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Chicken Little, Three Blind Men and an Elephant, and “Racial Profiling”:
A Commentary on the Collection, Analysis, and Interpretation of Traffic Stop Data

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Abstract

This paper discusses the collection, analysis, and interpretation of police traffic stop data. The focus primarily is on the theoretical, statistical, and practical determination of whether law enforcement is engaging in “racial profiling.” One of the most controversial components of research in this area relates to the “baseline” or comparison group. Researchers struggle with determining whether agencies are engaging in “racial profiling” when making traffic stops without some measure of what the world would look like in the absence of “racial profiling.” We know what “*is*,” but how can we know what “*should be*?” A model is proposed that delineates between populations and subpopulations of drivers. In addition, arguments are presented that current proxy measures are inadequate as “baselines,” and that a careful determination of the appropriate population for comparison is essential in reaching any conclusions about the profiling practices of any department. Further, it is argued that data from a population of stops within any agency become the baseline for comparison through the use of multivariate (CHAID) analysis, and through comparisons to future data collected by that agency.

Introduction

“The sky is falling,” Chicken Little exclaimed in a classic children’s tale with a moral on the consequences of making conclusions based on limited data and analysis. Social scientists might be likened to Chicken Little in that we often can obtain only bits and pieces of information about an issue or problem, but we try to use those bits and pieces to form broad, over-arching conclusions about the “bigger picture.”

Another allegorical tale with similar implications is the story of three blind men and an elephant. As each blind man collects data from various parts of the elephant within his reach, each reaches a different conclusion about the identity and character of the elephant. In fact, none derives the correct conclusion. If the storyteller had continued this tale, we might have discovered that reaching erroneous conclusions based on access to limited data has serious and far-reaching implications. We certainly see this in social science research (e.g., degeneracy theory, eugenics).

Currently, society is faced with several situations in which the first impulse is to quickly draft legislation, enact mandates and consent decrees, and apply solutions when the problems still have not been well defined. Communities across the United States, for example, are struggling with issues relating to the discretionary powers that society has bestowed upon law enforcement officers. In the past few decades it seems that allegations of police brutality, excessive use of force, abuse of power, and racial discrimination have spread like contagion across the country. One particularly thorny issue that has generated research, policy, legislation, court decisions, and controversy in the past ten years is the use of discretion in decisions to stop motorists.

Law enforcement agencies recently have been scrutinized as to the quality and quantity of their traffic stops, specifically as to the racial/ethnic distribution of the motorists stopped. Agencies and officers have been accused of “racial profiling,” or stopping motorists simply because of their racial/ethnic origins.

The precise definition of “racial profiling” is a matter of debate. While no universal definition exists, it generally is regarded as any act by law enforcement, whether it involves motorists or pedestrians, based solely on the race of the alleged violator (Ramirez, McDevitt & Farrell, 2000). More specifically, the U.S. Department of Justice considers racial profiling “any police action that relies upon the race, ethnicity or national origin of an individual rather than behavior of that individual that leads the police to a particular

individual who has been engaged in or having been engaged in criminal activity” (Ramirez, McDevitt & Farrell, 2000, p. 3).

At the heart of the issue is the claim that officers use a driver’s racial/ethnic origin in their decision to stop a particular motorist or a particular group of motorists, and that this racial bias is reflected in the racial distribution of drivers at various decision points throughout the stop event. These stop events include, but are not limited to: 1) the initial stop and the reason for the initial stop; 2) asking the driver to exit the vehicle; 3) running a warrant check; 4) requesting a consent search; 5) conducting a search; 6) seizing property; 7) detaining the driver; and 8) warning, citing, or arresting the driver.

This paper focuses on the initial stop given that this is where most descriptive analyses in prior studies have determined the presence of “racial profiling.” Prior researchers based these decisions on disparate or disproportionate stops of minority drivers compared to their representation in some population (ACLU, 2000; Harris, 1999; Lamberth, 1996; State of New Jersey v. Pedro Soto, 1996; Spitzer, 1999; Verniero & Zoubek, 1999).

This paper argues that one cannot determine whether a particular department is “racially profiling” simply by comparing percentages. Further, it questions whether a determination can be made at all given the difficulties involved with measuring the most appropriate “baseline” or comparison population.

The Baseline Dilemma

How does one measure “racial profiling?” That is, how can one determine whether drivers are being stopped in the “right” racial proportions? What *is* the racial distribution of stopped drivers and what *should* it be? Determining what “should” be is problematic.

Calls for the appropriate “comparison group” or “baseline” are becoming louder and more frequent. Prior studies have used various comparison groups to determine the baseline to which stopped drivers should be compared. Prior comparison groups have compared the racial distribution of drivers stopped to: 1) the racial distribution of the area as defined by census tract data (ACLU, 2000; Cox, Pease, Miller, & Dyson, 2001; Landsdowne, 2000; Spitzer, 1999; Texas Department of Public Safety, 2000; Verniero & Zoubek, 1999); 2) the racial distribution of persons of driving age in the area (Cordner, Williams, & Zuniga, 2000; Harris, 1999; Smith & Petrocelli, 2001; Washington State Patrol, 2001); 3) the racial distribution of licensed drivers in the area (Zingraff, et al., 2000); 4) the racial distribution of drivers

driving on the roadways, as determined by stationary observation; 5) the racial distribution of speeders driving on the roadways, as determined either by stationary or rolling surveys (e.g., Lamberth, 1996a, 1996b; Smith, et al., 2000); and 6) the racial distribution of drivers involved in accidents (Washington State Patrol, 2001).

The most basic, and most flawed, method is to compare the racial distribution of drivers stopped to the racial distribution of the area population as defined by census data (comparisons 1-3 above). In fact, all of the methods that rely on census tract information are inherently flawed for a variety of reasons. First and foremost is the fact that drivers through any particular area do not necessarily live in that area. This is true in municipal locations and would seem to be more particularly true for interstate traffic stops, given that there really is no residential area associated with any particular stretch of interstate.

For example, in two unpublished agency reports of traffic stop practices in Louisville, Kentucky and in Iowa City, Iowa, the authors found that 37% and 38% of stops made (respectively) were *not* of city residents (Edwards, Grossi, Vito, & West, 2002a, 2002b). Given that Louisville and Iowa City are extremely divergent in terms of city characteristics, this consistency is telling. It is likely to hold true across all jurisdictions, with the possible exception of very rural areas, and even may be magnified in larger cities where there are more significant proportions of commuters. This problem alone is enough to invalidate census comparisons.

More accurate comparisons involve drivers actually driving on the roadways. Several studies have used stationary surveys, posting observers along stretches of highway or at selected intersections to observe the racial/ethnic distribution of passing motorists.

Problems associated with stationary observations include the difficulties of estimating a driver's race/ethnicity when they are in a moving vehicle and the possibility that any selected intersection may be more or less busy during any particular observational period and may include different distributions of drivers on any given day at any given time.

Rolling surveys also have been used to estimate driving populations. In these situations, trained observers and recorders drive along selected portions of the roadways and attempt to estimate the racial distribution of fellow drivers.

Meehan and Ponder (2002) studied roadway composition and improved on previous studies by estimating “the driver composition for an entire community over a 2-week time period...using a rolling observational technique that mimics police patrol” (p. 310). These authors also used police data that included not only stop data, but also data on proactive Mobile Data Terminal (MDT) queries, such as the practice of “running plates.” This helped evaluate police surveillance activity in the absence of a traffic stop.

Finally, this study compiled police and roadway composition data over the same seven days. This enabled the researchers to “compare rates of police query and stop and ticket behavior with the composition of drivers on the road way with confidence that the distribution of drivers [they] observed on the roadways at various times and in various places reflects the composition of drivers the police were able to observe at the same time and place” (p. 311). This helped the authors “to establish an important linkage between race and place” (p. 311).

This study resulted in several interesting findings: 1) drivers did not drive on the roadways in proportion to their representation in the community. Black drivers in this study comprised less than 3% of the residential population, but were 13% of the drivers on the roadways. This figure, however, varied from a low of 3% to a high of 49%, depending on place. Greater proportions of Black drivers drove nearer the Black communities and fewer drove near the White communities; 2) Black drivers were proactively queried at rates higher than their representation in the driving population. They were about twice as likely as White drivers to be proactively queried. These figures again, however, varied dramatically by place. Rates increased as Black drivers moved away from Black communities toward White communities; 3) Black drivers were stopped at rates three times higher than their representation in the driving population. Once more, these rates varied by place (higher toward the White communities and lower toward the Black communities).

Instead of concluding that the officers in this city were racially biased, Meehan and Ponder argued that the “race and place” effect is a by-product of police training, police assignment and societal expectations. They claimed that, “important contextual factors, other than race may play a role in understanding police behavior” (p. 329). These factors include “community-wide practices of segregation that creates the gestalt for all citizens, including the police, of who belongs and who does not belong in

certain places” (p. 330). Further, they concluded that, “racial profiling by the police appears to reflect community practices of racial segregation,” and therefore is an “institutional phenomenon that may be shaped by organizationally specific practices (i.e., sector assignments) unrelated to race, per se” (p. 330).

As much as this study is a drastic improvement over prior studies that have used the rolling observational techniques, the question still remains as to why the racial distribution of stopped drivers would necessarily mirror the racial distribution of all drivers. In fact, this study illustrated that it does not, and perhaps should not, and that these distributions vary dramatically by place (see also Meehan & Ponder, 2002b).

Other rolling observations have attempted to document the racial distribution of law-violating behavior. This is in response to the recognition that the most appropriate population of comparison for stopped drivers is not who is driving, but who is driving in such a way that would make them eligible to be stopped by the police (Edwards, et al., 2000a; 2000b; Buerger & Farrell, 2002; Meehan & Ponder, 2002a, 2002b; Farrell, McDevitt & Buerger, 2002; Langan, Greenfeld, Smith, Durose, & Levin, 2001).

These attempts, however, are rare. One of the most notable examples is from Lamberth, who used rolling observational techniques to determine the racial/ethnic distributions of drivers and of speeders on selected portions of roadways in both New Jersey (New Jersey v. Soto, 1996) and in Maryland (Lamberth, 1996). The observers were instructed to drive the speed limit and to count drivers who passed them as “violators.” Others actually have equipped observers with stopwatches to determine speeding behaviors (Smith, et al., 2000), attempting to estimate actual speed rather merely classifying drivers as violators or non-violators.

The primary problem in using data about the racial distribution of speeders is that motorists not only are stopped for speeding. In fact, in Louisville, Kentucky, although 69% of the stops were for “moving violations,” only 37% were for speeding, per se (Edwards, et al., 2002a). This means that 63% of the stops were not for speeding and would not have been documented in these rolling observations.

Traffic Stop Baseline Model

So, what population establishes the most appropriate baseline? Should we compare stopped drivers to drivers who were not stopped? Baldus and Woodworth (2002) argue that, “to test the extent to which race may be a systemic factor in the exercise of officer discretion to stop motorists, one would

ideally have information on the racial characteristics of the people who were not stopped. This would enable us to compare the racial composition of those stopped with those who were not stopped” (p. 2). They subsequently claim that one cannot make inferences about the presence or absence of “racial profiling” without knowing the “proportion of minorities among all the drivers who could have been stopped but were not” (p.2). This comment is qualitatively and quantitatively different from their earlier argument. Drivers who were not stopped are different from drivers who *could* have been stopped but were not.

At this point, a distinction must be made between two subpopulations of drivers (see Figure 1, following page). At any given time on any given day at any given location under any given set of circumstances, there is a population of drivers. That population of drivers can be divided into two mutually exclusive categories:

Subpopulation #1: “Abiders”

Abiders are drivers generally “not eligible to be stopped” because they are not doing anything illegal or anything that would otherwise bring them to the attention of law enforcement. Abiders *should not* be stopped by the police.

Subpopulation #2: “Violators”

Violators are drivers “eligible to be stopped” because they are doing something that brings them to the attention of law enforcement (weaving, improper lane changes, failure to signal, speeding, reckless driving, expired plates, inoperable equipment, etc.). Violators *should* be stopped by the police. By all accounts, this subpopulation consists of the majority of drivers (most drivers could be considered violators, primarily for speeding). In fact, a survey by the National Highway Traffic Safety Administration (NHSTA) found that 84% of surveyed drivers reported seeing speeding or other unsafe driving all or most of the time (NHSTA Traffic Tech 186, 1999).

One can divide abiders and violators into drivers “stopped” and “not stopped.” Theoretically, “stopped” drivers should consist only of violators. “Not stopped” drivers, on the other hand, include both abiders and violators; abiders should not be stopped and it is impossible to stop all violators.

The job of law enforcement is to stop the violators (and conversely, not stop the abiders). But given that the violators are so numerous, law enforcement officers use their discretionary powers in determining who to stop and who to not stop. It is logical to assume that only the most serious or most obvious violators are the ones who attract law enforcement attention. As a result, most violators are not stopped and abiders sometimes are.

ALL DRIVERS

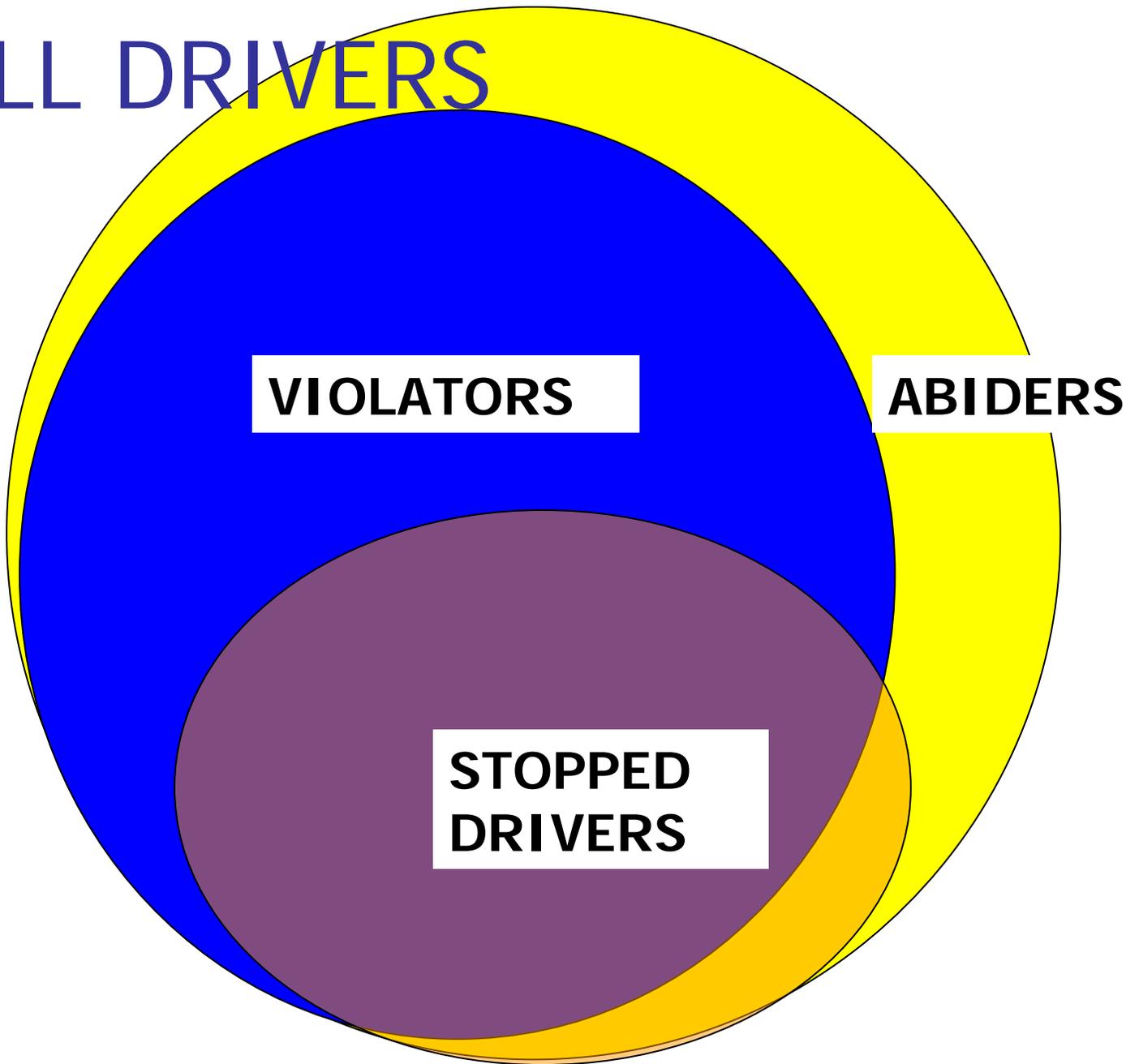


Figure 1: The Driving Population of Abider, Violators, and Stopped Drivers

In this model, there are four possible combinations of outcomes—two of which involve the possibility of discriminatory practices:

- 1) *Abiders who are not stopped* (the yellow section)
Abiders should not be stopped and are not = **No discrimination.**
- 2) *Violators who are stopped* (the purple section)
Violators should be stopped and are = **No discrimination**
- 3) *Abiders who are stopped* (the orange section)
Abiders should not be stopped and are = **Possible discrimination**
- 4) *Violators who are not stopped* (the blue section)
Violators should be stopped and are not = **Possible discrimination**

Therefore, there are two potential sources of discrimination in police stop practices, stopping drivers who should not be stopped, and not stopping drivers who should be stopped (outcomes #3 & #4 above). It is interesting to note that research efforts to date have focused on scenario #2—violators who are stopped—given that the only information we have is from traffic stops. Theoretically, this is not a potential source of discrimination since an officer must give a valid reason for stopping any vehicle (the driver is a violator, per se, and should have been stopped). Whether the driver believes the stop is valid is another question. The real focus of inquiry should be on outcomes #3 and #4.

Those who say that police “racially profile” seem to have two main contentions:

- 1) minority abiders are wrongfully stopped at higher rates than white abiders (and conversely, white abiders are rightfully not stopped at higher rates than minority abiders). In this case, minority drivers allege that they are stopped **ONLY** because of their skin color. They were not doing anything that would make them eligible to be stopped as a violator;
- 2) minority violators are rightfully stopped at higher rates than white violators (and conversely, white violators are wrongfully not stopped at higher rates than minority violators). In this case, minority drivers acknowledges that they were doing something that would make them eligible to be stopped (they are violators), but law enforcement disproportionately targets them rather than white violators.

For the first contention, the most appropriate comparison group would be the subpopulation of abiders who were not stopped. The racial distribution of abiders not stopped should approximate the racial distribution of abiders who were stopped. That would mean that law enforcement was stopping people of both races equally when they should not have been stopped. Stopping people who should not be stopped is a problem in itself and would need to be addressed by management. Proving that a person should not have been stopped, however, is problematic, given that law enforcement officers have at their disposal a wide variety of reasons for making a traffic stop.

For the second contention, the most appropriate comparison group would be the subpopulation of violators who were not stopped. The racial distribution of violators not stopped should approximate the racial distribution of violators who were stopped. This would mean that law enforcement was stopping people of both races equally when they should have been stopped. This logic, of course, is based on the questionable assumption that violation severity is evenly distributed among the races (i.e., no one race is committing more severe/serious violations that are more likely to attract law enforcement attention). This may or may not be the case. If violations are not evenly distributed among sexes, ages, marital statuses, education levels, etc. (NHTSA, 1999), it is not beyond the realm of possibility that they would not be evenly distributed among racial/ethnic categories.

For both of these situations, however, *the problem lies in determining the racial distribution of abiders and violators who were not stopped*. Currently, *there is no measure of the racial distribution of who is not stopped by the police*. Obtaining data on who is not stopped is similar to obtaining data on crime that is not reported (i.e., the “dark figure of crime”).

Finally, these populations and subpopulations constantly are changing depending on the time of day, the day of week, the week, the month, the season, the weather, social events, location, and many more factors. With such a constantly changing population, how can one devise a valid measure of its characteristics? For example, think of the population driving in any particular city on Sunday at 9:30 am. Are those drivers different from drivers on Sunday at 1:30 am? In Iowa City, for example, 41% of stops were between midnight and 3:00 am (Edwards, et al., 2002b). Drivers on the road at this time are unlikely to reflect the resident population of Iowa City, or of any city. Thus, it is ridiculous to assume that any population of drivers reflects the resident population (even the resident licensed driver population) of any community or surrounding area (with the possible exception of very rural areas).

Current Data as the Baseline

As to the validity of making conclusions without comparison populations, it seems preferable to use valid data from a population of stops as a basis for comparison rather than to make invalid comparisons to poorly devised proxy measures. Exhaustive documentations of a department’s traffic stop practices over a period of time should be used as a management tool, in conjunction with other measures of police performance, including citizen satisfaction surveys, complaints, reports of excessive force, etc. Data and

statistical analyses cannot substitute for good police-community relations, but primarily serve as an additional way for law enforcement agencies to measure their performance in this area.

Moreover, multivariate techniques, such as Chi-square automatic interaction detection (CHAID), used in the Louisville and Iowa City studies, provide the baseline from which the data can be evaluated. Data were collected pertaining to the *population* of stops. Each event can be computed as to its likelihood for the entire group. Sub-group comparisons then can be made to that figure. For example, in Iowa City, the base rate for receiving a moving violation was 68.6% for the population (Edwards, et al., 2002b). This means that, in the entire population of stops, 68.6% of the stops were made for a moving violation. CHAID determines whether any group (determined by race, sex, age, residency, etc.) received moving violations at significantly higher rates than the base rate for the entire population. If the CHAID analysis determined that race was a primary factor in any event (i.e., significantly related when controlling for all other measured factors), then one would have more valid evidence of bias.

In Iowa City, for example, certain age groups of drivers (younger) were at significantly higher risk than others for being stopped for moving violations (Edwards, et al., 2002b). This means that age was the primary factor (controlling for all other measured factors) in whether a person received a moving violation in Iowa City over the term of the study. This is supported by data from the National Highway Traffic Safety Administration (NHSTA) that indicate younger drivers report the highest levels of driving through stop signs without slowing, weaving back and forth between lanes, tailgating, driving through red lights, making an angry or obscene gesture or comment, cutting off another car, and driving under the influence (NHSTA, 1999). These all are things that could result in moving violations.

Conclusion

The main arguments of this paper are methodological. It does not attempt to deny that individuals have been targets of unjust police actions. It also does not attempt to justify those actions. Instead, it questions whether we have obtained a clear understanding of the issues involved. Moreover, it questions whether we have the ability to obtain a clear understanding of the issues given the numerous and varied human factors involved. These are questions related to the collection of traffic stop data.

Thirty-nine states have passed legislation regarding the collection of race and ethnicity data on motorists (Bureau of Justice Statistics, 2001). Affected agencies collect a variety of data elements in their

attempts to determine whether officers are engaged in discriminatory stop practices. Some collect a minimal amount of data such as the race, age, and sex of the driver, along with the reason for the stop and the stop outcome. Other agencies collect data pertaining to passengers of the vehicle, key events that may occur during the traffic stop (e.g., warrant check, search), and police officer demographics.

There appears to be no consensus regarding the most appropriate data collection elements across departments. The National Institute of Justice (NIJ), however, recommends certain data be collected on a “routine” basis (Ramirez, McDevitt & Farrell, 2000). These data elements include the date, time, and location of stop, license number and description of vehicle, length of stop, and name and identification number of the officer initiating the stop. The NIJ also recommends that certain “study specific” variables be considered. These include the race, date of birth and sex of the driver, the reason for stop, the outcome of the stop, and whether or not a search was conducted.

As agencies vary in their data collection techniques, they also vary in the methods chosen to analyze that data. Currently, there is “no industry standard for data analysis” (Farrell, McDevitt, and Buerger, 2002, p. 359). And although a study might collect information on a variety of variables, it does not necessarily follow that multivariate analytical techniques will be used to analyze that data. Often, authors just report long lists of descriptive comparisons based on the race of the driver and the actions taken during the stops.

The difference among studies as to their analytical techniques, on the surface, may not appear all that dramatic. When making conclusions about the practices of a department, however, these methodological considerations become critical. In fact, methodological considerations are considered paramount by prevailing judicial opinions (e.g., Chavez v. Illinois State Police, 2001; Silerberg v. Lynberg, et al., 2002).

Current research efforts have recognized the inadequacies of population comparisons. In a review of 13 published studies on the traffic stop practices of various law enforcement agencies across the country between 1996 and 2001, Engel, Calnon, and Bernard (2002) argue that “the mere presence of disparity in the aggregate rate of stops does not, in itself, demonstrate racial prejudice, any more than racial disparity in prison populations demonstrates racial prejudice by sentencing judges” (p. 250).

In addition, a recent publication by the Bureau of Justice Statistics concluded that racial differences in percentages of drivers stopped by the police “are not necessarily evidence that police use race as a factor in deciding whether to make a traffic stop—that is, not necessarily evidence of ‘racial profiling’” (Langan, Greenfeld, Smith, Durose, & Levin, 2001, p. 13). Although a national survey indicated that black drivers in 1999 “had higher chances than whites of being stopped at least once and higher chances than whites of being stopped more than once...to form evidence of racial profiling, the survey would have to show that (all other things being equal), blacks were no more likely than whites to violate traffic laws, *and* police pulled over blacks at a higher rate than whites” (p. 13, italics in the original). Currently, we are unable to measure racial differences in the breaking of traffic laws (or the racial distribution of violators on the roadways).

It is important, however, to emphasize one point. Discussions of racial profiling involve conclusions that a particular driver was or was not stopped because of his or her race. The questions of whether any particular person was stopped because of race or whether any particular race is disproportionately singled out for enforcement, however, cannot be answered with traffic stop data because of the distinction between an officer’s *decision* to stop a particular vehicle and the *reason* for the stop. The decision to stop is not the same as the reason for a stop. The difference is subtle but crucial. One cannot measure an officer’s decision to stop any particular vehicle except by the reason that he or she provides. That is, to measure why an officer stops a vehicle, we must rely on the reason that the officer provides on the contact report. That may or may not be the real reason that the officer decided to stop the vehicle.

Decision-making is an internal process that is not available for measurement on a form; the reason for the stop, on the other hand, is measurable. Officers may engage in biased decision-making processes, but be able to translate those biased decisions into valid reasons for a particular stop (e.g., “pre-text stops”). Short of mind-reading techniques, or of finding officers willing to indicate on a data collection instrument that the reason for the stop was “color of driver’s skin,” we can only go by what the officer indicates on the form. We, as outside observers, never can conclusively determine why an officer decides to stop a driver. Only the individual officer knows that. This also means that traffic stop data never should be used to conclude that officers do or do not use race as a factor *in the initial stop*. Whether race of the driver is or is not used in the initial decision to stop any particular motorist is, and always will remain, unknown.

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