Preliminary Yearly Report for the Maricopa County Sheriff's Office, Years 2014-2015

Prepared for Maricopa County Sheriff's Office

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About the Center for Violence Prevention & Community Safety

Arizona State University, in order to deepen its commitment to the communities of Arizona and to society as a whole, has set a new standard for research universities, as modeled by the New American University. Accordingly, ASU is measured not by whom we exclude, but by whom we include.

The University is pursuing research that considers the public good and is assuming a greater responsibility to our communities for economic, social, and cultural vitality. Social embeddedness – university-wide, interactive, and mutually-supportive partnerships with Arizona communities – is at the core of our development as a New American University.

Toward the goal of social embeddedness, in response to the growing need of our communities to improve the public's safety and well-being, in July 2005 ASU established the Center for Violence Prevention and Community Safety. The Center's mission is to generate, share, and apply quality research and knowledge to create "best practice" standards.

Specifically, the Center evaluates policies and programs; analyzes and evaluates patterns and causes of violence; develops strategies and programs; develops a clearinghouse of research reports and "best practice" models; educates, trains, and provides technical assistance; and facilitates the development and construction of databases.

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1. Executive Summary

1.1 Overview

In 2011, the Maricopa County Sheriff's Office (MCSO) came under a federal court order regarding racially biased policing practices. As part of meeting the requirements of the court order, MCSO contracted with the Center for Violence Prevention and Community Safety (CVPCS) to receive technical assistance on increasing the data and analytical infrastructure surrounding MCSO's traffic stop data analysis work group and enhancing their capacity to collect, maintain, analyze, and disseminate traffic stop data.

This executive summary provides a review of the October 2015 data audit of the first year of data collection with the TraCs system, or the data collection system implemented to gather information on traffic stops, a *brief description of the data employed in the coming analyses, and the major findings included within the report. The report examines a number of separate, but related issues: 1) the initial stopping decision, 2) the length of stop by race, 3) type of stop (e.g., warnings, citations, and incidental contact), 4) specific examinations of arrests by race, 5) specific examinations of searches by race, and 6) specific examination of seizures by race.

Following the review of findings is a summary of the CVPCS research team's recommendations (related to data collection, supervisory oversight, and further understanding of racial/ethnic disparities) for consideration by MCSO administrators.

1.2 Data

This report documents the findings from statistical analyses of data collected for all officer-initiated traffic stops conducted by the MCSO deputies from July 1, 2014 to June 30, 2015. These findings represent analyses from the first year of data collection for MCSO using the TraCs system, which is the data collection system implemented to gather information on traffic stops.

1.3 Data Audit

Analysis showed that the TRaCs system occasionally produced duplicate event numbers, or MC numbers. We found, however, that there is an alternative means of identifying traffic stops as unique within the TraCs data. The PrdKey variable, which is a variable created in MCSO's Sql-based data management system can also be used as a traffic stop identifier. Thus, rather than using Event Number to identify unique traffic stops, we suggest using the PrdKey variable to identify traffic unique stops as there are no duplicate ID numbers produced through it. Event Number is still important in the data though as it can be used to link the CAD/RMS data to the TraCs data.

Next, of the 27,850 traffic stops in the yearly data, 3,298, or approximately 12%, had missing GPS coordinates that originated from the TraCs system. An immediate solution for missing GPS data is to use GPS coordinates coming from the CAD/RMS system, also known as dispatch. These data have a very low missing rate for GPS coordinates (about 3%). MCSO is currently working with the provider of the GPS system to determine the causes associated with the failure of the TraCs system in capturing GPS coordinates.

Additionally, deputies and sergeants have limited abilities to correct vehicle stop contact forms once they have been entered into the TraCs system. In some cases, deputies and sergeants corrected

data by re-entering the form. This created a handful of duplicate traffic stop entries (approximately 1.1% of all data). To account for this, one entry from each traffic stops was randomly selected to be retained in the data.

We also found that TraCs data contained other missing data. During the first year, at the organizational level, MCSO was higher than a 5% missing data threshold for all months of the year. The range of missing data was as low as 10.6% in June 2014 and as high as 11.5% in July 2015. While missing data is a problem, it has become less so over time, with rates of missing data declining over the year.

Importantly, our analysis also showed that missing data was problematic for all deputies, not just a select few. Recommendations from the data audit included:

1. Addressing technological issues (such as auto-population of forms or GPS coordinate reporting) that are generating missing data in traffic stops,
2. Providing officers with additional training on reporting the location of stop and other information that would be useful in addressing missing data, and
3. Suggesting MCSO consider a broad range of strategies and tactics to address problems of quality of data, such as maintaining thorough records detailing the methods and frequency of interventions so that MCSO can assess which strategies are most effective in improving data quality.

1.4 Results

For the first yearly report, descriptive statistics are primarily employed to examine racially biased policing. Additionally, some simple inferential statistics are reported where appropriate. The descriptive statistics presented below are typically ratios of deputy behavior in the numerator over the average behavior at the higher administrative boundary, such as a beat or district. We report ratio-based results only for deputies who made, on average, 10 or more stops per month.

1.4.1 Distribution of Stops by Race

In general, there are a small percentage of deputies who stop minority drivers at rates that are twice as high as the administrative boundaries (such as a beat or district) they are making the stop in. These findings suggest that there are deputies acting outside of the norm established by the unit. However, to more clearly determine whether this is so, inferential models need to be run.

1.4.2 Type of Stop

The type of stop and race/ethnicity were not strongly related to one another at the organizational level (see Table 11a and b). Yet, descriptive statistics demonstrated there is evidence that some deputies and units differ in the types of stops they make by the race/ethnicity of the driver. For example, some deputies generate some types of stops by race at a greater frequency than other deputies working in the same beat or district. Additionally, some beats and districts generate specific types of stops by race at a greater frequency than other beats or districts. Thus, while there is a weak overall relationship between driver race/ethnicity and type of stop, there seem to be some “problem deputies” and “problem zones” within MCSO and its administrative boundaries that require further examination and may need to be addressed.

1.4.3 Arrest

Arrest and race/ethnicity were not strongly related to one another at the organizational level (see Table 14a and b). There is evidence that certain deputies and units are not performing according to what is "average" in MCSO. These deputies generate arrests by race at a greater frequency than other deputies working in the same beat or district by race.

1.4.4 Search

Searches of drivers and race/ethnicity were not strongly related to one another at the organizational level (see Table 17a and b), but there is evidence that certain deputies and units are not performing according to what is "average" in MCSO. These deputies engage in searches by race/ethnicity at a greater frequency than other deputies working in the same beat or district.

1.4.5 Seizure

Seizures of drivers' items and race/ethnicity were not strongly related to one another at the organizational level (see Table 20a and b). There is, however, evidence that certain deputies, beats, and districts engage in seizures by race with greater frequency than others.

1.4.6 Length of Stop

First, length of stop and race/ethnicity were not strongly related to one another at the organizational level (see Table 21). The length of stop analysis showed that racial minorities experienced longer lengths of stops than non-Hispanic and non-Black drivers. Furthermore, minority drivers (see results for Native Americans, Hispanics, Blacks, and Asians) experienced a greater variability in the length of stop, suggesting that there is a lack of consistency in the length of traffic stops across deputies. Both of these findings indicate potential issues with racial/ethnic bias.

1.5 Conclusion

In general, the analyses of the yearly data suggest there may be some issues with racially biased policing among some deputies, beats, and districts across the outcomes of decision to stop, type of stop, length of stop, and arrest by race/ethnicity. Continued work should examine the depth of these relationships.

2. Data Audit

The purpose of the data audit was to assist the Maricopa County Sheriff's Office in assessing the quality of their TraCs data and to develop and maintain high data quality. Regular examination of data quality enables any future policy and training recommendations to be based on the best quality data that is possible. Without indicators of high data quality, results from analyses are seen as questionable.

The data employed in the audit encapsulates one year of deputy initiated traffic stops by Maricopa County Sheriff's Office (MCSO) deputies ranging from July 1, 2014 to June 30, 2015. While MCSO had other calls for service during this period, this data includes only deputy initiated stops, which is the proper unit of analysis for discerning any racial bias or profiling involved in traffic stops.

There are two data sources employed in the data audit. The first is CAD data – or data about the traffic stops coming from the dispatch center. Geographic coordinates for each stop are pulled from the CAD data and matched to the TraCs data (discussed next) through the Event Number identifier. The second data source is the TraCs data, which includes the data coming from the vehicle stop contact form that was established as a part of the court order. A vehicle stop contact form is used by deputies to collect information about each traffic stop beyond what is collected in each citation, long form, incidental contact report, or warning. Here, individual traffic stops are identified by the Prdkey. The TraCs data contains information on the incident, driver, passenger(s) if there are any, and location of the traffic stop. For ease of reporting, this report will refer to the above datasets collectively as the "TraCs" data for the remainder of the report.

2.1 General Issues with the Data

The TraCs data experiences several problems during the first full year of data collection. The first problem the audit revealed was related to the Event Number variable, which is meant to be an identifying variable for each traffic stop. Typically, identifying variables enable each case, or here, each traffic stop, to be uniquely identified. There were two technology-related problems associated with the Event Number variable in this data. First, connectivity to the internet in the field was not always 100%, especially for deputies working in the more remote areas that MCSO covers, such as the Lakes District. This compounded the severity of the second problem, specially that, prior to July 14th, 2014, the CAD system was autofilling the Event Number for traffic stops in some circumstances. One of these circumstances was when the TraCs terminals in the field could not connect to the internet to show an Event Number had been used. On July 14th, this was corrected; currently Event Number is manually entered by the deputy and an error message appears if the deputy types in an Event Number that does not match the CAD data. While duplicate event numbers are problematic, fortunately, there is an alternative means of identifying traffic stops as unique. The PrdKey variable, which is a variable created in MCSO's data management system, can be used as an alternative traffic stop identifier. Thus, as noted above, rather than using Event Number, we suggest using the PrdKey variable to identify unique traffic stops.

Next, of the 27,850 traffic stops in the final cleaned yearly data, 3,298 or approximately 12% had missing GPS coordinates that originated from the TraCs system. MCSO experiences internet connectivity issues in some areas that MCSO covers, particularly in the Lakes District (which covers the remote areas of Lake Pleasant and Roosevelt Lake). With limited connectivity, the TraCs software system was unable to reliably provide GPS location coordinates. One means of addressing missing GPS coordinates is to geocode the stop location that is self-reported by the deputy. Using this information, 1,150 additional

traffic stops or about 35% of those traffic stops previously missing GPS coordinates can now be given GPS point locations. However, a better solution is using the GPS data from the CAD/RMS system or dispatch, which has a missing data rate of 3% (or about 823 stops). Note though that the CAD data are not matched to the PrdKey identifier, but rather the Event Number variable.

Another issue with TraCs data was the stop end time. While the TraCs program and data entry system was running beginning in April 2014, MCSO and the Monitor team decided to begin data analysis on July 1st, 2014. Shortly after July 1st, MCSO became aware of a software glitch in the TraCs system; specifically, for stops that began close to midnight and carried over to the early morning hours of the next day, the TraCs system did not assign an end time to the stop. On July 21st, 2014, MCSO released a software update that fixed the end time issue. Soon after the update, stops that bridged two days had end times. As a consequence of this glitch, though, there are 1,633 stops without end times, which also results in missing length of stop information. Because deputies had to log out and log back in to the TraCs system for the update to occur, there were some delays in the update fully spreading to terminals throughout MCSO. Additionally, the TraCs system did not update unless the deputy logged in, thus, for deputies not making regular stops, such as deputies not assigned to patrol, updating their TraCs system often took longer. The vast majority of these stops happen in July (n=1,619); however, there are a few stops that occur in August, September and October (i.e., in August, n = 10; in September, n = 3; in October, n = 1). After October, this issue is fully rectified and all stops had end times. A potential solution for capturing the end time for the 1,633 stops is to use information about the stop from the CAD system. However, since the CAD data are not matched to the PrdKey identifier, but rather the Event Number variable, matching end times with CAD information could produce more data errors.[1]

Lastly, deputies and their supervisors have limited ability to correct problems once a form is entered into the TraCs system. This has to do with the "status" of the form once it is entered – specifically it immediately becomes "validated". Once validated, the form is pushed into the TraCs and is seen as complete and free of errors; these are known as status 90 stops. When data entry mistakes are made, because the default entry status is "validated," this does not allow deputies and sergeants to make post-entry corrections to a form or take the form out of its validated status. Some sergeants will void a form then have the deputy re-entry the form.[2,3] In some cases, new TraCs forms that were simply

[1] We choose to use CAD information for GPS data and not the end time data for several reasons. First, the CAD GPS data is when the stop is called in; this enables us to more precisely know where the incident occurred versus were the deputy stopped the driver. Next, there is other information in the TraCs data that enable us to triangulate the location of the stop, such as the city and intersection information the deputy enters about the stop. Thus, there are ways with the GPS data to determine whether or not the CAD data is problematically matched to the traffic stop data in TraCs. That, however, is not the case with the end time. As such, ASU, MCSO, and the Monitor Team collectively decided that keeping the data as missing would be best, especially given that the issue is relatively constrained to one month in 2014.

[2] Voided forms can be found through the "status" variable; here their code is 3 or Void. The "rejection_reason" variable shows why the sergeant voided the form. More information on this code can be found in section 2.4 and Appendix B.

[3] Soon, all sergeants will be able to void forms, currently and in the past, only some sergeants knew how to void a form. Sergeants were trained to make corrections prior to midnight of the same day of the stop for citations and warnings so that the court system could have the correct forms. However, if the error was caught after that window, they often did make any changes.

re-entered without deleting the original form, thus creating a duplicate stop given that the PrdKey across the two stops is different. This occurs regularly over the 12 months in the first year of data (see Table 1 below). Fortunately, these duplicates are rare at 298 cases or 1.1% of the total data before cleaning. In section 2.4, we detail how we construct the data so that duplicates are eliminated. MCSO has worked to correct this issue for the future through a process of supervisory of review of data. Here, the any TraCs form submission will not immediately going into a status "90"; the EIS group will spot check the data before allowing any forms to be validated. If a form needs correct, then they will reject the form and alert the sergeant to have the deputy make any needed corrections. This will provide a significant upgrade to data quality in the future; however, for fiscal years 2014-15 and 2015-16, this issue will need to be considered when constructing the yearly data (details in section 2.4).

Table 1. Duplicate and Non-Duplicate data by Month

	Month traffic stop occurred												
	14-Jul	14-Aug	14-Sep	14-Oct	14-Nov	14-Dec	15-Jan	15-Feb	15-Mar	15-Apr	15-May	15-Jun	Total
Not Duplicate	2514	2506	1875	1784	1897	2715	1953	1876	2176	2480	3214	2860	27850
Duplicate	30	30	29	51	20	18	12	28	12	16	20	32	298
	2544	2536	1904	1835	1917	2733	1965	1904	2188	2496	3234	2892	28148

2.2 Missing Data

It is generally accepted that for data to be regarded as high quality, only 5% of the data can be missing (Engel et al. 2007; 2009; Engel, Cherkauskas and Smith 2008; Fridell 2004). During the first year of data collection, at the organizational level, there were no months where MCSO was beneath a 5% missing data threshold. The range of missing data was as low as 10.6% in June 2015 and as high as 11.54% in July 2014.

Missing data seems to be problem for all deputies. It is important to keep in mind that the analysis is focused on those deputies that conduct the most stops (i.e., approximately 10 or more stops per month). When examining missing data among deputies over the course of the first year of data collection, the average percent missing data per deputy was 10.8%, with the lowest yearly percent of missing data by a deputy being 9.26% and the highest being 12.0%. Put simply, no deputy was within the 5% threshold for data quality. Thus, missing data seems to be problem for all deputies, not just a select few. That said, the audit also showed that some deputies had more missing data than others. Missing data in the TraCs system, for the most part, is a deputy-based problem that aggregates to larger administrative boundaries (beats and districts).

2.3 Invalid Data

The audit showed that only a few deputies have invalid data entry issues. Common variables to have invalid data include the birth date of the driver, the license plate information of the vehicle, and the district the stop occurred in. Thus, while the entry of data by deputies has its problems, it is unlikely that it impacts data quality to a vast degree.

2.4 How the Data is Created

The first years of the implementation of data collection and use of technology are commonly problematic. There is a long history of innovation in policing technology (beginning as early as CB radios; Manning 1992) and slowly, police departments adopted these technological changes. This adoption was commonly fraught with problems (Manning 1992; Turner et al 2007; Willis et al. 2004); and importantly, these problems are often unanticipated (Koper, Lum and Willis 2014). MCSO is no different than the vast majority of law enforcement agencies implementing new technology and processes. Many of the problems noted above will either not exist or be as problematic in the next year of data collection. Until then, together with decisions about the data coming from MCSO and the Monitor team, we have taken several steps to assure that the first fiscal year of data is of good quality. Below, in a step-wise fashion, we describe the process of building the 2014-2015 year of deputy initiated traffic stop data.

First, traffic stops in the final dataset should be limited to those stops that have been completed in the TraCs system and were not involved in training activities. Thus, we begin to construct the final data by eliminating stops that are tagged as training activities or do not have a completed and validated status in the data. To capture only stops that are completed and validated in the TraCs system, we keep only stops where the "status" variable is equal to 90. To identify training stops that should be eliminated, we use both the Agency variable and deputy serial number. If the Agency number – which shows which district the stop took place in – is labeled as -9 or missing then the stop is considered a training stop. Next, if the deputy serial number variable starts with "ST," the stop is also considered a training stop. Both of these types of stops were eliminated from the final data set. Appendix B contains the original analysis of these cases that are dropped.

Second, we then move on to extract the duplicate cases created by deputies and sergeant re-entering traffic stops when the first entry into the TraCs system is problematic or has errors. In the spring 2016 quarterly monitor visit, ASU, MCSO, the Monitor team, DOJ and the plaintiffs discussed various methods of dealing with the duplicate cases. At issue here is whether or not duplicate stops were created at random or are systematically over-represented in some of the elements of concern in the court order. As an example, it may be possible that there are more Hispanics in duplicate cases than in non-duplicate cases. If this is the case, then deleting all the duplicate cases – both the original and the duplicate – would eliminate some traffic stops involving Hispanics. Naturally, this is a problem given that analyzing traffic stops involving Hispanics is at the core of the court order. ASU conducted analyses to ascertain whether the number of duplicate stops differed across core points of analyses in the court order, specifically, driver post-stop perceived race, district, whether the stop was extended, whether a search was conducted, and the conclusion of the stop. The results demonstrated that there is non-random distribution of duplicates (see Appendix A for the analysis) and ultimately, the group collectively felt the safest route to take was to randomly select a one case from the duplicate set to retain.

Randomly selecting which cases to keep and which ones to discard involved several steps. First, we created a variable that randomly assigned numbers to each case. Second, we created a within-duplicate set count variable. This means that when there are two cases in the duplicate set, then the first case receives a "1" on the variable while the second case receives a "2." Third, we then sorted the cases within each set by the random number. Whatever case had the highest random number, we kept for the yearly analysis.

The next step in creating the data is cleaning the variables. Without going into excessive detail, we recoded variables where needed, assigned missing values, and created variables for dates and times that are easily used in statistical analyses.

The final step in creating the yearly data was to shape the data set wide. A wide data set is one where for each row in the data, there is only traffic stop and that row contains all the information about the traffic stop. The structure of the MCSO data in TraCs, however, is not wide, but long. Here, there is one row per stop and an additional row for every passenger associated with the stop. The goal in reshaping the data was to put all information regarding a traffic stop on one row for ease of analysis. In the long dataset, there are 32,604 cases and these cases include rows for both the traffic stop information and the passenger information. Because both passengers and stops have rows, we do not have an accurate portrayal of the total number of stops. Once transformed into a wide dataset, the data set has 27,850 unique stops in the 2014-2015 yearly data.

2.5 Suggestions for Increasing Data Quality

Several solutions and recommendations are detailed to assist MCSO in obtaining lower rates of missing or invalid data and increasing data quality. First, when examining both missing data and invalid data (i.e., data that was incorrectly entered), missing data is by far the larger problem. The level of missing data in MCSO is in large part due to deputies. In addition, some of these issues are technology related. We recommend providing deputies with feedback and training on TraCs that is more intensive as well as assistance be made available to deputies on the use of the TraCs system. Another technological issue includes how deputies and sergeant address data entry problems or mistakes. In some circumstances, sergeants and deputies are not able to alter the data to correct issues or delete previous stops that were entered incorrectly, resulting in a small amount of duplicate data discussed above. Currently, MCSO is working on creating a supervisory data review process within its early intervention (EI) system that provides an additional step of data quality control prior to the traffic stop being fully released and validated in TraCs. This will greatly add to the quality of MCSO's TraCs data. As a next step, a flow chart of how data enters the TraCs system by the deputy and how that information eventually turns into data downstream should be constructed. Such a chart would be helpful in trouble shooting any future problems. Lastly, MCSO should consider a broad range of strategies and tactics to address problems associated with quality of data. In doing so, thorough records should be retained to detail the methods and frequency of changes to data collection (e.g., software updates, changes to TraCs forms) that MCSO has prescribed so that it can assess which strategies are most effective in addressing data quality.

2.6 Data Audit Overview

When compared to other agencies like Arizona Department of Public Ssafety (DPS) that are using the TraCs software, MCSO is performing well regarding data quality (missing and invalid data) in their first year of internal implementation and use. That said, the data audit found that there were several problematic areas of missing data, however, the vast majority of that problem laid with deputies and problems with the TraCs system's means of capturing geographic coordinates.

3. Characteristics of the Traffic Stop Data

The data employed in the yearly data analysis is the same as the data employed in the data audit. More specifically, this data encapsulates one year of deputy initiated traffic stops by Maricopa County Sheriff's Office (MCSO) deputies ranging from July 1, 2014 to June 30, 2015. While MCSO had other calls for service during this period, this data includes only deputy initiated stops, which is the proper unit of analysis for discerning any racial bias or profiling involved in traffic stops. The data source employed in this report comes from both the TraCs system, which includes the vehicle stop contact form

data established as a part of the court order, and the CAD/RMS data, which is information from emergency dispatch. A vehicle stop contact form is used by deputies to collect information about each traffic stop beyond what is collected for each citation, long form, incidental contact report, or warning. In the TraCs data, information is collected about the incident, driver, passenger(s) (if there are any with whom contact is made), and location of the traffic stop. For ease of reporting, the data will be referred to as the "TraCs" data for the remainder of the report. CAD/RMS data was used for geographic coordinates to located the traffic stop in a census tract or zip code. Traffic stops in the final dataset were limited to those stops that had been assigned a status of validated in the TraCs system and were not involved in training activities. There are other means for identifying these cases. The final number of stops is 27,850.

Table 2. Descriptive Statistics of Traffic Stops[a]

	Frequency	Percent
Race of Driver -- All Race/Ethnicity		
White	18835	67.6
Unknown	268	1.0
Native American	424	1.5
Hispanic	5724	20.6
Black	2000	7.2
Asian	574	2.1
Race of Driver -- Hispanics v. Non-Hispanic[a]		
Hispanic	5724	20.6
Non-Hispanic	21858	78.5
Type of Stop		
Warning	11600	41.7
No Contact	315	1.1
Long Form	78	.3
Field Incident	11	.0
Citation	15753	56.6
Arrested		
No	26055	93.6
Yes	1795	6.4
Searched		
No	27287	98.0
Yes	563	2.0
Seizure		
No	27387	98.3
Yes	463	1.7
Length of Stop		
0-20 min.	21356	76.6
60+ min.	1227	4.4
N = 27,850		

[a] This category excludes drivers in the Unknown racial category.

We begin with a brief description of the dataset. Before moving on, it is important to note how race/ethnicity is measured in the TraCs data. The state of Arizona does not collect race/ethnicity information when issuing driver's licenses; consequently, the TraCs data does not contain an objective measure of race/ethnicity (that is, a driver's self-reported race or ethnicity). As an alternative, deputies are obligated to report the race/ethnicity of drivers and passengers. While this is not an objective measure, deputies are obligated to report the race/ethnicity of drivers and passengers. As a result, there is little to no missing data on this variable. Additionally, in some circumstances, we examine the race/ethnicity of the drivers as Hispanic v. Non-Hispanic (encompassing all drivers perceived by deputies to be white, Black, Asian, or Native American); this is due to the focus of the court order.

Between July 1, 2014 and June 30, 2015, there were 27,850 non-duplicative officer-initiated traffic stops. Table 2 shows descriptive statistics for all traffic stops during this time. To begin with, whites have the largest percentage of traffic stops amongst drivers stop by MCSO at (67.6%), followed by Hispanics (20.6%). Citations are the most common type of stop (56.6%) with warnings following second (41.7%). Incidental contact stops are those where the deputy stops a vehicle because there is reasonable suspicion to do so, however no crime is committed (for example, an amber alert). These are uncommon stops, constituting only 1.1% of stops in the data.

Several other outcomes associated with traffic stops are also rare. With respect to arrest, 6.4% of stops results in arrest. In 2% of cases, drivers experience a probable cause, Terry, or consensual search by officers. We omit searches incident to arrest in this calculation. Finally, items are seized from drivers in 1.7% of cases. Tables 3, 4, and 5 provide more information for all stops; the trends in these descriptive findings are summarized below.

The majority of traffic stops had the following characteristics:

- Occurred on a weekday (65.7%)
- Lasted between 0 and 20 minutes (0 through 10 minutes 28.3%; 11 through 20 minutes 53%)
- May 2015 accounted for the largest percentage of traffic stops (11.5%); overall, stop activity at the organizational level was fairly consistent across months, with a difference of 4% between the busiest and slowest months
- Stops appear to follow a seasonal trend, with more stops occurring in the spring and summer months, followed by a decline in the fall and early winter
- Some seasonal variation in the prevalence of traffic stops can be expected. This may be due to changes in driving patterns in the summer or the population change in the winter associated with migratory patterned into Arizona from colder states.

At the organizational level, drivers involved in traffic stops were:

- On average, approximately 38 years of age
- Predominantly male (65.1%)
- Predominantly White (67.6%) or Hispanic (20.6%)
- Carried a driver's license issued by the State of Arizona (82.7%)

At the district level, characteristics of drivers were more varied:

- Drivers involved in traffic stops were consistently male, and Arizona drivers
- The average age of drivers ranged from early 30s to early 40s
- Some variation in racial or ethnic backgrounds of drivers stopped across districts can be expected. This is due to the demographic composition of residents and travelers in these districts, along with differences in the driving population in these areas.

Table 3. 2014-2015 Traffic Stops by Month – Organization and District

	% Jul '14	% Aug '14	% Sep '14	% Oct '14	% Nov '14	% Dec '14	% Jan '15	% Feb '15	% Mar '15	% Apr '15	% May '15	% Jun '15	Total Stops in Year
Organization	9.0	9.0	6.7	6.4	6.8	9.7	7.0	6.7	7.8	8.9	11.5	10.3	27850
District													
1	12.61	8.94	10.93	14.29	16.61	12.38	15.92	19.19	13.37	13.31	14.84	15.14	3854
2	14.44	18.36	19.95	15.36	15.34	9.54	15.26	16.10	19.44	21.73	19.35	17.66	4710
3	16.55	14.80	11.63	15.92	15.92	10.06	13.77	16.15	13.60	12.10	10.80	10.31	3674
4	15.04	14.41	12.43	15.92	14.39	11.68	15.92	14.93	15.26	13.55	11.73	15.80	3934
7	4.38	4.27	7.47	9.64	11.70	12.82	11.26	9.17	8.00	5.69	5.01	5.84	2134
5	29.36	31.88	24.21	11.49	21.24	36.94	19.25	17.16	21.42	13.95	24.67	19.76	6470
Enforcement Support	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.21	0.37	0.16	0.00	0.24	25
SWAT or K9	1.03	0.92	2.93	0.67	0.74	1.03	0.26	0.48	0.51	0.52	0.72	0.38	230
6	6.01	5.11	10.13	11.60	4.01	5.52	8.19	6.45	7.90	18.79	12.76	14.72	2652
Special Investigations	0.04	0.08	0.16	4.76	0.00	0.00	0.15	0.05	0.05	0.12	0.00	0.00	99
Major Crimes	0.52	1.24	0.16	0.22	0.05	0.00	0.00	0.11	0.00	0.08	0.00	0.10	59
Missing	0.04	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.09	0.00	0.12	0.03	9
Total Stops in Month	2514	2506	1875	1784	1897	2715	1953	1876	2176	2480	3214	2860	27850

Note: District row percentages are in relation to monthly total stops

Table 4. 2014-2015 Driver Characteristics in Traffic Stops – Organization and District

	Avg. Citizen Age	% Male	% White	% Unknown	% Native Am.	% Hispanic	% Black	% Asian	% AZ DL	Total Stops in Year
Organization	37.9	65.1	67.6	1.0	1.5	20.6	7.2	2.1	82.8	27850
District										
1	37.3	61.9	62.1	0.9	3.5	20.9	9.8	2.6	85.6	3854
2	36.5	65.2	43.5	1.2	1.9	39.3	11.2	2.8	78.1	4710
3	40.2	63.4	67.0	1.1	0.4	21.4	8.2	1.8	85.2	3674
4	38.9	63.9	85.3	0.8	0.6	9.4	2.6	1.1	85.3	3934
7	43.1	65.0	81.0	0.8	2.7	9.2	3.7	2.5	84.1	2134
5	37.2	70.2	72.8	0.7	1.1	17.8	5.5	2.0	80.8	6470
Enforcement Support	33.5	72.0	60.0	0.0	0.0	20.0	16.0	4.0	84.0	25
SWAT or K9	34.5	67.4	50.9	2.2	2.2	30.0	13.0	1.7	81.7	230
6	35.1	60.6	72.9	1.0	0.6	16.7	7.3	1.5	87.8	2652
Special Investigations	37.7	68.7	39.4	6.1	6.1	33.3	13.1	2.0	34.3	99
Major Crimes	32.7	66.1	50.8	6.8	6.8	16.9	16.9	1.7	16.9	59
Missing	44.1	88.9	44.4	0.0	0.0	55.6	0.0	0.0	77.8	9

Note: Information on whether the driver carries an Arizona driver's license is missing in 7.9% of total cases

Table 5. 2014-2015 Traffic Stop Characteristics – Organization and District

			Duration of Stop (in Minutes)							
	Total # of Stops	**% Weekday**	**% 0 - 10**	**% 11 - 20**	**% 21 - 30**	**% 31 - 40**	**% 41 - 50**	**% 51 - 60**	**% 60+**	**% Missing**
Organization	27850	65.8	26.2	50.4	8.5	2.4	1.2	0.9	4.4	5.9
District										
1	3854	69.1	24.7	49.7	10.5	2.6	1.6	0.8	4.4	5.6
2	4710	66.8	26.0	52.8	8.1	2.7	1.3	1.2	4.3	3.6
3	3674	75.0	20.2	48.4	11.0	3.6	1.8	1.2	5.9	7.9
4	3934	67.9	27.9	49.7	8.0	2.2	0.8	0.8	4.1	6.5
7	2134	65.1	14.0	62.7	10.4	2.5	1.0	0.8	4.7	3.8
5	6470	55.3	32.4	45.9	6.3	2.0	1.0	0.6	4.2	7.6
Enforcement Support	25	72.0	0.0	64.0	24.0	8.0	0.0	0.0	4.0	0.0
SWAT or K9	230	56.1	22.2	45.7	11.3	2.2	1.7	1.7	6.1	9.1
6	2652	70.1	31.2	52.1	6.6	1.4	0.9	0.9	2.9	4.1
Special Investigations	99	59.6	11.1	63.6	13.1	3.0	0.0	3.0	6.1	0.0
Major Crimes	59	62.7	10.2	61.0	6.8	5.1	3.4	3.4	8.5	1.7
Missing	9	66.7	22.2	44.4	11.1	11.1	0.0	0.0	11.1	0.0

4. Analysis of Traffic Stops

In this section, racial or ethnic based differences in traffic stop outcomes, both in the distribution of stops and post-stop, are examined. Descriptive statistics – primarily ratios – are employed in this analysis; inferential statistics are reported where appropriate. Ratios are a form of internal benchmarking, which is aimed at comparing the stop decisions of one officer to the stop decisions of other officers working around them (Walker 2001). Internal benchmarking provides law enforcement agencies some means of self-assessment that do not rely on difficult to use and compute external benchmarks, such as races of drivers by race in an area (Ridgeway and MacDonald 2010). There are two limitations associated with this type of analysis. First, if all officers within a specific unit are biased, no officer will look unusual. This is most problematic when bias is endemic across all officers and divisions within a department. Second, officers who are outliers may have legitimate reasons for being so. Ridgeway and MacDonald (2010) provide a good example: "a Spanish-speaking officer may appear to have an excessive number of stops of Hispanic suspects, when, in fact, the Spanish-speaking officer gets called in to handle and document those stops" (p. 189). These limitations notwithstanding, without the ability to use external benchmarking and other forms of increasingly sophisticated statistical analyses to determine racial bias, internal benchmarking is a commonly used alternative among law enforcement agencies (Ridgeway and MacDonald 2010; Walker 2001).

The comparative ratios essentially have the deputy behavior of interest in the numerator over the average behavior at the higher unit, such as a beat or district. If the ratio is sufficiently high (typically over 2.0), then it demonstrates that the deputy is potentially engaging racially biased policing. The ratio can be interpreted in the following way: 0 to 1.5: little to no evidence of bias, 1.5 to 1.99 suggests that the deputy is starting to stop a certain race at a higher rate than the average for the beat, district, or organization, and 2.0 or higher shows that the deputy is stopping a certain race at least two times the rate of the average at the beat, district, or organization level (Lamberth, 1996). The use of a specific ratio, in this case 2, for a benchmark is consistent with prior research on racial profiling or racially-biased policing by law enforcement (Lamberth, 1996).

We present condensed versions of the ratio benchmarks and other statistics used to determine racial/ethnically biased policing. These statistics are available in their uncondensed form in appendices as noted. Also used are means, percentiles, and standard deviations of variables where appropriate or necessary. Note that the statistics employed here do not control for underlying circumstances that may make certain rates and ratios seem high; an example would be a stop of a Hispanic is more likely to take place in a Hispanic neighborhood. As such, these findings show preliminary relationships only. Finally, the ratio results discussed below focus on deputies who made, on average, 10 or more stops per month from July of 2014 through June of 2015. This enables the results to focus on those deputies that are consistently involved in stop activity as well as identify patterns without potentially biasing results.

4.1 Distribution of Stops by Race/Ethnicity

One means of determining whether deputies are excessively stopping individuals of a certain race or ethnicity is to compare their rates of stop to the average stop rates for a particular race/ethnicity at the beat, district, or organizational level. If the ratio is high enough (greater than, or equal to, 2), then it demonstrates that the deputy is potentially engaging in racially biased policing.

Table 6. Descriptive Statistics Regarding Beat Level Percentages of Distribution of Stops by Race and Deputies' Performance Compared to Beat Level Statistics

	Beat Average for % of Stops by Race	% of Deputies above Ratio of 2	N[b]
By Hispanic			
Hispanic	21	12.9	107
Non-Hispanic[a]	79	1.3	11
Full Race Breakdown			
White	67	3.1	26
Native American	2	8.7	72
Hispanic	21	12.9	107
Black	8	12.9	107
Asian	2	10.8	90
Unknown	1	7.3	61

N = 832

[a] This category excludes drivers in the Unknown category. Note that the Unknown category is displayed below.

[b] Note that this number represents the number of deputy-beat combinations for deputies making, on average, 10 stops a month

Table 6 shows both the average percentage of stops by race across beats, and percentage of deputies who have a ratio of over two by race/ethnicity of the driver. The beat average for stops for all Hispanics is 21% compared to 79% for Non-Hispanics, which shows that Non-Hispanics are the most common stop in beats. However, there are 12.9% of deputies stopping Hispanics at a two times a higher rate than Non-Hispanics compared to the beat average The beat average for stops by race for whites is 67%, showing that whites are the predominate stop in beats. Hispanics are the second most common stop within beats at 21%. These percentages are similar to the overall percent of Whites and Hispanics for all stops (see Table 2). For each race/ethnicity, there are deputies who are stopping at a rate two times higher than the beat average. For traffic stops involving Whites, 3.1% of deputies stop Whites at twice the rate of the beat average. For stops involving Hispanics and Blacks, 12.9% of deputies are stopping these two races at a higher rate than the beat average. The percentage of deputies stopping Native Americans and Asians at a rate at least two times higher than the beat is slightly lower, at 8.7% and 10.8%, respectively.

Table 7 shows both the average percentage of stops by race/ethnicity across districts, and percentage of deputies that have a ratio of over two by race/ethnicity. The interpretation of the ratio remains the same: a deputy having a ratio of two or higher means that they are stopping a particular race/ethnicity at two times a higher rate than the unit average. The district average for stops for all Hispanics is 20.29% compared to 78.81% for Non-Hispanics. The district average for stops by race for whites is 68.14%, showing that whites are the predominant traffic stop in districts. Hispanics are the second most common stop within districts at 20.29%. For each race/ethnicity, there are deputies who are stopping at a rate two times higher than the district average. For traffic stops involving drivers of an unknown[4] race/ethnicity, 11.9% of deputies stop Unknowns at a higher rate than the beat average. The interpretation for this can signal that some officers are failing to identify a driver's race at a rate that is two times what is considered average in that district. For traffic stops involving Native American, 11.4%

[4] This is when the deputy cannot determine the race of the driver after having contact with the driver.

deputies are stopping this race at a higher rate than the district average. Appendix C contains each deputy's ratio by race for the comparison between deputy and district for decision to stop.

Table 7. Descriptive Statistics Regarding Beat Level Percentages of Distribution of Stops by Race and Deputies' Performance Compared to District Level Statistics

	District Average for % of Stops by Race	% of Deputies above Ratio of 2	N[b]
By Hispanic			
Hispanic	20.29	0	0
Non-Hispanic[a]	78.81	0	0
Full Race Breakdown			
White	68.14	0	0
Native American	1.49	11.9	8
Hispanic	20.29	0	0
Black	7.01	1.5	1
Asian	2.07	6	4
Unknown	9.00	11.9	8

N = 67

[a] This category excludes drivers in the Unknown category. Note that the Unknown category is displayed below.

[b] Note that this number represents the number of deputy-beat combinations for deputies making, on average, 10 stops a month.

4.1.1 Distribution of Stops by Race Summary

In general, whites and Hispanic drivers constitute the majority of drivers involved in traffic stops. A small percentage of deputies stop minority drivers at rates that are twice as high as is typical in the administrative boundaries (beat or district) in which they make the stop. This suggests that there are deputies acting outside of the norm established within the administrative boundary, and may be indicative of racially biased policing.

4.2 Type of Stop

Racially biased policing among deputies can also be assessed by examining deputies' rates of different types of stops across driver's race/ethnicity. For a particular deputy, are they more likely to give Whites warnings? Are Hispanics more likely to receive citations? To answer these questions, we compare deputies' rates of different types of stop by race/ethnicity of the driver to the average stop rates by type and race/ethnicity at the beat, district, and organizational level. If the ratio is high enough, then it demonstrates that the deputy is potentially engaging racially biased policing. An important caveat to the type of stop data is statistical power. When certain types of stops by race are low, an example being incidental contact stops of Asians, ratios can become skewed. As such, for infrequently occurring types of stops like Asians, unknowns, or incidental contacts, these results should be interpreted cautiously.

Starting with Table 8, the average percent of incidental contact stops for whites across beats is 46.5%, for Unknown race is it 1.6%, Native Americans 0.8%, 20.1% for Hispanics, 9.9% for Blacks and

1.6% for Asians, respectively. Very few deputies have a ratio of over two for incidental contacts by race/ethnicity. Indeed, the highest percentage lies with Hispanics: 1.9% of deputies have ratios of over two when compared to the beat level average.

Table 8. Descriptive Statistics Regarding Beat Level Percentages of Type of Stop by Race and Deputy Performance Compared to Beat Level Statistics

Incidental Contact			
	Beat Average for % of Stops by Race	% of Deputies above a Ratio of 2	N
White	46.5	1	8
Unknown	1.6	0.5	4
Native American	0.8	0.2	2
Hispanic	20.1	1.9	16
Black	9.9	1	8
Asian	1.6	0.4	3
Warnings			
	Beat Average for % of Stops by Race	% of Deputies above a Ratio of 2	N
White	70	2.3	19
Unknown	0.9	4.6	38
Native American	1.1	3.7	31
Hispanic	17.8	10.6	88
Black	7.4	9.5	79
Asian	2.3	7	58
Citations			
	Beat Average for % of Stops by Race	% of Deputies above a Ratio of 2	N
White	66.4	3	25
Unknown	0.6	5	42
Native American	1.9	6.9	57
Hispanic	21.6	11.2	93
Black	7.5	11.5	96
Asian	1.9	9.1	76

N = 832

In comparison to incidental contacts, there are much higher rates of deputies who have ratios of higher than two for stops resulting in warnings. Specifically, 10.6% of deputies are giving Hispanics warnings at two times the beat average, and 9.5% of deputies give Blacks warnings at twice the beat average. Finally, stops resulting in citations are similar to those involving warnings: 11.2% and 11.5% of deputies are giving Hispanics and Blacks citations at two times the beat average.

Table 9. Descriptive Statistics Regarding District Level Percentages of Type of Stop by Race and Deputy Performance Compared to District Level Statistics

Incidental Contact			
	Beat Average for % of Stops by Race	% of Deputies above Ratio of 2	N
White	66.9	4.5	3
Unknown	2.3	4.5	3
Native American	2.1	3	2
Hispanic	20.9	14.9	10
Black	6.7	10.4	7
Asian	1.2	4.5	3
Warning			
	Beat Average for % of Stops by Race	% of Deputies above Ratio of 2	N
White	69.5	0	0
Unknown	1	16.4	11
Native American	1.1	25.4	17
Hispanic	18.8	1.5	1
Black	7.3	6	4
Asian	2.3	10.4	7
Citations			
	Beat Average for % of Stops by Race	% of Deputies above Ratio of 2	N
White	67.4	0	0
Unknown	0.8	16.4	11
Native American	1.7	17.9	12
Hispanic	21.2	1.5	1
Black	6.8	3	2
Asian	1.9	14.9	10

N = 67

Table 9 shows the descriptive statistics regarding district level percentages of type of stop by race/ethnicity of the driver compared with deputy performance. The districts used here are 1-7, which includes Lake Patrol. Other districts, such as Major Crimes, or Swat/K9, have too few stops to analyze in this deputy to district comparison. Beginning with incidental contact stops, when comparing deputies to district level statistics, there are several deputies who have ratios that are equal to or higher than two. We point out notable percentages. Nearly 15% of deputies have rates of incidental contact stops of Hispanics that are two times higher than the district average. Also, 10.4% of deputies have rates of incidental contact stops of Blacks that are two times higher than the district average. Moreover, for stops that result in a warning, 25.4% of deputies have warning stop rates for Native Americans that are two times (or more) higher than the district average; over 16% of deputies have rates that are two times higher than the district average for stops involving warnings and drivers with an unknown race. Finally,

for citations, we see that 16.4%, 17.9%, and 14.9% of deputies have rates of giving citations to Unknowns, Native Americans and Asians that are at least two times higher than the district average. Additionally, Appendix D, E and F contain each deputy's ratio by race for the comparison between deputy and district for each type of stop: citation, incidental contact, and warning.

Table 10. Descriptive Statistics Regarding District Level Percentages of Type of Stop by Race and Beat Performance Compared to District Level Statistics

Incidental Contact			
	Beat Average for % of Stops by Race	% of Beats above Ratio of 2	N
White	62.5	3.3	4
Unknown	4.7	3.3	4
Native American	1.9	4.1	5
Hispanic	18.9	8.2	9
Black	6.8	7.4	8
Asian	1	2.5	3
Warning			
	Beat Average for % of Stops by Race	% of Beats above Ratio of 2	N
White	69.2	0	0
Unknown	1.2	12.3	14
Native American	1.3	12.3	14
Hispanic	18.4	13.9	16
Black	7.6	15.6	17
Asian	2.2	12.3	14
Citation			
	Beat Average for % of Stops by Race	% of Beats above Ratio of 2	N
White	66.3	0	0
Unknown	0.9	9.8	11
Native American	2.2	11.5	13
Hispanic	21.8	9.8	11
Black	6.9	15.6	17
Asian	1.9	8.2	9

N = 122

In addition to examining deputies, we examine the performance of beats and districts in relation to the larger units they are nested in: districts. The primary reason for understanding patterns of types of stops and race/ethnicity by higher units of aggregation is to understand what is considered average in these larger units. Thus, units that are drastically different (i.e., above 2) may signal a unit-level (i.e., beat or district) problem for that type of stop.

Table 10 shows the district average for type of stop by race and how beats perform in relation to those averages. Beats tend to have higher rates of all types of stops than districts, however, that varies by the race of the driver. For incidental contact stops, which happen relatively infrequently (315 total stops of 27,850 are incidental contact stops), a small proportion of beats have ratios that are over two for any race. For instance, 8.2 % of beats are over the district average of 18.9% of incident contact stops being for Hispanic drivers. For stops that result in warnings, no beat has an average that is higher (i.e., a ratio over 2) than their corresponding district for whites. However, at least 12% or more of beats are over a ratio of 2 for giving warnings to drivers of unknown race/ethnicity, Native Americans, Hispanics, Blacks, and Asians. For example, nearly 15.6% of beats are giving Blacks higher rates of warnings than what is occurring at the district level. Finally, for stops that result in citations, we see extensive deviations from the district averages on part of the beats. For instance, the average rate of warnings for whites at the district level is 66.3%, which is generally on par with the percentage of drivers who are white. Yet, no beats have a rate that is nearly two times this.

Table 11a. Relationship between Type of Stop and Hispanic v. Non-Hispanics

	Type of Stop				
	Warning	Citation	Incidental Contact	Other	Total
Non-Hispanic	9297	12171	241	58	21767
Hispanic	2167	3434	68	31	5700
Total	11464	15605	309	89	27467
Chi-Square	49.78**				
Cramer's V	0.043**				

+ p < 0.10; * p <0.05; ** p < 0.01

N = 27,467

Note: Stops with an "unknown" race/ethnicity were not included in the above analysis. Next, missing data for both stop outcomes (missing n = 93) and post-stop perceived race/ethnicity (missing n=25) as well as not including stops of unknown race/ethnicity, explain why the total in this table is 27,467 rather than the total number of stops (N = 27,850).

To test the relationship between the type of stop (i.e., stop conclusion) and the driver post-stop perceived race/ethnicity at the organization level, we conducted a chi-square test coupled with a Cramer's V statistic. The chi-square statistic determines whether type of stop and the driver's perceived race/ethnicity are independent from one another. The Cramer's V statistic shows how strong that relationship is. As shown in Table 11a, at the overall organizational level, there does seem to be a relationship between the ethnicity (Hispanic) of the driver and the conclusion of the stop (i.e., warning, citation, incidental contact, or other type of stop such as a field report). The chi-square test is significant ($p < 0.01$). The Cramer's V, on the other hand, shows that although the relationship is statistically significant, the strength of that relationship is small: only 0.043. Typically, Cramer's V are interpreted as follows: a Cramer's V between 0 to 0.29 demonstrates a weak relationship between the two variables, 0.3 to 0.59 shows a moderate relationship, while 0.6 to 1.0 shows a strong relationship. The Cramer's V here lies in the weak relationship range. Thus, when interpreted together, the significant chi-square suggests that while a relationship between the ethnicity of the driver and stop outcomes does exist, that relationship is a weak one. As shown in Table 11b, the relationship between the race of the driver and the conclusion of the stop is slightly stronger. The chi-square test is significant ($p < 0.01$) and the Cramer's V exhibits a weak relationship between the two variables at 0.036. This suggests that while there is a significant relationship between the race of the driver and stop outcomes, the relationship is weak at best.

Table 11b. Relationship between Type of Stop and the Driver Post-Stop Perceived Race/Ethnicity

	Warning	Citation	Incidental Contact	Other	Total
White	8049	10477	210	410	18777
Unknown	124	135	6	0	265
Native American	131	280	5	7	423
Hispanic	2167	3434	68	31	5700
Black	865	1099	22	9	1995
Asian	252	315	4	1	572
Total	11588	15740	315	89	27732
Chi-Square	109.580**				
Cramer's V	0.036**				

+ p < 0.10; * p <0.05; ** p < 0.01

N = 27,732

Note: Missing data for both stop outcomes (missing n = 93) and post-stop perceived race/ethnicity (missing n=25) explain why the total in this table is 27,732 rather than the total number of stops (N = 27,850).

4.2.1 Summary of Types of Stop

While the type of stop and race/ethnicity at the organizational level are not strongly related to one another (see Tables 11a and 11b), there is evidence that certain deputies and units are not performing according to what is "average" in MCSO. Here, these deputies tend to generate types of stops by race at a greater frequency than other deputies working in the same beat or district. Additionally, beats and districts as a unit also generate specific types of stops by race at a greater frequency than beats or districts (depending on the comparison). Thus, while there is not an overall relationship between race and type of stop, there seems to be "problem zones" within MCSO that need to be addressed.

4.3 Post-Stop Outcomes: Arrest by Race/Ethnicity

4.3.1 Descriptive Statistics

One concern about racially biased policing is that individuals of minority race/ethnicities differentially experience certain outcomes of traffic stops. Here we examine if this holds true for arrests in the first year of traffic stop data. One important caveat regarding the coming analyses is that arrests do not occur frequently,; as such, caution should be used when interpreting the descriptive statistics presented in Tables 12 and 13.

Table 12 compares deputies' rates of arrest by race/ethnicity to the beat average rate of arrest by race/ethnicity. Of the 6.4% of traffic stops that result in arrest (see Table 2), 26.8% of those arrests are of Hispanics, compared to 70.5% for Non-Hispanics. When comparing deputies' rates of arrest to the beat rates of arrest, 7.2% of deputies arrest Hispanics at a higher rate than the beat average, compared to just 1.6% for Non-Hispanics. When examining the beat average rate of arrest by race, 57.3% of those arrests are of Whites, while 26.8% of arrests are of Hispanics. These numbers are in discordance with the summary statistics of race in traffic stops (see Table 2). For instance, where Whites constitute 67.6% of stops, they make up only 57.3% of arrests. On the other hand, Hispanics make up 20.6% of the traffic stops yet are 26.8% of the arrests. This disparity is reflected when comparing deputies' rates of arrest to

the beat rates of arrest: 2.9% of deputies arrest Whites at a higher rate than the beat average, though 7.2% and 5.0% of deputies arrest Hispanics and Blacks at a higher rate than the beat average.

Table 12. Descriptive Statistics Regarding Beat Level Percentages of Arrests by Race and Deputies' Performance Compared to Beat Level Statistics

	% of Arrests by Race	% of Deputies above Ratio of 2	N
By Hispanic			
Hispanic	26.8	7.2	60
Non-Hispanic[a]	70.5	1.6	13
Full Race Breakdown			
White	57.3	2.9	24
Unknown	0.6	0.5	4
Native American	2.7	1.7	14
Hispanic	26.8	7.2	60
Black	9.3	5.0	42
Asian	1.3	1.9	16

N = 832[b]

[a] This category excludes drivers in the Unknown category. Note that the Unknown category is displayed below.

[b] Note that this number represents the number of deputy-beat combinations for deputies making, on average, 10 stops a month.

Table 13. Descriptive Statistics Regarding District Level Percentages of Arrests by Race and Deputies' Performance Compared to District Level Statistics

	% of Arrests by Race	% of Deputies above Ratio of 2	N
By Hispanic			
Hispanic	30.8	1.5	1
Non-Hispanic[a]	68.7	0.0	0
Full Race Breakdown			0
White	54.4	0.0	0
Unknown	0.5	7.5	5
Native American	3.9	10.4	7
Hispanic	30.8	1.5	1
Black	9.3	10.4	7
Asian	1.1	17.9	12

N = 67

[a] This category excludes drivers in the Unknown category. Note that the Unknown category is displayed below.

When deputies' performance on arrests by race/ethnicity is compared to district level statistics (Table 13), a different pattern emerges. First, at the district level, there are slightly different averages for arrests by ethnicity. At the district level, Hispanics represent 30.8% of arrests (versus 26.8% at the beat level and make up 20.6% of all stops). In contrast, Non-Hispanics comprise 68.7% of arrests (versus 70.5% at the beat level and make up 79% of all stops). When compared to the district level, deputies do

not appear to arrest Non-Hispanics at a higher rate compared to the district rate, and exhibit only slightly elevated levels (1.5%) for Hispanics. For race, Whites constitute 54.4% of arrests (versus 57.3% at the beat level and make up 67.6% of all stops). Conversely, Hispanics constitute 30.6% of arrests across districts (versus 26.8% at the beat level and make up only 20.6% of all stops). Notably though, when compared to the district level, 10.4% of deputies arrest Native Americans at or more than two times the average rate of the district and 17.9% of deputies arrest Asians at or more than two times the average rate of the district. Appendix G contains all deputies' ratios by race for the comparison between deputy and district for arrest.

4.3.2 Is There a Relationship between Arrests and Driver's Post-Stop Race/Ethnicity?

To test the relationship between whether the driver was arrested and the driver's post-stop perceived race/ethnicity at the organization level, we conducted a chi-square test coupled with a Cramer's V statistic. As shown in Table 14a, there is a statistically significant relationship ($p < .01$) between whether the driver was arrested and the post-stop perceived ethnicity (Hispanic) of that driver. The Cramer's V statistic is small at 0.043. This suggests that while there is a relationship between arrest and the driver's post-stop perceived ethnicity, it is a weak relationship.

Table 14a. Relationship between Arrest and the Driver Post-Stop Perceived Hispanic v. Non-Hispanic

	Non-Hispanic	Hispanic	Total
Not Arrested	20594	5179	25773
Arrested	1239	545	1784
Total	21833	5724	27577
Chi-Square	49.78**		
Cramer's V	0.043**		

+ p < 0.10; * p <0.05; ** p < 0.01

N = 27,577

Note: Stops with an "unknown" race/ethnicity were not included in the above analysis. Next, missing data post-stop perceived race/ethnicity (missing n=25) as well as not including stops of unknown race/ethnicity, explain why the total in this table is 27,467 rather than the total number of stops (N = 27,577).

Table 14b. Relationship between Arrest and the Driver Post-Stop Perceived Race/Ethnicity

	White	Unknown	Native American	Hispanic	Black	Asian	Total
Not Arrested	17851	257	357	5179	1834	552	26030
Arrested	984	11	67	545	166	22	1795
Total	18835	268	424	5724	2000	574	27825
Chi-Square	218.11**						
Cramer's V	0.089**						

+ p < 0.10; * p <0.05; ** p < 0.01

N = 27,825

Note: Missing data post-stop perceived race/ethnicity (missing n=25) explains why the total in this table is 27,825 rather than the total number of stops (N = 27,850).

Table 14b shows a significant chi-square statistic ($p < .01$), suggesting that there is a relationship between whether the driver was arrested and the post-stop perceived race of the driver. That said, the Cramer's V statistic is low, at 0.089. This suggests that while there is a relationship between arrest and the driver's post-stop perceived race, it is a weak relationship.

4.3.3 Summary of Stops with Arrests

While arrest and race/ethnicity at the organizational level are not strongly related to one another (see Table 14a and 14b), there is evidence that certain deputies and units are not performing according to what is "average" within MCSO, its beats or its districts. Here, these deputies tend to generate arrests by race at a greater frequency than other deputies working in the same beat or district. Again, while there is not a strong overall relationship between race and arrests, there seems to be "problem zones" within MCSO that need to be addressed.

4.4 Post-Stop Outcomes: Search by Race/Ethnicity

4.4.1 Descriptive Statistics

Similar to when we examined arrests, here we examine searches differentially felt by individuals of minority race/ethnicities in the first year of traffic stop data. Here, we combine three different types of searches: probable cause (PC) searches, consensual searches, and Terry searches. Searches incident to an arrest have been omitted. One important limitation regarding the coming analyses is that searches do not occur frequently. Indeed, of the 27,850 traffic stops conducted by MCSO, only 2.0% of stops involved a either a probable cause, consensual, or Terry search. Thus, descriptive statistics presented in Tables 15, should be considered with caution.

Table 15. Descriptive Statistics Regarding Deputy Level Percentages of Searches by Driver Race Compared to Beat Percentages

	Beat Average for % of Searches by Race	% of Deputies above Ratio of 2	N
By Hispanic			
Hispanic	29.20%	2.60	22
Non-Hispanic[a]	62.80%	0.70	6
Full Race Breakdown			0
White	48.70%	2.60	22
Unknown	<.01	0.10	1
Native American	5.50%	1.10	9
Hispanic	29.20%	2.60	22
Black	7.50%	1.90	16
Asian	1.10%	0.40	3

N = 832[b]

[a] This category excludes drivers in the Unknown category. Note that the Unknown category is displayed below.

[b] Note that this number represents the number of deputy-beat combinations for deputies making, on average, 10 stops a month.

Table 15 compares deputies' rates of search by race/ethnicity to the beat average rate of search by race/ethnicity. Of the 2% of traffic stops that result in a PC, consensual, or Terry search, 29.20% of

those searches are of Hispanics compared to 62.80% of Non-Hispanics. This is inconsistent with the summary statistics of ethnicity in traffic stops (see Table 2). When comparing the deputies' rates of searches to the beat rates of searches, 2.6% of deputies search Hispanics at a higher rate than the beat average, compared to just 0.70% of Non-Hispanics. When examining the rate of search by race, 48.7% of those searches are of Whites while 29.2% of searches are of Hispanics. These numbers are in discordance with the summary statistics of race in traffic stops (see Table 1). Where Whites constitute 67.6% of stops, they make up only 48.7% of searches. On the other hand, Hispanics have 20.6% of the traffic stops yet make up 29.2% of the searches. This disparity is reflected when comparing deputies' rates of searches to the beat rates of searches: 2.6% of deputies search Whites and Hispanics at a higher rate than the beat average, though 1.9% of deputies search Blacks at a higher rate than the beat average.

Table 16. Descriptive Statistics Regarding Deputy Level Percentages of Searches by Driver Race Compared to District Percentages

	District Average for % of Searches by Race	% of Deputies above Ratio of 2	N
By Hispanic			
Hispanic	34.5%	4.5%	3
Non-Hispanic[a]	65.3%	1.50%	1
Full Race Breakdown			
White	52.1%	4.5%	3
Unknown	0.2%	1.5%	1
Native American	4.7%	11.9%	8
Hispanic	34.5%	4.5%	3
Black	7.6%	9.0%	6
Asian	0.9%	1.5%	1
N = 67			

[a] This category excludes drivers in the Unknown category. Note that the Unknown category is displayed below.

When looking at deputies' performance on searches by race/ethnicity compared to district level statistics, a different pattern emerges (Table 16). First, at the district level, there are slightly different averages for searches by ethnicity (Hispanic). At the district level, for traffic stops resulting in searches, Hispanics constitute 34.5% of all searches; this is in comparison to the percentage of searches Hispanics constitute at the beat level (29.20%) and in MCSO overall (20.6%). Non-Hispanics make up 65.3% of all searches across districts (versus 62.8% at the beat level and 78.5% in MCSO overall). By race, whites constitute 52.1% of all searches; this is in comparison to the percentage of searches Whites constitute at the beat level (48.7%) and in MCSO overall (67.6%). Conversely, Hispanics constitute 34.5% of searches across districts (versus 29.2% at the beat level and 20.6% in MCSO overall). Notably though, when comparing to the district level, 11.9% of deputies search Native Americans at or more than two times the average rate of the district and 9% of deputies search Blacks at or more than two times the average rate of the district. Additionally, Appendix H contains each deputy's ratio by race for the comparison between deputy and district for searches.

4.4.2 Is there a Relationship between Searches and Driver's Post-Stop Race/Ethnicity?

To test the relationship between whether the driver was searched and the driver's post-stop perceived race/ethnicity at the organization level, we conducted a chi-square test coupled with a Cramer's V statistic. As the significant chi-square statistic in Table 17a shows, there is a relationship between whether the driver was searched the post-stop perceived ethnicity (Hispanic) of the driver. That said, the Cramer's V statistic is low at 0.043. This suggests that while there is a relationship between arrest and the driver's post-stop perceived ethnicity, it is a weak relationship.

Table 17a. Relationship between Searches of Drivers and Hispanic v. Non-Hispanic at the Organizational Level

	Non-Hispanic	Hispanic	Total
Not Searched	21457	5539	26996
Searched	376	185	561
Total	21833	5724	27557
Chi-Square	51.84**		
Cramer's V	0.043*		

+ p < 0.10; * p <0.05; ** p < 0.01

N = 27,577

Note: Stops with an "unknown" race/ethnicity were not included in the above analysis. Next, missing data post-stop perceived race/ethnicity (missing n=25) as well as not including stops of unknown race/ethnicity, explain why the total in this table is 27,467 rather than the total number of stops (N = 27,577).

Table 17b examines this relationship across race. The significant chi-square statistic shows that there is a relationship between whether the driver was searched and the post-stop perceived race of the driver. However, the Cramer's V statistic is low at 0.058, suggesting that the relationship between arrest and the driver's post-stop perceived race is a weak one.

Table 17b. Relationship between Searches of Drivers and Driver Race/Ethnicity at the Organizational Level

	White	Unknown	Native American	Hispanic	Black	Asian	Total
Not Searched	18537	266	401	5539	1950	569	27262
Searched	298	2	23	185	50	5	563
Total	18835	268	424	5724	2000	574	27825
Chi-Square	93.76**						
Cramer's V	.058**						

+ p < 0.10; * p <0.05; ** p < 0.01

N = 27,825

Note: Missing data post-stop perceived race/ethnicity (missing n=25) explains why the total in this table is 27,825 rather than the total number of stops (N = 27,850).

4.4.3 Summary of Stops with Searches

While searches and driver race/ethnicity at the organizational level are not strongly related to one another (see Table 17a and 17b), there is evidence that certain deputies and units are not

performing according to what is “average” in MCSO. Here, these deputies tend to generate searches by race at a greater frequency than other deputies working in the same beat or district. Again, while there is not a strong overall relationship between race and searches of drivers, there seems to be “problem zones” within MCSO that need to be addressed.

4.5 Post-Stop Outcomes: Seizures by Race/Ethnicity

4.5.1 Descriptive Statistics

Here we examine if seizures of items from drivers outcomes are differentially felt by minority race/ethnicities in the first year of traffic stop data. Note that in the coming analyses, seizures do not occur frequently. Indeed, of the 27,850 traffic stops conducted by MCSO, only 1.7% of stops involve a seizure. Thus, descriptive statistics presented in Tables 18 and 19 should be considered with caution.

Table 18 compares deputies’ rates of seizures by race/ethnicity to the beat average rate of seizures by race. Of the 1.7% of traffic stops that result in a seizure, 62.5% of those seizures involve Non-Hispanic divers, and 23.5% involve Hispanics. These numbers are a departure from the summary statistics of ethnicity in traffic stops (see Table 1). Non-Hispanics represent 78.5% of traffic stops, but make up 62.5% of seizures, while Hispanics represent 20.6% of traffic stops, but 23.5% of seizures. When examining the 1.7% of traffic stops that result in seizure by race, 46.3% of those seizures involve White drivers while 23.5% of seizures involve Hispanics. These numbers are in discordance with the summary statistics of race in traffic stops (see Table 1). Where Whites constitute 67.6% of stops, they make up only 46.3% of seizures. On the other hand, Hispanics have 20.6% of the traffic stops yet make up 23.5% of the seizures. This disparity is reflected when comparing deputies’ rates of seizures to the beat rates of seizures: 1.7% of deputies seize items from White drivers at a higher rate than the beat average, though 2.6% and 1.7% of deputies seize items from Hispanic and Black drivers at a higher rate than the beat average.

Table 18. Descriptive Statistics Regarding Deputy Level Percentages of Seizures by Driver Race Compared to Beat Percentages

	Beat Average for % of Seizures by Race	% of Deputies above Ratio of 2	N
By Hispanic			
Non-Hispanic[a]	62.5%	0.60%	5
Hispanic	23.5%	2.60%	22
Full Racial Breakdown			
White	46.3%	1.70%	14
Unknown	0.0%	0.00%	0
Native American	5.2%	0.70%	6
Hispanic	23.5%	2.60%	22
Black	10.6%	1.70%	14
Asian	0.5%	0.50%	4

N = 832[b]

[a] This category excludes drivers in the Unknown category. Note that the Unknown category is displayed below.

[b] Note that this number represents the number of deputy-beat combinations for deputies making, on average, 10 stops a month.

When looking at deputies' performance on seizures by race/ethnicity compared to district level statistics, as shown in Table 19, a different pattern emerges. First, at the district level, there are slightly different averages for seizures by ethnicity (Hispanic). At the district level, Non-Hispanics represent 70% of seizures compared to 62.5% at the beat level and 78.5% of all MCSO stops (see Table 1). Hispanics comprise 30% of seizures across districts (versus 23.5% at the beat level and make up only 20.6% of all stops). For race, Whites constitute 55.3% of seizures (versus 46.3% at the beat level and make up 67.6% of all stops). Conversely, Hispanics constitute 30% of seizures across districts (versus 23.5% at the beat level and make up only 20.6% of all stops). Notably though, when comparing to the district level, 11.9% of deputies seize items from Native Americans at or more than two times the average rate of the district and 10.4% of deputies seize items from Hispanic drivers, and 9.0% from Black drivers, at or more than two times the average rate of the district. Appendix I contains each deputy's ratio by race for the comparison between deputy and district for searches.

Table 19. Descriptive Statistics Regarding Deputy Level Percentages of Seizures by Driver Race Compared to District Percentages

	District Average for % of Seizures by Race	% of Deputies above Ratio of 2	N
By Hispanic			
Non-Hispanic[a]	70	0	0
Hispanic	30	10.4	7
Full Race Breakdown			
White	55.3%	0.0%	0
Unknown	0.0%	0.0%	0
Native American	4.5%	11.9%	8
Hispanic	30.0%	10.4%	7
Black	9.1%	9.0%	6
Asian	1.1%	3.0%	2

N = 67

[a] This category excludes drivers in the Unknown category. Note that the Unknown category is displayed below.

4.5.2 Is there a Relationship between Seizures and Driver's Post-Stop Race/Ethnicity?

To test the relationship between whether items were seized from the driver and the driver's post-stop perceived race/ethnicity at the organization level, we conducted a chi-square test coupled with a Cramer's V statistic. Table 20a shows the significant chi-square statistic, indicating there is a relationship between whether contraband was seized from the driver and the post-stop perceived ethnicity (Hispanic) of the driver. That said, the Cramer's V statistic is low at 0.022. This suggests that while there is a relationship between arrest and the driver's post-stop perceived ethnicity, it is a weak relationship.

Table 20a. Relationship between Seizures and Hispanic v. Non-Hispanics at the Organizational level

	Non-Hispanic	Hispanic	Total

No Seizures	21499	5597	27096
Seizures	334	127	461
Total	21833	5724	27557
Chi-Square	13.09**		
Cramer's V	.022**		

+ p < 0.10; * p <0.05; ** p < 0.01

N = 27,577

Note: Stops with an "unknown" race/ethnicity were not included in the above analysis. Next, missing data for post-stop perceived race/ethnicity (missing n=25) as well as omitting stops of unknown race/ethnicity (n = 268), explain why the total in this table is 27,557 rather than the total number of stops (N = 27,850).

Table 20b shows there is a statistically significant relationship (p < .01) between whether contraband was seized from the driver and the post-stop perceived race of the driver. The Cramer's V statistic is low at 0.049. This suggests that while there is a relationship between arrest and the driver's post-stop perceived race, it is a weak relationship.

Table 20b. Relationship between Seizures Race/Ethnicity at the Organizational level

	White	Unknown	Native American	Hispanic	Black	Asian	Total
No Seizures	18576	266	401	5597	1953	569	27362
Seizures	259	2	23	127	47	5	463
Total	18835	268	424	5724	2000	574	27825
Chi-Square	66.35**						
Cramer's V	.049**						

+ p < 0.10; * p <0.05; ** p < 0.01

N = 27,825

Note: Missing data post-stop perceived race/ethnicity (missing n=25) explains why the total in this table is 27,825 rather than the total number of stops (N = 27,850).

4.5.3 Summary of Stops with Seizures

While seizures and driver race/ethnicity at the organizational level are not strongly related to one another (see Tables 20a and 20b), there is evidence that certain deputies and units are not performing according to what is "average" in MCSO. Here, these deputies tend to engage in seizures of driver items by race at a greater frequency than other deputies working in the same beat or district. Again, while there is not a strong overall relationship between race and seizures, there seem to be "problem zones" within MCSO that need to be addressed.

4.6 Length of Stop

4.6.1 Descriptive Statistics – Overall Length of Stop

In this section, we examine the length of stop by race across various units of aggregation. Here we employ percentiles since length of stop is a continuous variable. The average length of stop is just over 24 minutes. Table 21 below shows the average length of stop by race and the length of stop at the 95th percentile by race. We also conducted t-tests to determine if the average length of stop for a

particular race is significantly different for other stops. When a * symbol is near the length of stop, it indicates that this average is significantly different compared to whites.

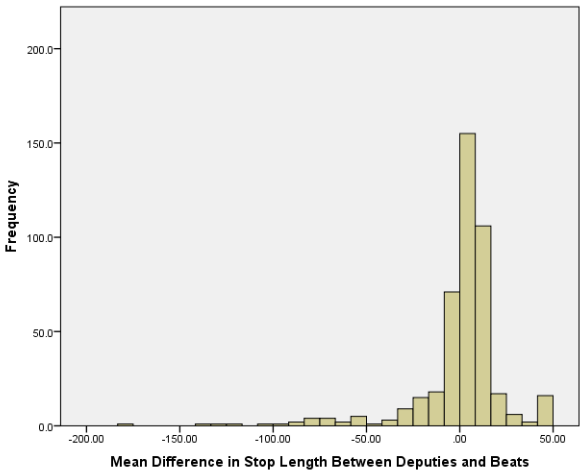
For stops involving drivers who are white, their average length of stop is just over 22 minutes; this is significantly lower from the length of stops by non-whites. Other significantly different length of stop averages by race, including the average for Hispanics: generally Hispanics have a longer average length of stop than Whites. Blacks are similar to Hispanics in that their length of stop average is significantly different than Whites. This also holds for stops of Blacks that are non-extended detention stops: here, Blacks see a significantly higher average than Whites on the length of non-extended stops. Finally, Asians experience significantly shorter length of stops, though this difference is not statistically significant. Another important finding from this analysis is variability in length of stop by race. The 95th percentile – or the score that marks where 95% of all scores fall beneath – varies greatly across races. This suggests inconsistent stop lengths by race.

Table 21. Descriptive Statistics for Length of Stop by Race and Extended Detention with T-Tests for the Difference in Means between Whites and other Race/Ethnicities

	All	Whites	Unknown	Native American	Hispanic	Black	Asian
All stops							
Mean	24.35	22.46	14.26	28.64	27.66 *	29.43 *	22.03
95th Percentile	57.00	45.00	38.30	105.00	74.00	69.8	33.00
Non-Extended Stops							
Mean	17.01	16.53	13.94	18.74	17.40	20.38 *	19.20
95th Percentile	20.00	20.00	24.80	22.00	21.00	21.00	20.00
Extended Stops							
Mean	63.45	62.18	39.38	74.24	63.79	69.79	62.51
95th Percentile	188.30	186.00	103.70	250.25	179.00	217.20	204.50

* $p < 0.05$

Figure 1. Overall Distribution of the Difference between Deputies Average Length of Stop and the Beat Length of Stop



An additional means of understanding length of stop is by examining how far away a specific deputy's average length of stop is from the average length of stop within the organizational unit they work in (i.e., beat or district). This employs similar thinking to the ratio statistics, where deputies are compared to the administrative unit average. In addition to this comparison, we can also compare to the average length of stop in beats to the average length of stop in districts or MCSO overall; this comparison also applies to districts. These comparisons will give us a picture of how deputies, beats, and districts are faring in regard to length of stop relative to the larger administrative units in which they are nested.

First, we begin by looking at the deputies' length of stops when compared to the beat and districts they work in, as well as the overall MCSO organization. Deputies, on average, differed by 0.30 minutes from the average length of stop in the beat that the stop occurred in. Additionally, the average difference between the deputy's and the beats' mean has a standard deviation of 25, showing substantial variability in the average difference. Figure 1 displays the distribution of these average differences, and shows that some deputies were very far below the average length of stop for the beat the stop took place in, while far fewer deputies were above the average length of stop for the beat where the stop took place. Note that for this analysis, we do not differentiate between the race of the driver and whether the stop was extended.

The coming section includes comparisons deputies' averages to beats' averages, district averages, and MCSO's overall organizational average. In the section below, we focus on deputy averages and their differences from the average of the administrative boundaries—beats, districts, and MCSO—that they are nested in. Additional analyses were conducted which compare beat averages to district averages for length of stop, as well as the overall organizational average. Finally, districts are compared to the overall organization. Due to repetition, these results are shown in Appendices J through L.

4.6.2 Descriptive Statistics – Length of Stop for Non-Extended Stops

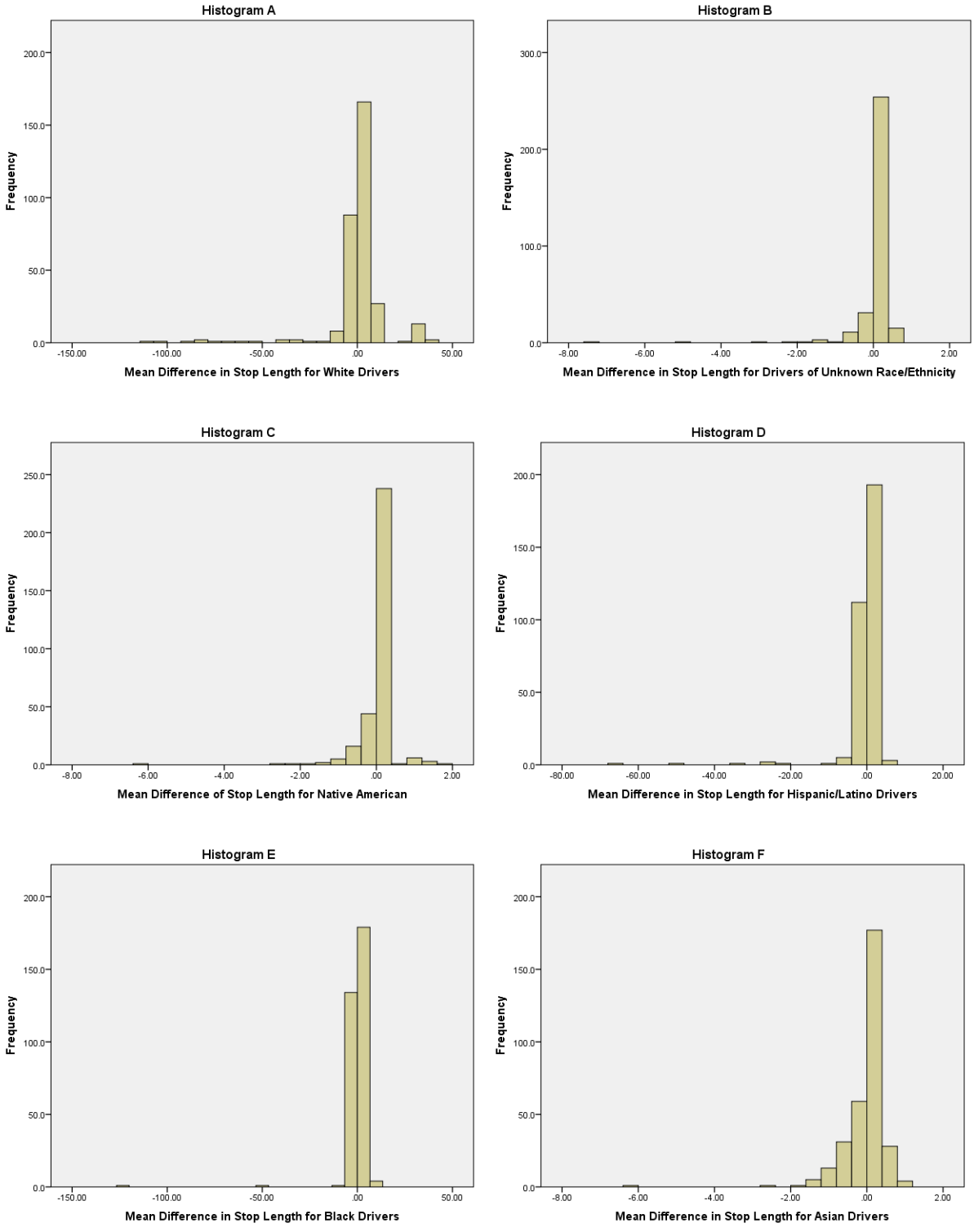
An additional means of understanding differences in length of stop is by examining how far away deputies, beats, and districts are from some average length of stop; additionally, we can look at these difference by the race of the driver. We begin by looking at how different deputies' average length of stops are from the average length of stop in the beat where the stop occurred. Figure 2 shows the distributions of the difference between deputies average length of stop and the beat length of stop for non-extended stops by race/ethnicity. To save space, six different graphics are shown, each showing the distribution for the specific race of the driver.

4.6.2.1. Length of Non-Extended Stops by Race/Ethnicity – Comparing Deputies to Beats

We begin by examining the difference between deputies' average stop length for white drivers and the beat average stop length for white drivers; this difference is shown in Histogram A. Here, deputies were—on average—0.41 minutes higher in their length of stops than the beat average for non-extended stops involving white drivers. There is a wide standard deviation of 16.6, suggesting a high degree of variability in this average.

Next, deputies were—on average—0.028 minutes lower in their length of stops than the beat average for non-extended stops involving drivers of unknown race or ethnicity. The standard deviation of 0.595 is quite small suggesting that most deputies' averages fall very close to the beat average when stopping drivers of unknown race or ethnicity. This distribution is shown in Figure 2, Histogram B.

Figure 2: Distributions of the Difference between Deputies Average Length of Stop and the Beat Length of Stop for Non-Extended Stops by Race/Ethnicity



For non-extended stops involving Native American drivers, we see a similar pattern as we do for drivers of unknown race/ethnicity. The average difference between the deputies' and beat stops is 0 with a standard deviation of 0.538, showing that most deputies' averages fall very close to the beat average. Figure 2, Histogram C also demonstrates that the stops are tightly distributed around the mean of 0.

For stops non-extended stops involving Hispanic drivers, deputies were—on average—0.49 minutes lower in their length of stops than the beat average for non-extended stops. There is a moderately wide standard deviation of 5.792, suggesting there is more variability in the average difference in stop length than differences involving other minorities, such as Native Americans, though not as much variability as is seen in stops involving whites (see Figure 2, Histogram D). Also important to notice in Figure 2 is the long left hand tail; this demonstrates that there were several deputy averages of non-extended stops involving Hispanic or Latino drivers that were much lower in length than the beat where the stop took place.

Next we examine the difference in stop length between deputies' averages and the average of the beat the stop took place in for non-extended stops involving Black or African American drivers. Deputies were—on average—0.27 minutes lower in their length of stops than the beat average for non-extended stops involving Black drivers. There is a wide standard deviation of 7.8, suggesting that there is more variability in the average difference in stop length than for other minorities, such as Native Americans, though not as much variability as whites (see Figure 2, Histogram E). Also important to note in Histogram E is the long left hand tail; this demonstrates that there were several deputy averages of non-extended stops involving Black drivers that were much lower in length than the average for the beat where the stop took place.

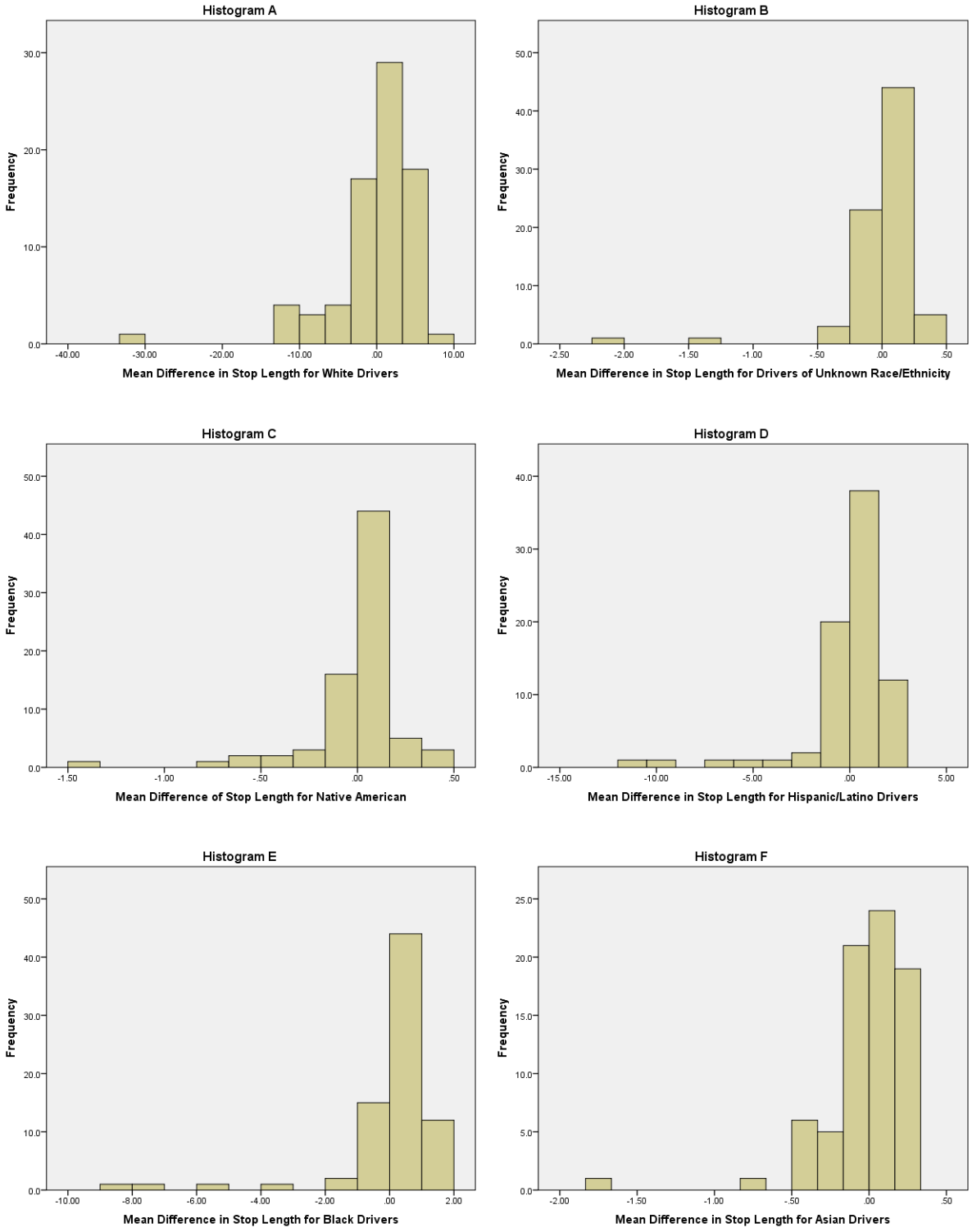
For non-extended stops involving Asian drivers, we see a similar pattern as we do for drivers that are either Hispanic or Black. Deputies were—on average—0.027 minutes lower in their length of stops then the beat average for non-extended stops involving Asian drivers. Furthermore, there is a small standard deviation – .56 – suggesting very little deviation from the mean. Also important to notice in Histogram F is the long left hand tail; this demonstrates that there were several deputy averages of non-extended stops involving Asian drivers that were much lower in length than the beat where the stop took place. Though keep in mind that with the small standard deviation, there are only a few cases in the left tail.

4.6.2.2. Length of Non-Extended Stops by Race/Ethnicity – Comparing Deputies to Districts

In this section we compare deputies' average length of stops to the average length of stop in the district where the stop occurred. Generally, in the comparison between deputy and district averages, there are smaller differences. Like before, Figure 3 shows the various distributions of the difference between deputies average length of stop and the district length of stop for non-extended stops by race/ethnicity. To save space, six different graphics are shown together, each showing the distribution for the specific race/ethnicity of the driver.

To begin with, we examine deputies' average length of stop white drivers—which is shown in Histogram A—compared to the district average where the stop took place. Here, deputies were—on average—0.18 minutes shorter in their length of stops then the district average for non-extended stops involving white drivers. There is a wide standard deviation of 5.63, suggesting variability in that average.

Figure 3: Distributions of the Difference between Deputies Average Length of Stop and the District Length of Stop for Non-Extended Stops by Race/Ethnicity



Next we examine this difference on average for those stops involving drivers of unknown race or ethnicity. The average difference between the deputies' and district stops is 0, with a standard deviation of 0.32, showing that most deputies' averages fall very close to the district average. The distribution of this difference is shown in Figure 3, Histogram B.

For non-extended stops involving Native American drivers, we see a similar pattern as we do for drivers of unknown race/ethnicity. The average difference between the deputies' and district stops is 0, with a standard deviation of 0.245, showing that most deputies' averages fall very close to the districts' average. Figure 3, Histogram C shows also demonstrates that the stops are tightly distributed around the mean of 0.

For non-extended stops involving Hispanic drivers, deputies were—on average—0.04 minutes lower in their length of stops then the district average for non-extended stops. There is a moderately sized standard deviation of 2.34, suggesting that there is more variability in the average difference of stop length than stops involving other minorities, such as Native Americans (see Figure 3, Histogram D). Also important to note long left hand tail appearing in Histogram D; this demonstrates that there were several non-extended stops involving Hispanic or Latino drivers that were much lower in length than the district average where the stop took place.

Next we examine the difference in stop length between deputies' averages and the average of the district the stop took place in for non-extended stops involving Black or African American drivers. Deputies were—on average—0.04 minutes lower in their length of stops than the district average for non-extended stops involving Black drivers. There is a standard deviation of 1.61. See Figure 3, Histogram E for this distribution.

Finally, for non-extended stops involving Asian drivers, we see a similar pattern as we do for drivers that are either Hispanic or Black. For non-extended stops involving Asian drivers, deputies were—on average—nearly identical to the district average. Furthermore, there is a small standard deviation – 0.29 – suggesting very little deviation from the mean. See Figure 3, Histogram F for this distribution.

4.6.2.3. Length of Non-Extended Stops by Race/Ethnicity – Comparing Deputies to the Overall Organization

In this section we compare deputies' average length of stops to the average length of stop in MCSO as a whole. Generally, we see smaller differences in average length of stop. Like before, Figure 4 shows the distributions of the difference between deputies average length of stop and the average length of stop for non-extended stops by race/ethnicity within MCSO. It is important to note that the histograms have different scales on the x-axis making direct comparisons difficult. Six different graphics are shown, each showing the distribution for the specific race of the driver.

The statistics for the deputy average length of stop and the average length of stop in MCSO as a whole are relatively similar across the race/ethnicity of driver. Instead of discussing each histogram, we point out patterns. Most notability we see that deputies do not have average stop lengths for non-extended stops that are largely different from the overall average in MCSO. Notably, non-extended stops involving white or Hispanic/Latino drivers tend to have higher standard deviations – 4.49 and 1.96 – respectively. Thus, for non-extended stops involving white or Hispanic/Latino drivers, there tends to be more variability in the length of stop.

Figure 4: Distributions of the Difference between Deputies Average Length of Stop and MCSOs Overall Length of Stop for Non-Extended Stops by Race/Ethnicity

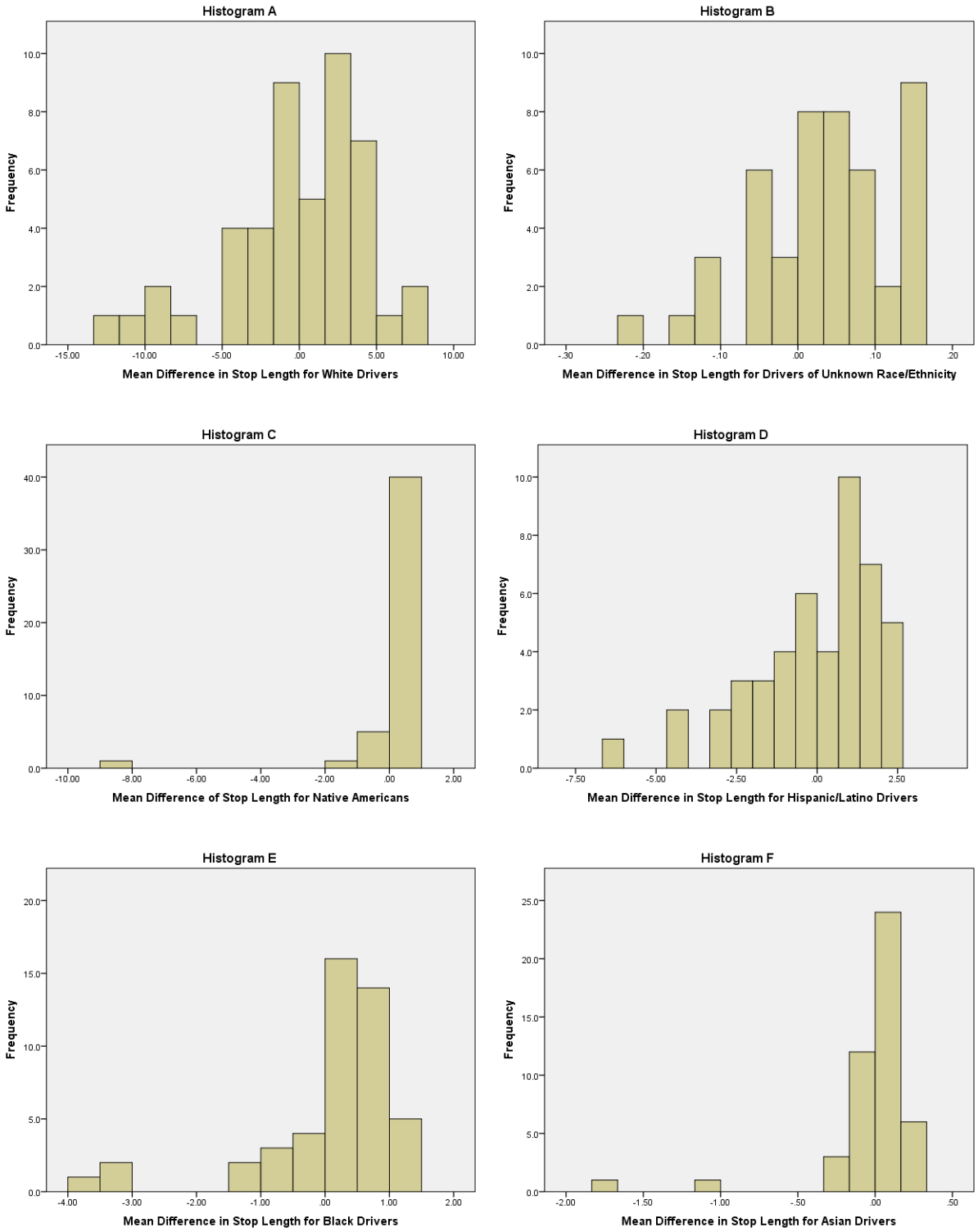
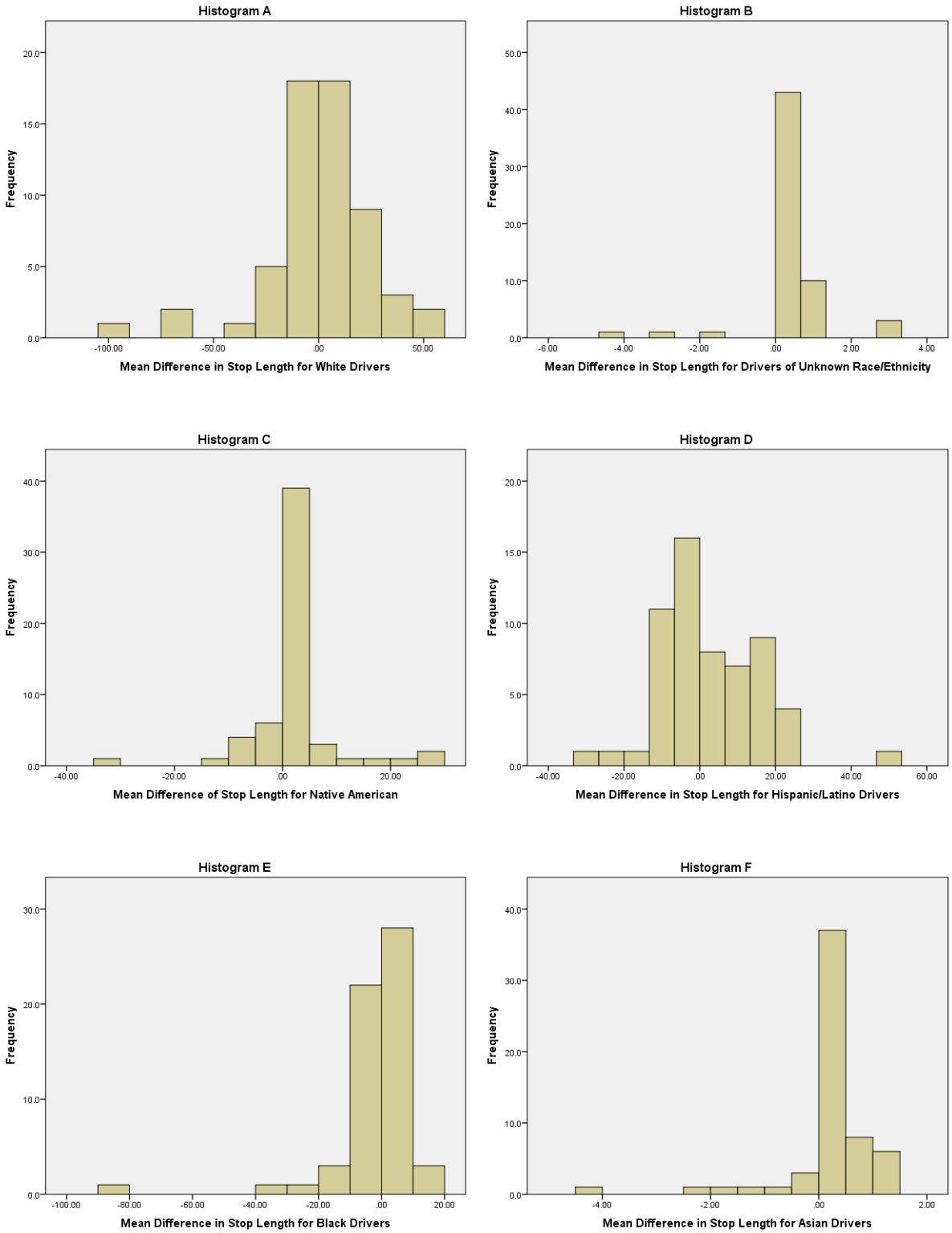


Figure 5: Distributions of the Difference between Deputies Average Length of Stop and the Beat Average Length of Stop for Extended Stops by Race/Ethnicity



4.6.3 Descriptive Statistics – Length of Stop for Extended Stops

Extended stops are those that are more involved and require more time to complete. Stops involving searches, seizures, or DUIs, for example, are longer. Before diving into the analyses, note that extended stops are by nature longer, which will be reflected in the statistics presented here, particularly the standard deviations. Additionally, because they are used for a variety of different reasons, DUIs versus searches, for example, there will be more variability in the length of these stops. In the coming sections, we examine deputies' average length of stop for extended stops compared to the beat and districts the stops occur in, as well as the overall MCSO organization.

4.6.3.1. Length of Extended Stops by Race/Ethnicity – Comparing Deputies to Beats

To begin with, we examine the difference between deputies' averages for extended stops of white drivers to the beat average where the stops took place. This distribution is shown in Figure 5, Histogram A. Here, deputies were—on average—0.34 minutes higher in their length of stops than the beat average for extended stops involving white drivers. As discussed earlier, there is a wide standard deviation of 25.65, suggesting a high degree of variability in this average.

Next we examine this difference in averages comparing deputy averages to beat averages for extended stops involving drivers of unknown race or ethnicity. Deputies were—on average—0.14 minutes higher in their length of stops than the beat average for extended stops involving white drivers. The standard deviation of 1.03 is quite small suggesting that most deputies' averages fall very close to the beats' average. This distribution is show in Figure 5, Histogram B.

For extended stops involving Native American drivers, the average different between the deputies' and beat stops is 1.48 with a standard deviation of 8.64, showing that there is a greater degree in variability in the difference between the deputies' and beats' average length of stop. Figure 5, Histogram C shows also demonstrates that the stops are not tightly distributed around the mean of 0; instead there is a long left hand tail suggesting that one stop is an outlier.

For extended stops involving Hispanic or Latino drivers, deputies were—on average—3.03 minutes higher in their length of stops than the beat average. There is a wide standard deviation of 13.38, suggesting a high degree of variability in the differences in the averages. In Figure 5, Histogram D, we see that for that the stops are not tightly distributed around the mean of 0, though there is a stop in the right tail that is likely influencing the standard deviation and pushing it to be larger.

Next we examine the difference in stop length between deputies' averages and the average of the beat the stop took place in for extended stops involving Black or African American drivers. For extended stops involving Black drivers, deputies were—on average—2.01 minutes lower in their length of stops than the beat average for extended stops involving Black drivers. There is a moderately wide standard deviation of 13.20, suggesting that high variability in the mean difference. When examining this in Histogram E, in Figure 5, we see that there are a few deputies that are significantly below the beats' average.

For extended stops involving Asian drivers, deputies were—on average—0.157 minutes higher in their length of stops than the beat average for extended stops involving Asian drivers. Furthermore, there is a small standard deviation – 1.20 – suggesting very little deviation from the mean, which is confirmed in Histogram F of Figure 5.

Figure 6: Distributions of the Difference between Deputies Average Length of Stop and the District Average Length of Stop for Extended Stops by Race/Ethnicity

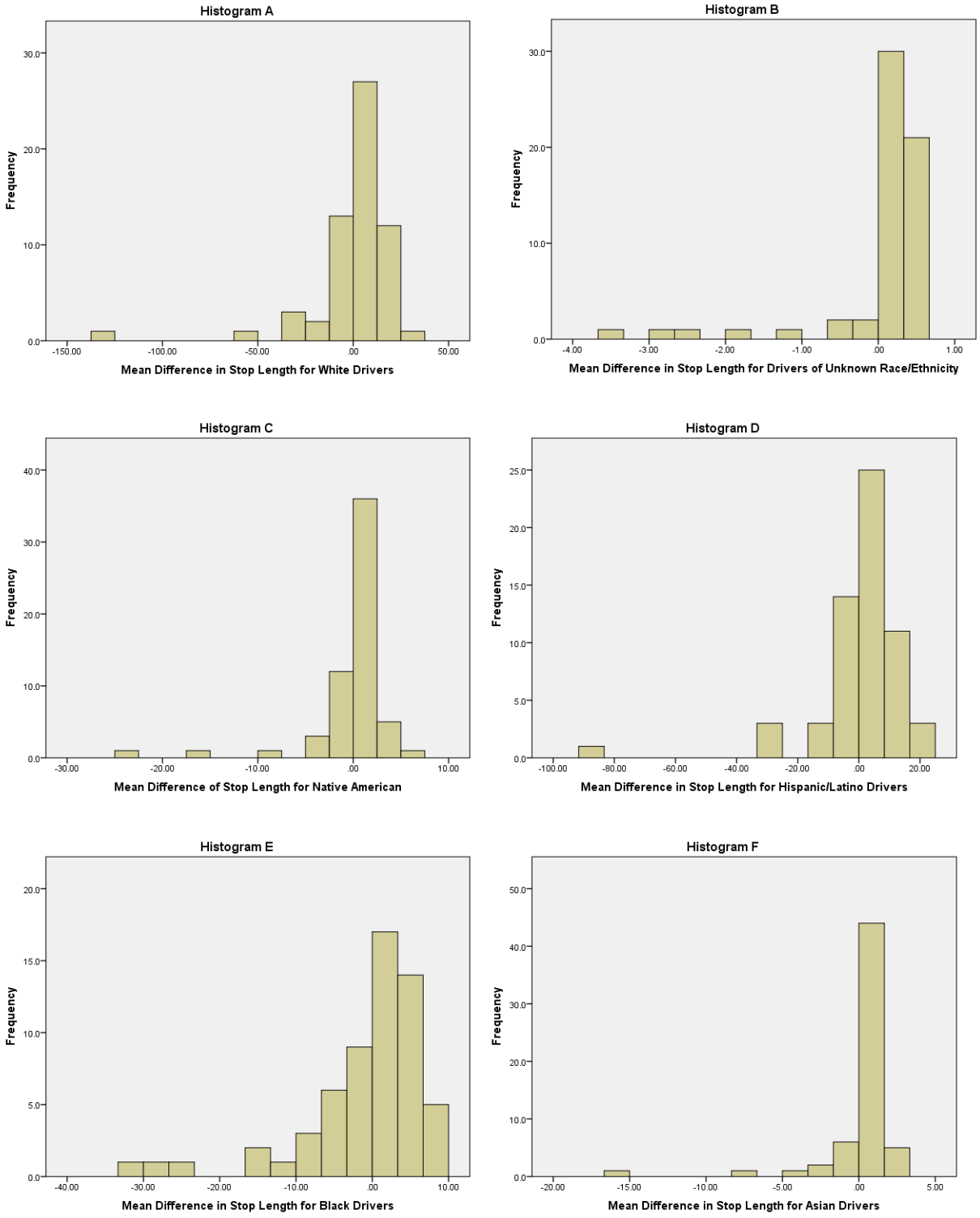
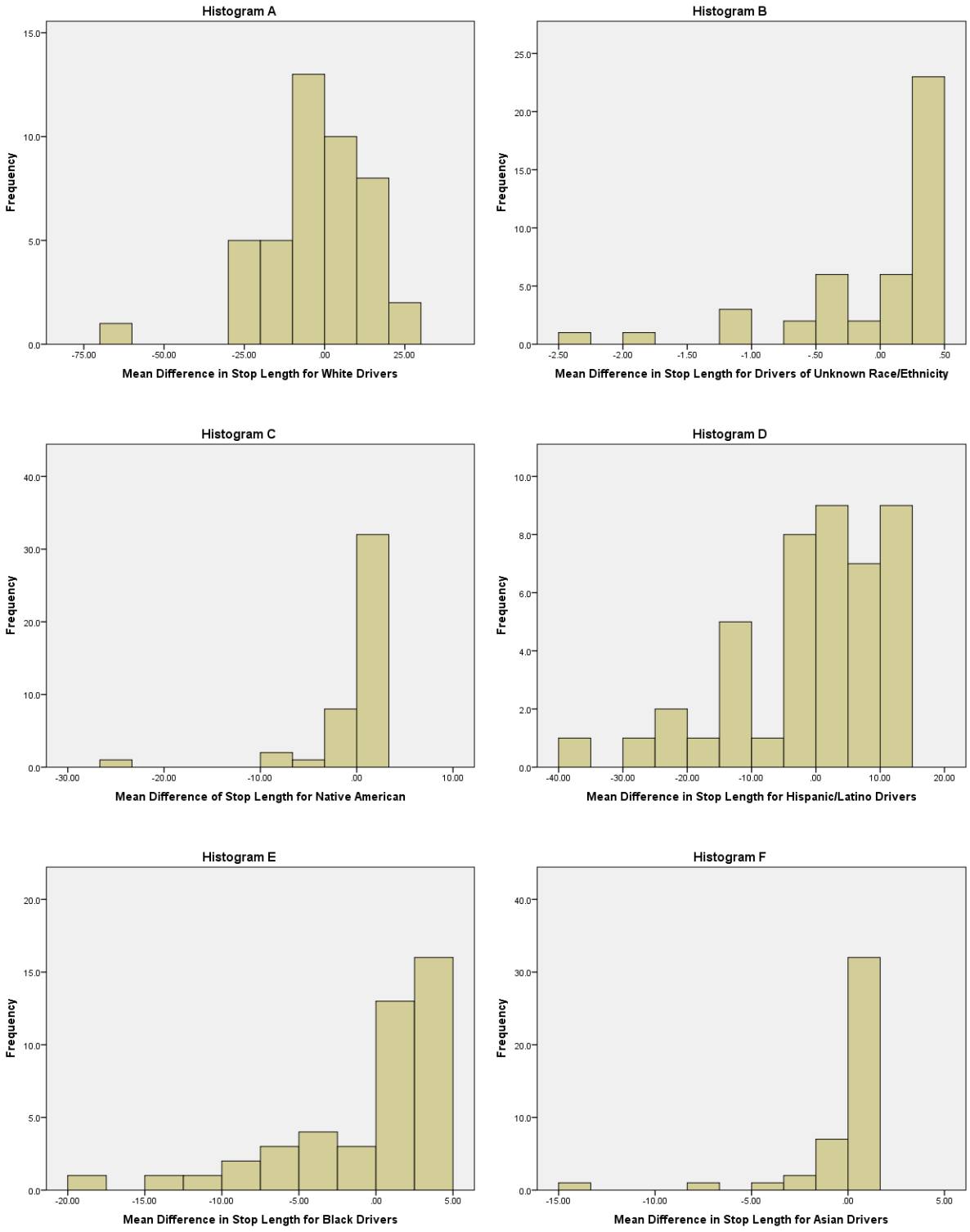


Figure 7: Distributions of the Difference between Deputies Average Length of Stop and MCSOs Overall Length of Stop for Extended Stops by Race/Ethnicity



4.6.3.2. Length of Extended Stops by Race/Ethnicity – Comparing Deputies to Districts

In this section, we compare deputies' average length of stops are to the average length of stop in the district where the stop occurred for extended stops. Like before, Figure 6 shows the distributions of the difference between deputies average length of stop and the district length of stop for extended stops by race/ethnicity. To save space, six different graphics are shown, each showing the distribution for the specific race of the driver.

To begin with, we examine the difference in deputies' average length of stop for white drivers and the district average. The distribution of this difference is in Histogram A. Deputies were—on average—0.78 minutes longer in their length of stops than the district average for extended stops involving white drivers. There is a wide standard deviation of 22.58, suggesting high variability in that average. Note that in Histogram A, there is a large number of deputies with mean differences above the mean of about 0.

Next we examine this difference on average for those stops involving drivers of unknown race or ethnicity. Histogram B in Figure 6 shows that deputies were—on average—0.05 minutes lower in their length of stops than the district average for extended stops involving white drivers. The standard deviation of 0.769 is quite small suggesting that most deputies' averages fall very close to the districts' average.

For extended stops involving Native American drivers, the average different between the deputies' and district stops is 0.21 shorter with a standard deviation of 4.38, showing greater variability in the comparison between deputies' and districts' average extended length of stop. Figure 6, Histogram C shows also that there may be one deputy leading the high variation as stops are otherwise closely clustered around the mean.

For extended stops involving Hispanic or Latino drivers, deputies were—on average—0.2 minutes higher in their length of stops than the district average for extended stops. There is a wide standard deviation of 15.7. Note that in Histogram D, there is a large number of deputies with mean differences above the mean of about 0.

Next we examine the difference in stop length between deputies' averages and the average of the district the stop took place in for extended stops involving Black or African American drivers. On average, deputies were 0.64 minutes lower in their length of stops than the district average for extended stops involving Black drivers. There is a moderately wide standard deviation of 8.13.

For extended stops involving Asian drivers, deputies were—on average—nearly identical to the district average (mean of 0.05). Furthermore, there is a small standard deviation – 2.5 – suggesting very little deviation from the mean.

4.6.3.3. Length of Extended Stops by Race/Ethnicity – Comparing Deputies to the Overall Organization

In this section we compare deputies' average length of stops are to the average length of stop in MCSO as a whole. Generally, in this comparison, we see smaller differences in average length of stop. Like before, Figure 7 shows the distributions of the difference between deputies average length of stop and the average length of stop for extended stops by race/ethnicity within MCSO. It is important to note that the histograms have different scales on the x-axis making direct comparisons difficult. To save space, six different graphics are shown, each showing the distribution for the specific race of the driver.

The statistics for the deputy average length of stop and the average length of stop in MCSO as a whole are relatively similar across the race/ethnicity of driver, which the exceptions of drivers who are either White or Hispanic/Latino. Extended stops involving White or Hispanic/Latino drivers tend to have higher standard deviations – 16.71 and 11.89 – respectively. Thus, for extended stops involving white or Hispanic/Latino drivers, there tends to be more variability in the length of stop. Moreover, that variability tends to also come from the right hand side of the distribution – or more simply, higher than average stops.

4.6.4 Summary of Length of Stop

The length of stop analysis shows that certain races experience significantly longer lengths of stops (Hispanics and Blacks) than drivers not in that racial category. Furthermore, minority drivers (see the results for Native Americans, Hispanics, Blacks, and Asians) seem to experience a great variety in the length of stop, suggesting that there is not a consistency in treatment regarding length of stop across deputies. However, when examining descriptive statistics which compare deputies' average length of stop to the average length of stop of the organizational units—beats, districts, and MCSO—deputies are nested within, for the most part, there is not large scale deviation from those organizational averages. Thus, while individual level findings indicate potential issues with racial bias, deputies seem to be acting within larger organizational standards.

5. Conclusion

The preliminary analyses of the first year's data suggest there are potential problems associated with racially biased policing among some deputies and within certain administrative boundaries (i.e., beats and districts) across the distribution of stops, type of stop, length of stop, arrests, searches, and seizures by the race/ethnicity of drivers. Some of the next steps that should be considered to address these problems include:

(1) Provide findings from the first year's data that serve as direct feedback to supervisory personnel at the beat and district levels so that they are aware of problems within their respective units.
(2) Provide direct feedback to individual officers with incidental contact, warnings, citations, and length of stop ratios over two, so they know their performance is out of compliance with acceptable ratios/norms in their administrative unit.
(3) Review, and where necessary revamp, and deliver officer-level training aimed at reducing unacceptable ratios by targeting officers and organizational units with persistent high ratios.
(4) Train supervisors in mentoring strategies that can be used to remediate unacceptable stop-related behaviors/practices of high ratio officers.
(5) Integrate deputy level quarterly traffic stop feedback report findings into the MCSO early intervention (EI) system.
(6) Moving from descriptive and simple inferential statistics to more complex inferential statistics that control for other elements – like place of stop – that are likely to influence descriptive statistics.

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Appendix A: The Duplicate Stop Analysis

Duplicate Analysis

By Danielle Wallace

In the attached analysis, I conducted two types of analyses to determine if the duplicate traffic stops were statistically different from other stops. First, I conducted cross tabulations of whether the stop was a duplicate stop and several variables that are related to the court order. Specifically I test: driver post-stop perceived race, district, whether the stop was extended, whether a search was conducted, and the conclusion of the stop. Next, off of these cross-tabulations, I estimated chi-squares to test whether a relationship existed between a whether a traffic stop is a duplicate case and other variables.

In brief, I find is that all chi-square tests are significant, suggesting a relationship between being a duplicate traffic stops and driver post-stop perceived race, district, whether the stop was extended, whether a search was conducted, and the conclusion of the stop.

That said, these results should be taken with a grain of salt. As cell sizes get smaller (here they are quite small because there are only 298 duplicates), they become less reliable estimates. Every cross-tabulation where there are more than 4 cells (for example, duplicate yes/no and extended stop yes/no) receives a warning showing that some cells have an expected frequency or count that is lower than 5. Chi-square statistics are sensitive to large sample sizes and small cell sizes; given that there are only 298 cases that are duplicate, in some of the analyses below, you will see tables that may have 5 or fewer cases in a particular cell. This typically biases the chi-square upward, making significant differences more likely to be found. As such, in the coming analyses, I analyze the specifics of the cross-tabulation tables to see if there truly seems to be differences. Again, when counts are really low, as you will see in the coming tables, it's difficult to determine differences.

Table 1

Event Number Duplicate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	27850	98.9	98.9	98.9
	1.00	298	1.1	1.1	100.0
	Total	28148	100.0	100.0	

As a back drop, Table 1 is the breakdown of duplicate (1) versus non-duplicate events (0). Duplicate events consist of only 1.1% of all of the traffic stop data. Additionally, in Table 2 we see that these duplicates happen over the course of the first fiscal year of data analysis as seen in the table below. Note though that the majority of these duplicates happen in 2014.

Table 2

	Month traffic stop occurred												
	14-Jul	14-Aug	14-Sep	14-Oct	14-Nov	14-Dec	15-Jan	15-Feb	15-Mar	15-Apr	15-May	15-Jun	Total
Not Duplicate	2514	2506	1875	1784	1897	2715	1953	1876	2176	2480	3214	2860	27850
Duplicate	30	30	29	51	20	18	12	28	12	16	20	32	298
	2544	2536	1904	1835	1917	2733	1965	1904	2188	2496	3234	2892	28148

Moving on to the cross tab analysis, I want to quickly note that I abbreviate non-duplicate traffic stops as “NonDup” and duplicate traffic stops as “Dup”.

Table 3

		NonDup	Dup	TOTAL
White	Count	18835	180	19015
	% within Event Number Duplicate	67.7%	60.4%	67.6%
Unknown	Count	268	5	273
	% within Event Number Duplicate	1.0%	1.7%	1.0%
Native American	Count	424	0	424
	% within Event Number Duplicate	1.5%	0.0%	1.5%
Hispanic	Count	5724	78	5802
	% within Event Number Duplicate	20.6%	26.2%	20.6%
Black	Count	2000	35	2035
	% within Event Number Duplicate	7.2%	11.7%	7.2%
Asian	Count	574	0	574
	% within Event Number Duplicate	2.1%	0.0%	2.0%
Total	Count	27825	298	28123
	% within Event Number Duplicate	100.0%	100.0%	100.0%

Starting with duplicates and driver’s perceived post-stop race (Table 3), we see that the breakdown of race by duplicates is approximately similar to the non-duplicate cases. For instance, looking at the results for White drivers, the % within event number duplicates show that white drivers make up 67.7% of cases in the non-duplicate traffic stops while white drivers make up 60.4% of drivers in the duplicate traffic stops. The remainder of the percentages comparing across non-duplicate v. duplicate stops are similar (with the exceptions of Native American and Asian stops, which are low baseline events to begin with).

As noted earlier, the chi square test is significant.

Next, we turn to the results for examining whether duplicates are different across district (Table 4 on the next page). Like the other analyses, the chi square test is significant for this table. There seems to be some small differences between duplicates and non-duplicates by agency. These differences appear in Districts 2, 4, and 6, as well as Lake Patrol.

Table 4

		NoDup	Dup	TOTAL
District 1	Count	3854	38	3892
	% within Event Number Duplicate	14.0%	14.7%	14.1%
District 2	Count	4710	58	4768
	% within Event Number Duplicate	17.2%	22.5%	17.2%
District 3	Count	3674	35	3709
	% within Event Number Duplicate	13.4%	13.6%	13.4%
District 4	Count	3934	29	3963
	% within Event Number Duplicate	14.3%	11.2%	14.3%
District 7	Count	2134	6	2140
	% within Event Number Duplicate	7.8%	2.3%	7.7%
Lake Patrol	Count	6470	50	6520
	% within Event Number Duplicate	23.6%	19.4%	23.5%
District 6	Count	2652	42	2694
	% within Event Number Duplicate	9.7%	16.3%	9.7%
TOTAL	Count	27436	258	27694
	% within Event Number Duplicate	100.0%	100.0%	100.0%

Looking at the results for District 2, the % within event number duplicates show that District 2 makes up 17.2% of cases in the non-duplicate traffic stops while District 2 makes up 22.5% of drivers in the duplicate traffic stops. This pattern is similar for District 6.

In District 4 and the Lakes District, duplicate stops make up a greater percentage of stops. This could be related to the overall call volume in these areas.

In table 5 below, I examine the percentages association with duplicate traffic stops and whether or not the stop was extended. Again, the chi-square on this table is significant. When looking at the percentages, extended stops make up about 15.7% of non-duplicate stops while they make up about 34.6% of duplicate stops. This is perhaps not surprising given that when conducting an extended stop, the deputy needs to input more information and therefore there is a higher potential to make entry errors. Keep in mind, this only amounts to about 103 stops that are both duplicates and extended. While the percentages are significantly different, this number of stops only amounts to 0.3% of all the stops in the first year's data.

Table 5

		NoDup	Dup	
Not Extended	Count	23485	195	23680
	% within Event Number Duplicate	84.3%	65.4%	84.1%
Extended	Count	4365	103	4468
	% within Event Number Duplicate	15.7%	34.6%	15.9%
	Count	27850	298	28148
	% within Event Number Duplicate	100.0%	100.0%	100.0%
	% of Total	98.9%	1.1%	100.0%

Table 6				
		NoDup	Dup	
No Search	Count	26973	276	27249
	% within Event Number Duplicate	96.9%	92.6%	96.8%
Search	Count	877	22	899
	% within Event Number Duplicate	3.1%	7.4%	3.2%
Total	Count	27850	298	28148
	% within Event Number Duplicate	100.0%	100.0%	100.0%
	% of Total	98.9%	1.1%	100.0%

The cross-tabulation between duplicate stops and stops where searches were conducted has similar results to that of extended stops (Table 6 to the left). Duplicate stops have contain a higher percentage of searches than non-duplicate stops (7.4% v. 3.1%). Like extended stops, when conducting a search, the deputy inputs more information and therefore there is a higher potential for them to make entry errors. This may result in a duplicate form entry. Keep in mind, this only amounts to about 22 stops that are both duplicates and had searches. This amounts to 0.008% of all the stops.

In Table 7, I show the cross-tabulation between the final conclusion of the stop and whether the stop is a duplicate. Here, the percentages across non-duplicate and duplicate stops look similar.

Table 7				
		NoDup	Dup	
Warning	Count	11600	129	11729
	% within Event Number Duplicate	41.8%	43.6%	41.8%
No Contact	Count	315	6	321
	% within Event Number Duplicate	1.1%	2.0%	1.1%
Long Form	Count	78	4	82
	% within Event Number Duplicate	.3%	1.4%	.3%
Field Incident	Count	11	1	12
	% within Event Number Duplicate	.0%	.3%	.0%
Citation	Count	15753	156	15909
	% within Event Number Duplicate	56.8%	52.7%	56.7%
Total	Count	27757	296	28053
	% within Event Number Duplicate	100.0%	100.0%	100.0%

Conclusion

There are significant differences between whether the stop was a duplicate and the variables of interest, namely: driver post-stop perceived race, district, whether the stop was extended, whether a search was conducted, and the conclusion of the stop. These differences are primarily seen in the significant chi-square tests. Given the limitations of chi-squares when sample sizes are large and cell sizes are low, I turned to comparing percentages across duplicate and non-duplicate stops. Differences between the types of stops (duplicate v. non- duplicate) were seen in the following: monthly counts, race/ethnicity of driver, and district. This suggests some systematic differences between duplicate and non-duplicate stops, particularly related to time and place. Thus, rather than deleting all stops, I would recommend randomly selecting one stop from each duplicate set to retain.

Appendix B: Analysis of Cases not Included in the Yearly Data

Case Drop-Out Analysis

Danielle Wallace, ASU

December 11, 2015

Traffic stops in the final dataset should be limited to those stops that have been completed in the TraCs system and were not involved in training activities. There are two reasons why cases should be deleted from the dataset: training activities or when the traffic stop has not been completed in the TraCs system. Below we walk through each of the ways traffic stops can be deleted from the dataset, as well as how many cases of the datasets were dropped by type.

1. Incomplete forms

The status variable deals with cases that have been entered into the TraCs system, and for some reason, are incomplete. Below is a table of all the potential values the Status variable could have; this table was provided by MCSO. The definition of all these codes as documented by MCSO is in Appendix A.

TraCs Form Status Codes	
0	Open
1	Validated
2	Rejected
3	Void
4	Issued
5	Accepted
6	Located
7	Transmitted
8	Deleted
9	Locked
10	Non-Reported
11	Office Printed
50	ADOT Accepted
51	Pending Test Results
90	Contact Completed (MCSO only)
91	Pending Intox

The only cases that should remain in the dataset are those with a status of 90, meaning that have been completed and reviewed by the supervising officer. The table below show the status variable as it appears in the long dataset (i.e., the data that includes multiple rows for passengers).

	Frequency	Percent
Open	30	0.1
Validated	17	0.1
Void	96	0.3
Contact Completed (MCSO only)	32761	99.6
Total	32904	100.0

According to MCSO's Early Intervention Unit, the "open" designation shows that the traffic stop is currently open in the TraCs system and in process of being completed. In other words, these are forms that have not been finalized. Next, the "validated" designation shows that the traffic stops has gone through the TraCS validation process but have not been submitted by the user. When status is laved as "void", this shows that the forms have been voided by a supervisor due to entry error, mistake, or some other reason. Why the cases were voided can be found in the string variable "rejection_reason." Finally, "contact completed" shows that the form for the traffic stop has been fully completed and verified.

Rejection reasons that supervisory officers noted include correcting an MC or event number, end time, adding missing information on the secondary unit, incorrect statement of a warning when citation was issued, or missing the race/ethnicity of a passenger. In these cases, a new form was generated for the deputy to complete. Appendix B includes the rejection reasons.

In sum, open, validated and voided cases were dropped, resulting in 143 cases being dropped, with 32,761 cases remaining in the dataset.

2. Training

Traffic stops that are entered due to training, can be identified by either the Agency variable or the Deputy serial number. When conducting training on the TraCs cases, MCSO has mock up citations, driver's license numbers, and deputy serial numbers. Below I discuss how each variable signals traffic stops to be deleted.

2a. Agency

Training cases show up as missing, or -9 on the agency variable. When using this information, the agency is not included.

	Frequency	Percent
-9	185	0.6
5021	1	0.0
5040	2	0.0
5041	4454	13.5
5042	5667	17.2
5043	4175	12.7
5044	4527	13.8

5045	2441	7.4
5046	7896	24.0
5048	35	0.1
5055	266	0.8
5056	2982	9.1
5062	188	0.6
5063	79	0.2
5073	5	0.0
5083	1	0.0
Total	32904	100.0

Thus, 185 out of 32,904 cases did not have an agency reported and therefore will be deleted, resulting in 32,719 cases.

2b. Deputy Serial Number

Additionally, any time a training for TraCs occurred, the deputy being trained entered in a deputy serial number that began with the letters "ST". Below is a table showing the frequency at which deputy serial numbers which begin with "ST" occur in the data.

Deputy Serial Number	Frequency
ST001	82
ST002	17
ST003	5
ST004	6
ST005	7
ST007	16
ST008	5
ST009	5
ST011	2
ST012	4
ST013	6
ST014	11
ST015	11
TOTAL	177

As such, 177 cases out of 32,904 would be deleted due to being designated as training.

2c. Overlap

Many of the cases from the training and deputy serial number variables overlap. As shown in the table below, all of the cases that are dropped due to the deputy serial number (the rows) are captured by dropping the cases without an agency variable (the columns).

	Dropped by Agency	
	NO	YES	Total

Dropped by Deputy Serial	NO	32719	8	32727
Number	YES	0	177	177
Total		32719	185	32904

4. Conclusion

Overall, once overlap among variables is taken into account, 300 cases out of 32,904 are dropped. This amounts to approximately 1% of the total data. This is shown in the table below.

	Frequency	Percent
NO	32604	99.1
YES	300	0.9
Total	32904	100.0

Note that the summation of the number of cases that would be deleted from the status variable (143) and the number of cases that would be deleted from the agency variable (185) does not equal 300. This is because about 28 cases overlap. This is shown in the table below.

		Dropped by Status		
		NO	YES	Total
Dropped by Agency	NO	32604	115	32719
	YES	157	28	185
Total		32761	143	32904

Meanings of the Status Value Labels

Status Code	Value Label	Meaning of Value Label
0	Open	These are forms in the TraCS system that are currently open and in process of being completed that have not been finalized
1	Validated	These are forms that have gone through the TraCS validation process but have not been submitted by the user
2	Rejected	These are for Accident Forms Only and applies to a supervisor rejecting a form for corrections back to the deputy
3	Void	These are forms that have been voided by a supervisor due to entry error, mistake, or some other reason.
4	Issued	This is a status only available for forms which are given to a person by the deputy (citation, warning, incidental contact)
5	Accepted	This status is for Accident Forms Only and applies to a supervisor approving the form once sent to them for review
6	Located	Not currently utilized
7	Transmitted	Not currently utilized
8	Deleted	Not currently utilized. Forms are not deleted and instead voided to maintain a record
9	Locked	Not currently utilized
10	Non-Reported	Not currently utilized
11	Office	Printed; Not currently utilized
50	ADOT Accepted	This status is for Accident Forms Only and is noticed that the electronic submission to ADOT was successful.
51	Pending test results	Not currently utilized
90	Contact Completed	Contact form, tow sheet, etc. has been completed/submitted
91	Pending Intox	Not currently utilized

Reasons for Form rejections

	Frequency	Percent
=== Form Voided ===1/28/2015 6:38:28 AM by S1578INCORRECT IR NUMBER	1	.0
=== Form Voided ===1/31/2015 4:05:37 PM by S1868WRONG MC NUMBER USED, NEW CONTACT FORM GENERATED WITH CORRECT MC NUMBER	3	.0
=== Form Voided ===1/9/2015 5:03:02 PM by S0988INCORRECT DR #	1	.0
=== Form Voided ===10/21/2014 7:52:55 PM by A6830INCORRECT MC NUMBER WAS PUT IN. CORRECTED VERSION ISSUED	1	.0
=== Form Voided ===10/23/2014 2:00:45 PM by A6830INCORRECT END TIME WAS PLACED ON REPORT. CORRECTED CONTACT FORM COMPLETED	1	.0
=== Form Voided ===10/25/2014 1:03:28 AM by S0893FORM NEEDS TO BE EDITED BY ORIGINATING DEPUTY TO ADD A SECONDARY UNIT THAT STOPPED ON TRAFFIC STOP. NEW CONTACT FORM WILL BE DONE TO SHOW SECONDARY UNIT	1	.0
=== Form Voided ===10/29/2014 12:03:34 PM by S0727VOIDED PER DEPUTY SO HE COULD RE-ENTER AND MAKE CORRECTIONS.	1	.0
=== Form Voided ===10/3/2014 7:15:04 PM by S0988DEPUTY HORNING FAILED TO PUT THE CONTACT ETHNNICITY FOR THE PASSENGER ON THE FORM. A NEW FORM WAS GENERATED TO REPLACE THE ORIGINAL	1	.0
=== Form Voided ===10/30/2014 3:57:08 PM by A5213I ENTERED THE WRONG MC FILE #	5	.0
=== Form Voided ===10/30/2014 5:10:56 AM by S1820WRONG MC NUMBER	1	.0
=== Form Voided ===11/1/2014 4:04:15 AM by S1678PRINTER ERROR ON SCENE/HAND WRITTEN	1	.0
=== Form Voided ===11/22/2014 7:25:37 PM by S0988DEPUTY SCRIVENER MADE A MISTAKE AND DID NOT RECORD THE ETHNICITY OF ONE OF THE PASSENGERS. CONSEQUENTLY A NEW FORM WAS GENERATED	3	.0
=== Form Voided ===11/28/2014 6:41:46 PM by S0988DEPUTY CARRILLO NOTED A WARNING IN THE CONTACT CONCLUSION BOX, WHEN HE ISSUED A CITATION. CONSEQUENTLY, A NEW FORM WITH THE CORRECT ENTRY WAS GENERATED	1	.0
=== Form Voided ===12/11/2014 11:46:53 AM by S1868DEPUTY COPE ADVISED ME AFTER VALIDATING THIS FORM THAT HIS CALL SIGN WAS NOT SHOWN IN THE "UNIT/CALL SIGN" BOX. I HAD DEPUTY COPE CREATE A NEW CONTACT FORM WITH THE APPROPRIATE CALL SIGN SHOWING.	1	.0
=== Form Voided ===12/13/2014 9:25:19 AM by S1868UPON BI-MONTHLY TRACS REVIEW IT WAS NOTED THE POST RACE/GENDER PERCEPTION WAS LEFT BLANK FOR THE PASSENGER. A NEW CONTACT FORM WAS COMPLETED WITH THE REQUIRED INFORMATION.	1	.0

=== Form Voided ===12/13/2014 9:28:01 AM by S1868UPON BI-MONTHLY TRACS REVIEW IT WAS DISCOVERED THE POST RACE/GENDER PERCEPTION OF THE PASSENGER WAS NOT FILLED OUT. A NEW CONTACT FORM WITH THE REQUIRED INFORMATION WAS COMPLETED.	1	.0
=== Form Voided ===12/20/2014 11:01:18 PM by S1868POST PERCEPTION WAS INADVERTANLY LEFT AS UNKNOWN AN NEW CONTACT WAS IMMEDIATELY ISSUED	1	.0
=== Form Voided ===12/30/2014 9:07:45 PM by S1833TIMES ARE INNACURATE PER DEPUTY AND NEEDS TO BE UPDATED	1	.0
=== Form Voided ===12/5/2014 11:43:35 AM by S1513WRONG IR# WAS ENTERED AND A NEW CONTACT FORM WAS GENERATED WITH THE CORRECT INFORMATION	1	.0
=== Form Voided ===2/11/2015 7:43:21 AM by S1294TWO CONTACT SHEETS COMPLETED WHEN ONLY ONE WAS NEEDED	1	.0
=== Form Voided ===2/28/2015 8:01:27 PM by S0988DEPUTY HORNING INADVERTENTLY PUT THE WRONG TIME ON THE CONTACT SHEET. THE SHEET WAS REPLACED WITH ONE BEARING THE CORRECT TIME.	1	.0
=== Form Voided ===2/4/2015 7:59:25 PM by S1833STOP RESULTED IN THE EXT. DET. DUE TO DUI INVEST. AND ULTIMATELY LEAD TO ARREST. CONTACT FORM INDICATES "NO" FOR EXT. DET. AND "NO" FOR ARRESTED. ERROR FOUND. FORM WAS CORRECTED ON 2/3/15 W/ REASONS	1	.0
=== Form Voided ===3/24/2015 3:11:07 PM by S1833DOESNT LIST SECOND UNIT	1	.0
=== Form Voided ===3/29/2015 6:54:35 PM by S1826PER DEPUTY, WILL NEED TO CORRECT TIMES. WILL CREATE A NEW CONTACT FORM FOR THIS 910.	1	.0
=== Form Voided ===3/3/2015 9:43:53 AM by S1079PRACTICE RECORD -VOIDED-	2	.0
=== Form Voided ===3/3/2015 9:44:11 AM by S1079PRACTIVE RECORD -VOIDED-	1	.0
=== Form Voided ===3/31/2015 11:40:14 AM by S1294WRONG MC NUMBER	1	.0
=== Form Voided ===3/7/2015 4:59:15 AM by S1820CORRECT ERRORS FOR BIO	1	.0
=== Form Voided ===3/7/2015 5:15:14 AM by S1820ERROR ON LOCATION	1	.0
=== Form Voided ===4/11/2015 10:25:32 AM by S1833HUNTER WAS NOT THE SECOND PERSON IN PRIMAIRY UNIT. HUNTER IS THE SECONDARY UNIT.	2	.0
=== Form Voided ===4/12/2015 7:50:19 PM by S0988DEPUTY BEEKS PUT THE WRONG STOP TIME ON THE FORM. A SECOND FORM WAS GENERATED TO CORRECT THIS ISSUE.	1	.0
=== Form Voided ===4/17/2015 6:59:35 PM by S0988DEPUTY BELL PUT THE WRON INFORMATION IN THE POST STOP PRECEIVED ETHNICITY BOX. A SECOND FORM WAS GENERATED WITH THE CORRECT INFORMATION.	3	.0

=== Form Voided ===4/21/2015 5:23:23 AM by S1578THE FORM WAS NOT NEEDED	3	.0
=== Form Voided ===4/24/2015 5:14:55 PM by S0988DEPUTY GARDNER INADVERTENTLY PLACED "HISPANIC" IN THE PRE-STOP ETHNICITY FOR THE THIRD PASSENGER WHEN HE DID NOT SEE TH PASSENGER BEFORE THE STOP. AS SUCH, ANOTHER CONTCAT FORM WAS GENERATED	2	.0
=== Form Voided ===4/24/2015 6:19:09 PM by S1299COMPUTER CRASHED WHILE ENTERING INFORMATION.	1	.0
=== Form Voided ===4/25/2015 7:15:32 PM by S1299COMPUTER ERROR	1	.0
=== Form Voided ===4/26/2015 7:42:25 PM by S0988DEPUTY HORNING FAILED TO EXPLAIN WHAY THE SUSPECT WAS ARRESTED IN THE EXPLINATION OF WHY THE STOP WAS EXTENDED. A SECOND FORM WAS GENERATED TO REPLACE THIS FORM	1	.0
=== Form Voided ===4/30/2015 4:10:58 AM by S1833CITATION NEEDS TO BE REISSUED DUE TO INAPPROPRIATE CHARGE AND INAPPROPRIATE LOCATION.	1	.0
=== Form Voided ===4/4/2015 7:01:50 PM by S1569WRITTEN WARNING WAS ISSUED THE WRONG MC NUMBER WHEN IT WAS TYPED BY DEPUTY FROM HIS COMPUTER SCREEN. CORRECT MC SHOULD BE MC 15-068552. DUE TO OUR HUMAN MISTAKE WE ARE VOIDING THIS WARNING. SGT FELIX	1	.0
=== Form Voided ===4/7/2015 2:53:36 AM by S1578SERIAL NUMBER ERROR FOR SECOND UNIT	1	.0
=== Form Voided ===4/7/2015 6:25:40 PM by S1833DUPLICATED FORM. CONTACT FORM ALREADY COMPLETED FOR THIS TRAFFIC STOP	1	.0
=== Form Voided ===4/7/2015 9:00:47 PM by S1833CONTACT END TIME IS INCORRECT, PLEASE CORRECT.	1	.0
=== Form Voided ===5/2/2015 8:33:19 PM by S1833CORRECTIONS REQUIRED.	1	.0
=== Form Voided ===5/21/2015 9:27:04 AM by S1270THIS WAS TEST FILE LOOKING FOR A PROBLEM WITH TRACS	1	.0
=== Form Voided ===5/22/2015 6:42:37 PM by S1569DEPUTY ENTERED THE WRONG DR ON THIS FORM WHILE TYPING THE FORMS IN HIS CAR. HE EXPLAINED THE MISTAKE TO ME. NO ISSUES. SGT. A. FELIX S1569	2	.0
=== Form Voided ===5/29/2015 4:17:27 AM by S1767MONTHLY INSPECTION OF TRAFFIC DATA BY SGT REVEALED SOME ERRORS THAT NEED TO BE ADDRESSED: ADDITIONAL UNITS AND REASON FOR EXTENDED DETENTION. WILL HAVE YOUNG REDO FORM	2	.0
=== Form Voided ===5/29/2015 5:27:32 PM by S0988THIS CONTACT FORM INDICATES THE STOP TIME WAS EXTENDED WITHOUT A CORRISPONDING EXPLINATION FOR THE EXTENSOION. AS SUCH. A NEW FORM WAS GENERATED WITH THE APPROPRATE EXPLINATION.	1	.0

=== Form Voided ===5/29/2015 5:43:33 PM by S0988DEPUTY ALLEN MADE A MISTAKE IN THE EXPLINATION BOX OF THIS CONTACT FORM. A NEW FORM WAS GENERATED TO REPLACE IT.	1	.0
=== Form Voided ===5/5/2015 6:48:07 PM by S1783OPENED A SECOND CONTACT TO ADD COMMENTS	1	.0
=== Form Voided ===5/5/2015 7:23:11 PM by S1833REASON FOR EXTENDED DURATION REQUIRED	1	.0
=== Form Voided ===5/5/2015 7:23:39 PM by S1833REASON FOR EXTENDED DURATION REQURIED	1	.0
=== Form Voided ===5/5/2015 8:12:10 PM by S1820NEW CONTACT FORM WILL BE GENERATED BECAUSE CITATION WAS VOIDED OUT. S1820	1	.0
=== Form Voided ===5/9/2015 5:40:12 PM by S0988DEPUTY ENTEMAND FAILED TO PUT ENOUGH DETAIL IN THE REASON FOR EXTENDED DURATION BOX. A SECOND FORM WITH GREATER DETAIL WAS GENERATED TO REPLACE THIS ONE.	1	.0
=== Form Voided ===5232015 5:01:52 PM by S0482DUPLICATE CONTACT FORM	2	.0
=== Form Voided ===6/13/2015 2:45:50 AM by S1458ERROR ON INFORMATION	1	.0
=== Form Voided ===6/2/2015 2:54:23 PM by S1372FORGOT TO ADD SECOND DEPUTY	1	.0
=== Form Voided ===6/28/2015 8:07:39 AM by S0988DEPUTY JOHNSON DID NOT ENTER ALL OF THE INFORMATION NECESSARY TO CORRECTLY COMPLETE THE CONTACT FORM. A NEW FORM WAS GENERATED TO REPLACE THIS ONE.	8	.0
=== Form Voided ===7/10/2014 7:44:06 AM by S0988CONTACT END TIME WAS INCORRECT. CONSEQUENTLY, THE FORM WAS VOIDED AND REPLACED.	1	.0
=== Form Voided ===7/12/2015 8:57:43 AM by S1820INCORRECT TIMES S1820	1	.0
=== Form Voided ===7/19/2014 6:29:39 AM by S1868THIS WAS NOT A VEHICLE STOP, IT WAS A SUSPICIOUS VEHICLE WHERE A PERSON STOPPED AND PICKED UP A KNOWN PROSTITUTE. BOTH SUBJECTS WERE RAN AND BUT NOT CHARGED WITH CRIME. DRIVER WAS CITED FOR NPOI	1	.0
=== Form Voided ===7/19/2014 9:46:50 PM by S0727MADE A NEW ONE WITH CORRECTIONS	1	.0
=== Form Voided ===7/26/2014 5:52:08 AM by S0988FORM WAS VOIDED BECAUSE THE COMPUTER PUT THE STOP LOCATION IN AGILA. CONSEQUENTLY A NEW FORM WAS CREATED TO REPLACE THIS ONE WITH THE CORRECT LOCATION.	1	.0
=== Form Voided ===7/31/2014 9:51:37 AM by S0988THE LOCATION OF THIS STOP IS LISTED AS AGILA, WHEN THE STOP WAS MADE OUTSIDE OF GILA BEND. THE DEPUTY WILL COMPLETE A DUPLICATE FORM.	1	.0

=== Form Voided ===7/31/2014 9:53:13 AM by S0988THE LOCATION LISTED ON THE FORM I SAGILA, WHEN THE STOP WAS ACTUALLY MADE OUTSIDE OF GILA BEND. THE DEPUTY WILL COMPLETE A DUPLICATE FORM WITH THE CORRECT INFORMATION.	1	.0
=== Form Voided ===7/9/2015 10:02:44 PM by S1767INCORRECT	2	.0
=== Form Voided ===8/4/2015 6:03:27 PM by S1820ADDITIONAL OFFICER FIELD WAS NOT COMPLETED, A NEW FORM WAS SUBMITTED WITH UPDATED INFORMATION. S1820	2	.0
=== Form Voided ===8/4/2015 6:04:35 PM by S1820CITY BOX WAS BLANK, A NEW FORM WAS GENERATED WITH UPDATED INFORMATION. S1820	1	.0
=== Form Voided ===9/13/2014 6:44:19 PM by S0988THE FORM WAS VOIDED BECAUSE IT DID NOT CONTAIN GENDER/RACE CHARACTERISTICS OF PASSENGER. A SECOND FOMR WAS GENERATED TO REFLECT THE PASSENGER INFORMATION.	1	.0
=== Form Voided ===9/22/2014 10:49:26 AM by S1252COMPUTER CONECTIVITY FAILURE	1	.0
=== Form Voided ===9/27/2014 11:48:04 AM by S0988DEPUTY ENTEMAN DID NOT PUT THE SIGNIFICANT EVENT TIME ON THE FORM. CONSEQUENTLY, A REPLACEMENT FORM WAS GENERATED.	1	.0
=== Form Voided ===9/27/2014 6:56:12 PM by S0988DEPUTY SCRIVENER PUT THE WORNG MC NUMBER ON THIS CONTACT FORM. HE REGENERATED THE FORM PUTTING THE CORRECT INFORMATIONON IT.	1	.0
=== Form Voided ===9/3/2014 4:47:39 AM by S1344INCORRECT. VOICED REASON FOR STOP WAS NOT ON CITATION	1	.0
=== Form Voided ===9/7/2014 7:05:44 PM by S0988DEPUTY ENTEMAN DID NOT PLACE THE CORRECT VALUE IN THE POST STOP ETHNICITY BOX. HE CREATED ANOTHER CONTACT FORM TO REPLACE THIS ONE.	1	.0
=== Supervisor Review ===4/22/2015 11:13:09 AM by S1506LICENSE SEIZED FOR 28-3511 / SUSPENSION OF LICENSE. WILL REVIEW REPORT FOR FUTHER DETAILES WHEN TURNED IN BEFORE END OF SHIFT.	1	.0
=== Supervisor Review ===4/22/2015 11:15:05 AM by S1506	1	.0
=== Supervisor Review ===4/22/2015 11:18:14 AM by S1506	1	.0
=== Supervisor Review ===4/22/2015 5:39:43 PM by S1506DEPUTY DID NOT CHECK YES OR NO ON CONTACT FORM FOR VOICED REASON FOR STOP THROUGH COMMUNICATIONS. SPOKE WITH DEPUTY WHO UNDERSTOOD HE MISSED THE CHECK BOX AND WILL MAKE SURE ALL NECESSARY INFORMATION I	1	.0
=== Supervisor Review ===4/22/2015 7:12:09 PM by S1626MIS-TYPED TOWN OF QUEEN CREEK LOCATION AND LISTED USERY MOUNTAIN FROM DROP-DOWN MENU. DISCUSSED.	1	.0

=== Supervisor Review ===4/24/2015 11:56:29 AM by S1927DRIVER ACCUSED DEPUTY OF PROFILING HIM AS HISPANIC AND WAS SOLE REASON FOR THE STOP.DEPUTY MADE COMMENTS IN NARRATIVE ON CITATION. NO EVIDENCE EXISTS TO SUPPORT DRIVERS CLAIM.	1	.0
=== Supervisor Review ===4/24/2015 12:57:54 PM by S1927FAILED TO CHECK BOX OF VOICED REASON FOR STOP.	1	.0
=== Supervisor Review ===4/29/2015 10:09:28 AM by S1626	1	.0
=== Supervisor Review ===4/29/2015 10:10:56 AM by S1626	1	.0
=== Supervisor Review ===4/29/2015 10:15:24 AM by S1626	1	.0
=== Supervisor Review ===4/29/2015 2:07:10 PM by S1626	2	.0
=== Supervisor Review ===4/30/2015 5:20:10 PM by S1626DEPUTY REPORTED CITIZEN REPORTED OBJECT IN ROADWAY/HAZARD DURING TRAFFIC STOP CAUSING SLIGHT DELAY AND DRIVER PRODUCED INSURANCE CARD AFTER CITE WAS ISSUED.	1	.0
=== Supervisor Review ===5/10/2015 2:28:32 AM by S17833511- AND 910S	1	.0
=== Supervisor Review ===5/14/2015 10:27:58 PM by S1767CONTACT FORM REFLECTS A CITATION WAS ISSUED WHEN IN FACT IT WAS A WARNING	1	.0
=== Supervisor Review ===5/15/2015 3:05:15 AM by S1783CONTACT FORM HAS END TIME OF 1545. DEPUTY ACCIDENTLY PUT 1545, THE START TIME, BUT END TIME SHOULD OF BEEN 1600 PER CAD.	1	.0
=== Supervisor Review ===5/15/2015 3:10:35 AM by S1783EXTENDED TIME DUE TO DEPUTY HAD SUSPICION OF DUI AND REQUESTED A PBT TO LOCATION. DRIVER ADMITTED HE DRANK A BEER EARLIER TO DEPUTY.	1	.0
=== Supervisor Review ===5/25/2015 1:33:48 PM by S089328 INFO DIDN'T COME BACK DUE TO MISSING INFORMATION. MIDDLE INITIAL WAS NEEDED. ASSISTANCE GIVEN BY COMMUNICATIONS	1	.0
=== Supervisor Review ===5/26/2015 4:34:26 PM by S0893DEPUTY ROWE INFORMED ME THAT HE HELD THE DEFENDANT FOR A TRAFFIC TICKET FOR APPROXIMATELY 30 MINUTES DUE TO COMPUTER ISSUES. THE SUBJECT WAS NOT HAPPY DUE TO THE DELAY. SUBJECT WAS CITED FOR SPEED WHIC	1	.0
=== Supervisor Review ===5/5/2015 6:49:07 PM by S1783CAD/MPS FROZE UP AND TOOK LONGER THAN THE NORM TO ISSUE CITATIONS DUE TO COMPUTER ISSUES.	1	.0
=== Supervisor Review ===5/5/2015 7:00:11 PM by S1783TS EXTENDED BECAUSE DRIVER OBTAINED HIS CORRECT REG AND PLATE INFO	1	.0
=== Supervisor Review ===5/8/2015 10:20:53 AM by S1506	1	.0
=== Supervisor Review ===5/8/2015 2:04:59 PM by S1506SPEED NOTED FOR REASON FOR STOP STATES 50 IN 50 ZONE. POSTED SPEED LIMIT PER CITATION IS 35MPH. SHOULD READ 35 IN A 50 ZONE. DISCUSSED WITH DEPUTY	1	.0
=== Supervisor Review ===5182015 10:52:50 AM by S1521NO ISSUE FOUND	1	.0

=== Supervisor Review ===5182015 10:54:17 AM by S1521NO ISSUE FOUND	3	.0
=== Supervisor Review ===5182015 10:55:31 AM by S1521NO ISSUE FOUND	1	.0
=== Supervisor Review ===5182015 10:56:32 AM by S1521NO ISSUE FOUND	3	.0
=== Supervisor Review ===5182015 11:29:56 AM by S1521NO ISSUE FOUND	1	.0
=== Supervisor Review ===6/30/2015 9:32:58 AM by S0893I BROUGHT TO DEPUTY SPINDLER'S ATTENTION THAT THE STOP WAS LONGER THAN 20 MINUTES AND THE BOX WAS MARKED NO WHERE ASKED IF STOP WAS EXTENDED. SPINDLER ADVISED HE HAD SCANNER AND COMPUTER ISSUES ON THE	1	.0
=== Validated Form Edited - Open ===1/25/2015 1:46:08 PM by S0482	1	.0
=== Validated Form Edited - Open ===1/9/2015 7:40:32 PM by S1956	1	.0
=== Validated Form Edited - Open ===1/9/2015 7:41:29 PM by S1956	1	.0
=== Validated Form Edited - Open ===11/12/2014 2:41:45 PM by S1293	1	.0
=== Validated Form Edited - Open ===12/13/2014 7:38:50 AM by S1872	1	.0
=== Validated Form Edited - Open ===12/2/2014 5:25:24 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:46:29 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:47:51 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:48:26 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:49:05 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:49:41 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:50:02 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:50:34 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:50:58 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:51:16 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:51:44 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:52:13 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:52:42 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:53:14 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:53:34 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:54:00 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:54:23 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:54:42 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:55:00 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:55:36 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:55:54 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:56:09 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:57:28 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:57:57 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:58:09 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:58:23 AM by S1293	1	.0

=== Validated Form Edited - Open ===12/2/2014 7:58:45 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 7:59:01 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:00:31 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:00:44 AM by S1293	1	.0
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=== Validated Form Edited - Open ===12/2/2014 8:05:11 AM by S1293	1	.0
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=== Validated Form Edited - Open ===12/2/2014 8:06:30 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:06:44 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:07:02 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:07:17 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:08:59 AM by S1293	1	.0
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=== Validated Form Edited - Open ===12/2/2014 8:09:34 AM by S1293	1	.0
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=== Validated Form Edited - Open ===12/2/2014 8:12:03 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:12:25 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:12:44 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:13:01 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:13:23 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:13:44 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:14:06 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:14:25 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:14:50 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:15:16 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:15:38 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:16:02 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:16:19 AM by S1293	1	.0

=== Validated Form Edited - Open ===12/2/2014 8:16:51 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:17:08 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:17:21 AM by S1293=== Validated Form Edited - Open ===9/22/2014 12:25:50 PM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:17:39 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:17:58 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:18:34 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:19:40 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:19:52 AM by S1293	3	.0
=== Validated Form Edited - Open ===12/2/2014 8:20:10 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:20:23 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:20:37 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:21:11 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/2/2014 8:21:24 AM by S1293	1	.0
=== Validated Form Edited - Open ===12/3/2014 5:24:14 AM by S1293	1	.0
=== Validated Form Edited - Open ===2152015 12:12:57 PM by S1930	1	.0
=== Validated Form Edited - Open ===3/29/2015 2:03:20 PM by S1967	1	.0
=== Validated Form Edited - Open ===4/8/2015 9:26:37 PM by S1756	1	.0
=== Validated Form Edited - Open ===5/2/2015 10:43:45 AM by S2007	1	.0
=== Validated Form Edited - Open ===6/15/2015 5:59:12 PM by S1619	1	.0
=== Validated Form Edited - Open ===6/15/2015 6:00:34 PM by S1619	1	.0
=== Validated Form Edited - Open ===6/20/2015 3:42:22 PM by S1722	1	.0
=== Validated Form Edited - Open ===6/22/2015 5:33:48 PM by S1937	1	.0
=== Validated Form Edited - Open ===6/22/2015 5:34:29 PM by S1937	1	.0
=== Validated Form Edited - Open ===6/25/2015 7:01:28 AM by S1872	1	.0
=== Validated Form Edited - Open ===8/27/2015 11:19:19 AM by S2012	1	.0
=== Validated Form Edited - Open ===8/27/2015 3:47:37 AM by S1917	1	.0
=== Validated Form Edited - Open ===9/11/2015 5:28:49 AM by S1847	1	.0
Total	32904	100.0

Appendix C. Distribution of Stops by Race: Deputy-District Comparison Ratios

District	Deputy SN	Ratio by Whites	Ratio by Ethnicity Unknowns	Ratio by Native Americans	Ratio by Hispanics	Ratio by Blacks	Ratio by Asians
5041	S0793	0.87	0.47	0.62	0.98	1.83	1.85
5041	S1250	1.38	0.00	0.00	0.36	0.63	0.32
5041	S1468	0.66	0.66	4.58	1.36	1.20	0.95
5041	S1642	0.73	2.79	0.74	1.60	1.49	0.60
5041	S1644	0.97	1.67	1.34	1.12	0.88	0.60
5041	S1934	1.13	2.40	0.21	0.75	0.88	1.01
5041	S1938	1.06	0.00	1.17	0.98	0.75	0.95
5041	S1986	0.57	0.50	2.25	1.80	1.60	1.07
5041	S1993	1.04	1.35	1.32	0.76	1.03	1.30
5042	S1293	1.38	0.00	1.46	0.73	0.42	1.32
5042	S1484	0.85	3.76	2.28	1.29	0.20	0.58
5042	S1691	1.05	1.96	0.00	1.18	0.41	0.27
5042	S1714	1.10	0.00	1.71	0.99	0.52	1.45
5042	S1768	1.10	0.00	1.47	1.02	0.63	0.75
5042	S1841	0.59	0.00	1.41	1.28	1.70	0.72
5042	S1936	0.97	1.18	0.71	0.97	1.11	1.70
5042	S1946	1.28	0.35	0.43	0.87	0.63	0.72
5042	S1967	1.05	0.00	0.94	0.97	0.86	1.48
5042	S1970	0.51	0.00	2.33	1.35	1.49	1.27
5042	S2007	1.06	0.00	0.78	0.83	1.42	1.33
5043	S1294	1.08	0.73	0.00	0.77	1.00	1.35
5043	S1905	1.08	0.52	0.00	0.85	0.71	1.60
5043	S1942	1.05	0.58	6.36	0.70	1.03	1.78
5043	S1952	1.02	0.00	1.49	0.91	1.04	1.67
5043	S1995	0.94	0.00	0.00	1.24	1.26	0.32
5043	S1999	1.07	0.52	0.00	0.71	1.21	1.60

5044	S0920	0.93	2.91	0.38	1.43	1.29	0.92
5044	S1609	0.99	0.70	0.92	1.29	0.67	0.55
5044	S1645	0.99	0.00	1.85	1.32	0.67	0.55
5044	S1681	1.01	0.00	0.00	1.12	1.23	0.38
5044	S1940	1.02	0.00	0.71	0.68	1.54	2.12
5044	S1955	1.06	1.42	0.94	0.44	0.90	1.12
5044	S2002	1.12	0.47	0.00	0.17	0.45	1.11
5044	S2003	0.97	0.00	2.45	1.13	1.08	2.18
5045	S1782	0.94	0.00	2.15	0.78	2.11	1.16
5045	S1818	1.14	0.00	0.00	0.60	0.63	0.00
5045	S1949	1.13	0.00	0.37	0.65	0.26	0.13
5045	S1951	0.96	0.32	1.41	1.29	0.74	1.42
5045	S1978	0.87	4.17	1.71	1.36	1.55	1.34
5046	S0482	1.07	0.95	0.30	0.76	1.10	0.80
5046	S0933	0.87	1.48	1.41	1.35	1.54	0.74
5046	S1005	0.85	2.72	0.58	1.43	1.81	0.00
5046	S1036	1.24	1.57	0.50	0.21	0.58	0.53
5046	S1176	1.05	0.00	1.28	0.95	0.61	1.01
5046	S1210	1.20	0.32	1.21	0.47	0.39	0.21
5046	S1381	0.90	3.65	0.77	1.34	1.04	0.82
5046	S1428	1.12	0.00	0.66	0.55	0.89	1.39
5046	S1521	1.01	0.00	1.16	0.87	1.33	1.22
5046	S1616	0.98	0.71	0.91	1.02	1.28	0.96
5046	S1747	0.89	0.50	0.32	1.64	0.49	1.18
5046	S1770	0.99	0.00	1.37	1.14	0.70	1.20
5046	S1777	1.12	1.13	1.08	0.58	0.90	0.00
5046	S1779	0.94	1.40	0.89	1.07	1.54	0.94
5046	S1799	1.00	0.00	0.84	1.13	0.81	0.74
5046	S1845	0.97	0.65	0.83	1.04	1.12	1.53
5046	S1868	0.94	0.00	1.17	1.21	0.67	2.46
5046	S1880	1.08	0.00	0.59	0.67	1.35	0.31

5046	S1895	0.89	0.37	3.06	1.03	1.31	2.72
5046	S1908	1.02	3.56	0.76	1.00	0.58	0.80
5056	S1315	0.91	0.77	1.22	1.41	0.97	1.06
5056	S1727	1.09	0.49	0.77	0.68	0.88	1.01
5056	S1834	0.93	0.00	0.00	1.37	1.12	1.11
5056	S1872	0.94	2.23	0.00	1.40	0.55	1.16
5056	S1935	0.90	1.13	1.44	1.29	1.27	1.10
5056	S1937	1.08	0.00	0.32	0.62	1.42	0.42
5056	S1944	1.03	0.70	1.11	0.98	0.88	0.48
5056	S2004	0.82	2.23	2.36	1.32	0.94	5.15

Appendix D. Type of Stop – Citation: Deputy-District Comparison Ratios

District	Deputy SN	Ratio by Whites	Ratio by Ethnicity Unknowns	Ratio by Native Americans	Ratio by Hispanics	Ratio by Blacks	Ratio by Asians
5041	S0793	0.89	0.53	0.51	0.99	1.80	1.60
5041	S1250	1.38	0.00	0.00	0.39	0.69	0.42
5041	S1468	0.60	0.00	6.52	1.00	1.12	1.02
5041	S1642	0.75	2.29	0.60	1.65	1.34	0.47
5041	S1644	0.94	2.19	1.71	1.14	0.92	0.00
5041	S1934	1.14	0.83	0.16	0.73	0.97	1.51
5041	S1938	0.99	0.00	1.11	1.08	0.95	0.87
5041	S1986	0.48	0.00	2.45	2.01	1.63	0.42
5041	S1993	1.00	2.15	1.89	0.73	0.99	1.31
5042	S1293	1.46	0.00	1.31	0.66	0.47	1.32
5042	S1484	0.93	8.46	0.65	1.09	0.26	0.46
5042	S1691	1.05	1.48	0.00	1.18	0.45	0.32
5042	S1714	1.09	0.00	1.27	1.00	0.59	1.52
5042	S1768	1.13	0.00	1.67	0.98	0.66	0.60
5042	S1841	0.62	0.00	1.39	1.25	1.66	0.75
5042	S1936	0.90	1.49	0.91	1.00	1.08	1.96
5042	S1946	1.30	0.47	0.57	0.90	0.34	1.02
5042	S1967	1.09	0.00	0.43	0.88	0.94	2.17
5042	S1970	0.45	0.00	2.65	1.39	1.49	1.06
5042	S2007	0.92	0.00	0.81	0.87	1.92	1.16
5043	S1294	1.09	1.16	0.00	0.74	0.80	1.79
5043	S1905	1.08	0.86	0.00	0.77	0.79	2.21
5043	S1942	1.03	0.00	8.15	0.68	0.99	2.22
5043	S1952	0.98	0.00	3.05	1.11	1.11	0.00
5043	S1995	0.89	0.00	0.00	1.44	0.97	0.54
5043	S1999	1.02	1.25	0.00	0.80	1.29	1.29

5044	S0920	0.94	2.26	0.56	1.42	1.05	0.35
5044	S1609	1.00	0.78	0.78	1.10	0.81	0.73
5044	S1645	0.99	0.00	3.72	1.17	0.43	1.16
5044	S1681	0.96	0.00	0.00	1.01	3.20	0.00
5044	S1940	1.11	0.00	0.00	0.32	0.00	3.80
5044	S1955	1.06	0.00	0.00	0.34	2.98	0.00
5044	S2002	1.16	0.00	0.00	0.14	0.00	1.62
5044	S2003	0.98	0.00	2.46	0.95	1.53	2.05
5045	S1782	0.94	0.00	5.17	0.34	1.22	0.00
5045	S1818	1.12	0.00	0.00	0.94	0.00	0.00
5045	S1949	1.12	0.00	0.33	0.63	0.38	0.16
5045	S1951	0.94	0.55	1.23	1.24	1.06	1.78
5045	S1978	0.88	3.00	2.05	1.40	1.21	1.19
5046	S0482	1.04	1.32	0.32	0.83	1.22	0.86
5046	S0933	0.87	1.01	1.49	1.34	1.54	0.66
5046	S1005	0.83	3.12	0.77	1.41	1.98	0.00
5046	S1036	1.23	0.00	0.00	0.30	0.76	0.76
5046	S1176	1.03	0.00	0.84	1.21	0.19	0.56
5046	S1210	1.20	0.40	1.17	0.49	0.39	0.13
5046	S1381	0.85	5.42	0.89	1.45	0.98	1.18
5046	S1428	1.17	0.00	0.00	0.57	0.70	0.52
5046	S1521	0.93	0.00	3.00	0.79	1.66	2.98
5046	S1616	0.99	0.93	0.92	0.96	1.29	0.91
5046	S1747	0.91	0.75	0.00	1.58	0.41	1.47
5046	S1770	0.97	0.00	0.93	1.19	0.72	1.54
5046	S1777	1.10	0.00	1.18	0.62	1.05	0.00
5046	S1779	0.97	1.16	1.14	1.01	1.39	0.75
5046	S1799	1.00	0.00	0.54	1.10	0.90	0.90
5046	S1845	0.99	0.83	0.82	0.88	1.27	1.90
5046	S1868	0.92	0.00	0.64	1.31	0.57	2.99
5046	S1880	1.09	0.00	0.75	0.74	0.83	0.50

5046	S1895	0.92	0.00	3.11	1.06	1.10	2.06
5046	S1908	1.02	3.54	0.87	1.03	0.39	1.15
5056	S1315	0.94	0.00	0.00	1.30	0.80	3.48
5056	S1727	1.04	3.30	0.00	0.69	1.37	0.00
5056	S1834	0.94	0.00	0.00	1.49	0.69	0.00
5056	S1872	0.96	2.44	0.00	1.33	0.63	0.00
5056	S1935	0.90	1.56	1.41	1.18	1.35	1.87
5056	S1937	1.06	0.00	0.59	0.66	1.48	0.59
5056	S1944	1.00	0.00	0.00	1.14	0.82	1.43
5056	S2004	0.51	0.00	15.23	1.42	1.75	15.23

Appendix E. Type of Stop – Incidental Contact: Deputy-District Comparison Ratios

District	Deputy SN	Ratio by Whites	Ratio by Ethnicity Unknowns	Ratio by Native Americans	Ratio by Hispanics	Ratio by Blacks	Ratio by Asians	Ratio by Non-Hispanics
5041	S0793	0.76	0.00	0.00	0.00	0.00	12.50	1.32
5041	S1250	1.52	0.00	0.00	0.00	0.00	0.00	1.32
5041	S1468	1.52	0.00	0.00	0.00	0.00	0.00	1.32
5041	S1642	0.00	50.00	0.00	0.00	0.00	0.00	0.00
5041	S1644	1.52	0.00	0.00	0.00	0.00	0.00	1.32
5041	S1934	0.51	0.00	0.00	3.03	0.00	0.00	0.44
5041	S1938	1.52	0.00	0.00	0.00	0.00	0.00	1.32
5041	S1986	0.00	0.00	25.00	0.00	0.00	12.50	1.32
5041	S1993	1.52	0.00	0.00	0.00	0.00	0.00	1.32
5042	S1293	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1484	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1691	2.05	0.00	0.00	0.00	0.00	0.00	1.78
5042	S1714	2.05	0.00	0.00	0.00	0.00	0.00	1.78
5042	S1768	2.05	0.00	0.00	0.00	0.00	0.00	1.78
5042	S1841	0.00	0.00	0.00	2.28	0.00	0.00	0.00
5042	S1936	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1946	0.82	0.00	0.00	1.37	0.00	0.00	0.71
5042	S1967	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1970	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S2007	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5043	S1294	1.53	0.00	0.00	0.00	0.00	0.00	1.28
5043	S1905	0.76	0.00	0.00	0.00	4.58	0.00	1.28
5043	S1942	0.92	0.00	0.00	1.83	0.00	0.00	0.77
5043	S1952	1.53	0.00	0.00	0.00	0.00	0.00	1.28
5043	S1995	0.76	0.00	0.00	0.00	4.58	0.00	1.28
5043	S1999	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5044	S0920	1.00	0.00	0.00	0.55	1.82	0.00	1.05
5044	S1609	1.18	0.00	0.00	0.00	0.00	0.00	1.11
5044	S1645	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5044	S1681	0.00	0.00	0.00	10.40	0.00	0.00	0.00
5044	S1940	1.18	0.00	0.00	0.00	0.00	0.00	1.11
5044	S1955	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5044	S2002	1.18	0.00	0.00	0.00	0.00	0.00	1.11
5044	S2003	1.18	0.00	0.00	0.00	0.00	0.00	1.11
5045	S1782	1.56	0.00	0.00	0.00	0.00	0.00	1.27
5045	S1818	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5045	S1949	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5045	S1951	1.56	0.00	0.00	0.00	0.00	0.00	1.27
5045	S1978	0.00	3.50	0.00	3.50	3.50	0.00	0.32
5046	S0482	1.28	0.00	0.00	0.87	0.00	0.00	1.04
5046	S0933	0.99	0.00	0.00	0.00	2.79	0.00	1.22
5046	S1005	0.60	0.00	0.00	2.44	1.68	0.00	0.73
5046	S1036	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1176	0.50	0.00	0.00	0.00	5.58	0.00	1.22
5046	S1210	0.00	0.00	0.00	6.09	0.00	0.00	0.00
5046	S1381	0.99	0.00	0.00	2.03	0.00	0.00	0.81
5046	S1428	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1521	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1616	0.89	0.00	0.00	0.00	1.68	13.40	1.22
5046	S1747	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1770	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1777	1.12	0.00	0.00	0.00	2.09	0.00	1.22
5046	S1779	1.49	0.00	0.00	0.00	0.00	0.00	1.22
5046	S1799	0.50	0.00	22.33	2.03	0.00	0.00	0.81
5046	S1845	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1868	0.50	0.00	0.00	4.06	0.00	0.00	0.41
5046	S1880	1.49	0.00	0.00	0.00	0.00	0.00	1.22

5046	S1895	1.24	11.17	0.00	0.00	0.00	0.00	1.02
5046	S1908	0.00	0.00	0.00	3.05	4.19	0.00	0.61
5056	S1315	1.29	0.00	0.00	0.00	0.00	0.00	1.29
5056	S1727	0.97	0.00	0.00	1.38	0.00	0.00	0.97
5056	S1834	0.86	0.00	0.00	1.83	0.00	0.00	0.86
5056	S1872	1.29	0.00	0.00	0.00	0.00	0.00	1.29
5056	S1935	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1937	0.86	0.00	0.00	1.83	0.00	0.00	0.86
5056	S1944	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S2004	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix F. Type of Stop – Warning: Deputy-District Comparison Ratios

District	Deputy SN	Ratio by Whites	Ratio by Ethnicity Unknowns	Ratio by Native Americans	Ratio by Hispanics	Ratio by Blacks	Ratio by Asians	Ratio by Non-Hispanics
5041	S0793	1.56	0.00	0.00	0.00	0.00	0.00	1.27
5041	S1250	1.40	0.00	0.00	0.29	0.45	0.00	1.20
5041	S1468	0.68	1.15	2.91	1.66	1.27	0.97	0.83
5041	S1642	0.83	3.42	0.00	0.99	2.05	1.44	0.97
5041	S1644	0.95	1.49	1.25	1.14	0.89	1.25	0.96
5041	S1934	1.13	3.73	0.00	0.72	0.84	0.39	1.04
5041	S1938	1.19	0.00	1.14	0.78	0.27	1.14	1.07
5041	S1986	0.63	0.80	2.03	1.73	1.60	1.35	0.81
5041	S1993	1.05	0.81	0.68	0.82	1.05	1.36	1.05
5042	S1293	1.14	0.00	2.03	1.05	0.26	1.13	0.98
5042	S1484	0.78	0.00	4.08	1.49	0.15	0.65	0.73
5042	S1691	1.11	4.61	0.00	1.11	0.37	0.00	0.88
5042	S1714	1.77	0.00	0.00	0.54	0.00	0.00	1.29
5042	S1768	1.04	0.00	1.16	1.11	0.60	0.97	0.95
5042	S1841	0.55	0.00	0.00	0.68	4.04	0.00	1.21
5042	S1936	1.16	0.00	0.00	0.82	1.21	0.88	1.12
5042	S1946	1.28	0.00	0.00	0.71	1.29	0.00	1.19
5042	S1967	1.03	0.00	2.80	1.03	0.90	0.00	1.00
5042	S1970	0.69	0.00	1.06	1.16	1.56	1.77	0.92
5042	S2007	1.14	0.00	0.87	0.83	1.01	1.46	1.12
5043	S1294	1.04	0.00	0.00	0.89	1.36	0.00	1.05
5043	S1905	1.11	0.00	0.00	1.09	0.28	0.00	0.99
5043	S1942	1.06	1.04	4.79	0.65	1.16	1.45	1.09
5043	S1952	1.03	0.00	0.00	0.82	1.04	2.86	1.07
5043	S1995	1.00	0.00	0.00	0.95	1.55	0.00	1.03
5043	S1999	1.10	0.00	0.00	0.61	1.14	1.88	1.12

5044	S0920	0.94	5.79	0.00	0.80	1.45	3.00	0.97
5044	S1609	0.98	0.00	2.27	1.67	0.00	0.00	0.95
5044	S1645	0.99	0.00	0.00	1.51	1.01	0.00	0.97
5044	S1681	1.02	0.00	0.00	1.22	0.65	0.45	0.99
5044	S1940	0.98	0.00	0.88	0.89	2.20	1.52	1.02
5044	S1955	1.04	1.67	1.00	0.55	0.56	1.16	1.03
5044	S2002	1.10	0.63	0.00	0.21	0.63	0.88	1.07
5044	S2003	0.95	0.00	2.50	1.38	0.69	2.40	0.98
5045	S1782	0.97	0.00	0.59	0.99	1.61	1.37	1.01
5045	S1818	1.14	0.00	0.00	0.44	0.72	0.00	1.06
5045	S1949	1.23	0.00	0.00	0.00	0.00	0.00	1.10
5045	S1951	1.00	0.00	2.06	1.18	0.53	0.89	0.99
5045	S1978	0.88	4.47	0.70	1.16	1.90	1.60	0.96
5046	S0482	1.28	0.00	0.00	0.00	0.79	0.00	1.20
5046	S0933	0.85	3.73	0.00	1.48	1.19	1.33	0.88
5046	S1005	0.91	2.25	0.00	1.40	1.44	0.00	0.91
5046	S1036	1.23	1.95	1.33	0.17	0.47	0.35	1.15
5046	S1176	1.10	0.00	3.39	0.42	0.79	1.78	1.12
5046	S1210	1.28	0.00	0.00	0.00	0.45	1.00	1.20
5046	S1381	1.06	0.00	0.00	0.79	1.49	0.00	1.05
5046	S1428	0.98	0.00	4.13	0.51	1.45	3.24	1.10
5046	S1521	1.03	0.00	0.00	1.01	1.17	0.37	1.01
5046	S1616	0.91	0.00	0.00	1.46	1.21	1.08	0.92
5046	S1747	0.84	0.00	2.18	1.81	0.77	0.57	0.86
5046	S1770	1.14	0.00	5.65	0.47	0.66	0.00	1.11
5046	S1777	1.20	4.76	0.00	0.40	0.00	0.00	1.07
5046	S1779	0.87	1.78	0.00	1.31	1.98	0.63	0.93
5046	S1799	1.14	0.00	0.00	0.97	0.00	0.00	1.02
5046	S1845	0.84	0.00	0.00	2.38	0.00	0.00	0.75
5046	S1868	0.96	0.00	2.80	1.10	0.82	1.83	0.99
5046	S1880	1.04	0.00	0.00	0.52	2.55	0.00	1.10

5046	S1895	0.81	0.00	3.61	1.05	1.83	3.78	1.00
5046	S1908	1.09	4.15	0.00	0.70	0.66	0.00	1.02
5056	S1315	0.88	0.92	2.23	1.54	1.04	0.54	0.90
5056	S1727	1.11	0.00	1.28	0.68	0.77	0.93	1.07
5056	S1834	0.91	0.00	0.00	1.18	1.59	1.65	0.98
5056	S1872	0.88	2.67	0.00	1.53	0.43	2.35	0.87
5056	S1935	0.90	0.95	1.16	1.42	1.16	0.84	0.92
5056	S1937	1.10	0.00	0.00	0.56	1.38	0.36	1.10
5056	S1944	1.08	1.48	3.59	0.68	0.96	0.00	1.05
5056	S2004	0.84	2.00	1.62	1.37	0.87	3.52	0.91

Appendix G. Post-Stop Outcome – Arrest: Deputy-District Comparison Ratios

District	Deputy SN	Ratio by Whites	Ratio by Ethnicity Unknowns	Ratio by Native Americans	Ratio by Hispanics	Ratio by Blacks	Ratio by Asians	Ratio by Non-Hispanics
5041	S0793	1.62	0.00	0.00	0.98	0.00	0.00	1.02
5041	S1250	1.22	0.00	0.00	1.47	0.00	0.00	0.76
5041	S1468	0.81	0.00	2.24	0.74	1.33	0.00	1.14
5041	S1642	0.61	8.00	0.96	1.16	1.43	4.00	0.87
5041	S1644	1.07	0.00	1.68	0.55	1.50	0.00	1.24
5041	S1934	0.00	0.00	0.00	2.95	0.00	0.00	0.00
5041	S1938	0.81	0.00	1.49	1.47	0.00	0.00	0.76
5041	S1986	0.32	0.00	0.78	1.67	1.74	0.00	0.66
5041	S1993	0.81	0.00	5.97	0.00	0.00	0.00	1.52
5042	S1293	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1484	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1691	0.90	0.00	0.00	1.13	1.09	0.00	0.88
5042	S1714	0.00	0.00	10.78	1.32	0.00	0.00	0.68
5042	S1768	1.49	0.00	0.63	0.93	0.30	0.00	1.08
5042	S1841	0.96	0.00	1.41	0.95	1.17	2.11	1.07
5042	S1936	1.81	0.00	0.00	0.85	0.00	0.00	1.17
5042	S1946	0.70	16.17	3.59	0.66	0.85	10.78	1.14

5042	S1967	0.79	0.00	0.00	1.48	0.00	0.00	0.51
5042	S1970	0.45	0.00	1.73	1.10	1.91	0.00	0.91
5042	S2007	1.85	0.00	0.00	0.49	1.28	0.00	1.54
5043	S1294	1.22	0.00	0.00	0.36	0.90	7.83	1.27
5043	S1905	0.99	0.00	0.00	0.71	1.51	5.22	1.13
5043	S1942	1.09	0.00	0.00	0.89	1.13	0.00	1.06
5043	S1952	0.65	0.00	0.00	1.34	2.26	0.00	0.88
5043	S1995	1.11	0.00	0.00	0.97	0.82	0.00	1.03
5043	S1999	1.16	0.00	0.00	0.59	1.51	0.00	1.18
5044	S0920	0.96	0.00	0.00	1.26	0.82	0.00	0.93
5044	S1609	0.86	0.00	0.00	1.40	1.64	0.00	0.89
5044	S1645	1.13	0.00	0.00	0.93	0.00	0.00	1.02
5044	S1681	1.06	0.00	0.00	0.58	2.26	0.00	1.12
5044	S1940	1.21	0.00	0.00	0.66	0.00	0.00	1.09
5044	S1955	1.21	0.00	0.00	0.00	2.58	0.00	1.28
5044	S2002	1.41	0.00	0.00	0.00	0.00	0.00	1.28
5044	S2003	0.96	0.00	0.00	1.19	0.58	3.21	0.95
5045	S1782	0.83	0.00	2.28	0.36	2.05	0.00	1.08
5045	S1818	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5045	S1949	1.15	0.00	0.29	1.11	0.26	1.32	0.99

5045	S1951	0.86	0.00	1.82	1.44	0.55	0.00	0.94
5045	S1978	0.76	0.00	0.61	1.73	2.19	5.47	0.90
5046	S0482	0.54	0.00	0.00	1.25	0.00	19.20	0.91
5046	S0933	0.97	0.00	1.89	0.79	2.02	0.00	1.08
5046	S1005	0.76	4.11	1.03	1.34	1.83	0.00	0.86
5046	S1036	1.61	0.00	0.00	0.00	0.00	0.00	1.37
5046	S1176	1.29	0.00	0.00	0.75	0.00	0.00	1.09
5046	S1210	0.97	0.00	0.00	1.51	0.00	0.00	0.82
5046	S1381	0.92	0.00	0.00	1.08	1.83	0.00	0.98
5046	S1428	1.29	0.00	0.00	0.75	0.00	0.00	1.09
5046	S1521	1.07	0.00	0.00	1.25	0.00	0.00	0.91
5046	S1616	0.95	3.95	0.00	1.08	1.23	0.79	0.96
5046	S1747	0.80	0.00	0.00	1.73	0.51	0.00	0.74
5046	S1770	1.11	0.00	1.71	0.81	0.30	2.74	1.07
5046	S1777	0.97	0.00	0.00	1.25	0.85	0.00	0.91
5046	S1779	0.80	0.00	2.77	1.16	1.48	2.22	0.95
5046	S1799	0.91	0.00	1.57	0.90	1.67	2.50	1.04
5046	S1845	1.43	0.00	0.00	0.42	0.00	0.00	1.22
5046	S1868	1.03	0.00	0.00	1.34	0.00	0.00	0.88
5046	S1880	1.41	0.00	0.00	0.47	0.00	0.00	1.20

5046	S1895	0.99	0.00	2.94	0.92	0.78	2.35	1.03
5046	S1908	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1315	1.14	0.00	0.00	0.88	1.17	0.00	1.08
5056	S1727	1.91	0.00	0.00	0.00	0.00	0.00	1.55
5056	S1834	0.76	0.00	0.00	1.76	0.00	0.00	0.62
5056	S1872	1.27	27.33	0.00	0.00	0.00	0.00	1.03
5056	S1935	0.54	0.00	1.95	1.05	3.35	0.00	0.99
5056	S1937	0.82	0.00	1.95	1.26	0.84	0.00	0.88
5056	S1944	1.43	0.00	0.00	0.73	0.00	0.00	1.16
5056	S2004	1.91	0.00	0.00	0.00	0.00	0.00	1.55

Appendix H. Post-Stop Outcome – Search: Deputy-District Comparison Ratios

District	Deputy SN	Ratio by Whites	Ratio by Ethnicity Unknowns	Ratio by Native Americans	Ratio by Hispanics	Ratio by Blacks	Ratio by Asians	Ratio by Non-Hispanics
5041	S0793	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5041	S1250	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5041	S1468	0.87	0.00	2.97	0.63	1.39	0.00	1.17
5041	S1642	0.76	0.00	0.87	1.48	0.82	0.00	0.78
5041	S1644	0.00	0.00	4.95	1.05	2.31	0.00	0.98
5041	S1934	2.17	0.00	0.00	0.00	0.00	0.00	1.46
5041	S1938	1.44	0.00	0.00	1.05	0.00	0.00	0.98
5041	S1986	0.67	0.00	0.00	1.94	0.53	0.00	0.56
5041	S1993	0.00	0.00	7.43	1.58	0.00	0.00	0.73
5042	S1293	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1484	0.00	0.00	5.40	0.99	2.31	0.00	1.01
5042	S1691	0.00	0.00	0.00	1.65	0.00	0.00	0.00
5042	S1714	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1768	0.55	0.00	0.00	1.42	0.00	0.00	0.36
5042	S1841	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1936	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1946	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5042	S1967	0.00	0.00	0.00	1.65	0.00	0.00	0.00
5042	S1970	1.16	0.00	2.70	0.99	0.00	0.00	1.01
5042	S2007	3.86	0.00	0.00	0.00	0.00	0.00	2.53
5043	S1294	1.30	0.00	0.00	0.36	1.04	0.00	1.24
5043	S1905	1.26	0.00	0.00	0.80	0.00	0.00	1.08
5043	S1942	1.22	0.00	0.00	0.90	0.00	0.00	1.04
5043	S1952	1.22	0.00	0.00	0.00	2.61	0.00	1.38
5043	S1995	0.41	0.00	0.00	1.81	2.61	0.00	0.69
5043	S1999	1.62	0.00	0.00	0.00	0.00	0.00	1.38
5044	S0920	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5044	S1609	0.66	0.00	0.00	4.00	0.00	0.00	0.57
5044	S1645	1.13	0.00	12.57	0.00	0.00	0.00	1.14
5044	S1681	0.88	0.00	0.00	0.00	3.67	0.00	1.14
5044	S1940	1.05	0.00	0.00	1.60	0.00	0.00	0.91
5044	S1955	1.09	0.00	0.00	0.00	1.83	0.00	1.14
5044	S2002	1.31	0.00	0.00	0.00	0.00	0.00	1.14
5044	S2003	0.94	0.00	0.00	1.14	1.57	0.00	0.98
5045	S1782	0.00	0.00	4.80	0.00	0.00	0.00	1.14
5045	S1818	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5045	S1949	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5045	S1951	0.86	0.00	0.69	2.29	0.00	0.00	0.82
5045	S1978	1.50	0.00	0.00	0.00	0.00	0.00	1.14
5046	S0482	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S0933	1.83	0.00	0.00	0.00	0.00	0.00	1.49
5046	S1005	0.43	0.00	1.91	1.64	2.29	0.00	0.70
5046	S1036	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1176	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1210	1.83	0.00	0.00	0.00	0.00	0.00	1.49
5046	S1381	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1428	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1521	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1616	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1747	0.82	6.50	0.00	1.39	0.65	0.00	0.75
5046	S1770	1.26	0.00	1.12	0.75	0.45	0.00	1.13
5046	S1777	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1779	0.52	0.00	4.64	1.33	1.86	0.00	0.85
5046	S1799	0.88	0.00	0.00	0.99	1.56	5.20	1.02
5046	S1845	1.83	0.00	0.00	0.00	0.00	0.00	1.49
5046	S1868	1.22	0.00	0.00	1.03	0.00	0.00	1.00
5046	S1880	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5046	S1895	1.02	0.00	0.00	1.38	0.00	0.00	0.83
5046	S1908	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1315	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1727	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1834	0.52	0.00	0.00	1.57	0.00	0.00	0.48
5056	S1872	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1935	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1937	1.05	0.00	0.00	1.05	0.00	0.00	0.96
5056	S1944	0.00	0.00	0.00	2.09	0.00	0.00	0.00
5056	S2004	2.09	0.00	0.00	0.00	0.00	0.00	1.92

Appendix I. Post-Stop Outcome – Contraband: Deputy-District Comparison Ratios

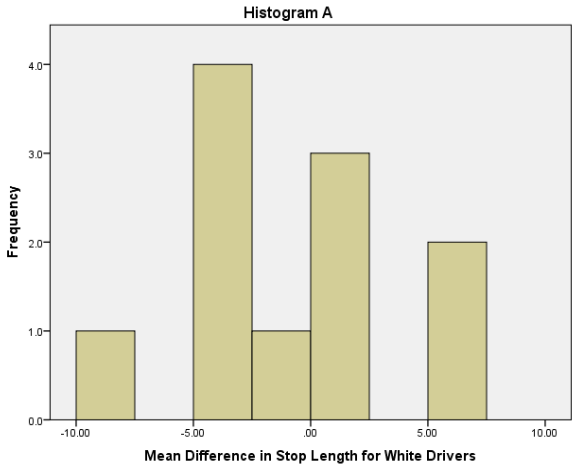
District	Deputy SN	Ratio by Whites	Ratio by Ethnicity Unknowns	Ratio by Native Americans	Ratio by Hispanics	Ratio by Blacks	Ratio by Asians	Ratio by Non-Hispanics
5041	S0793	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5041	S1250	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5041	S1468	0.57	0.00	3.63	0.91	0.73	0.00	1.04
5041	S1642	0.25	0.00	2.15	2.01	0.64	0.00	0.61
5041	S1644	0.65	0.00	1.38	1.04	1.66	0.00	0.99
5041	S1934	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5041	S1938	0.00	0.00	0.00	1.81	2.90	0.00	0.69
5041	S1986	0.00	0.00	0.00	2.72	1.45	0.00	0.35
5041	S1993	1.53	0.00	3.22	0.00	0.00	0.00	1.38
5042	S1293	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1484	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1691	0.00	0.00	0.00	1.20	2.89	0.00	0.75
5042	S1714	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1768	1.08	0.00	0.00	1.20	0.00	0.00	0.75
5042	S1841	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1936	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1946	0.00	0.00	0.00	0.00	0.00	0.00	0.00

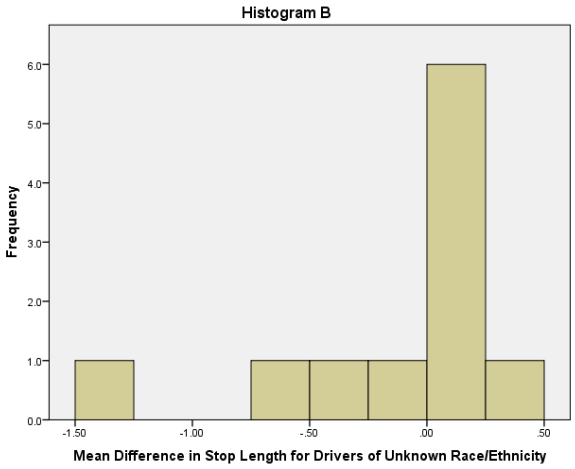
5042	S1967	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5042	S1970	1.30	0.00	0.00	1.08	0.00	0.00	0.90
5042	S2007	1.86	0.00	7.43	0.26	1.24	0.00	1.94
5043	S1294	1.54	0.00	0.00	0.00	0.00	0.00	1.23
5043	S1905	1.54	0.00	0.00	0.00	0.00	0.00	1.23
5043	S1942	1.16	0.00	0.00	0.00	1.50	0.00	1.23
5043	S1952	1.54	0.00	0.00	0.00	0.00	0.00	1.23
5043	S1995	0.62	0.00	0.00	2.16	1.20	0.00	0.74
5043	S1999	1.54	0.00	0.00	0.00	0.00	0.00	1.23
5044	S0920	1.30	0.00	0.00	0.00	0.00	0.00	1.17
5044	S1609	0.82	0.00	0.00	1.73	1.88	0.00	0.88
5044	S1645	1.30	0.00	0.00	0.00	0.00	0.00	1.17
5044	S1681	0.98	0.00	0.00	0.00	3.75	0.00	1.17
5044	S1940	0.98	0.00	0.00	1.73	0.00	0.00	0.88
5044	S1955	1.30	0.00	0.00	0.00	0.00	0.00	1.17
5044	S2002	1.30	0.00	0.00	0.00	0.00	0.00	1.17
5044	S2003	0.92	0.00	0.00	1.79	0.56	0.00	0.87
5045	S1782	0.76	0.00	1.56	0.00	4.17	0.00	1.11
5045	S1818	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5045	S1949	1.52	0.00	0.00	0.00	0.00	0.00	1.11

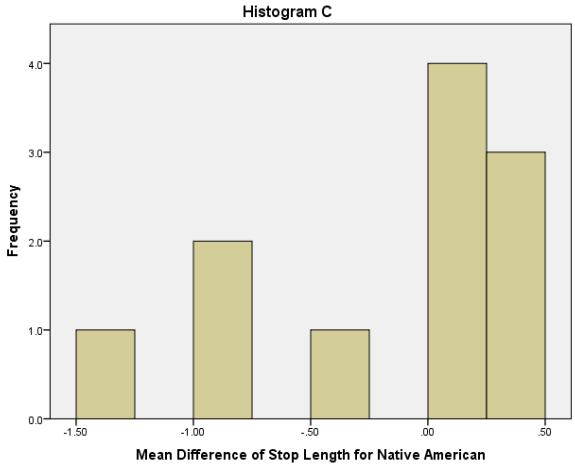
5045	S1951	0.90	0.00	0.93	1.85	0.62	1.85	0.91
5045	S1978	0.76	0.00	3.13	0.00	0.00	0.00	1.11
5046	S0482	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S0933	0.96	0.00	16.33	0.00	0.00	0.00	1.56
5046	S1005	0.46	0.00	1.31	1.46	2.80	0.00	0.75
5046	S1036	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1176	1.28	0.00	0.00	0.93	0.00	0.00	1.04
5046	S1210	1.44	0.00	0.00	0.70	0.00	0.00	1.17
5046	S1381	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1428	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1521	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1616	0.96	0.00	0.00	1.05	0.00	6.13	0.97
5046	S1747	0.85	0.00	0.00	1.56	0.00	0.00	0.69
5046	S1770	1.51	0.00	2.33	0.40	0.00	0.00	1.33
5046	S1777	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1779	0.00	0.00	0.00	2.80	0.00	0.00	0.00
5046	S1799	0.70	0.00	0.00	1.02	2.55	4.45	0.99
5046	S1845	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5046	S1868	0.00	0.00	0.00	2.80	0.00	0.00	0.00
5046	S1880	1.65	0.00	0.00	0.40	0.00	0.00	1.33

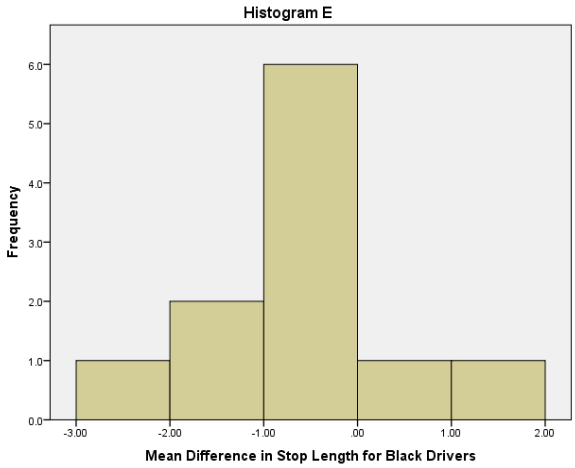
5046	S1895	1.60	0.00	0.00	0.47	0.00	0.00	1.30
5046	S1908	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1315	0.67	0.00	0.00	2.50	0.00	0.00	0.63
5056	S1727	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1834	0.00	0.00	0.00	5.00	0.00	0.00	0.00
5056	S1872	1.33	0.00	0.00	0.00	0.00	0.00	1.25
5056	S1935	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5056	S1937	1.07	0.00	2.00	0.50	0.00	0.00	1.13
5056	S1944	1.33	0.00	0.00	0.00	0.00	0.00	1.25
5056	S2004	0.00	0.00	0.00	0.00	0.00	0.00	0.00

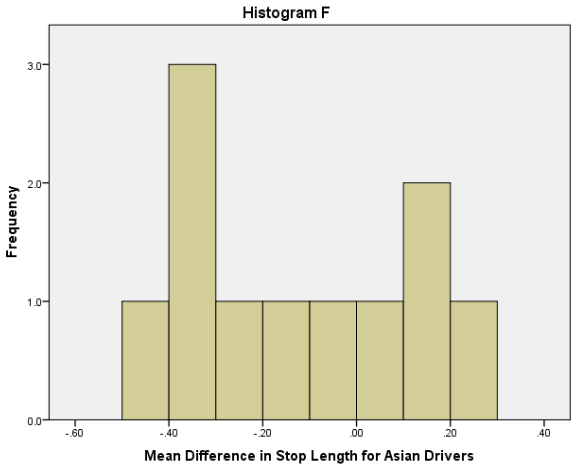
Appendix J: Distributions of the Difference between District Average Length of Stop and the Overall Organization Average Length of Stop for All Stops by Race/Ethnicity



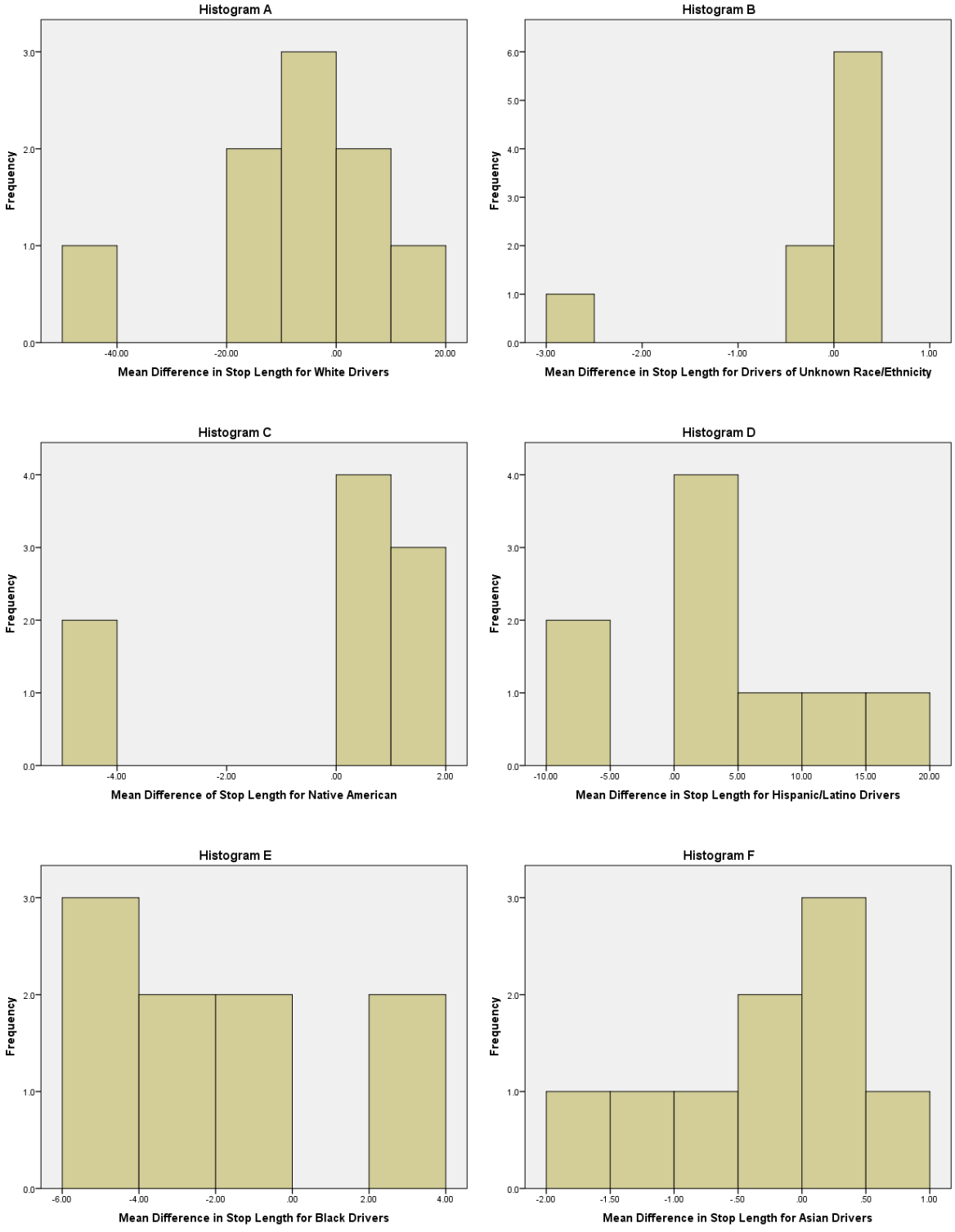








Appendix K: Distributions of the Difference between District Average Length of Stop and the Overall Organization Average Length of Stop for Extended Stops by Race/Ethnicity



Appendix L: Distributions of the Difference between District Average Length of Stop and the Overall Organization Average Length of Stop for Non-Extended Stops by Race/Ethnicity