

# A Multi-Level Bayesian Analysis of Racial Bias in Police Shootings at the County-Level in the United States, 2011-2014

MEMO 3: A RESPONSE TO DELILAH ELLISON

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## Abstract

*Recently, Delilah Ellison released a blog post called "Serious problems with county by county source data" here <http://napalmhorn.blogspot.com.co/2016/07/serious-problems-with-county-by-county.html>. I reply to the issues raised in this memo.*

## I. COMMENTS AND RESPONSE

Original, directly-quoted text in black, my responses in blue.

First, as I realize this may be viewed by people who don't understand or care about data science, let me say the following.

1. I don't want innocent black people to be killed by police
2. I don't deny racism still exists in america.
3. I don't want police to get away with murder.

The quality of social scientific progress depends on good pre- and post-publication peer review. It is a benefit to me, and the community to have people critically evaluating the claims made in my paper. If there are problems anywhere in the analysis or inference, they need to be corrected.

Second, this is a response to this article linked here ->

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0141854> In particular this quote:

"Under the assumptions that police express no racial bias in use of force upon encountering suspects/civilians, and also engage in interactions with suspects/civilians in direct proportion to race/ethnicity-specific crime rates (where crime rates covary with race/ethnicity), one would expect to see an association between racial bias in police shootings and race-specific crime rates—an association that is not found in these results."

Disproportional: If more law abiding black people lived in high crime neighborhoods, then I would expect black people to be shot by police at a rate higher than the proportional crime rate in those neighborhoods. This is because police are assigned by neighborhood, so they would have

more police encounters. For example 77375 vs 77054 probably have different numbers of police per resident.

My analysis is at the county-level, not the city-level, and as acknowledged in my paper, the ecological inference fallacy might be to blame for the fact that I failed to find the association between racial differences in crime rates and racial bias the the shooting of unarmed individuals. It could very well be that within each county, at the zip-code level there is a positive association between racial bias in police shootings and differences in race-specific crime rates. Unfortunately, I do not have the data to test for associations at this finer level.

Additionally, I acknowledged in my study that my results in no way speak to the race-specific probability of being shot conditional on encounter by an officer. I am in complete agreement that my observations of racial bias in police shooting may be driven strongly by differential encounter rates. However, I do not believe that the differential encounter rate hypothesis serves to dismiss concerns about racial bias in the killings of *unarmed* individuals.

Where are these race/ethnicity crime rates? I don't see them in the data, so I pieced together what I can find from other sources.

These data are included in the Supplementary Materials, in the file called: MapFileData-WithCountyResultsAndCovariates.csv.

However, it is best to get the revised version here: <https://github.com/Ctross/Publications/tree/master/PLoS-RacialBiasPoliceShootings/Data/MaintainedImprovedData>, since another researcher found 7 cases of duplicated data that my original screening procedure missed. The crime data were gathered from the records held at:

United States Department of Justice Office of Justice Programs Federal Bureau of Investigation. Uniform Crime Reporting Program Data: Arrests by Age, Sex, and Race, 2012. Inter-University Consortium for Political and Social Research. 2014

The columns: WeaponsBlack.sum, WeaponsWhite.sum, AssaultsBlack.sum, AssaultsWhite.sum present the race-specific count data taken from the DOJ records. These data were divided by the relevant US Census population data WA\_TOT (total white residents in county) and BAC\_TOT (total black residents in county) to yield rates of crime per unit population.

What I have been able to find, about race, and location specific crime rates, directly contradicts your findings.

I do not think what you show below contradicts my findings. Importantly, your methods do not appear to account for variation in population size. One cannot assess the relative risk of police shootings by just dividing the number of black people shot by police by the total number of people shot. If equal numbers of black and white people are shot, but the white population is much bigger than the black population, the relative risk is not 1. Also, it is best to model just the unarmed cases. Further, I describe a pattern across many counties. I do not find a relationship between the variables I indicate across counties. However, in many counties there is likely to be positive rates of racial bias in police shootings of unarmed people and positive ratios of black-to-white crime rates—as you have found.

Higher crime rates, especially violent crime rates or murder rates, matching with higher killed by police numbers for a certain race in certain location would fit with the narrative of addition police encounters creating additional risk.

I agree with this entirely, and I personally think that encounter risk plays a huge role. However, I have not been able to find a national-level database of police encounters by race to test this idea.

I call this encounter risk. Its reasonable to expect this to especially increase shooting proportionally to violent crime rates or murder rates because of stress decisions. I would expect political pressure after murders to cause additional police patrols in that area, which would increase encounter risk. So if the murder rate racial proportion  $\geq$  racial proportion killed by police that

would be indication of encounter risk over bias.

This theory is interesting, and it meshes nicely with what I say in my paper: it is unlikely that analyses like mine will be very useful for anything in the future, other than possibly identifying optimal locations for more finely-resolved studies. It is very likely that the *sources* of racial bias in police shootings are heterogeneous over space and time. Also, I use the word bias to just mean some increase over what would be expected if police shot unarmed individuals in direct proportion to their population levels. Bias may arise through encounter risk (I think that this is almost certainly true) and/or it may arise through other mechanisms like racially-based psychological biases in assessment of the risk posed to police by a suspect, or even just pure racism. I cannot say anything about which, given my data.

71% of murderers in Chicago were black <http://www.intellectuالتakeout.org/blog/chicago-75-murdered-are-black-71-murderers-are-black> which is MORE than the proportion of black people killed by police (15/23) from <http://mappingpoliceviolence.org/cities/>

First off, we do not want to look just at the ratio of “the proportion of black people killed by police.” We want to first look just at the *unarmed* cases since the armed cases already have a well understood cause. Next, and *very importantly* we need to correct for the population sizes of black and white residents. This being said, I see somewhat similar pattern in my data to what you describe. Cook county has a black to white assault rate ratio of 5.82 and a predicted biased police shooting rate ratio of 10.10. Just as you describe, in this particular county, we see both an elevated black-to-white assault-rate ratio and an elevated black-to-white ratio in police shooting of unarmed people. It should be noted, also, that [mappingpoliceviolence.org](http://mappingpoliceviolence.org) now has much more detailed data than I used in my very preliminary study. The new data is probably much better than what I used a couple years ago. I’d love to see what your analysis shows after correcting for armed status and population size using the newer, better data.

67% of murderers in Houston were black <https://www.ncjrs.gov/pdffiles1/nij/grants/194606.pdf> which is MORE than the proportion of black people killed by police (6/15) from <http://mappingpoliceviolence.org/cities/> Here, my data show a black-to-white assault-rate ratio of 3.13, and a black-to-white ratio in police shooting of unarmed people of 5.5.

61.8% of people arrested for murder in NYC were black <http://www.colorofcrime.com/2016/03/the-color-of-crime-2016-revised-edition/> which is LESS (by 1 shooting) than the (10/15) killed by police from <http://mappingpoliceviolence.org/cities/>

In New York county, in the USPSD data I have, I see one unarmed white killed, but no unarmed black individuals killed. Again, the USPSD data was much sparser 2 years ago, and part of why I wrote my paper was to inspire more people to start recording these data more rigorously.

Finally, below I provide a scatter of the assault-rate ratio and police shooting ratio for the counties where I have data. As you can see, there are generally elevated ratios for both black-to-white assault rates and black-to-white rates of police shootings; however, counties with high rates of black-to-white crime do not have higher average ratios of black-to-white police shooting rates. Of course, one can pick out a few of the cases clustered in the upper-right (Cook county [Chicago], for example, is up there) and say: “See look in these counties there is both more biased crime rates and more biased police shooting rates”, but doing so ignores most of the overall pattern.

**Figure 1:** *Here is a scatter of the assault-rate ratio and police shooting ratio for the counties where I have data.*

