How Roadway Composition Matters in Analyzing Police Data on Racial Profiling

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Statistical analysis of racial profiling requires an accurate measure of the racial composition of roadways. This article reports on a rolling roadway composition method used to estimate the racial composition of roadways in a predominantly White suburban community bordering a predominantly African American community. The importance of roadway data when analyzing police data on racial profiling is demonstrated by comparing these roadway composition data with police mobile data terminal query and stop data. Roadway data reveal patterns of police profiling behavior that are not visible through analyses of police data alone.

This article argues that roadway composition data is essential to the analysis of police behavior when studying racial profiling of motorists. Police data alone show only the number and proportion of stops of African American and White drivers. They do not show how these numbers relate to the number of African American and White drivers using the roads. Proxy measures, drawn from the number of African American residents or license holders, assume that all roads in the community contain the same proportion

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of African American and White drivers. However, our roadway study shows that the percentage of African American drivers on the roads within a suburban community varies from 1% to 49%. This is a large variation, and it is consequential to the analysis of police data.

In this article, we show that when police data by itself are used to analyze profiling, it appears that the police surveil and stop African American drivers at higher rates in high-crime areas of a suburban community that borders a predominantly African American community, a practice that appears to be fully justified. However, when the actual distribution of African American drivers on the roads is correlated with police data, the data reveal a profiling tendency exactly the reverse of that shown with police data alone. The police surveil and stop African American drivers at rates that are approximately proportional to their numbers in the driving population when they are driving in or close to African American areas. When African American drivers are in Whiter areas, however, surveillance and stops are 2 to 3 times greater than the proportion of African American drivers on the roads.

Increasingly, state legislatures are requiring law enforcement agencies to collect traffic stop data and are considering other proposed remedies for reducing profiling such as the installation of video cameras in patrol cars. Police executives have cautiously approached the issue of how, and in what form, traffic stop data should be collected and analyzed, as well as who should analyze it, fearing that traffic stop statistics, like crime statistics, can be easily misinterpreted. However, it is remarkable that little attention has been paid to establishing independent baseline measures of who is driving the roadways (i.e., the race and gender composition of drivers). With few exceptions (Lamberth, 1994), proxy measures for roadway composition (e.g., licensed drivers, residential population, automobile accident records) that treat racial composition as uniform throughout a community have been used by researchers when analyzing police data on racial profiling.

In the seven states where the collection of traffic stop data has been statutorily mandated (California, Connecticut, Missouri, North Carolina, Rhode Island, Texas, Washington), legislation does not require including a measure of roadway composition. Missouri's legislation comes the closest to recognizing this issue but not without ambiguity. In Missouri, the attorney general is required to compare stop data to the state's minority residential population and report this to state officials and the public. Individual law enforcement agencies are required to periodically review whether patterns of stops are "in a number disproportionate to the population of minority

groups *residing or traveling within* the jurisdiction of the law enforcement agency" (State of Missouri Statutes, sec. 5 (2) (a) 590.650 R.S. MO., italics added). The statute provides for counseling and sensitivity training for those officers found engaging in racial profiling, and permission is granted to use federal funds for equipping patrol cars with video cameras and microphones. However, no provision or support in the legislation addresses how the police might determine the numbers of minorities traveling within their jurisdiction and whether the proportion varies in different areas of a community.

Without appropriate roadway composition data, the concern of police executives that data can be misinterpreted may be well founded. Claims of disparate treatment by the police require evidence that the police disproportionately single-out persons on the basis of their race or ethnicity. Police data alone contain no evidence of proportionality. They show the number of African American and White drivers stopped or ticketed but do not contain any information about the universe of drivers on the road from whom someone is selected for enforcement action.

In this article, we describe an innovative roadway composition methodology and explain why collecting roadway composition data, which give an accurate picture of who uses the roads and when they use them rather than using proxy measures, is essential. The lack of roadway data could lead to a serious misunderstanding of profiling behavior.

Although racial profiling can occur in various contexts (e.g., in airports) and circumstances (e.g., as a pedestrian), our research focuses on racial profiling in the driving context typically called "driving while Black." This phenomenon has received increasing attention from legal scholars, the media, and federal and state legislative bodies since 1997. Table 1 reports the results of a Lexus-Nexus search conducted using the terms *driving while Black* and *racial profiling*.

These data illustrate that from 1997, news stories and law review articles on this topic have grown exponentially, raising public awareness of this issue. Legislation requiring traffic stop data collection has followed suit. Thirty-nine of the 50 states have now passed legislation related to collecting race and ethnicity data on motorists, although the circumstances and agencies affected vary (U.S. Bureau of Justice Statistics 2001b).

Although racial profiling is not solely a "Black" issue, either by definition or in its social consequences, racial profiling gained prominence as a social problem in this particular form (i.e., driving while Black), and we argue that there is a significant relationship between this phenomenon and

TABLE 1. Articles About Racial Profiling or Driving While Black, 1994-2000

Year	*Law Reviews*	*News Wire Services*	*Newspapers*	*Radio/Television*	*Total*
1994	—	—	—	1	1
1995	1	1	1	—	3
1996	2	—	3	6	11
1997	17	5	9	14	45
1998	25	20	47	198	290
1999	58	591	441	2,901	3,991
2000	71	1,009	1,335	16,010	18,425

Note: Results of a Lexus/Nexus keyword search using the keywords *racial profiling* or *driving while Black*, 1994 to 2000.

race in the United States. Since slavery and its aftermath, America's "race problem" has historically been, and continues to be, centered on its treatment of African Americans. Although police profiling of other minorities and ethnic groups is also problematic and deserves study, we focus on African Americans because as an American minority, with the possible exception of the Native Americans, they have suffered and endured more abuse from the legal and political system than other more recent minority groups (e.g., Latinos, Arab-Americans).

Many reports and analyses of driving while Black have focused on interstate highways that have reputations as drug transport corridors (Harris, 1997; Verniero, 1999). It has been argued that the driving-while-Black phenomenon has roots in America's "war on drugs," in which behavioral profiles of drug couriers became synonymous with "Blackness," even though patterns of African American and White drug use revealed that African Americans were no more likely than Whites to use drugs. However, one of the most common experiences reported by African Americans is that when driving through suburban communities, or areas outside where they live, they are profiled because they are presumed to be "out of place" (Ramirez, McDevitt, & Farrell, 2000; Weitzer, 1999, 2000). Unlike profiling for drug offenses, this form of profiling suggests that the police are responding to other dimensions of race: the presence of African Americans in areas not typical for the community. Although assumptions about African American criminality and drug use may factor into this treatment, our data strongly suggest that police expectations about place—who belongs and where they belong—play a very large role in police behavior. Furthermore, we have argued that these expectations about place do not exist in a social vacuum:

They reflect community attitudes and practices, notably, residential segregation (Meehan & Ponder, 2002).

Our research design is unique in several important respects. First, our roadway data estimates the driver composition for an entire community over a 2-week time period. Using a rolling observational technique that mimics police patrol, we systematically drove the major roadways of a suburban community. A driver and an observer randomly selected target vehicles and recorded the race and gender data of drivers, noting the time and place of each observation. In this way, we estimated the roadway composition for an entire suburban community by time and place, not just for specific stretches of roadway or intersections where the police may be more actively stopping or ticketing drivers.

Our research site is a predominantly White suburban community that borders a predominantly African American community. Like many American suburbs, this community is residentially segregated but contains work, entertainment, and shopping venues both within and outside its borders that bring African Americans into (or through) the community. Thus, our roadway design captures variations in roadway usage that occur given that African Americans do not reside in this community but do use its roadways.

Second, our police data are unique. Unlike research that uses only recorded traffic stop or ticket data to examine police profiling behavior, we developed an approach that analyzes the proactive queries officers make about vehicles and persons from their in-car mobile data terminal (MDT). We created a police data set consisting of MDT queries made by patrol officers combined with other police records (e.g., patrol logs, computer-aided dispatch information, tickets) that record outcomes. The routine of "running plates" is a common information-gathering practice employed by officers, which may or may not lead to a traffic stop. By focusing on officer query behavior, we are able to examine the environmental scanning behavior of officers, and in doing so, we reveal a key facet of officer decision making about the driving population. In short, examining query behavior offers insight into the nature and extent of officers' surveillance of the driving population when it occurs in the absence of a traffic stop.

In this respect, we argue for the inclusion of routine surveillance behavior (i.e., queries) among those police behaviors (e.g., stops, searches, tickets) typically studied in racial profiling research. Racial profiling is defined as

> any police initiated action that relies on the 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 et al. 2000, p. 3, italics added)

By this definition, justification for police action requires the presence of "suspicious" behavior(s) or law enforcement information that leads police to reasonably conclude that a specific person is engaged in or about to engage in criminal behavior. We examine whether routine surveillance behavior, as reflected in the information queries officers make using in-car computers, constitutes racial profiling by this definition.

Third, both the police and roadway data cover the same 7 days. The methodological significance of this design is important. It enables us to compare rates of police query and stop and ticket behavior with the composition of drivers on the roadway with confidence that the distribution of drivers we 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. This provides a more accurate measure and different results from a proxy measure, such as the percentage of African American driver's licenses in the state or community when correlated with police data. In this respect, our roadway data enable us to establish an important linkage between race and place.

In addition to roadway composition, some argue that comparable rates of violators and the seriousness of violations are necessary to prove profiling (U.S. Bureau of Justice Statistics, 2001a, p. 15). That is, if it can be shown that African Americans are more likely than Whites to engage in driving behaviors that would warrant more attention from the police, then disproportionate stops of African Americans are justifiable. However, no satisfactory method for ascertaining violator rates has been agreed on (U.S. General Accounting Office, 2000, p. 2). For example, Lamberth (1994) and his colleagues counted the number of African Americans and Whites passing their observation vehicle who exceeded the speed limit by 6 miles per hour finding that the vast majority of drivers (between 92 and 98%) violate the speed limit and are eligible to be stopped (U.S. General Accounting Office, 2000, p. 10). Furthermore, African Americans and Whites had a violation rate that was generally in proportion to their numbers in the driving population. However, it is not clear if the police pay attention to only one factor (i.e., exceeding the speed limit) when making a decision to stop. Clearly, seriousness of violation (i.e., exceeding the limit by 25 as opposed to 5 miles per hour) is a factor that would more likely lead to police action.

Our roadway composition study does not measure law-violating behavior. Although this is an extremely important issue, a complete discussion of

it is beyond the scope of this article. However, any attempt to measure the violation rate of drivers needs to reconcile the debate posed by the "could have/would have" distinction raised in *Whren vs. the United States* (hereafter *Whren*). As Harris (1997) has persuasively argued, the laws regulating driving, drivers, and their vehicles make it quite likely that every driver commits some violation that could have resulted in a police stop. The enforcement of traffic laws is selective by its very nature. Certain departments make traffic enforcement a priority, whereas others do not. Enforcement can wax and wane depending on the season (e.g., holidays) or local incidents that increase public pressure (e.g., high-profile accidents) or crime events (e.g., a series of armed robberies) that lead police to increase traffic stops in certain areas and at certain times of day.

Thus, the important question becomes whether any given violation would have resulted in a stop or enforcement action. It is a matter of to whom and to what and under what circumstances the police pay attention to certain vehicles and drivers as opposed to others. To answer this requires comparing the distribution of traffic offenses in the population of drivers to police enforcement practices (e.g., stops, tickets) in given jurisdictions. This would require access to police data to ascertain stop and ticketing practices within a given jurisdiction—something the Supreme Court effectively rendered moot in *Whren* by allowing pretext stops to be based on a "could have" standard (Harris, 1997).

In the remaining sections of this article, we first describe our research site and the police and roadway data collected giving special emphasis to the latter. We then examine two findings from our research and illustrate that important aspects of police behavior are discovered when roadway data are included with the analysis of police data. These findings have important consequences for understanding where and how profiling behavior is occurring, thus demonstrating the importance of roadway composition data to police administrators and researchers alike.

DESCRIPTION OF THE DATA

Data were collected from a medium-size suburban department with more than 100 sworn officers. This department has no minorities and few women. The city has more than 75,000 residents and can be characterized as blue collar and predominantly White. African Americans constitute less than 3% of the residential population. The city has a mix of industrial and technological industries. It is among the larger cities in the state and shares one border

with a city of predominately African American residents (more than 75%) hereafter called "Black City."[1] These two communities reflect the pattern of racial segregation found throughout the United States.

Both qualitative and quantitative data were collected in this department. The initial interest in the MDT as an investigative and surveillance tool has its origin in field observations and discussions of this practice with officers in this (and one other) department. Field research conducted over 4 years (1996 to 1999) prior to collection of the MDT and roadway data in April 2000 included extensive ride-alongs[2] with patrol officers (240 hours) and 25 interviews at all levels of the command staff (from the chief to sergeants) and specialized units (e.g., detective bureau, internal affairs).

During 7 days (24-hour periods) spanning 2 weeks in April 2000, we conducted a roadway study and obtained a printout of all MDT transmissions made by patrol officers. To avoid officer bias, only the chief and two other command staff officers were aware of this research. We obtained all MDT queries and car-to-car communications for the 6-week period before, during, and after our roadway study. We found no explicit or even "coded" references to our research presence in these MDT car-to-car exchanges between officers. Thus, we have confidence that officers were not aware of this research and did not alter their behavior.

ROADWAY COMPOSITION DATA

We designed and conducted a rolling observational protocol consisting of a two-person team in a moving observation car systematically driving the 15 major roadways in this community. Our decision to employ a rolling method versus observation of intersections was based on several factors.

First, officers typically do not remain in one location for an extended length of time during their shift: They roam their sectors using the major roadways. The major roadways have two lanes on each side, carry the bulk of all traffic in the city, and are approximately one mile apart. There are also smaller roadways a half-mile between these major roads. These smaller, narrower half-mile roads lead to even smaller neighborhood roads. Our decision to sample only the major roadways assumes that regardless of where one lives in the city, or when one passes through the city, one eventually uses one of the major roadways. For the most part, while on patrol, officers primarily use the major mile roadways, followed by the half-mile roadways. Thus, a rolling observation car more closely mimics patrol practice.

Second, given the size of the city, coverage of the 50 major intersections, or even sampling them, was impractical due to lack of personnel.

Third, a rolling observation car is less obtrusive to both the citizenry and the police. Setting up at major intersections for any extended period of time was impractical in many places due to safety issues. Furthermore, it also risked calling attention to our presence as observers. For example, at many intersections, parking in a commercial lot at certain times of day in high-crime areas could result in a call to the police about a suspicious vehicle.[3]

Our observations occurred over the course of a 2-week period: In Week 1, we observed on Sunday, Tuesday, Thursday, and Saturday, and in Week 2, we observed on Monday, Wednesday, and Friday. Teams were randomly assigned one of eight designated routes (called "sorties"), which they drove for 3-hour time windows (e.g., 7 a.m. to 10 a.m.) spanning 24 hours a day. Because the car and driver were constantly moving and observing vehicles, using 3-hour time blocks minimized driver and observer fatigue.

An observation team was fielded each day from midnight to 3 a.m. The 3 a.m. to 6 a.m. time block was excluded from the time schedule due to very low traffic volume on these roads. The 3-hour observation periods were slightly different for weekdays (Monday through Friday) and weekends (Saturday and Sunday) due to traffic volume. The weekday time windows reflect the morning and evening rush hour periods, lunch traffic, and evening traffic. On weekdays, in addition to the midnight to 3 a.m. block, the other four time blocks were 7 a.m. to 10 a.m. (morning rush hour), 11 a.m. to 2 p.m. (lunch hour), 4 p.m. to 7 p.m. (afternoon rush hour), and 8 p.m. to 11 p.m. (evening). On weekends, given that there are no work-related rush hour periods, the four time blocks were 9 a.m. to 12 p.m. (morning), 1 p.m. to 4 p.m. (afternoons), 5 p.m. to 8 p.m. (early evening), and 9 p.m. to 12 p.m. (late evening).

Vehicles were sampled on the 15 major roads that run north to south and east to west in this community. A two-person team in an observation car was randomly assigned one of eight sorties, which they drove for the 3-hour time windows. Each sortie entailed citywide coverage. Two starting points, each a mile apart, were established in each of the far corners of the city (northwest, northeast, southwest, southeast). This created eight potential starting points that were randomly assigned for each sortie. In this way, there was no systematic bias introduced into these roadway observations. For example, if each sortie began in those parts of the city, or on specific roadways, where there were more African American drivers, then the race data would be skewed.

Each sortie consisted of an assigned travel route. Four routes entailed driving all of the major north-south roads of the city and then driving the major east-west roads of this city until 3 hours had lapsed. Four other routes entailed driving all of the major east-west roads of the city and then driving the major north-south roads of this city until 3 hours had lapsed. In this way, each sortie entailed citywide observation coverage. Typically, observers would complete one of the east-west and one of the north-south sorties during a 3-hour period.

The observer, using a stopwatch, observation protocol, and mini–tape recorder, recorded observations for every target vehicle that was randomly selected. At 30-second intervals, using the selection protocol, the observer identified a target vehicle within one to three car lengths of the team vehicle. They excluded vehicles that had already been recorded, trucks, commercial vehicles, and buses and included passenger cars, vans, or trucks and vehicles with out-of-state license plates.

For each observation, except when stopping at traffic lights, the observer scanned for a target vehicle from the left rear position moving forward to the front position. If they were driving on a three- or four-lane road, they continued scanning to the right rear position if necessary to obtain a target. At traffic lights, or when the observation vehicle was in a turning lane, the observer scanned from the front to the rear on the side(s) where traffic was located.

If there was no target vehicle within one to three car lengths at the 30-second interval, this observation was recorded as "no target vehicle available" with the time and location so noted. The observer then reset the stopwatch for the next 30-second interval. When a target vehicle was available, observer and driver had 60 seconds to observe and record data. After 60 seconds, if the team was not able to acquire and record this information, this observation was recorded as a "failure to acquire" the relevant information.

Each observation included recording the following data: sortie observation number, license plate,[4] the driver's race and gender, the observation location (i.e., route street and cross streets), the target position (e.g., front left), and the time of the observation. The location for each observation was mapped according to the department's sector boundaries, which allowed us to analyze race and gender data by sector and compare that with police sector data. The time of each observation was collapsed into a variable reflecting police shifts (e.g., 8 a.m. to 4 p.m.).

This protocol was field tested two times. Eight observers were trained after four revisions to the protocol were made based on these trials. A 1-day pilot test was conducted in the target city, which yielded 750 observations

over a 12-hour period. After we were confident in both the protocol and the training of the observers (which included the two authors, another faculty member, and five students), we began observations in the target city for a 2-week period, covering each day of the week. A total of 22 combinations of observer teams were fielded. There was no significant difference in target selection by race or gender, location, and observation team. In short, our protocol is valid and reliable (analysis not shown but available on request).

A total of 35 sorties, spanning 105 hours, yielded 6,269 observation windows of randomly selected drivers on the 15 major roadways in this community. A target vehicle was available in 61% (n = 3,840) of the observations, and no target vehicle was available within one to three car lengths in 39% (n = 2,429) of the observations. The race and gender composition of drivers using these roadways were calculated from these 3,840 observations and mapped according to time and location using the corresponding police sector designations.

MDT Query Database

When officers conduct an MDT query, the information they request and receive is preserved electronically. Officers can receive information about a vehicle (e.g., year, make, model, name and address of registered owner, and vehicle status [stolen, unregistered])[5] or an individual (e.g., criminal career history (CCH), outstanding warrants, probation/parole restrictions). In our data set, each officer's query is compared with subsequent queries they make to construct a query's event history. For example, when a plate query (the most common query type) is processed and subsequently the name of that vehicle's owner is queried for a CCH, these are coded as continuations of the first query event. The MDT also records which officer is making the query, their patrol assignment (place), and time of query. By combining this query information with patrol officer's logs and police dispatcher's records, an outcome for each query is determined. In sum, information about the driver can be correlated with the place of the query, time of day, officer characteristics (i.e., age, years of experience on force, use of computer),[6] and query outcome.

The MDT query database consists of all 5,604 MDT queries made by 111 patrol officers working during 7 days (24-hour periods) spanning 2 weeks in April 2000. In this article, we analyze the 3,716 queries occurring in proactive time windows during which, we argue, officers have more discretion whether to query the MDT. That is, we eliminate all reactive events (and

queries) in which the officer is either required, or is more likely, to run a plate or a name (e.g., traffic accidents, calls for service such as "suspicious vehicles," or when an arrest occurs).[7] This focuses the analysis on queries officers choose to initiate when they are not engaged in reactive work.

There are several important advantages to incorporating MDT data into the analysis of officer behavior. First, not all stops are recorded in patrol logs or CAD systems. Officers make many more queries than actual stops, and query behavior is far more prevalent than recorded stops. For example, during these 7 days, there were 3,716 proactive queries made by 111 officers. By contrast, on these same days, there were only 333 recorded traffic stops made by 73 of these officers.[8] Only 9% of the 3,716 proactive queries are related to a recorded stop. Thus, there is more query behavior than recorded stops to analyze.

Second, MDT queries are a measure of officers' environmental scanning, which is automatically recorded by the computer. One does not need to rely on the officer's memory or reporting skills for these data. The computer technology records the action of the officer, and in doing so, documents a practice. When systematically aggregated, the queries provide important insight into how officers surveil their environment.

Third, MDT queries and replies provide important information about vehicles, owners, and individuals. For example, if a query returns a "hit," it means that the officer has received information from the computer that there is a problem with the plate or vehicle (i.e., unregistered, reported stolen) or person (i.e., there is an outstanding warrant, probation/parole status).[9]

However, race data for drivers are not available in the information police receive from MDT queries.[10] Thus, we must use a proxy measure, like the police do, when they use knowledge of community composition to link race with place. That is, officers know which communities are Whiter, more African American (or minority), or some combination of the two and where in their own community racial, ethnic, and class composition differs (Brown, 1981). Given distinct patterns of residential segregation in the metropolitan area studied, we assigned a race identity (African American, White, or other) for each driver, by inference, using the residence of the vehicle owner. Drivers are coded as White if the vehicle's owner lives in a community whose population is 97% or more White. Drivers are coded as African American if the vehicle's owner lives in a community whose population is 75% or more African American. The remaining drivers who do not meet either 97% White or more than 75% African American residence thresholds are not included in the race analysis.[11]

This approach assumes (a) that the registered vehicle owner is usually driving the car and (b) when owners loan their vehicle, it is usually to family members or friends who reside in the same community and/or are most likely to be the same race. As defined by us, the MDT data indicate that 27% of drivers (owners) were African American and 73% were White, that is, they lived in communities meeting our definitions of primarily White or primarily African American.

As a measure of place, we used the officer's sector assignment to indicate the location of the query. Without a global positioning system in every patrol vehicle, it is impossible to know the exact location when an officer makes a query. Thus, sector assignment, although crude, is the best (only) way to measure location. There is considerable social and economic variation in this community that is reflected in the creation of patrol sectors and patterns of patrol assignments.

Patrol assignments use eight sector designations we label A through H, which correspond to geographical boundaries the officer is responsible for patrolling. Sectors are not all equal in size but are configured according to crime levels and citizen calls for police service. Each of the border sectors (A-D), which constitute about one third of the square mileage in this community, cover smaller areas because they are densely populated, generate the most calls for service, and have the highest reported property and violent crime rates.

The two middle sectors (E-F) and two farthest sectors (G-H) from the border are equal in size and cover one third of the city each. They contain larger property lots with wealthier residents and businesses. These sectors have lower population density, fewer calls for police service, and less reported violent and property crime. Thus, officers in these sectors (E-F, G-H) have more space to patrol and fewer calls for service. Like the officers in this department, we use the border, middle, and farthest sector distinction in our analysis.

The sector is not only an organizational boundary, it is an important boundary of personal responsibility and obligation. Officers assigned to a sector are responsible for handling calls for service occurring in their area (which are assigned to them by the dispatcher) and for preventive patrol in their sector (i.e., visibly patrolling their sector and investigating any persons, or situations, that are either criminal in nature or a threat to the public order broadly construed). For the most part, officers remain within, or very near, their sector boundaries, because an officer realizes that being out of

position (or place) to respond to calls or to handle problems before they become citizen calls within their sector reflects poorly not only on their ability to control their sector in the eyes of their peers and superiors but also on their own sense of self-worth and autonomy as a police officer. Thus, for officers, the sector is an extension of self (Meehan, 1991).

Officers are sometimes sent to other (typically adjoining) sectors to back up the sector officer on dangerous or troublesome calls or to handle a call for that sector officer if that officer is already engaged in a call or otherwise "out of service." However, when out of their own sector on such assignments, officers develop a "studied inattentiveness" (Rubenstein, 1973, p. 149) toward minor violations, behaving in a way so as not to embarrass their colleague.[12] Officers especially realize that being out of position to respond to those calls that require emergency help for a fellow officer may not only put their colleague in the adjoining sector in physical jeopardy but also put at risk one's value as a colleague and self-worth as an officer. Thus, a sector assignment confers important responsibilities and obligations on the officer.

There is considerable evidence to suggest that the ethos of officer autonomy respects sector boundaries, especially where proactive behavior is concerned. Officers will not "poach" in another officer's sector because of the potential to make the sector officer look like they are not doing their job. Consequently, the officer's sector assignment is used to measure the place location of a proactive query.

How Roadway Composition Matters

Our analysis first examines police query and stop behavior using only police data. Our focus is on the specific effect of place on police behavior given African Americans' reports of "out of place" profiling experiences. That is, if profiling by race is related to place (i.e., where African Americans are in the community), there should be significant differences in where police query and stop behavior is occurring. The independent variable we use to measure place is the patrol sector assignment.

Furthermore, when we analyze police query behavior, we exclude those proactive queries associated with a recorded police stop. We assume that when officers decide to record a stop, these proactive events are more likely to have been based on an observed violation or suspected illegal activity that can be later justified if necessary. From our perspective, the question is, To

what extent do police act solely on the basis of race? When officers run plates and do not stop a driver, we assume they did not observe a violation that would have warranted a stop. Therefore, if significantly more queries not related to stops involve Blacks than Whites, we have some confidence that those queries are influenced by race. If race is a factor in query behavior, we would also conclude it is a factor in stops. By focusing on queries that do not result in stops, however, we control for possible legal justifications for action. Thus, we examine the proactive surveillance behavior (measured by queries) of officers who, for the record, did not record a stop.

We compare police query and stop behavior data with roadway composition data. That is, we examine whether police query and stop behavior is proportionate to the numbers of African Americans on the roadways. Our goal is to show how conclusions about profiling and stop behavior significantly differ when roadway composition data are taken into consideration.

POLICE QUERY AND STOP BEHAVIOR

Table 2 shows the distribution of African American and White proactive police queries by sector. As one might expect, the vast majority of queries occur in the more populated and active border sectors, followed by the middle sectors and the farthest sectors from the border. Using police data alone, African Americans appear to be slightly more likely than Whites are to be queried in the border sectors (68% versus 63%), and Whites are more likely than African Americans are to be queried in the sectors farthest from the border (18% versus 13%). In the middle sectors, the query rates appear to be identical (19%). These data suggest a weak but nonetheless significant relationship between race and place ($\chi^2 = 7.833$, $p < .02$). One would conclude from these data that African Americans are more likely to be queried in areas closer to the border and that queries of African Americans decrease as they move through Whiter areas of the community.

Table 3 shows the distribution of African American and White stops by sector. These data reveal a pattern similar to the query data. The majority of stops of both African Americans and Whites occur in the border sectors. However, again, Whites appear to be more likely than African Americans are to be stopped in the farthest sectors, whereas African Americans are more likely to be stopped in the middle sectors. African Americans are slightly more likely than Whites are to be stopped in the border sectors and middle sectors. The relationship, however, is not statistically significant ($\chi^2 = 2.473$, $p < .290$). The low number of cases (i.e., stops) distributed in the

TABLE 2. Distribution of African American and White Proactive Police Queries by Sector

	Race			
	White		*African American*	
Sector	*%*	n	*%*	n
Borders Black City (Sectors A-D)	63	872	68	343
Middle sectors (Sectors E-F)	19	269	19	99
Farthest from Black City (Sectors G-H)	18	253	13	65
Total	100	1,394	100	507

Note: Police query data based on 3,716 proactive mobile data terminal queries made by the police. $\chi^2 = 7.833$, $df = 2$, $p < .02$.

TABLE 3. Distribution of African American and White Stops by Sector

	Race			
	White		*African American*	
Sector	*%*	n	*%*	n
Borders Black City (Sectors A-D)	63	114	66	41
Middle sectors (Sectors E-F)	14	26	19	12
Farthest from Black City (Sectors G-H)	23	42	15	9
Total	100	182	100	62

Note: Police query data based on 3,716 proactive mobile data terminal queries made by the police. $\chi^2 = 2.473$, $df = 2$, $p < .290$.

middle and farthest sectors may contribute to this. However, the data do suggest a pattern: African American stops predominate in border sectors and decrease in the middle and farthest sectors. Also, there are modest differences between where African Americans and Whites are stopped. A police administrator might conclude from these data that the potential for profiling activities is greater among border sector officers. The highest number of queries and stops of African Americans does occur in the sectors with the highest crime rates and closest to the border.

SECTOR ASSIGNMENTS

In this department, more officers are concentrated in the border sectors (A-D) because these sectors have the highest reported crime rates in the city, the largest volume of calls for service, and hence opportunities for officers to test their skills and to prove their worth as police officers. Within the

department, officers assigned to these sectors are not only busier but also have earned reputations as "hard workers" and "action-oriented" officers who "take care of business." Thus, working a border sector is a sign of status and prestige. However, obtaining a border sector assignment is not a simple process.

In general, sector assignments are based on a combination of factors, the most important of which is officer seniority. The mean number of years of experience for border sector officers is 6.5; for middle sector officers, it is 4.0 years; and for the sectors farthest from the border, it is 5.9 years. Thus, more experienced officers work the border sectors and the sectors farthest from Black City, with less experienced officers in the immediately adjoining sectors in the middle. This distribution is the product of both the seniority system and an individual officer's preferences for specific types of police work.

Each year, officers choose their shift and sector assignment on the basis of seniority, and this is reviewed and approved by the shift sergeants and lieutenants. For the most part, an officer with seniority is granted a border sector request unless complaints against him or her filed by citizens are too numerous or complaints from other border sector officers that they do not work hard enough are lodged with supervisors. Thus, officers choose a sector according to their personal preference for type of police work. For example, if an officer's work preference is a low-call, no-action sector, where they will deal with little crime and wealthier residents, they choose one of the two sectors (G or H) farthest from the border sector. When officers with more seniority choose such a sector, they are generally retiring from the action. These sectors require minimal effort in comparison to border sectors where, in addition to calls in that sector, one must be a vigilant radio listener, always aware of what other border sector officers are doing and where they are in case they need assistance. Thus, the sectors farthest from Black City offer fewer opportunities for "real" police work.

This analysis of police data without roadway composition data would suggest that experienced border sector officers, whose areas contain the highest crime rates and requests for police services, have a greater penchant for being proactive in their policing style and that this entails querying and stopping African Americans in their sectors. As one moves away from the border, profiling behavior seems to decrease. However, we will show that this analysis fails to untangle the complexity of profiling behavior that emerges when roadway composition data are compared with police data.

COMPARING ROADWAY AND POLICE DATA

Tables 4 and 5 show that the race and gender compositions of the roadways in this community vary by place and time. African American drivers tend to use roads closer to the border of Black City and are slightly more likely to drive at night (12 a.m. to 8 a.m.) and on weekends. The distribution of men (60%) and women (40%) on the roadway remains relatively stable across place and time, except women are less likely to drive after midnight.[13]

Overall, African Americans constitute 13% of the drivers on the roadways, even though they comprise less than 3% of the residential population. Clearly, more African Americans are employed in or pass through this city than reside there. These data alone demonstrate how residential population would be an inadequate proxy measure for African American drivers. Furthermore, the distribution of African American drivers on these roadways is not a uniform 13% throughout the city.

Sectors A through D, which border Black City, contain the highest percentage of African American drivers (an average of 24%). There are significantly fewer African Americans driving the roads in the middle sectors (E-F) and sectors (G-H) farthest from Black City. Each border sector (A-D) includes the border road between this city and Black City: About one half (49%) of the drivers on this border road are African American, whereas the percentage of African Americans on other city border roads, which adjoin predominantly White communities, is much lower. Comparing this border road to the interior roads, the proportion of African American drivers drops precipitously to an average of 11% overall for interior roadways. This border-sector pattern is dramatically magnified when comparing the Black City border road with the road farthest from this border, where African American drivers constitute only 3% of the drivers.

Table 6 compares the overall roadway observation data with the MDT query data. Although 13% of the drivers on the roadways were African American, 27% of all proactive police queries were about African American drivers. Whites, on the other hand, who make up 87% of the drivers, constituted only 73% of proactive police queries. Overall, African American drivers are twice as likely as White drivers are to be proactively queried (2.1 vs. 0.8).

Importantly, correlating the police data with the roadway data illustrates a relationship between racial profiling and place. African Americans traveling in the sectors bordering the Black city have query rates that are slightly higher (and statistically significant) than their numbers in the driver

(text continues on p. 327)

TABLE 4. Race and Gender of Drivers Observed by Place: Patrol Sector and Street Type

	African American						*White*					
	Male		*Female*		*Total*		*Male*		*Female*		*Total*	
	%	n	%	n	%	n	%	n	%	n	%	n
Grand mean	7	269	6	238	13	507	53	1,981	34	1,274	87	3,261
Patrol sector												
Borders Black City												
A	11	22	12	25	23	47	50	100	27	55	77	155
B	15	31	8	18	23	49	54	114	23	50	77	164
C	12	56	14	64	26	120	48	216	26	118	74	334
D	12	49	10	41	22	90	48	198	30	123	78	321
Middle sectors												
E	6	38	6	38	12	76	54	353	34	224	88	577
F	5	29	3	19	8	48	55	349	38	241	92	590
Farthest from Black City												
G	4	27	2	15	7	42	57	346	36	221	93	567
H	3	17	3	18	6	35	52	305	42	242	94	547
Street type												
Borders Black City	26	65	24	59	49	124	39	97	12	30	51	127
Interior streets	6	193	5	148	11	341	53	1,623	35	1,070	89	2,693
Farthest border-Black City	2	3	1	2	3	5	59	92	37	58	97	150

Note: Roadway observation data: Drivers (n = 3,840) observed during 35 sorties on 7 days over a 14-day period in April 2000.

TABLE 5. Race and Gender of Drivers Observed by Time: Police Shift and Type of Day

	African American						*White*					
	Male		*Female*		*Total*		*Male*		*Female*		*Total*	
	%	n	%	n	%	n	%	n	%	n	%	n
Grand mean	7	269	6	238	13	507	53	1,981	34	1,274	87	3,261
Police shift												
Midnights (12 a.m.-8 a.m.)	8	41	7	37	16	78	58	288	26	131	84	419
Days (8 a.m.-4 p.m.)	6	91	7	111	13	202	52	799	34	525	87	1,324
Afternoons (4 p.m.-12 a.m.)	8	137	5	90	13	227	51	894	36	618	87	1,512
Day type												
Weekdays	7	184	6	167	13	351	53	1,456	34	951	87	2,407
Weekends	8	85	7	71	16	156	52	525	32	323	84	848

Note: Road observation data: Drivers (n = 3,840) observed during 35 sorties on 7 days over a 14-day period in April 2000.

TABLE 6. Racial Composition of Drivers on the Roadways Compared to Proactive Mobile Data Terminal Queries by Individual Patrol Sectors

	African American					*White*				
	Drivers		*Queries*			*Drivers*		*Queries*		
	%	n	%	n	*Ratio*[a]	%	n	%	n	*Ratio*[a]
Grand mean	13	507	27	572	1:2.1***	87	3,261	73	1,581	1:0.8
Borders Black City										
Sector A	23	47	32	115	1:1.4***	77	156	68	241	1:0.9
Sector B	23	49	35	57	1:1.6**	77	164	64	103	1:0.8
Sector C	26	120	26	99	1:0.9	74	335	76	311	1:1.0
Sector D	22	90	25	113	1:1.1	78	322	75	331	1:1.0
Middle sectors										
Sector E	12	76	28	62	1:2.4***	88	579	71	154	1:0.8
Sector F	8	48	26	49	1:3.3***	92	590	74	141	1:0.8
Farthest from Black City										
Sector G	7	42	16	15	1:2.0*	93	568	86	95	1:0.9
Sector H	6	35	22	62	1:3.8***	94	547	77	205	1:0.8

Note: Driver data based on roadway observation data for 1 week in April 2000 ($n = 3,840$). Police query data based on 3,716 proactive mobile data terminal queries made by the police during this same 1-week period.

a. D-Q ratio equals the percentage of police queries divided by the percentage of drivers and expressed as a ratio.

*$p < .01$. **$p < .001$. ***$p < .0001$. All tests are two tailed.

TABLE 7. Racial Composition of African American Drivers on the Roadways Compared to Recorded Stops of African Americans by Patrol Sectors

	African American Drivers		*African American Stops*		*Driver-Stops Ratio*[a]
	%	n	%	n	
Grand mean	13	507	25	62	1:1.9***
Borders Black City (Sectors A-D)	24	306	26	41	1:1.1
Middle sectors (Sectors E-F)	10	124	32	12	1:3.2**
Farthest from Black City (Sectors G-H)	6	77	18	9	1:3.0***

Note: Driver data based on roadway observation data for 1 week in April 2000 (n = 3,840). Recorded stop data based on 3,716 proactive mobile data terminal queries made by the police during this same 1-week period.
a. Driver-stop ratio equals the percentage of African American stops divided by the percentage of African American drivers and expressed as a ratio.
**p < .001. ***p < .0001. All tests are two tailed.

population. As African American drivers move from border sectors to the farthest sectors of this White community, however, their query rate increases dramatically. African Americans traveling in areas containing the largest pockets of wealthier White residential neighborhoods have query rates that are 2 to 3 times greater than their numbers in the driver population. By comparison, Whites have about the same chance of being the subject of a query throughout the city.

Table 7 compares roadway data with police stop behavior. Officers stop African American drivers in the nonborder sectors at a rate 3 times greater than the percentage of African American drivers on these roads. Officers in the middle sectors have a slightly higher stop rate than officers in the farthest sectors. By contrast, border sector officers stop African American drivers at rates that are equal to their numbers on those roadways. African American drivers are not only surveilled when they are "out of place" (i.e., in Whiter areas) but also are more likely to be stopped in these areas. Thus, a race and place effect is also evident in the stop behavior of nonborder officers.

Racial profiling is sometimes justified by the claim that officers stop African Americans (and in our data, query more African Americans) because African Americans have higher rates of criminality. This view would argue that officers query the license plates of African American drivers expecting to find a "hit"—a problem with the vehicle or driver. However, in our data, the differences between the African American hit rate (8.6%) and White hit rate (6.6%) was small and not statistically significant.

Furthermore, in the nonborder sectors, where officers query a higher proportion of African American drivers, the hit rate for African Americans is lower than the hit rate for Whites. In the border sectors where the African American hit rate is slightly higher than the White hit rate, officers query a smaller proportion of African American drivers. Thus, a higher level of African American criminality does not exist in those sectors where the most racial profiling occurs (Meehan & Ponder, 2002).

With these roadway data, we have provided an alternate analysis of profiling, comparing queries and stops to estimates of roadway usage by African Americans. Border sector officers, for the most part, treat the presence of African Americans in their sectors as normal for those areas. Indeed, more African Americans travel these roads. However, as African Americans travel into Whiter areas, their presence is treated quite differently. This suggests that profiling is inextricably tied not only to race but also to police officers' conceptions of "place," "who belongs," and "where they belong."[14]

What accounts for this race and place effect? First, we argue that the occupational training of police professionals plays an important role in this process. It is well documented that police officers develop and use an intricate knowledge of place (Bittner, 1970; Klinger, 1997; Rubenstein, 1973, p. 129ff; Sacks, 1972; Sherman, 1989). Officers are trained to observe the "normal" appearances of persons, physical objects, and behaviors within their sectors. Anything incongruous with what is normal for that place and time is noticed and requires scrutiny.

That the presence of African Americans in Whiter areas is considered incongruous by officers reflects the residential demographics of the community itself. Patterns of residential segregation of African Americans throughout the United States are significant (Massey & Denton, 1993). Although one in three African Americans now live in suburban communities, American suburbs are disproportionately White (Baldassare, 1992; Thernstrom & Thernstrom, 1997). Community members, real estate agents, and lending institutions are important community gatekeepers at strategic points in maintaining or changing the racial composition of a community (Pearce, 1979; Gotham, 1998). The consequence of these patterns for police officers who monitor the community everyday cannot be emphasized enough.

Second, the disproportionate distribution of queries and stops may also be the unintended consequence of how officers' sector assignments are made. In this department, officers with less seniority who want a higher status border sector assignment are at a disadvantage because opportunities to

be involved in the "action" are quite limited and require them to stand out in their nonborder sector assignment to move ahead in the status hierarchy. Typically, for those officers who want a border sector assignment but cannot have it due to the seniority system, the sectors farthest from the border are boring. These younger officers can get closer to the border sectors by choosing an assignment in middle sectors E or F, which are adjacent to the border sectors. These sector assignments provide more opportunities to back up border sector officers and take calls in those border sectors when assigned by dispatch. The opportunity to test their skills as police officers and "stand out," which in turn can help earn a border sector assignment, depends on doing "real" police work (i.e., locating stolen cars, criminals with warrants) in the less busier, lower crime, nonborder sectors. Consequently, these officers are more proactive in the nonborder middle sectors (E and F) and in doing so may produce higher rates of African American queries with the expectation that such query behavior will produce hits. However, this query behavior is not productive. Furthermore, this may also explain the fact that the highest level of recorded stops of African Americans occurs in the middle sectors that contain the younger officers.

CONCLUSION

Our aim has been to demonstrate the importance of collecting and using roadway observation data when analyzing police data related to racial profiling. Although the police have developed a facileness for deflecting criticism or basking in the glory brought annually with the publication of Uniform Crime Report data for their jurisdictions, traffic stop data related to the issue of racial profiling are more troublesome. Analyses supporting the existence of racial profiling open departments to potential lawsuits. Analyses not supporting the existence of racial profiling open departments to criticisms that data were incorrectly collected or manipulated. To these concerns we would add that the police should insist that adequate research and funding be provided to understand a very basic question necessary to understanding traffic stop data: Who is using the roadways? Without an accurate measure of this, answering the question, "Do we profile by race?" will be impossible to answer with any degree of certainty.

We have also shown that important contextual factors other than race may play a role in understanding police behavior. Racial profiling of African Americans, as measured by surveillance query behavior, occurs most often in lower crime areas, suggesting that a real need to prevent crime may

have little to do with the practice of racial profiling. We argue that the practice reflects 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. Using our data and analysis, we reject the "few bad apples" explanation of police profiling, as well as those explanations that simplistically argue that all police organizations are racist. Racial profiling by the police appears to reflect community practices of racial segregation. As such, it is an institutional phenomenon that may be shaped by organizationally specific practices (i.e., sector assignment) unrelated to race per se. That is, the challenge to profiling research will be understanding the specific contextual factors in each police organization that may, in important yet unintended ways, contribute to racial profiling.

NOTES

1. We selectively alter aspects of the community and department description to preserve anonymity.

2. During ride-alongs, a semistructured interview about current information technology was employed and observations made of how officers utilize information technology (e.g., in-car computers and cameras) during patrol. Field notes were written upon leaving the setting.

3. In the event that the observation vehicle was stopped by the police during the roadway study, each team had a letter from the lieutenant in charge of research indicating that we were conducting a traffic flow study for the department. However, no observation team was stopped by the police.

4. License plate information was collected because of our interest in mobile data terminal (MBT) queries, which 80% of the time consists of officers running license plates. We use license plate data for two purposes: (a) to test if our observation of the race of the driver was correlated with the race of the driver inferred by the residence of the owner (see note 11) and (b) to compare the plate hit rate of police officers with a sample of plates from our data.

5. Variables for the age and theft risk of each vehicle queried were also created to examine whether officers' queries are influenced by the age and/or make of the vehicle and its theft risk. Vehicle age is based on the registration information provided on the MDT. Theft risk was assigned using the top 50 stolen vehicles reported for the state based on insurance industry records. Each car is assigned a value on a theft-risk scale of 0 to 50 (0 = lowest, 50 = highest). The mean (and median) age of all vehicles queried was 10 years (i.e., 1990); the year range was 1963 to 2000. The mean theft risk was 1.63, and 94% of the vehicles that were queried had no theft risk (i.e., an assigned value of zero).

6. A total of 111 officers, constituting about 80% of officers regularly assigned to patrol, made 3,275 proactive MDT queries during the 7 days of the study. Officers who made queries have a mean age of 34.8 years and a mean of 7.5 years of experience. Officers who made proactive queries are slightly younger (mean = 34.1) and have slightly less experience (mean = 6.9).

7. For this 7-day period, officers made 5,604 queries; of those, 3,963 were a first query. Of the 3,963 first queries, 2,673 (67%) were proactive. These 2,673 proactive queries resulted in an additional 1,043 follow-up queries that originated from the first proactive query. Thus, the total number of proactive queries is 3,716. Our analysis focuses on the 2,673 first proactive queries. The data from the 1,043 proactive follow-up queries were included as a part of the first query's record.

8. We used officers' logs and dispatchers' records to identify all recorded traffic stops and code outcomes reported on the log (i.e., warn, issue ticket, arrest). These data do not reflect the actual number of traffic stops as officers do not record all stops in their logs nor call them into the dispatcher who records stops in the dispatch database.

9. A hit does not automatically indicate police action is necessary. For example, officers can run a name and receive hits on either similarly spelled names or persons with a different birth date because the computers provide a range of possible spellings or misspellings. We coded a hit only when it was clear that the person whom the officer was inquiring about was the person who the computer indicated had an outstanding warrant, and so forth. Similarly, some license plates can be incorrectly entered on the first query, and receive a hit. But on the second query (with a digit or letter changed), the plate record is legitimate or "clear" (i.e., no outstanding legal status).

10. Race is not even included for an operator's license query. Only CCH queries provide race information, but this is usually incomplete. In our data, only 154 (4%) of the CCH queries identify the person's race. Furthermore, most persons do not have a criminal record.

11. Although this approach leaves room for error, it is in the direction of undercounting African Americans. We tested this assumption by comparing race as assigned by residence (a variable we call resrace) to the actual race observed in three related data sets. In the pilot test of the roadway observation protocol, we recorded the license plates, race, and gender of 526 randomly selected drivers. Then, using all African American drivers observed ($n = 76$) and a random sample of the 450 White drivers observed ($n = 78$), the police department conducted a computerized search of those plates similar to what officers do with an MDT. We also compared the residence recorded for all tickets ($n = 339$) and arrests ($n = 258$) during the 2-week time period of our study with the race recorded by the officer on tickets and arrest reports. In these data sets, the race of the driver or ticketed or arrested person is known (or at least observed and recorded by someone), not merely inferred. Across each data set, race as assigned by residence is positively and significantly correlated with race as observed: roadway pilot (.80, $p < .001$); ticket (.90, $p < .001$), and arrest (.80, $p < .001$).

Furthermore, resrace reliably predicts race, as observed for both Whites and African Americans, across each data set. For example, resrace predicts observed African American drivers 100% of the time in the roadway observation pilot data, 92% of the time in ticket data, and 89% of the time in arrest data. Although there is error because some Whites may live in a predominantly African American community and be incorrectly coded as African American, and some African Americans may live in a predominantly White community and be incorrectly coded as White, the error is in the direction of undercounting African American drivers. The rate of true positives for African Americans is consistently greater than our assumption of 75%. If anything, African Americans are more likely to be incorrectly coded as White using resrace. This means the rate of profiling indicated in our analysis may actually be higher but not lower than reported. We interpret this as confirmation of the high degree of residential segregation in the study region. In general, we conclude that for the

purpose of measuring racial profiling of African American drivers, residence reliably serves as a proxy for race.

12. There is a also a norm of reciprocity that operates among officers when another unit is assigned to cover a call in one's sector: If the call requires simple paperwork, the sector officer will write that report rather than letting the officer who was called in to handle the problem do so. In this way, officers who are assigned to cover a call for the sector officer do not increase their own report writing.

13. In our data, women comprise 40% of the drivers on the road, and their distribution is uniform throughout the city. White women use interior roads and roads farthest from the Black City border, whereas African American women use roads closer to the Black City border. Our analysis indicates that where gender differences occur, it is African American females who are the target of MDT queries.

14. In our study, the effects of officer characteristics (age, experience, role), vehicle characteristics (age, theft potential), event variables (time, location, query type, outcome), and driver characteristics (race, gender) do not explain the phenomenon of race and place. Some variables, such as officer experience and sector assignment, slightly increase or reduce the effect. But we argue that they do not explain it. We also examined variation in decisions by officers working alone (one-officer vehicles) and in teams (two-officer vehicles) and by sector and shift assignment. These, too, did not reduce the overall effect of race and place.

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