Measuring Intra- and Inter-group violent crime for African Americans and Latinos in South Bureau, Los Angeles

John R. Hipp
George E. Tita
Lyndsay N. Boggess

University of California, Irvine
Department of Criminology, Law & Society
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Does violent crime occur more frequently among same race individuals, or across different races? To hear recent media reports, one might suspect that inter-group violent crime (that is, violent events between individuals of different races) happen most frequently. Is this true?

Although we are interested in relative rates of inter- and intra-group crime, this is a more methodologically challenging question than it appears on the surface. When computing inter- and intra-group crime rates, there are three key methodological issues: 1) the physical closeness (propinquity) of other group members; 2) the relative size of each group; 3) the preference for interaction with fellow group members. First, propinquity is simply the notion that those who are closest in physical space will be most likely to interact, and requires taking into account the local context in which such interactions occur. Second, the relative size of each group can be illustrated in an extreme example: an all-Latino neighborhood will experience no inter-group crime—not because of a preference for within-group crime, but simply because there are no opportunities given the lack of other groups in the neighborhood. Third, the preference for committing crime events against others of the same group is what we are interested in estimating. Simply computing the number of such events in a neighborhood and comparing them will almost always be wrong. Therefore, we use statistical theory to propose a solution to this problem. With this solution, we are able to compute “crime rates” of inter- and intra-group crime in neighborhoods (these rates are in the same metric as typically used UCR crime rates, and therefore readily interpretable). We immodestly point out that we are aware of no social science studies that have adopted this approach, and thus most studies inaccurately compare inter- and intra-group crime. Once we have created these estimates, it is straightforward to view trends in these rates over time. It is also straightforward to map these rates in neighborhoods (as we show below).

We describe our approach more fully in the Appendix. Briefly, we: 1) Compute the interaction probability given an assumption of random mixing (for each tract); 2) calculate the proportion of all hypothetical interactions in the tract for the particular inter-group crime of interest; 3) multiply this value by the tract population and use this as the denominator in computing the rate of intra- or inter-group crime (in each tract).

The following analyses focus entirely on South Bureau, Los Angeles, which in 2000 was 50.5% Latino, 31.9% black, and 10% white.
As an example of how a naïve approach not taking into account such interaction probabilities, Table 1 shows three different computations comparing intra- versus inter-group crime. The first approach (the blue bars) simply counts up the number of aggravated assaults committed by blacks against other blacks, and the number of aggravated assaults committed by blacks against Latinos. Over the 2000-2006 period, blacks committed 4.54 times as many aggravated assaults against fellow blacks as against Latinos. And Latinos committed 3.7 times as many aggravated assaults against Latinos as against blacks.

However, this naïve approach does not take into account that half of this population is Latino, whereas only about 1/3 is black, suggesting that there is far more opportunity for Latinos to be victims. The second (red) bars take this relative composition into account. Taking into account the relatively fewer blacks, it now appears that blacks are 7.12 times as likely to assault fellow blacks as assault Latinos. Conversely, adjusting for their larger composition, it now appears that Latinos are only 2.4 times as likely to assault a fellow Latino as a black.

However, these second estimates are too high, as they implicitly assume that blacks and Latinos are equally spread throughout all the census tracts of South Bureau. We know this is untrue. In the third bars, we take into account the relative group sizes in the neighborhood (the block group) in which the crime event occurred. In these third, and most appropriate estimates, we find that blacks are 5.89 times as likely to assault fellow blacks as to assault Latinos. And we find that Latinos are just 1.62 times as likely to assault a fellow Latino as to assault a black.
Figure 1. Ratio of intra- to inter-group aggravated assaults for Latinos and African-Americans, Los Angeles South Bureau, 2000-06. Raw count, total adjusted for group proportions, total adjusted for proportion and spatial location.
In Figure 2 we compute similar ratios for homicides. The third bars represent the most correct estimates, and show that blacks are 7.58 times as likely to kill a fellow black as to kill a Latino. And Latinos are 1.72 times as likely to kill a fellow Latinos as to kill a black.
Figure 3. Ratio of intra- to inter-group robberies for Latinos and African-Americans, Los Angeles South Bureau, 2000-06. Raw count, total adjusted for group proportions, total adjusted for proportion and spatial location

In Figure 3, we compute these ratios for robberies. We see that blacks are no more likely to rob a fellow black as to rob a Latino. But Latinos are 2.56 times as likely to rob a fellow Latinos as to rob a black.
We next look at whether there is a trend over time in the ratio of intra- to inter-group crime. Figure 4 shows these ratios for aggravated assaults over the 2000-06 period. Figure 5 shows these ratios for homicides. Figure 6 shows them for robberies.
Figure 5. Ratio of intra- to inter-group homicides for Latinos and African-Americans. Block groups in Los Angeles South Bureau, 2000-06

Note the odd results in 2005 and 2006. We return to these in Figure 8 below.
Figure 6. Ratio of intra- to inter-group robberies for Latinos and African-Americans. Block groups in Los Angeles South Bureau, 2000-06
We next view the actual rates of these inter- and intra-group violent crimes over the 2000-06 period, instead of viewing these ratios. Figure 7 compares the four types of aggravated assault (black on black, black on brown, brown on black, and brown on brown), as well as a dotted line for the overall average.
Because there is such a difference in the rate of black on black aggravated assault, Figure 7a shows the rates of the other three types of aggravated assault.
Figure 8 compares the four types of homicides. Note that there are two spikes: black on brown homicides in 2005, and brown on black homicides in 2006.
Figure 8a compares three types of homicides (excluding black on black). The two spikes are even more apparent here.
Figure 9. Intra- and inter-group robbery rates, Los Angeles city block groups, south bureau, 2000-06

Figure 9 compares the four types of robberies.
Conclusion

- We used a sophisticated methodology to estimate the rate of within-group and across-group crime between blacks and Latinos in South Bureau in Los Angeles from 2000-06 using crime data obtained from the LAPD (we account for the size of the two groups, and the extent to which they live near one another)
- In general, within-group violent crime is more common than across-group:
  - blacks are about 500% more likely to assault a fellow black than a Latino
  - And about 650% more likely to murder a fellow black
  - Latinos are about 60% more likely to assault or murder a fellow Latino than a black; about 150% more likely to rob a fellow Latino
  - Only for robbery do blacks equally victimize both Latinos and blacks
- There have been two spikes in across-group homicides over this period:
  - in 2005, black on Latino homicide spiked up
  - in 2006, Latino on black homicide spiked up
  - but no such spikes for aggravated assault or robbery
- No other substantive patterns in these crime types over this period

What can we do next with this approach?

- Extend the analyses to the entire city of Los Angeles, instead of focusing just on South Bureau
  - Would allow viewing the interaction between other racial/ethnic groups rather than just Latinos and African Americans
  - We need the data to perform such analyses
- Take into account the difference between aggravated assaults with and without a gun
  - This would allow testing whether the pattern of assaults with a gun mirrors that of homicides
  - This would help in understanding whether the two peaks we observed for inter-group homicide in 2005-06 were true effects (if inter-group firearm assaults also increased) or simply a statistical artifact (if there is no change in inter-group firearm assaults).
  - We need the data to perform such analyses (we do not currently have information on the weapon used)
- Explain why some neighborhoods have higher rates of certain types of violent crime (either intra- or inter-)
  - Does the change in demographics (race/ethnicity) from 1990-2000 in these neighborhoods predict these rates?
  - Does the change in demographics (race/ethnicity) during the study period (2000-06) in these neighborhoods predict changes in these rates
- Estimate more fine-grained temporal data (estimate monthly crime rates for inter- and intra-group robberies and assaults)
  - Test whether these patterns in specific neighborhoods show more rapid changes
- Estimate whether these effects “spill-over” from adjacent neighborhoods
  - Test whether higher rates of certain types of crime in nearby neighborhoods affect these crimes in the neighborhood of interest.
Always a “boundary problem” with such an approach, since we do not have information on the neighboring block groups for neighborhoods on the edge of South Bureau.

This “boundary problem” would be alleviated by having data for crime throughout Los Angeles

- Test whether deployment of department resources affects these patterns
  - Combined with the monthly analyses described above, this would directly test the effect of such resources on these different types of crime
  - Combined with the “spill-over” analysis described above, this would provide us a sense of how wide a geographic area such resources impact.
  - *We need the deployment data to perform such analyses*
- Long-term goals: collecting other information regarding victims and offenders
  - Would require a departmental shift in what information is considered “important” enough to electronically code
  - We would like to initiate a dialogue with LAPD personnel regarding which types of data we would want to collect

### Data needs for the next analytical steps

- Data on all events in the entire city for the 2000-06 period. This would include the information we utilized for South Bureau (the sex, race and age of the offender and victim, the date, time and location of the event, the crime type) as well as information on the type of weapon used.
- Data on deployment during this same time period.

### Implications for Policing

- In the short-term, the above analysis demonstrates that LAPD is not on the brink of a major inter-group crime wave. Though certain inter-group crimes are likely to sensationalized, it is important that resources continue to focus on the major issue of intra-group crime.
- As the demographics of Los Angeles continue to change, it is important to understand how these changes might impact local crime levels. Under certain conditions, areas that experience racial/ethnic succession might experience an increase in inter-group hostilities while in others, inter- and intra-group crime might decrease. In order to better understand these dynamics it is imperative that we move beyond the black-Latino comparisons and incorporate data from throughout the city. Only then can LAPD anticipate changing demands on deployment of resources brought about by racial/ethnic change at the local level.
Appendix

An important innovation of our study is appropriately taking into account the possibility of contact between the group members for the crime type of interest by accounting for the conditional probability of interaction. Note that although some researchers have been aware of this issue for some time (O'Brien 1987), there is nonetheless frequent confusion in the inter-group crime literature as to which “population” is appropriate to use in the denominator when calculating intra- and inter-group crime rates. One approach uses the population of the victim’s group or the offender’s group as the denominator when calculating these types of crime as rates (Jacobs and Wood 1999; Parker and McCall 1999). Another approach simply uses the total population as the denominator (Wadsworth and Kubrin 2004). Neither of these approaches are appropriate, and we therefore use the conditional probability of within group interaction. Thus, given that an interaction has occurred, the probability that it involved two members of group A \((i_{aa})\) in a particular census tract is:

\[
i_{aa} = \frac{(N_A)(N_A-1)}{(N)(N-1)}
\]

where \(N_A\) is the size of group A, and \(N\) is the tract’s total population. Since the denominator captures the total number of possible interactions in the denominator, this measure captures the proportion of interactions that should be between two members of group A. The equation for group B is analogous:

\[
i_{bb} = \frac{(N_B)(N_B-1)}{(N)(N-1)}
\]

where all terms are as defined before, and \(N_B\) is the size of group B. Finally, the possibility of inter-group interactions initiated by members of group A is defined by the expression:

\[
i_{ab} = \frac{(N_A)(N_B)}{(N)(N-1)}
\]

where all terms are as defined before. The possibility that members of group B initiated inter-group interactions is the same value. Since the probability of interaction across groups is the same regardless of who initiates the interaction, we only needed this one conditional probability interaction to handle these two possible crime types.

For each of these conditional probabilities, we multiply it by the tract population and include it in the equations we estimate. For neighborhoods in which these were the only two groups, these conditional probabilities would sum to one. Thus, multiplying by the tract population places these into the familiar metric of per capita crimes. For instance, the black on black violent crime equation is:

\[
\text{c}_{bb} = \alpha + i_{bb}
\]

where \(i_{bb}\) is the conditional probability of an interaction between two black residents given the tract population size, as defined above in equation 4 (with a coefficient constrained to 1), and \(\alpha\) is an intercept.

We estimated negative binomial regression models for these four separate count outcomes. That is, the count outcome is estimated with a Poisson distribution, with the additional parameter with an assumed gamma distribution that accounts for the non-independence of the crime events. The exponentiated value of \(\alpha\) gives the expected number of crime events per interaction given this random interaction assumption. In our full model, it gives the expected number of crime events per interaction when all other variables have values of zero. We then generalize this model by including our exogenous measures of interest:

\[
\text{c}_{bb} = \alpha + i_{bb} + BX + \Gamma YR
\]

where all terms are as defined above, \(X\) is the matrix of exogenous measures (e.g., racial/ethnic composition, inequality, etc.), \(B\) is a vector of their effects on the outcome, \(YR\) is a matrix of
indicator variables for the year of the data with a vector of $\Gamma$ effects on the crime type. For the inter-group crime models we included the conditional probability from equation 5 (multiplied by the tract population) in the model with a coefficient constrained to one.

References

