small, they indicate that training was not effective in terms of reducing disparity for Latino motorists. It is important to note that there is no main effect of training on change in disparity over time and no other interaction effects between training and other variables. Likewise and contrary to the hypothesis, collecting data and participating in community meetings are associated with increases in disparity from T1 to T2 for Black and Latino motorists, respectively, when adopted by agencies with a more diverse police force. These results may be artifactual and, as such, they must be interpreted cautiously.

**Discussion**

To evaluate the effectiveness of measures designed to decrease disparity in traffic-enforcement outcomes, this study compared traffic citations issued to motorists in certain Massachusetts municipalities at two points in time. The same factors that were used to explain differences in disparity across police departments at one point in time were considered as predictors of change within each department between T1 and T2. Therefore, the influence of external features of municipalities, internal organizational characteristics, and reforms undertaken to address racial profiling was analyzed.

Consistent with the findings in the previous chapter, the results of the bivariate analyses demonstrate that the experience of racial profiling is different for Black and Latino motorists. There was little change in disparity for Blacks overall, but more than half of the smallest communities (< 10,000 residents) had higher levels of disparity at T2
compared to T1. In contrast, Latino motorists experienced decreases in disparity in more than 80% of the sample municipalities and increases in fewer than 20% of the municipalities in each size category. Although the reasons for these observed differences are not well understood, the middle-ground-status that Latinos are thought to occupy between Whites and Blacks in U.S. society could help to explain why they experienced decreases in disparity to a greater extent than Black motorists. Latinos may not seem out of place to the same extent as Blacks when driving through different types of municipalities first because most municipalities in the sample have larger Latino than Black populations and secondly because they experienced an increase in the number of Latino residents between 2000 and 2010.

The models explaining change in disparity over time accounted for less of the observed variation than those explaining disparity at one point in time. Overall, they explained only 12% and 16% of the variance for Black and Latino motorists, respectively. Therefore, there is a large amount of variance in change in disparity that remains unaccounted for in these models. More research is needed to identify the key variables that were omitted here.

It is possible that external political and social factors are important in changing officers’ traffic enforcement practices. Other research has demonstrated that media coverage about racial profiling and the introduction or passage of state legislation requiring agencies to collect demographic data during police stops had significant effects in terms of reducing racial disparity in searches of Black and White motorists (Warren & Farrell, 2009; Warren & Tomaskovic-Devey, 2009). These findings suggest
that external oversight, which was not measured here, played a critical role in holding police organizations accountable, perhaps by motivating supervisors to monitor and correct officer behavior.

*Effect of racial threat on change in disparity over time*

An important finding of this study is that, controlling for other factors, the percentage of minority residents in a municipality influenced change in disparity over time for Black and Latino motorists. Levels of disparity were higher at T2 than they were at T1 in municipalities with more racial threat. This finding builds upon prior research which demonstrates that police enforce the law differently based on the racial composition of the area they are policing. It also suggests that police practices did not change significantly—and may have deteriorated—during the study period. Blacks and Latinos are likely perceived as threats and thus “provoke police into acting as control agents” (Crank, 1990, p. 186).

It is disconcerting to consider that, during a time of heightened public pressure to address the problem, most municipalities did not experience change in disparity, and some saw levels of disparity increase during the study period. Given the effort to reform and the expectations of transparency throughout the process, these findings suggest one of two problematic outcomes. The first explanation is that disparities are linked to operational and/or institutional practices that cannot be changed through increased awareness and training about racial equality in traffic enforcement. Secondly, disparities could be driven by differences in the behavior of motorists, which puts them
at risk for being stopped and cited. However, as discussed in the previous chapter, the results of this study do not explain why more disparity was observed at T2 than at T1 in racially mixed municipalities.

**Effect of organizational characteristics on change in disparity over time**

The structural characteristics of police organizations had no effect on change in disparity over the 5-year period. Other researchers who have studied the effectiveness of agency structure have analyzed the types of structures that are best suited to achieve certain organizational goals such as order maintenance and the provision of services (Langworthy, 1992; Crank & Langworthy, 1992). As we saw in chapter five, a confusing set of results has emerged from the studies that seek to explain the relationship between organizational structures and agency outputs. While previous research identified some links between structure and police activity, there is scant evidence that certain types of agency structures are associated with change in police activity over time.

Perhaps other organizational factors not included in this study are important in explaining change in disparity. For example, research on organizational change emphasizes the importance of agency leadership in facilitating reform (Skogan & Hartnett, 1997), and change in police leadership has had significant effects in terms of reducing racial disparity in searches of Black and White motorists (Warren & Farrell, 2009; Warren & Tomaskovic-Devey, 2009). Here, a measure of the number of chiefs who led the department during the study period was included in the models and was not
found to influence disparity over time. It is plausible that change in leadership alone is not sufficient to motivate officers and mid-level managers to modify their behavior.

White (2010) argues that the chief must send a clear message to line officers, through words and actions, in order to prevent racially biased policing. The importance of the chief’s role in communicating his or her commitment to fairness in traffic enforcement was conveyed in a small group discussion with municipal police chiefs that took place at Northeastern University. The focus group participants explained that the chief is ultimately responsible for obtaining “buy-in” from officers for reducing disparity (Chiefs, 2011). A comprehensive ethnographic study is needed to better understand how administrators conveyed information to their subordinates and what messages officers received from their leaders regarding the issue of racial profiling.

Effect of reforms on change in disparity over time

Another interesting result is that two specific reform efforts undertaken by police departments were shown to be effective in terms of decreasing disparity for Black—but not Latino—motorists. When controlling for the other variables, departments that analyzed traffic citation data and those that met with members of the community to discuss racial profiling saw small reductions in levels of disparity between T1 and T2. This finding indicates that certain types of reform may be successful in lowering the incidence of racial profiling, but its importance is tempered because the effect is small and was not observed with other reforms or for Latino motorists.
Nevertheless, the departments that made an effort to understand their citation data and engage in dialogue with members of the community yielded positive results in terms of decreasing disparity. Interestingly, as we saw in chapter four, these two reforms were the “least popular,” with one-quarter of the agencies reporting that they analyzed their traffic citation data and only 18% stating that they participated in community meetings to discuss the issue of racial profiling. It is reasonable to conclude that these unpopular reforms were the most difficult ones to implement, which is why departments that undertook the challenge experienced decreases in disparity over the study period. Moreover, given that they are not easy to execute, it is not surprising that only small decreases in disparity were observed.

Beyond the technical issues related to performing the calculations, analyzing traffic stop data presents managerial challenges for police administrators. Departments are encouraged to develop a protocol to help supervisors discuss disparities with officers as well as a system for monitoring and initiating disciplinary action when the analyses show unacceptable levels of disparity. Agencies that are willing to determine when and how to discipline officers are clearly dedicated to changing their traffic enforcement practices. It is likely that departments that used the data to provide feedback to officers about their performance during traffic stops are the ones that experienced lower levels of disparity at T2 compared to T1.

Besides the difficulty of implementation, police chiefs may not have attempted reform because their agencies’ traffic enforcement practices may be perceived as providing organizational benefits. As previously discussed, administrators maintain
agency policies and practices that their sovereigns view as effective (Crank & Langworthy, 1992; Manning, 1997; Schafer & Mastrofski, 2005). Given that making traffic stops provides opportunities to demonstrate officer productivity, police leaders may not be motivated to adopt reforms that are viewed as getting in the way of that work.

Just as police agencies are notoriously difficult to change, research has shown that officers resist change as well (Brown, 1985; Lumb, 1995; Maguire, 1997; Manning, 1997; Mastrofski, 1990; Sherman, 1974; Skolnick & Bayley, 1986; Wilson, 1968). However, studies demonstrate that officer behavior can be influenced through rewards for performing in accordance with agency policies (Bratton & Knobler, 1998; DeJong et al., 2001; Mastrofski et al., 1994). We are not aware of incentive systems associated with racial profiling reforms, but it is feasible that officer behavior would change if the department had a disincentive system, in other words, a method of holding officers accountable when they are shown to disproportionately issue citations to Black and Latino motorists (EOPSS, 2008; Wilson, 1968).

If officers do not suffer repercussions when they fail to meet performance standards, they are unlikely to change their behavior, and levels of disparity are unlikely to drop. This is particularly true given the possibility that officers are not aware that they are treating certain motorists differently than others. In fact, researchers (Tillyer, Engel & Cherkauskas, 2010; Warren & Tomaskovic-Devey, 2009) and professional law enforcement groups such as the Commission on the Accreditation of Law Enforcement Agencies, the International Association of Chiefs of Police, and the Police Executive
Research Forum have recommended monitoring and addressing the behavior of police officers based on the recognition that unconscious bias may be contributing to the disparities in traffic stops and their outcomes (McDevitt, 2009).

While most Americans—including police officers—consider themselves to be tolerant of others, regardless of their race or ethnicity, psychologists and other social scientists now understand that most people have unconscious biases that stem from cultural influences and stereotypes (Gaertner & Dovidio, 1986; Dovidio et al., 2002). Research shows that these internalized beliefs can influence our behavior even when we are unaware of them (Correll, Park, Judd, & Wittenbrink, 2002; Eberhardt et al., 2006; Hodson et al., 2002; Tomaskovic-Devey, Mason, & Zingraff, 2004). For example, building on the well-established body of research showing that the stereotype of Black Americans as violent and criminal is consistent, frequent, and automatic, Eberhardt, Purdie, Goff, & Davies (2004) found that police officers were more likely to report that a face looks criminal when that face appeared more stereotypically black.

Without realizing it, police officers may be using traffic stops to express unconscious hostility toward Blacks and Latinos based on stereotypes about dangerousness and criminality. “When an officer is making discretionary decisions about who to pull over and who to cite, cognitive bias processes may make the misbehavior observed seem slightly more suspicious or dangerous when a car is driven by a minority citizen” (Warren, Tomaskovic-Devey, Smith, Zingraff, & Mason, 2006, p. 269). Understanding this cognitive process makes the challenge of changing officer behavior appear less daunting. As McDevitt (2009) suggests, officers may alter their
behavior once they are made aware of the phenomenon of unconscious bias and the possibility that they could be acting in a biased way. Educating officers seems critical for changing levels of disparity; however, in the present study, providing comprehensive training to officers on the issue of racial profiling was not found to significantly reduce disparity over time.

As previously mentioned, engaging in dialogue with members of the community may be an effective approach for decreasing disparity. Slightly lower levels of disparity for Black motorists were observed at T2 than at T1 in municipalities with departments that participated in such discussions. In addition to this direct effect, participating in community meetings reduced disparity more significantly in municipalities with relatively large Black or Latino populations as compared to municipalities with a smaller percentage of minority residents, a result that is consistent with the finding in the previous chapter that police may behave more fairly when their departments are engaged in dialogue with people who reside in their municipalities if there is a sizeable minority community.

Like traffic stop data analysis, participating in police-community discussions on the issue of racial profiling may represent a higher level of commitment to eliminate bias-based policing on the part of a police department. As Brown (1985) explained,

Police departments tend to wait for the articulation of external needs and/or demands, assess the levels of social and political pressure being applied and then respond through the internal management and operational systems with the resource level consistent with their own perception of the demand (p. 21).
In order for police participation in meetings with community members to be effective, a level of trust between police and citizens must exist. In many communities, especially predominantly minority communities, views of police and other government agencies are very negative (Greene, 1999; Harcourt, 2001). This distrust has implications for relations between members of minority groups and the police. Researchers have found less willingness among community members to participate in community-police meetings in disadvantaged urban areas, for example (Parker et al., 2004). Therefore, depending on the status of the relationship between police and community members in a particular municipality, the conversation may begin differently.

The results of this study may signify that these relationships were already established in some municipalities. Pre-existing relationships would have facilitated the dialogue and enabled police to have productive discussions about the racial profiling problem and the role of police with members of their communities. In these types of communities, such a dialogue may have led to identifying effective solutions for reducing disparity for Black motorists.

Because the data did not include information about the nature of the police-community relationship, we do not know to what extent the lines of communication were already open between the two groups in each municipality. Research has shown that significant and consistent outreach efforts over time are necessary for police to build a cooperative partnership with the community (Rosenbaum & Lurigio, 1994). Given the time needed to develop such constructive collaborations, reduced levels of disparity are
not likely to be observed within the 5-year study period in municipalities where dialogue was recently initiated.

While analyzing data and community outreach showed minimal effects, the other reforms do not seem to be productive for lowering disparity for Black or Latino motorists. Based on prior research showing that policies can effectively control officer behavior, an expectation of this study was that adopting anti-profiling policies would increase racial parity in traffic citations issued to Black and Latino motorists. For example, other studies have shown that policies regarding the use deadly force, automobile pursuits, and arrests in domestic violence incidents reduced officer discretion (White, 2010). Likewise, agencies with policies aimed at reducing disparity have been shown to have lower levels of gender disparity than agencies without policies (Farrell, 2011), and the likelihood that higher levels of racial threat would be associated with higher drug arrest rates for Blacks was reduced when the department had more rules and policies (Eitle & Monahan, 2009).

The present study’s findings indicate that anti-profiling policies may not be effective for reducing disparity in traffic citations. Without information about the substance of agency policies or the emphasis placed on them by agency leaders, it is impossible to ascertain why adopting a policy was not associated with lower levels of disparity, but we can speculate that policy adoption was merely symbolic or insufficient to bring about change in police behavior. By itself, a policy is “not enough to control racially biased policing and other types of misconduct” (White, 2010, p. 474). Because it is impossible to create policies for every possible situation, in addition to adopting a
policy, other methods including training and supervision are recommended to control officer behavior and reduce the incidence of racial profiling.

It is likely that most reforms are not effective when implemented on their own. Data collection was also shown to be insufficient in achieving parity in traffic enforcement outcomes, an interesting finding given the emphasis placed on data collection by law enforcement agencies in many states and municipalities across the country. Fifteen years ago, the promise of data collection was that it would provide opportunities for better understanding officer decision-making within the context of traffic stops. However, for many agencies, participating in a data collection program may have provided them with cover to continue performing traffic enforcement as they did before. As Miller (2009) argues, the purpose of adopting data-collection programs may be to maintain a police department’s image rather than effectuate real change.

Providing training to officers was similarly ineffective for changing levels of disparity. One explanation, mentioned previously, is that the 5-year study period was too short for the effects of training to be noticed. Agencies were not asked to report when they implemented training and other reforms, but it is likely that a large number did so only after the release of 2004 Report on Racial and Gender Profiling. Therefore, the changes measured here may represent initial efforts for many agencies in grappling with the issue. Interestingly, in municipalities where the police department reportedly provided comprehensive training, 31% experienced decreases in disparity, half saw no change, and 21% experienced increases in disparity between T1 and T2 for Black
motorists. For Latino motorists, 69% experienced decreases, 20% saw no change, and 10% experienced increases in disparity from T1 to T2.

It is important to note that the measure of comprehensive training used in this study represents a count of officers trained and the types of training provided. To further investigate the reasons why training may not be an effective reform for reducing disparity, future research should explore the specific nature of the training provided to officers, as well as its frequency, which would help to understand its effect on officer behavior. In addition, we are unaware of the extent to which agency leaders provided training to their officers as a “presentational strategy” requiring officers to participate in training about racial profiling to demonstrate their concern about the problem without actually addressing it. By decoupling the training from the agency’s day-to-day activities, agencies can benefit from the perception that they responded to the public and avoid modifying their traffic enforcement practices (Mastrofski & Ritti, 1996). Therefore, training may not have succeeded in reducing disparities in police departments that did not reinforce the desired behaviors.

Previous research on policing suggests that the extent of training that officers received was a powerful predictor of changing officer behavior in making DUI arrests, but the effect of training was observed only in departments that actively encouraged and promoted DUI arrests as a department goal (Mastrofski & Ritti, 1996). The authors cautioned that the “benefits of training are more assumed than empirically demonstrated” (p. 293). Likewise, Schultz and Withrow (2004) found that training programs developed in response to findings of racial or ethnic disparity in traffic
enforcement were largely symbolic, and training took place in contexts that did not prioritize the goal of decreasing disparity in traffic enforcement outcomes.

Despite some limitations, this analysis contributes to the literature by examining factors believed to explain the link between external (municipal) characteristics, internal (structural) characteristics, and police behavior. It is also the first study to examine police reform efforts to address racial profiling in effectuating change over time in disparity for Black and Latino motorists. In analyzing agency-level data about changes in traffic enforcement outcomes over time, it adds to the criminal justice-related phenomena that are routinely studied via trend analysis (Tillyer et al., 2010).

This direct assessment of the empirical validity of racial threat and institutional theory provided evidence consistent with both perspectives. Traffic citation outcomes were largely unaffected by the reforms undertaken by municipal police departments, and levels of disparity remained stable during the study period. Like other research demonstrating that reforms to hold police accountable do not always result in actual changes to working practices, the results of the present study confirm how difficult it is to change police activity. The lack of information regarding the nature of agency reform efforts, specifically with regards to data analysis, training, and community outreach, limits our ability to analyze qualitative changes in agency traffic enforcement practice. Therefore, it is difficult to ascertain to what extent the reforms undertaken represented real change.
Chapter VII

Conclusions, Limitations, and Implications

Although racial discrimination is a societal issue, police agencies share responsibility with other actors to monitor the use of unjust police authority and ensure the primacy of the rule of law. Unfair treatment of people of color by police is not a new development. The national debate about racial profiling is the current manifestation of an enduring problem in policing. Several factors led to the widespread recognition of the problem of racial profiling in the mid-1990s. Among them were the research findings presented by John Lamberth, expert witness in two state court cases: State of New Jersey v. Soto and Wilkins v. Maryland State Police.

At that time, activists in the Black community in New Jersey were receiving large numbers of complaints about racial profiling. They hired Dr. Lamberth, a statistician at Temple University, to determine whether state troopers were disproportionately stopping Black motorists (Lamberth, 1996). His study’s results showed that Black and White motorists violated the traffic laws at almost exactly the same rate on the southern part of the New Jersey Turnpike where he conducted a rolling survey. However, while Blacks made up 13.5% of the turnpike’s population and 15% of the speeders, they represented 35% of those stopped by police. Lamberth obtained similar results in his study of traffic stops by the Maryland State Police on I-95 between Baltimore and the Delaware border. His analysis showed that 17.5% of the traffic
violators were Black, but 28.8% of those stopped and 71.3% of those searched were Black (Lamberth, 1996). The results led Lamberth to conclude that:

Absent some other explanation for the dramatically disproportionate number of stops of blacks, it would appear that the race of the occupants and/or drivers of the cars is a decisive factor or a factor with great explanatory power. I can say to a reasonable degree of statistical probability that the disparity outlined here is consistent with the existence of a discriminatory policy, official or de facto, of targeting blacks for stop and investigation. (Harris, 1999)

The Soto and Wilkins cases heightened public attention and, across the country, people of color came forward with their own accounts of being racially profiled. Many complaints were articulated by law-abiding, prominent Black Americans who had nevertheless been stopped by police and were subject to humiliating treatment. As a result, in 1999, the ACLU and the NAACP launched a national “Campaign Against Racial Profiling,” calling for the elimination of the practice (www.aclu.org). For the first time, the problem of racial profiling was being recognized beyond the Black community.

In 2000, a local tragedy helped to persuade New England politicians to look more closely at the problem of racial profiling. Sgt. Cornel Young, Jr., a young Black off-duty police officer, was shot to death in Providence, Rhode Island by other officers who had mistaken him for a suspect. Following the accident, then-state Senator Dianne Wilkerson proposed legislation to study the issue of racial profiling in Massachusetts. “The shooting really, really hit home. It allowed us the time and place—that particular moment—to get the legislation passed” (Wilkerson, 2008).
In response to the media attention on the stories of countless Black and Latino Americans, a number of states passed legislation that banned racial profiling and required police to collect data on the race and ethnicity of the motorists they stop (Fridell, 2004). Police agencies nationwide began to collect information about their traffic enforcement practices. Following the recommendations of the Department of Justice and professional police organizations, agencies responded by adopting other measures to eliminate, or at least reduce, racial and ethnic disparities in traffic enforcement. In particular, police agencies were urged to implement reforms such as adopting new policies that prohibit racial profiling, analyzing traffic citation data, providing training for officers, and participating in community outreach around the issue of racial profiling. Some undertook these measures voluntarily, while others did so pursuant to consent decree or legislation.

To date, these efforts had not been evaluated either in terms of their diffusion across police departments or their ability to lower disparity for motorists of color. Therefore, we did not know if the steps being taken were productive. To fill this gap, the general aim of this research was to determine whether the state law addressing the issue of racial profiling led municipal police departments in Massachusetts to adopt reforms and whether the adoption of those reforms reduced disparity in the traffic citations issued to Black and Latino motorists. Hypotheses were developed based on two theories to explain the external and internal influences on agency-level change. The racial threat perspective was used to test whether the racial composition of a municipality influences the adoption of reforms and their impact on traffic stop outcomes across municipalities and over time. Institutional theory was used to inform
predictions about the effect of organizational factors on these outcomes. This study explored both sets of factors as predictors of racial profiling reforms and their effect on disparity across multiple departments and over a 5-year period.

**Conclusions**

Municipal police departments in Massachusetts have taken steps to address racial profiling. A majority of the agencies (56%) collected traffic citation data, 72% of them had policies against profiling, and 77% provided training to their officers about bias-based policing. As we saw in chapters five and six, these reforms were not effective for reducing disparity for Black and Latino motorists. The two least popular reforms, analyzing traffic citation data (adopted by 25% of the sample agencies) and participating in meetings with the community (adopted by 18% of the agencies), had small effects on decreasing disparity for Black motorists over time that likely appear larger than they truly are because the agencies in the sample had high levels of disparity and thus had more room to improve.

Overall, the reforms as measured in this study’s survey did not produce change, which suggests that they may not have been undertaken for the purpose of improving police performance but rather to satisfy the superficial goal of appearing to solve the problem. If their goal was to benefit from the publicity associated with the adoption of reforms, some municipal police chiefs in Massachusetts may have calculated that the institutional benefit of increasing their legitimacy in the public’s eyes was sufficient.
The question raised by these findings is how to change police practice, which is discussed in greater detail below.

Effect of racial threat

With one exception, environmental factors were not associated with police agency adoption of any of the five reforms examined in this study. Miller (2009) similarly found no association between environmental variables and the adoption of an anti-profiling policy. However, as suggested by racial threat theory, his analysis revealed that efforts to hold police accountable were less likely to be undertaken in municipalities where the level of racial threat was greater until the size of the Black population reached beyond 20% of the municipality’s residents, the point at which the Black population may have sufficient political power to impact police activities. While the current study did not replicate Miller’s (2009) finding, it extended his work by examining the effect of adopting accountability measures on traffic enforcement outcomes for Black and Latino motorists.

Importantly, this study’s findings confirm the racial threat hypothesis as well as prior research which shows that police officers behave differently depending in part on the racial and ethnic composition of the area they are policing. Traffic laws were enforced most unequally in the sample municipalities with larger Black or Latino populations. In these municipalities, there were greater disparities in traffic citations issued to Black and Latino motorists at one point in time as well as increasing levels of
disparity over the study period. As hypothesized, the importance of racial threat was demonstrated in all of the models predicting disparity.

This finding adds to the literature on race, ethnicity, and policing by showing that levels of racial threat predict unequal traffic enforcement in addition to other previously studied police behavior, such as arrest rates and use of force. Scholars have relied on the racial threat theory to explain variations in the use of formal and informal punitive actions to control members of minority groups, and a significant body of research suggests that officers may exert more authority in areas where they perceive that racial and ethnic minorities pose a threat to the White elite. Like other methods of social control, traffic enforcement provides police with the opportunity to address illegal behavior and deter future violations, but the influence of racial threat on disparity in traffic enforcement practices has been largely unexamined.

Research confirms that officers base their decisions, in part, on the racial composition of the neighborhood in which an incident arises (Liska et al., 1982; Taylor & Covington, 1993). The relative size of the Black population is the most common indicator of racial threat (e.g., Parker et al., 2005; Stewart et al., 2009; Stolzenberg et al., 2004) as most researchers have focused only on the Black community as the potential threat (Ennis et al., 2010). For this study, the percentage of Latino residents in each municipality was used as a predictor of Latino racial—or minority group—threat because Latinos may be seen as undermining the interests of White citizens given that they now outnumber Blacks in more than half the urban centers in this country and represent the fastest growing population group in the United States. Other researchers
have used measures of Black-on-White crime to test the threat of Black crime hypothesis, but those data were not available for the municipalities in this study. Instead, the percentage of non-White arrestees was included in earlier models to measure crime committed by members of racial and ethnic minority groups as discussed later in the limitations section.28

The racial composition of the neighborhood where stop occur is also related to the number of citations issued during traffic stops. In particular, officers are known to issue more citations in neighborhoods where relatively more minorities reside (Greenleaf et al., 2008; Ingram, 2007; Smith, 1986) and in places with more White residents that officers may be protecting from outsiders (Greenleaf et al., 2008). As we saw previously, the results of studies testing racial threat theory to explain neighborhood variation in traffic stops and searches are mixed (Petrocelli et al., 2003; Renauer; 2012). Studies examining traffic stop rates present inconsistent results and sometimes show that neighborhood racial composition is an important factor in terms of influencing traffic stop rates (Greenleaf et al., 2008; Ingram 2007; Novak & Chamlin, 2008).

Some of these findings demonstrate that police are more active in terms of issuing citations in minority and mixed-race neighborhoods, a factor that likely influences the quality of life of residents in those neighborhoods and represents a type of unequal treatment. However, they do not describe the disparate traffic enforcement outcomes that are of interest in this study. What distinguishes this study from prior research is its measurement of unequal treatment in police activity.

28 After running the first series of regressions, due to multicollinearity, a decision was made to drop the % non-White arrestees variable from the models. It was correlated with the percentage of Black residents in a municipality (% Black) at r = .807, p < 0.000.
Effects of organizational characteristics

In seeking to understand the factors that influenced agency decisions to adopt anti-profiling measures, this study contributes to the literature on organizational structure by demonstrating that internal characteristics of police departments were associated with the adoption of certain reforms. Although prior research shows only weak or inconsistent effects of internal agency characteristics on police reforms, in this sample, organizational factors were important in predicting the adoption of reforms. Consistent with Miller’s (2009) study, organizational factors appeared to be more important than environmental ones in explaining the adoption of reforms, but contrary to his finding that an agency’s personnel diversity decreased the likelihood of a data collection program being adopted, in the present study, racial diversity was associated with an increased likelihood of reforms being undertaken.

Besides the racial diversity of the police force, the most influential factors in a police organization’s adoption of measures to reduce racial profiling were the educational level of the force and the number of ranks in an agency. Thus, in Massachusetts, departments with a more diverse police force, more college-educated officers, and more ranks were more likely to have a policy prohibiting racial profiling, provide comprehensive training to their officers, and participate in community meetings to discuss racial profiling. Departments with higher proportions of college-educated officers also undertook the more challenging effort of analyzing traffic citation data.

One explanation for these results is that these agencies may have had sufficient resources to adopt new reforms, but more research is needed to explore that possibility. Another reason for adopting a policy, providing training, and participating in community
outreach is that these reforms may have become standard features of modern police departments. Miller (2009) speculated that the issue of racial profiling has become so culturally significant that agencies have adopted reforms because they are concerned about their public perception. The results of the present study build upon his research and provide some evidence that police agencies have made changes to appease the public without actually affecting their operations. As explained in chapters five and six, there were no associations between agency features and either static levels of disparity in 2008 or change in disparity over time.

That organizational characteristics did not help to explain traffic enforcement outcomes is consistent with institutional theory because it demonstrates that an organization’s structural features may not be associated with its performance. These findings support the theoretical work of Manning (1997), who suggests that the core strategy of police agencies is the management of appearances rather than the improvement of officer decision-making. Other researchers also have concluded that an agency’s structure is not related to accomplishing its goals because departments decouple formal structure from daily tasks (e.g., Mastrofski et al., 1987). If not related to police activities, perhaps organizational characteristics serve a presentational purpose. For instance, employing a diverse police force can be seen as a way to enhance police legitimacy rather than a means by which to improve policing outcomes.

Effects of reforms on disparity

An important but disappointing result of this study is that reforms had no direct effect on levels of disparity across municipalities in 2008, and only two reforms had
minimal effects in terms of reducing disparity over time. Although some interaction effects were observed, overall the reforms did not produce the change that was expected. They appear to play a ceremonial role in terms of demonstrating agency concern but do not seem to be effective for reducing disparity. Besides demonstrating how difficult it is to change people and organizations, this finding is helpful in shifting the discussion about racial profiling. The important question now is why the reforms did not work.

*Symbolic change?*

Adopting a policy, collecting data, and providing training to officers may be largely symbolic. While the adoption of these measures has become commonplace across municipal police departments in Massachusetts, they had no effect on change in disparity. Instead, the reforms may serve to demonstrate the department’s concern about racial profiling without requiring actual changes in traffic enforcement practices. Agency leaders may have focused more on ceremonial criteria than improved performance when they adopted the reforms in part because they did not know whether reforms could reduce disparity (Willis et al., 2007). As Miller (2007) argued, some agencies may believe they can “manage the perception of racial profiling by demonstrating their responsiveness to community concern without having to show … whether the policy has had any effect on police decision making in encounters with citizens” (p. 253).

Given the limited evidence in the literature that having a formal policy can produce desired effects, it is not surprising that anti-profiling policies may not result in
the reduction of disparities. While formal policies outline the parameters of permissible behavior and explain the connection of that behavior to the department’s mission, informal policies generally govern the conduct of most officers (Walker, 1977; Wells & Falcone, 1992). Enforcing traffic laws is low-visibility work, and the policies relating to traffic enforcement may not be emphasized by agency leaders unless a negative outcome occurs.

It is also possible that the observed traffic stop outcomes are a function of officers responding to pressure from supervisors to cite motorists or arrest offenders. For example, Lundman (1979) showed that departments with productivity quotas also had higher levels of racial and ethnic disparities in traffic citations, which can be understood to mean that, under pressure, officers “resort to stereotypical notions about the motorists most deserving of formal sanction” (Farrell, 2011, p. 8). In addition, officers may not be receiving a great deal of training about the policy and how to follow it. In their study of pursuit policies, for example, Wells and Falcone (1992) found that officers in most departments were simply given a copy of the policy to place in their folders. Therefore, a future area of inquiry could explore how policies can be implemented to make a difference for patrol officers when the nature of their work is highly discretionary.

Likewise, the results of the present study show that half the departments provided only minimal training to officers, primarily at roll call and through in-service training. Neither type of training is likely to have an impact on actual police practices because they may amount to little more than a memorandum read at roll call, reminding
officers to avoid profiling motorists and formulaic in-service trainings (Buerger, 2002). Only 25% of the agencies in the sample indicated that they provided specialized off-site training to members of the department, and a similar number reported that training was provided through the police academy. The reasons why certain individuals were selected to participate in certain types of training are unknown.

Although training is viewed as the means by which to effectuate the individual transformation necessary to achieve organizational change, in order to be effective, the message must be reinforced repeatedly. It is also important to tailor any training according to officer assignment, specialty, strengths, weaknesses, and interests rather than using a one-size-fits-all approach. More research is needed to learn about the nature of the training and the frequency with which it was provided in order to better understand why training was not a significant predictor of disparity in traffic enforcement outcomes.

Comparing the Black and Latino experience

Because Latinos now comprise the largest minority group in the U.S., some researchers have emphasized the importance of including Latinos in studies of traffic stop outcomes. Here, levels of disparity for both Black and Latino motorists were analyzed and compared. Consistent with a small but growing body of research, the present study’s findings suggest that Latinos experience disparity to a lesser extent than their Black counterparts. However, like Black motorists, Latinos are treated differently than Whites, particularly when they are stopped in ethnically diverse municipalities.
As was previously explained, caution is required when drawing conclusions about outcomes for Latino motorists. Police officers face the challenge of identifying individuals as “Hispanic” who can belong to any racial category and whose physical characteristics vary widely. Therefore, the citation data may contain coding errors that likely result in an undercount of Latino motorists who are actually cited. Secondly, the Driving Population Estimate for each municipality is based on census data that are likely to under-report the number of Latino residents. This undercount may artificially inflate the measurement of disparity. Among other explanations, researchers have hypothesized that the fear of deportation among undocumented immigrants and a distrust of government authorities among immigrants generally may discourage many Latinos from participating in the census (Brownrigg & Martin, 1989; Weitzer, 2010).

Neither Black nor Latino motorists experienced important changes in levels of disparity following the adoption of reforms. As such, this study is limited in terms of informing police practitioners and policy-makers interested in lowering the incidence of racial profiling for members of both minority groups. Other limitations in the design of the study, the data, and the analytic strategy are described in the next section.

Limitations

The previous conclusions must be considered in light of the study’s limitations. Because the study was conducted in one state during one period of time (April 2001–December 2008), its results are not generalizable for municipal police agencies beyond Massachusetts during this particular time frame. An important limitation discussed in chapters five and six is the study’s small sample size. With only 202 agency responses,
the models were not robust, which means there is a greater risk of Type I error, which is the incorrect rejection of the null hypothesis when it is true (Warner, 2008). More reliable conclusions could be drawn based on a larger sample examining change across many departments at several points in time. In addition, there were insufficient data to conduct a time series analysis, which would necessitate traffic citation data collected at uniform time intervals for a certain period of time before and after the release of the 2004 report. Here instead, an arbitrary time point was selected based on the availability of the data from the RMV.

The expectation was that multi-stage structural equation modeling techniques would be used to examine the effects of external and internal characteristics of police departments on static levels of disparity and change in disparity over time. Researchers use structural equation modeling (SEM) to understand mediational effects in their models. SEM was to include two measurement models: one for each of the latent variables (for which the measured variables serve as multiple indicators) and a “causal” model representing a theory that organizational- and municipality-level variables may have direct effects on disparity and change in disparity over time but that these effects may be partially mediated by the adoption of reforms. Because the results of the OLS regression models showed that there were no mediation effects to further explore, this modeling was not used.

In the present study, all the variables were aggregated to the agency- or municipality-level to facilitate OLS modeling. The municipality was used as the unit of analysis because reform policies and practices were adopted by municipal police
departments and thus applied uniformly department-wide. However, factors that are known to influence traffic stops, such as economic and socio-demographic factors, may vary unevenly across city neighborhoods. Police street stops and arrests are also distributed unevenly in different parts of a municipality (Gelman et al., 2007; Spitzer, 1999). Therefore, the analysis could have washed out significant neighborhood effects because it specified an overly extensive geographical unit. If disparity decreased in certain parts of the municipality but not in others, the analysis could entirely fail to see this important outcome. It would also mask effects of reforms that may have been targeted at certain precincts or divisions within the department. Some scholars have used smaller geographical areas to gain precision in their analyses given the variation in both racial composition and police activity that can exist from block to block in some municipalities. For example, Engel, Smith, and Cullen (2012) analyzed drug arrests by the Seattle Police Department at the level of the Statistical Reporting Area (SRA), which consists of one to several square blocks.

The problem is that many variables are not specified at the neighborhood level. This includes a lack of information regarding the specific location or neighborhood where traffic citations are issued. The citation data obtained from the Registry of Motor Vehicles only indicates the city in which the citation was issued with the exception of Boston, where district-level information is included. The lack of specificity regarding the location of stops limits the ability to determine whether changes in levels of racial disparity differ from neighborhood to neighborhood, the level at which racial profiling may be occurring.
In addition, the Driving Population Estimate (DPE) is based on municipality-wide data when, in fact, the driving population varies across neighborhoods depending on the existence of factors drawing non-residents to or through the municipality. Likewise, an effect of conducting the analysis at the municipality/agency level means that it may not capture the influence of activity occurring at the district (or smaller departmental unit) level for which information was not available. Finally, certain stop-level information that was available could not be controlled for in the models because the analysis explored agency-level effects. Multilevel modeling would allow the examination of stop level data that are nested within groups (i.e., the police agencies) and further nested within municipalities. With the traffic stop as the unit of analysis, more information about the nature and severity of traffic violations could be included in the models.

Given its reliance on survey responses, another limitation of this study is the inability to know whether respondents correctly and consistently described their racial profiling activities. The survey was accompanied by a letter of support signed by the Massachusetts Secretary of Public Safety and Security and the President of the Massachusetts Chiefs of Police Association, therefore it is likely that respondents attempted to respond accurately, but that cannot be verified. In addition, the survey responses do not include information about how the reforms were implemented by each agency. Consequently, the associations found between different reforms and other sets of variables may not represent the true efforts of the police departments in the sample.

Many of this study’s limitations relate to the measurement of variables that were included in the models. While the percentage of Black and Latino residents in a
municipality is the most commonly used measure of racial threat, other researchers have argued that the threat of Black-on-White crime is a more precise indicator of the perceived threat posed by Black individuals in each municipality (Eitle et al., 2002). Here, the percentage of non-White arrestees was used to measure crime committed by members of racial and ethnic minority groups because data on Black-on-White crime were not available for the municipalities in the study. A decision was made to drop these two racial threat variables from the analysis as they did not enhance the models due to multicollinearity.

Stewart et al. (2009) included in their analysis a measure of racial change in a neighborhood by calculating the growth in the size of the Black population during the previous decade (Stewart et al., 2009). Therefore, to uncover more subtlety as to how racial threat influences formal mechanisms of control and because this study explored change in levels of racial disparity over time, an indicator of demographic change over time was included in early models of this study. The variable was calculated as the difference between the percentage of residents identified as Black (or Latino) in the 2000 decennial census and in the 2010 census in the sample municipalities. The results of models that analyzed change in Black (and Latino) population did not provide additional information and, as such, the variables were left out.

Furthermore, there are other dimensions of racial threat that percent Black residents and percent Latino residents do not capture. For instance, political threat has been measured using the presence of a Black mayor, and economic threat has been measured using indices of racial inequality (Parker et al., 2005; Stolzenberg et al., 2004). Perhaps an indicator of threat should also consider whether departments have a Black
police chief. The presence of a Black police chief could be associated with a higher Black representation among police officers. An important question is whether the measure of racial threat actually influences officer behavior or whether other factors that are associated with large Black and Latino populations explain the outcomes.

Rather than demonstrating that an organization’s structural features are not associated with its performance, the results may reveal a limitation in this study’s measurement of agency structure. Using the size of department, its number of ranks, the diversity and education of its police force may not allow us to see other aspects of an agency’s structure that might be important in influencing traffic stop outcomes. Without conducting more research, we cannot determine why structure was not related to the level of disparity.

Furthermore, one of the control variables that could be measured differently in a future study is the variable that relates to agency leadership. For this study, a measure of stability was included in the analysis represented as the number of police chiefs who led a particular department between 2001 and 2008. This measure is limited in terms of what it tells us about the role of the agency’s leader in terms of changing agency policy and practice. Based on the results of the analysis, the inclusion of the “number of chiefs” variable allows us say that neither the adoption of reforms or levels of disparity were affected by the amount of administrative turnover in a department but it does not provide information about the influence of the chief on officer performance. To capture information about how the chief implemented the reforms, survey questions could ask whether a chief participated in training about racial profiling or convened a working group of command staff, rank and file officers, and community members designed to
produce a consensus approach to deal with the problem. More specific questions about the chief’s level of involvement in such a working group might further our understanding of the extent to which chiefs led departmental reform efforts.

This study was also limited with respect to the outcome variables. It is recommended that data be collected during all officer-initiated traffic stops regardless of the outcome (e.g., warning, citation, arrest) to facilitate the analysis of officers’ decision-making in initiating the stop (Tillyer et al., 2010). However, the data used in the present study included only the traffic stops that resulted in citations being issued. Therefore, rather than predicting factors that influence the level of disparity in all traffic stops, this study was limited to exploring the predictors of disparity in traffic citations issued to motorists of different racial and ethnic backgrounds.

The lack of data on all stops limits our ability to fully understand disparity because we cannot identify the race and ethnicity of drivers who were stopped and did not receive a formal citation. Evidence that Black and Latino motorists are stopped but not cited would suggest that officers are making pretextual stops due to their suspicion of people of color. This limitation is less significant with respect to the dependent variable that measures change in disparity over time because the use of citations alone is consistent with the original study’s almost exclusive use of citations and the same measure was used to compare disparity at T1 and T2. However, it is possible that citation practices of a particular agency may have changed during the course of the study period.
Another limitation associated with the outcome variable relates to the measure of change in disparity that was used in this study. Consistent with the first study (Farrell et al, 2004), the level of disparity was measured by calculating the absolute difference in percentages between those cited by police and the benchmark population (DPE) in each municipality, and change in disparity was determined by subtracting the amount of disparity found at T1 from that found at T2. The problem with this measure is that it may give the appearance that more change has occurred in municipalities with larger minority populations. For example, a municipality that had disparity levels of 1% at T1 and 2% at T2 appears to have changed little compared to a municipality whose disparity level increased from 5% to 10% during the study period. However, both represent a doubling of the original level of disparity. Because of this, the change measure may seem misleading.

Clearly, many questions remain unanswered, and much more information is needed to understand why and how different reforms work. The present study did not attempt to explain the reasons for the observed variations in the adoption of reforms and the levels of disparity across agencies and over time because these are questions that cannot be answered using statistical models. A quantitative strategy was selected to identify factors associated with disparity and change in disparity that would be generalizable to all the municipal police departments across the Commonwealth. Although this method facilitated the analysis of the relationships among a large number of variables, it did not allow for an in-depth examination of the nature of the relationships that could be explored using qualitative research methods.
Future research must include conducting an ethnographic study to see how reforms are being implemented and how their implementation influences the day-to-day actions of police that may or may not result in disparities. Observations would focus on how police make decisions about traffic stops, their training sessions, and dialogue between officers and their supervisors, for example. Other qualitative methods could also be used to probe into the processes and outcomes of racial profiling reforms. For example, evaluation studies could be conducted using agencies that have not yet adopted reforms so that levels of disparity could be tested pre- and post-adoption. A questionnaire study could inquire into the specific methods used to implement reforms. The means by which different agencies carried out the adoption and implementation of reforms could be investigated using a process evaluation. Under this approach, the focus of inquiry would be the operation of the reforms.

As part of a systematic assessment of racial profiling reforms, focus group discussions with officers from different types of agencies in different types of municipalities could contextualize and thus provide a better understanding of what factors might be producing this study’s findings. A limitation associated with this type of inquiry is the possibility that participants will respond in ways they believe are expected of them which may differ from their true beliefs. This is especially true given the sensitive nature of the issue of racial profiling and the public nature of the focus group session. Although these discussions may not reveal as much as an observation study could, other scholars also have recommended that future studies include interviews and focus group discussions with officers to learn more about their decision-making process during traffic stops (e.g., Tillyer et al., 2010).
If they are part of a well-designed study, focus group discussions could provide useful information about officers’ and supervisors’ perceptions regarding their agencies’ goal(s) in conducting traffic enforcement, the way in which it is implemented including the existence of incentives or disincentives for issuing more citations and reducing levels of disparity, and the challenges they experience in enforcing the traffic laws. Information could be elicited about the differences in traffic enforcement practices between officers as well as variations in officers’ attitudes toward traffic enforcement and/or certain types of violations.

Conducting qualitative research would be useful in answering questions about how reforms could be improved, whether there are better alternatives, and whether there are unintended outcomes. Such a study (or studies) would inform the development and improvement of reforms as well as the direction of future research, both qualitative and quantitative.

**Implications and contributions to the literature**

The most significant implication of this research is that changing police policies and practices is challenging. Levels of disparity remained relatively consistent between T1 and T2 and continued to be highest in municipalities with larger Black and Latino populations. Agencies reported that they adopted anti-profiling policies and conducted training but the survey responses may not provide an accurate picture of agency efforts. And, although some leaders in the law enforcement community may have embraced the need for reform to address racial profiling, it appears that they did not alter their
practices to make fairness in traffic enforcement a central goal. For that difficult work to be incorporated into the daily activity of policing, it is likely that more change needs to occur.

Willis et al. (2007) argued that using data and statistics and coordinating with members of the community need to become central concerns in the recruitment, training, and socialization of police to achieve more equality for motorists of all racial and ethnic backgrounds. This requires changing the deeply entrenched culture and norms that exist in police departments. Among the questions that remain unanswered is whether the reforms that were undertaken are ineffective ways of reducing disparity or whether they could be effective if implemented properly. In other words, we need to know more about what prevented change from occurring.

Impediments to change

Police officers and their leaders likely share responsibility for failing to reduce disparity. First, officers had the discretion not to implement the reforms adopted by their departments. We expect that policies set by administrators will flow down to patrol officers who will abide by them, but officers can exercise their power to prevent change from occurring. Manning (1997) describes officers as controlling their work conditions through self-preservation. Therefore, the threat of being held accountable may have served as a disincentive to implementing racial profiling reforms.

Likewise, supervisors may have played an obstructionist role to avoid the responsibility of bringing about the change in practice. Prior research has shown that
first-line supervisors can impede the implementation of reforms (Bayley, 1994; Walker, 1993). Because of their oversight role, they are in a unique position to affect the institutionalization of change (Kelling & Bratton, 1993; Skogan & Hartnett, 1997). The sensitive nature of the issue of race in our country may have discouraged supervisors from engaging officers in frank dialogue. In addition to the discomfort of discussing the possibility that officers use race and ethnicity improperly in performing their duties, the solutions for addressing the problem are not simple. In fact, this research demonstrates that the practices recommended by police professionals and academicians are not particularly effective. Without clear answers about how to reduce disparities, supervisors may not have been willing to exert themselves.

Police administrators may have adopted a defensive stance by failing to analyze their traffic citation data because results of those analyses could reveal that disparities persist. Manning (1997) explained that the bureaucratization of police departments makes it difficult to hold the police accountable for their actions in part because the police maintain control over information. Without transparency about the decisions made by agency leaders, the public cannot know whether reforms were attempted or merely “papered on” (Buerger, 2002, p. 385). With regards to racial profiling, neither traffic citation data nor information about police operations are readily available to the public so it is difficult to evaluate the steps police are taking.

Other reform efforts that have been evaluated similarly demonstrate the difficulty of changing police practices. One such initiative was the attempt to change police response to domestic violence. In 1984, the U.S. Attorney General’s Task Force on
Family Violence issued a report that encouraged domestic violence calls to be given priority and that arrests be the preferred response (Davis & Smith, 1995). Police protocols for responding to domestic incidents were revised to take the decision to arrest away from victims. The goal was to shield victims from possible retaliation from batterers.

New laws enacted across the country either encouraged officers to arrest or made arrest mandatory when probable cause existed. In examining the impact of the legislative change on police behavior, Simpson, Bouffard, Garner and Hickman (2006) noted that “police have a strong incentive to implement these policies in order to appear proactive…. but may be reluctant to change their behavior” (p. 299). Nonetheless, their findings demonstrated an increasing likelihood of arrest during the time period of the study and a significant positive impact of the policy on the likelihood of arrest in Maryland where they conducted the study. The reform initiative appeared to have achieved its goal according to this study however other research on the effectiveness of mandatory arrest for reducing subsequent violence has produced mixed results (Davis & Smith, 1995).

Two differences between domestic violence reforms and those adopted to address racial profiling are important to consider. In contrast with a policy that prohibits racial profiling, the domestic violence policy change clearly eliminated officer discretion by making arrests mandatory. Furthermore, unlike disparity, which is difficult to calculate accurately, arrests—the measure used to assess officer performance with regards to domestic violence calls—are easy to quantify.
Because it is difficult to define and measure acceptable performance and outcomes in the context of race-based traffic enforcement, the task of reforming institutions and people may involve a greater commitment and a consistent effort over time. These considerations give rise to questions about why certain leaders are willing to commit themselves to the goal of reducing racial profiling and how “buy-in” can be achieved from those who do not share their goal.

In order to verify and contextualize the findings of this study, a small discussion group was organized with some police chiefs who met at Northeastern University. The purpose of the discussion was to gather information from a “street perspective” to better understand why adopting reforms did not correspond with changes in practice and reductions in disparity. Prior research on police misconduct reforms shows that efforts to change employee behavior and agency culture were less likely to occur without the support of credible agency leadership (Bratton & Knobler, 1998; Chanin, 2012). As the focus group participants explained:

Sometimes, it only falls with the chief. So the chief has to bring that down within the organization, and … instead of a good thing, it becomes the chief told us we had to. And you don’t get the same type of buy-in. It’s not until you can convince them that it’s for their own good, that you get the true buy-in…. There are still many chiefs in the Commonwealth who feel that, ‘I’ll check it off on the check box and say it was done, but I’m not going to be the one that’s going to continue putting this across to my command staff, to my supervisors that this is important’ (Chiefs focus group, 2011).

Here, the participant conveyed that responses to survey questions may not reveal very much about an agency’s implementation of different reforms. During the discussion, police chiefs shared their belief that many police leaders were not motivated
to implement real change. According to one chief: “there was [sic] a lot of chiefs who were defiant, and simply said, we aren't going to do it” (Chiefs focus group, 2011). These individuals viewed data collection and other reforms as a test that they could complete and put behind them rather than a practice that would become integrated into their daily operations. But research on organizational change shows that reform is sustained only when leaders continue to emphasize its importance and highlight its value after the changes have been made (Skogan & Hartnett, 1997; Ikerd & Walker, 2010). This consistent effort to keep the issue a priority for officers is challenging for agency leaders. One of the chiefs explained: “The guys keep saying ‘When is this going away? When is this going away?’ … [they] think it was an experiment for two years and then it [will be] gone” (Chiefs focus group, 2011).

According to the chiefs who participated in the discussion, the low rate of implementation of some reforms may relate to the shift in priorities that all law enforcement agencies have been required to make in the aftermath of the events of September 11, 2001. One chief explained: “Ten years ago, 25% of the work we do today as police officers didn’t exist. … We saw a major increase in Homeland Security-type training … chemical stuff, hazmat stuff, stuff we’ve never had before” (Chiefs focus group, 2011). Therefore, the significant effort required for an agency to adopt disparity as a performance measure may not be the highest priority of even those police leaders who see merit in it (Weisburd, Mastrofski, McNally, Greenspan, & Willis, 2003).
Another explanation for their failure to conduct data analysis is that, rather than “pushing back” against adopting reforms, some agencies were unable to hire an analyst or find an officer with the knowledge or interest to conduct the analysis for the department. One chief explained that, today, officers are interested in data analysis. “People are sort of talking about data-driven decisions and using numbers way more. … Ten years ago, that was sort of cutting-edge thinking. Now, it’s day-to-day stuff” (Chiefs focus group, 2011). Another challenge the chiefs identified involved problems with the software that EOPSS provided to help with the data analysis.

Some chiefs may have put forth very little effort because they did not believe the 2004 Report on Racial and Gender Profiling presented an accurate picture of their officers’ performance. They were not interested in changing their traffic enforcement policies or practices and, if they adopted any reforms, it was only to satisfy a potential external reviewer. For example, with respect to training, one participant stated: “Let’s face it, some training is more like a CYA so the chief can say: ‘We’ve done all we can. … We can't change [the officers’] minds or get them to understand it’” (Chiefs focus group, 2011).

The participants also discussed the difficulty that supervisors face when talking to officers about the disparities they find in the traffic citation data. Without training, supervisors do not know how to respond when officers react defensively. The consensus within the group was that, in order to really change, there must be a shared conviction in the goal of the reforms within the entire organization. The chiefs expressed their belief that many agency leaders do not perceive racial profiling as an important concern
because it is viewed as a priority only in municipalities located within the Greater Boston area.

Several participants speculated about the reasons why the study found very low percentages of agencies engaged in community outreach. One of them explained that some agencies—primarily smaller ones—had not previously developed a relationship with the minority community in their municipalities and suggested that “some chiefs just don’t know how to identify those members of the community they need a talk to” (Chiefs focus group, 2011). In contrast, larger departments had an ongoing relationship with the minority community so it was easier to engage in discussions about racial profiling and traffic stop data collection. The participant described her department’s approach for the dialogue with members of the community in the following way:

[The community members] want to know what you do with the numbers. As long as you can tell them that you’re not just taking the numbers and filing them away somewhere…. I think if you’re honest with them, and they see you trying, and I think if they see an effort going forward, an educational part, that you’re not hiding things, and you’re willing to talk about it, that this is actually what you’re doing. And I always acknowledge too that we’re not perfect. That yeah, we are still going to get complaints. (Chiefs focus group, 2011)

Motivating officers to change

Given the difficulty of changing police practices, it is unlikely that officers would change their behavior without a system of incentives or disincentives. Studies demonstrate that officer behavior can be influenced through rewards for performing in accordance with agency policies (Bratten & Knobler, 1998; DeJong et al., 2001;
Mastrofski et al., 1994), and researchers believe that fear of discipline can induce officers to modify their behavior (VanMannen, 1985; Wilson, 1968).

In her study of supervisory styles, Engel (2000) found that officer behavior can be influenced by their supervisors. Perhaps because they serve as role models, active supervisors who “[perform] the dual function of street officer and supervisor” had the most influence over their subordinates’ behavior toward citizens (Engel, 2000, p. 273). Interestingly, supervisors were found to influence their subordinates’ difficult-to-monitor behaviors, such as problem-solving activities and use of force rather than arrests and citations, which are easier to monitor. Engel (2000) speculated that, in performing uncertain tasks, officers may need more clarification from supervisors. Therefore, active supervisors have more opportunities to influence behavior when the officer is engaging in highly discretionary duties.

The implications of Engel’s research may be relevant for supervising officers involved in traffic enforcement, an area of policing that involves a great deal of discretionary decision-making. She found that active supervisors who used more aggressive enforcement tactics influenced their subordinates to do the same. Likewise, supervisors who do not emphasize the importance of equitable traffic enforcement may serve as poor role models for their subordinates. On the other hand, supervisors who are committed to the goal of reducing disparity have the potential of influencing officers’ traffic enforcement practices. They may be able to affect the way in which traffic enforcement is performed and thus reduce disparities if they are actively engaged with their subordinates in the field and are setting a good example.
In their study of community policing reform, Rosenbaum and Lurigio (1994) explained that changing officer behavior may be impeded by the fact that reforms are often undertaken without involving the rank and file. Officers and mid-level managers who are informed about the objectives and activities involved in the reform effort are more likely to accept it rather than perceive it as interfering with their primary goals as police (O’Reilly, 2002). More research is needed to determine whether officers and mid-level supervisors in municipal police departments in Massachusetts were asked to participate in the development of reforms, whether they supported the adoption of reforms, and to what extent agency leaders played a role in developing that support. Furthermore, suggestions must be developed about how to involve officers in the reform effort in ways that make them feel invested in finding solutions.

*The challenge of holding officers accountable*

Scholars have concluded that accountability requires data-driven processes to ensure officer compliance with anti-profiling policies and procedures (Tillyer et al., 2010; Warren & Tomascovic-Devey, 2009). When supervisors have the means by which to monitor and hold officers accountable, they can influence officer performance by ensuring their compliance with anti-profiling policies. Therefore, an implication for practice is that agencies must enable supervisors to monitor the policing practices of their officers by providing adequate training and/or technical support so that first-line supervisors can understand how to identify potential problems and how to mentor officers.
Presumably, results could be achieved if police supervisors know how to analyze and use the data to make better decisions. This requires some personnel with training in statistics, which may explain why only one-quarter of the agencies reported they were involved in data analysis. Given the data-related challenges of implementing racial profiling reforms, the Massachusetts Executive Office of Public Safety and Security (EOPSS) supported agencies by creating an electronic tool to collect and analyze traffic stop data and funding the development of technical guides.

The software allowed supervisors to generate reports based on their traffic citation data, and EOPSS provided it to the municipalities that were mandated to collect additional data after the release of the 2004 report. The series of guides was designed by the Institute on Race and Justice (IRJ) at Northeastern University to assist police departments in their efforts to collect, analyze, and successfully use traffic stop data to assess community concerns about racial profiling (IRJ, 2005). The guides include information about auditing traffic stop data, analyzing the data using both internal and external benchmarking, conducting post-stop analyses, and creating community dialogue. With the detailed instructions provided, police chiefs or their designees can learn to calculate standardized scores for each individual officer to internally compare officers and groups of officers and determine the driving population estimate that can be used as an external benchmark. At this time, how and to what extent these resources were utilized is unknown.

The IRJ’s guides encourage supervisors to hold one-on-one discussions with officers to interpret the meaning of racial and ethnic disparities in their traffic stop
outcomes. During these meetings, supervisors are expected to explain the possibility of unconscious bias affecting the officer’s decision-making process during traffic stops (IRJ, 2005). Although this “nonjudgmental approach” for educating officers may be “met with less resistance” (McDevitt, 2009, p. 338), supervisors face a significant challenge in attempting to change officer behavior in light of formal and informal norms traditionally present in most police agencies.

It is not clear that officers who are made aware of the possibility that they were acting in a biased way will alter their behavior. Many people are not receptive to having conversations about race and racial discrimination, which are seen as controversial issues. Officers may balk at the notion that they are treating certain people unfairly when their intention is to enforce the law in an equitable manner. Furthermore, they may resist re-evaluating their traffic enforcement practices if they believe that the residents of their municipality are not concerned about racial profiling.

Because disparities represent a new type of performance measure for most officers who are accustomed to being evaluated based on their “productivity” in arresting offenders or citing traffic violators, officers may be unfamiliar with or uncertain about agency expectations if performance standards are not well defined and clearly communicated. However, if officers are held accountable when their citation data do not meet the agency’s performance standard, they may learn to modify their traffic enforcement practices, regardless of their attitudes and beliefs.

For the past 50 years, scholars and law enforcement professionals have recommended improving police-citizen relationships. The community policing
movement has been premised on the idea of building cooperative relationships between the police and citizens. Despite a lack of empirical support to date, the belief is that it is important—and difficult—for police departments to develop and nurture a relationship with community members. The COPS Office cautions that efforts to engage the community must be “long-term and on-going” to be effective (IRJ, 2008, p. 22). Clearly, simply meeting with community members is not enough. Departments must take the community’s concerns into consideration when developing strategies to respond to racial profiling.

In some departments, there is strong internal resistance to this type of reform. Therefore, the implementation of reform tends to be superficial and does not disrupt existing agency practices that are seen as successful in controlling crime. Having studied two major reform movements in American policing, Willis and Mastrofski (2011) concluded that “police agencies have shown a remarkable capacity to absorb reforms while buffering core structures and practices from change” (p. 58). Although outward appearances may change, standard practices generally remain intact. The results of the present study appear to confirm their observation that profound changes may take time to achieve.

Clearly, we are a long way from reducing racial disparities in traffic stops. The issue is complicated because it reflects the societal challenge of coming to terms with our racist past. The effectiveness of reforms likely depends on an agency’s level of commitment to fairness in traffic enforcement and its willingness to engage members of the Black and Latino communities in their municipalities to achieve that goal but more
research is needed to understand what reforms can reduce disparity in traffic citations and how they should be implemented to produce the best results. In the meantime, stakeholders and policy-makers in every community must decide what levels of racial disparity are acceptable if they wish to avoid being told what is acceptable by a court. The use—or perceived use—of race as a factor in police decision-making impacts the public’s overall trust and confidence in the law and in the police as enforcers of the law. This reduced trust and confidence in the law has many negative implications such as reduced participation in governmental support activities, which include reporting criminal behavior and testifying in criminal trials. Thus, to avoid further undermining the legitimacy of the law in American communities, the problem of racial profiling must be addressed.
Appendix A

SURVEY
Traffic Stop/Racial Profiling Data Collection

All survey responses will remain confidential. Information about your individual agency and about the person completing the survey will not be made publicly available. Statistics will be reported in the aggregate only.

Please respond to the following questions as accurately as possible. If you do not have specific information, please provide your best guess.

If you have any questions, please feel free to contact me by phone 978-804-7034 or email hakstian.a@husky.neu.edu.

1. How many full-time sworn officers do you have in your department?
   - 0–10
   - 11–30
   - 31–50
   - 51–100
   - over 100

2. In which county is your community located?
   - Middlesex
   - Worcester
   - Essex
   - Barnstable
   - Dukes
   - Berkshire
   - Hampden
   - Hampshire
   - Suffolk
   - Norfolk
   - Bristol
   - Nantucket
   - Plymouth
   - Franklin
3. Did any members of your department receive training regarding traffic stop data collection or analysis or bias-based policing before 2004?

☐ No  ☐ Yes

If yes, please specify who received training:

☐ Entire department  ☐ Supervisors only  ☐ Members of the patrol division only  ☐ Other (specify): ________________________________

4. Did any members of your department receive training regarding traffic stop data collection or analysis or bias-based policing since 2004?

☐ No  ☐ Yes

If yes, please specify who received training:

☐ Entire department  ☐ Supervisors only  ☐ Members of the patrol division only  ☐ Other (specify): ________________________________

5. If members of your department have had any training regarding traffic stop data collection or analysis or bias-based policing since May 2004, please indicate what type of training was conducted?

(check all that apply)

☐ Roll call  ☐ In-service training  ☐ Police academy  ☐ Specialized off-site training with outside agency (e.g. Mass. Chiefs Association, Municipal Police Institute, PERF, Police Foundation, Regional Community Policing Institute, other)

Please specify the agency or agencies that conducted the training:

__________________________________________________________

6. Is your department currently collecting information regarding the race and gender of motorists on all traffic stops?

☐ No  ☐ Yes

If yes, please check all that apply:

☐ Use form supplied by EOPSS  ☐ Modified existing CAD system to collect data  ☐ Other (specify): __________________________________________
7. Are you aware of any complaints from motorists over the past five (5) years alleging racial profiling against your department concerning traffic enforcement?

☐ No    ☐ Yes

If yes, please specify:

a. How many complaints were received in the past 5 years: ______

b. What has your department done as a result of such complaint(s)?
   (check all that apply)
   ☐ Investigated
   ☐ Met with complainants
   ☐ Met with community groups
   ☐ Provided training or discipline, as deemed appropriate
   ☐ Other (specify): __________________________________

8. Has your department adopted a Policy & Procedure or a similar document (General or Special Order, Rule & Regulation, or Standard Operating Procedure) on racial profiling or biased policing?

☐ No    ☐ Yes

If yes, specify approximately what year the policy/order/rule was adopted.

☐ Before 2001        ☐ Between 2001 and 2004
☐ Between 2004 and 2006 ☐ Between 2006 and 2010
☐ Not sure

9. Since the release of the EOPSS report (in May 2004), has your department conducted any analysis of your traffic stop data demographics?

☐ No
☐ Yes, for at least one year
☐ Yes, continuously since then and analysis is still ongoing

If yes, specify what method was used (check all that apply):

☐ Have not used any software package to enter/analyze data
☐ Bearingpoint (supplied through Executive Office of Public Safety)
☐ IMC reports
☐ Tiburon
☐ Intergraph
☐ Larimore
☐ Conducted our own internal analysis
☐ Other (specify):
_____________________________________________________________________________
10. Since May 2004, has your department participated in meetings with members of your community to discuss the issue of racial profiling and/or data collection?

☐ No  ☐ Yes  ☐ Unsure

If your department has not participated in meetings with members of your community, please skip to question 13.

11. If your department has participated in meetings with members of your community around the issue of racial profiling and/or data collection (since May 2004), how did they come about and how often have they taken place? (check all that apply)

- Initiated by the department
- In response to a request from a local community group or local advocacy group
- In response to a request from officials in the city or town
- In response to a request from organizations outside the city or town
- Other (please specify): __________________________

12. If your department initiated meetings with members of your community (after May 2004), what groups were invited to the meetings, and who attended the meetings? (check all that apply)

<table>
<thead>
<tr>
<th>Invited</th>
<th>Attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents ..............................................</td>
<td>☐</td>
</tr>
<tr>
<td>Business community ..................................</td>
<td>☐</td>
</tr>
<tr>
<td>Neighborhood Crime Watch or neighborhood community policing group members .......................</td>
<td>☐</td>
</tr>
<tr>
<td>Other city agency officials ..........................</td>
<td>☐</td>
</tr>
<tr>
<td>Youth group members ..................................</td>
<td>☐</td>
</tr>
<tr>
<td>Church group members ..................................</td>
<td>☐</td>
</tr>
<tr>
<td>Advocacy group members ...............................</td>
<td>☐</td>
</tr>
</tbody>
</table>

Other (please specify): ____________________________________________________________________________
13. In your opinion, how helpful would each of the following strategies be to support your department’s efforts to prevent or address perceptions of racial profiling in the future?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Very Helpful</th>
<th>Helpful</th>
<th>Unsure</th>
<th>Not Helpful</th>
<th>Very Unhelpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training for supervisors or chiefs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training for patrol officers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical assistance in doing data analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial support for data entry or analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical assistance for discussions with your community</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other (please specify): ____________________________

14. Does the chief or any supervisor(s) review your department’s traffic enforcement records (such as citations) on a regular basis?

☐ No  ☐ Yes

If yes, how often does this usually happen?

☐ Daily  ☐ Once a week  ☐ Once a month  ☐ Annually

15. Is someone assigned to supervise the data collection on traffic stops in your department?

☐ No  ☐ Yes  If yes, what is that person’s rank? ________________________

16. Is someone assigned to analyze data on traffic stops in your department?

☐ No  ☐ Yes  If yes, what is that person’s rank? ________________________

17. Is someone assigned to audit (check for accuracy) the data in your department?

☐ No  ☐ Yes  If yes, what is that person’s rank? ________________________
18. What is the approximate percentage of officers in your department who are:

<table>
<thead>
<tr>
<th>Group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>__________%</td>
</tr>
<tr>
<td>African American</td>
<td>__________%</td>
</tr>
<tr>
<td>Latino/Hispanic</td>
<td>__________%</td>
</tr>
<tr>
<td>Asian</td>
<td>__________%</td>
</tr>
<tr>
<td>Other</td>
<td>__________%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

19. What is the approximate percentage of officers in your department who have achieved the following educational levels?

<table>
<thead>
<tr>
<th>Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school or GED</td>
<td>__________%</td>
</tr>
<tr>
<td>Some college</td>
<td>__________%</td>
</tr>
<tr>
<td>Completed college</td>
<td>__________%</td>
</tr>
<tr>
<td>Some graduate school</td>
<td>__________%</td>
</tr>
<tr>
<td>Completed graduate school</td>
<td>__________%</td>
</tr>
<tr>
<td>Other</td>
<td>__________%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

20. How many officers hold the rank of sergeant or above in your department? _________

21. How long have you been chief of this department? ________________

On occasion, a researcher may need to follow up to obtain clarification or to ask additional questions. If you are willing to be contacted for this purpose, please complete the following:

Name of department (optional): ______________________________________________________

Respondent (optional): ______________________________________________________________

Respondent’s rank (optional): _________________________________________________________

Date: ___________________________________________________________________________

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY.
__________ Police Department
Address
City/Town, MA

August 2, 2010

Dear Chief __________,

Two years ago, the Executive Office of Public Safety and Security surveyed all law enforcement agencies in the Commonwealth to learn about the steps they had taken to address concerns about racially disparate traffic stops and to gather information about their traffic stop data collection practices. As a result, we learned a great deal about the measures that are under way in municipalities in Massachusetts.

Nationally, police departments have undertaken a variety of measures to address concerns about biased traffic enforcement including: adopting policies, collecting and analyzing data on traffic stops and searches, conducting training, and participating in meetings with community members on the issue of racial profiling and data collection. Because researchers have not yet evaluated how well these efforts address the problems of racially disparate traffic stops and searches, we do not yet know if taking these steps reduces such disparities.

The attached survey is designed to gather more detailed information about the policies and practices that municipal police departments are utilizing to address racial profiling in their communities. Surveys will be assigned a unique numeric identifier allowing us to separate agency names from survey responses. Any identifying information about the response of particular agencies will be kept confidential for the duration of the study and will be destroyed at the conclusion of the study. The person completing the survey is not required to identify him/herself or the police department. Information about your individual agency and about the person completing the survey will not be made publicly available.

Given that the purpose of the study is to determine whether certain types of police agencies in certain types of communities encounter more challenges in addressing concerns about racial profiling, statistics will be reported in the aggregate by agency characteristic, not by agency name. While no agency specific data will be made public, I would be happy to provide your department with your agency’s specific findings and make myself available to discuss them with you at the conclusion of the study.

The survey can be completed and returned in the enclosed envelope. If you encounter any questions as you are completing the survey or if you wish to discuss the use of the survey findings, please feel free to contact me by phone (978) 804-7034 or email hakstian.a@husky.neu.edu or to contact my dissertation advisor, Dr. Amy Farrell at (617) 373-7439 or am.farrell@husky.neu.edu. If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection at (617) 373-7570 or irb@neu.edu. You may call anonymously if you wish.

Thank you in advance for your participation in this study.

Sincerely,

Anne-Marie Hakstian
Doctoral candidate, Law, Policy, and Society Program
July 20, 2010

Dear Police Chief,

Three years ago, the Executive Office of Public Safety and Security (EOPSS) surveyed all police departments in the Commonwealth to gather information about their traffic stop data collection practices and their efforts to address concerns about racially disparate traffic stop practices. As a result we learned that many agencies continue to this day to collect and analyze traffic stop and citation data, and that many others had collected and analyzed their traffic stop data at one time but were no longer engaged in ongoing data collection. In addition, we learned that there may be limitations in the ability of agencies to enter and analyze their data. In fact, a majority of police departments reported that training, technical assistance, and support for traffic stop data analysis would help them to address perceptions of racial profiling in the future.

Working in collaboration with EOPSS and the Massachusetts Chiefs of Police Association, researchers at Northeastern University have designed the enclosed survey to gather more detailed information about the policies and practices that municipal police departments are utilizing to address biased policing in their communities. It is being distributed to law enforcement leaders throughout the Commonwealth and consists of questions about measures that police departments have undertaken relative to traffic stop/racial profiling data collection practices. The information that is obtained will improve our understanding of what initiatives may have the greatest impact on reducing disparity levels and identifying best practices.

We believe that the survey will be extremely helpful in illuminating the work law enforcement agencies throughout the Commonwealth have been doing to address racial profiling. Following the return of the surveys, analyses will be conducted to provide aggregate information about innovative practices that have been effective in addressing public concerns about agency responsiveness to previous research identifying racial disparities in traffic stops. The responses from the enclosed survey will be anonymous, but the aggregate findings will be included in an academic paper and reported back to EOPSS and the Massachusetts Chiefs of Police Association to improve our knowledge about responses to racial profiling and strategically address concerns by stakeholders outside of law enforcement about the practices in our profession.
Your cooperation and participation in this research is important in improving our understanding of traffic stop and racial profiling data collection practices across the Commonwealth. Please take the time to complete the enclosed survey. If you have any questions about the research project, please feel free to contact Anne-Marie Hakstian (978-804-7034 or hakstian.a@husky.neu.edu) or Dr. Amy Farrell (617-373-7439 or am.farrell@husky.neu.edu). If you have questions about our support of this study, please contact us at (508-839-5723).

Thank you in advance for your participation in this study.

Sincerely,

Mary Elizabeth Heffernan
Massachusetts Secretary of Public Safety

Chief Mary R. Lyons, President
Massachusetts Chiefs of Police Association, Inc.

EXEcutivE COMMITTEE, Continued

Chief Lincoln W. Miller
Marion (Plymouth)

Chief Brian A. Kyes
Chelsea (Suffolk)

Chief Peter F. Roddy
Leominster (Worcester)

Chief Patrick T. Foley
Douglas (Worcester)

Life Member
Chief David F. Casolino (Ret.)
Falmouth
Appendix B
Driving Population Estimate

The IRJ’s study that culminated in the Massachusetts Racial and Gender Profiling Report (Farrell et al., 2004) used four different measures of disparity. They consisted of the level of disparity in: 1) traffic citations given to residents, 2) traffic citations given to all drivers including those who drive through but do not reside in a particular community, 3) the likelihood of being searched once cited, and 4) traffic citations versus written warnings (Farrell et al., 2004). The benchmarks used for each measure of racial / ethnic disparity are described below.

The first measure compared the racial demographics of the municipality’s residents who were issued citations against the residential population of that city. The researchers used the 2000 U.S. Census Bureau statistics of individuals who are 18 years of age and older to determine the racial and gender demographics of the resident populations in each municipality.

The second measure compared the race of all motorists who were issued citations against the estimated driving population in each municipality. The driving population estimate (DPE) was calculated using research from the field of transportation planning to identify factors that “push” drivers out of surrounding municipalities (e.g., the percentage of people who drive more than 10 miles to work) and that “draw” drivers into target cities from surrounding communities (e.g., percent of state employment and percent of state retail trade). Creating the Driving Population Estimate (DPE) involved estimating the degree to which surrounding cities contribute to the driving population of the target city, calculating the total population and demographic breakdown of each potential contributing city, determining how many people were eligible to be
“pushed” from each city, and the degree to which each city “draws” in drivers from surrounding communities.

The factors used to measure “push” were 1) the percentage of people within the community who own cars, 2) the percentage of people who drive more than 10 miles to commute to work, and 3) the travel time (in minutes) between the contributing city and the target city. The factors used to construct measures of “draw” in each target city were 1) percent of state employment, 2) percent of state retail trade, 3) percent of state food and accommodation sales, 4) percent of state recreation and amusement sales, and 5) percent of state average daily road volume. The average of these five measures was taken for each city to create a final ranking of the relative “draw” power for each city. Among the 202 study cities, 55 are “no draw” cities; therefore, the DPE benchmark is identical to a simple census benchmark for those municipalities.

The third measure examined the likelihood of being searched once the motorist was stopped based on race/ethnicity. The study identified the proportion of citations issued to White motorists that resulted in a non-inventory search and compared it to the proportion of citations issued to non-White motorists that resulted in a non-inventory search. A non-inventory search can be based on the motorist’s consent, probable cause, reasonable suspicion, or incident to arrest. A test of statistical significance was used to measure the probability that the observed differences in search rates were solely due to chance.

The fourth measure compared the proportion of drivers who were issued a written warning to those who were issued a citation by race/ethnicity. Again, a measure of statistical significance was used to determine when observed racial differences in dispositions were due solely to chance (Farrell et al., 2004).
For the present study, the DPE was used to calculate the level of disparity in a municipality. The level of disparity is the difference between the percentage of traffic citations issued to motorists in each racial and ethnic category and the percentage of each racial and ethnic category that constitutes the DPE in the municipality. For example, 37.1% of all citations issued by the Boston Police Department in 2008 were issued to Black motorists. The DPE for Black drivers in Boston is 14.1%. Therefore, the level of disparity equals 23.0%. See also, Fridell (2004). By the Numbers: A Guide for Analyzing Race Data from Vehicle Stops, Chapter 5: Benchmarking with Adjusted Census Data. Washington, DC: Police Executive Research Forum.
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