The continued high level of residential racial segregation in America is well documented; most blacks continue to live in separate areas from whites in American urban areas (Intrator, Tannen, and Massey 2016). Sociologists and criminologists recognize that blacks continue to be victims of homicide at much higher rates than whites across metropolitan areas. Nevertheless, sociologists often analyze homicide rates of urban areas as if the overall homicide rates indicate higher or lower risks for all residents (e.g., McCall, Land, and Parker 2010, 2011). This paper shows that the homicide rate for whites is essentially uncorrelated with the homicide rate for blacks across metropolitan areas in the United States and suggests that analyses of overall homicide rates can severely misrepresent the situation for both underlying subgroups.

We suggest that the absence of correlation between race-specific homicide rates is an important phenomenon in itself that suggests that the causes and consequences of homicide rates in American metropolitan areas can be very different for whites than blacks. This phenomenon of racial lack of correlation across places can be contrasted to the much more strongly correlated experiences of men and women and of young adults and other age groups across metropolitan areas, even as men and young adults consistently experience higher rates of homicide than women and other age groups across all metropolitan areas. Using the same data sources as we use for analyzing race-specific homicide rates of metropolitan areas, we show that the homicide risks for men and women and young adults and other age groups vary together across metropolitan areas while the homicide risks for blacks and whites do not.

This absence of a correlation between white and black homicide rates across metropolitan areas should be taken as an indication that the causes and consequences of homicide rates for whites and blacks may be very different. Thus, we suggest that one cannot confidently interpret analyses involving overall homicide rates in American metropolitan areas as necessarily applying to either underlying racial subgroup. We suggest that the only way to understand the causes of homicide across American urban areas is to analyze the race-specific rates separately. Such analyses directly show the correlates for each subgroup and make it clear when the correlates are similar and when they are different.

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This paper is divided into five sections. (1) We present evidence of this important phenomenon that black homicide rates are essentially unrelated to white homicide rates across metropolitan areas. We describe the data, present analyses of race-specific homicide rates, and contrast them with similar analyses for sex and age. (2) We consider what this noncorrelation indicates about predictors and causes of variation in homicide risks across American metropolitan areas. (3) We consider why we should not be surprised and why we should sometimes expect to find that processes will be different for blacks and whites in American metropolitan areas. (4) We show that in the context of an essentially zero correlation between homicide rates of whites and blacks, it is not only possible, but it is even likely that analyses of overall homicide rates misrepresent separate underlying race-specific processes. In particular, we provide an empirical example where black and white homicide rates are related to another variable (location in the South) in opposite directions such that no overall correlation or regression analysis could effectively represent both of them. Then, we show why many overall correlation or regression analyses are likely to misrepresent the average of analyses for the two subgroups separately. (5) Finally, we discuss implications for describing and understanding causes and consequences of homicide across American metropolitan areas today, implications for future research on both homicide and other issues across American metropolitan areas at this time, and broader implications for research on uncorrelated subpopulations more generally.

Evidence That Black and White Metro Homicide Rates Are Uncorrelated

It is well known that there is a high level of racial segregation between blacks and whites in American metropolitan areas and that one of the implications is that blacks are subject to much higher rates of homicide than whites. Researchers, however, have not investigated the possibility that the great separateness of blacks and whites may have the further implication that there is essentially no tendency for blacks and whites in the same metropolitan areas to share higher or lower risks of homicide. In this section, we describe the data and present results demonstrating that there is essentially no association between the black and white homicide rates across American metropolitan areas. We also show that this is in marked contrast to the fact that both men and women and young adults and other age groups share similar experiences of high and low homicide rates across American metropolitan areas, even as men and young adults consistently experience higher homicide rates across all metropolitan areas.

Data

We draw on two sources of data for the analysis. Information on the number and characteristics of homicides for each county in the United States was obtained from the Centers for Disease Control and Prevention (CDC) Underlying Cause of Death files for 2008 to 2010. Past studies have shown that CDC death records capture homicides more accurately than the commonly used Supplementary Homicide Reports and that the identification of race on death certificates has high reliability (Loftin, McDowell, and Fetzer 2008; Riedel 1999). Information on the population sizes for different demographic subgroups for metropolitan statistical areas (MSAs) comes from the American Community Survey (ACS) three-year estimates for 2010. Since homicide is a relatively low incidence form of death in any given year, we averaged the homicide rates per 100,000 for each MSA over the three years. In addition, to increase reliability, we restricted our analysis to MSAs with at least 20,000 black residents. In a supplementary analysis, we explored a range of thresholds for the minimum black population in MSAs from 10,000 to 30,000 and found a similar pattern of results (available at https://github.com/sbauldry/bwh).

The analysis sample includes 177 MSAs with at least 20,000 black residents. For these MSAs, we calculated homicide rates per 100,000 overall for whites and blacks, men and women, and young adults (ages 15–34) and other age groups (i.e., ages less than 15 or greater than 34). All of the data and preparation and analyses were conducted using Stata v15 (StataCorp 2017), and all of the code is maintained at a publicly available repository (https://github.com/sbauldry/bwh).

Correlations between Subgroup-specific Homicide Rates

Table 1 presents descriptive statistics for selected average homicide rates between 2008 and 2010 across the 177 MSAs with at least 20,000 black residents. As one would expect, the average homicide rate for blacks was more than six times higher than the rate for whites. In addition, the average homicide rates for men and young adults were substantially higher than the rates for women and other age groups, respectively.

| Homicide Rates | Mean  | SD   | Minimum | Maximum |
|----------------|-------|------|---------|---------|
| Overall        | 5.72  | 3.25 | .78     | 22.41   |
| White          | 3.18  | 1.61 | .71     | 8.39    |
| Black          | 19.75 | 9.22 | 4.57    | 57.52   |
| Male           | 9.07  | 5.63 | .98     | 40.22   |
| Female         | 2.54  | 1.32 | .3      | 6.62    |
| Young adult    | 10.91 | 7.19 | .73     | 56.45   |
| Other ages     | 3.75  | 2.02 | .64     | 11.01   |

Note: Analysis sample restricted to metropolitan statistical areas with at least 20,000 black residents.

Table 1. Descriptive Statistics for Selected Homicide Rates Per 100,000 across Metropolitan Statistical Areas (N = 177).
illustrate the bivariate associations between the subgroup-specific homicide rates using scatter plots with the points weighted by the population size of the MSA. The fourth panel illustrates the correlation coefficients and 95 percent confidence intervals for the subgroup-specific homicide rates. A visual inspection of the scatter plots suggests a much weaker relationship between black and white homicide rates than between either male and female homicide rates or homicide rates for young adult and other ages. This visual impression is confirmed by the correlations. The correlation between black and white homicide rates is .06 across the 177 MSAs, compared with correlations of .73 between male and female homicide rates and .77 between homicide rates for young adults and other ages.

The fact that there is variation in the racial composition of MSAs and that homicide rates are generally much higher for blacks presumably both for males and females and young adults and other ages would tend to produce positive correlations between male and female rates and between young adult and other rates. Similarly, variations in the gender and age composition of MSAs could also be confounders. To account for this possibility, we estimated the partial correlation between black and white homicide rates adjusting for the percentage of black residents, percentage of males, and percentage of young adults in the 177 MSAs. The partial correlation is .10 between black and white homicide rates, a bit higher than the zero-order correlation of .06 but still close to zero, especially in comparison to the male-female and young adult–other ages correlations.

Implications of the Low Correlation for Prediction and Causation

A low correlation tells us that knowing the value of one variable does not help us predict the value of the other variable. So knowing the risk of homicide for blacks in a metropolitan area does not tell us about the likely risk of homicide for whites in the same metropolitan area, and vice versa. In the context that metropolitan areas generally have higher homicide rates for blacks than whites (see Table 1), there are some metropolitan areas whose homicide rates are especially high for blacks and low for whites (e.g., Buffalo-Niagara Falls, NY, MSA has a much higher than average black homicide rate of 32.86 per 100,000 and a much lower than average white homicide rate of 1.39) and others that have homicide rates that are especially low for blacks and high for whites.
The overall homicide rates for metropolitan areas are weighted averages of the separate unrelated black and white rates, where the weights are the proportions of blacks and whites in the metropolitan area. Because blacks have higher homicide rates in all metropolitan areas, that weighting makes percentage black a major predictor of overall homicide rates, irrespective of whether percentage black is related to the homicide risks for either blacks or whites. Standardization (weighting the separate homicide rates the same for all metropolitan areas) avoids that problem, but standardized rates do not indicate the actual risks for either group within a metropolitan area, and predictions of the standardized rates are probably best made by predicting the underlying separate homicide rates.

The implications of a low correlation for prediction are relatively clear, but the implications for causation are less straightforward. The overall correlation is itself a type of modified average correlation that does not directly convey much about particular causal processes. Nevertheless, the essentially null correlation does tell us some important things about the underlying causes of homicide rates in metropolitan areas. If the primary causes of homicide rates in metropolitan areas affected black and white rates in the same ways (e.g., increasing street lighting, social services, and police presence), we would expect to find a positive correlation between the black and white rates. If the primary causes of homicide had opposite effects on black and white rates (e.g., increasing physical and transportation barriers between rich and poor neighborhoods, increasing aggressive policing of street drug traffic, or otherwise increasing inequality/favoritism for whites over blacks might in theory decrease the risk of homicide for everyone), then we would expect to find a negative correlation between the black and white rates. Finding essentially no correlation suggests that the causes of homicide rates for whites and blacks are neither overwhelmingly coincident nor opposite. That further suggests that we should not assume that policies designed to reduce homicide rates are likely to have similar benefits for whites and blacks in the same metropolitan area. The near-zero correlation suggests both may be possible and neither is inevitable.

It is possible that black and white homicide rates do have similar causes in terms of their own experiences within their separate contexts within each metropolitan area, and their experiences of those causal factors may be uncorrelated across metropolitan areas. For example, neighborhood disorganization could lead to increased homicide rates for both whites and blacks. Furthermore, if it were the case that the extent of neighborhood disorganization in primarily black communities was unrelated to the extent of neighborhood disorganization in primarily white communities across metropolitan areas, then we could observe a common cause of homicide rates for both whites and blacks while observing a low correlation between white and black homicide rates. However, especially because the social contexts of whites and blacks are often separate and different in many American metropolitan areas, it is not reasonable to assume that the factors driving homicide rates for whites and blacks are the same. Rather, it is crucial to analyze the black and white rates separately.

**Why We Should Not Be Surprised and Sometimes Should Expect to Find Differences**

As discussed earlier, researchers have extensively documented the extent of racial residential segregation in American cities, and residential segregation is only one of the factors that separates blacks from whites in these metropolitan areas. It is well known that families, workplaces, churches, voluntary organizations, and other social contexts are racially homogeneous and racially segregated (McPherson, Smith-Lovin, and Cook 2001). Even within contexts, friendships and activities are often racially separate; and even interaction between whites and blacks may be different for whites and blacks. So it should not be surprising if one finds that some conditions of metropolitan areas are experienced differently by whites and blacks and that the responses and effects may be different (cf. Tyler 2005).

For example, it is possible that political protests focusing attention on racialized police abuse in a metropolitan area might affect police behavior toward blacks differently than their behavior toward whites. In addition, a large body of work documents the extent of racialized policing such that similar confrontations with the police generate quite different experiences and interpretations and responses depending on the race of the individual and the neighborhood context (cf. Voight et al. 2017). Finally, as another example, unemployment rates may have different effects on homicide rates depending on how they interact with other conditions in the neighborhoods.

**Variables Expected to Have Different Effects on Black and White Homicide Rates**

A few past studies have analyzed black and white rates of homicide and other violent victimization separately, and they have often found and reported different results for blacks and whites. Ousey (1999) and Krivo and Peterson (2000) reviewed and interpreted much of this research up until the year 2000. More recently, Harris and Feldmeyer (2013) found that immigration had very different effects on white and black experience of violent crime. Like (2011) showed that black-white segregation and inequality increased violent victimization rates for blacks and decreased violent victimization rates for
whites. LaFree, Baumer, and O’Brien (2010) and Light and Ulmer (2016) found and analyzed widely varying gaps between black and white rates of urban homicide rates over time.

Nevertheless, many researchers have continued to analyze overall rates, even when one would theoretically expect different race-specific effects. For example, Ferraro (2016) examined the effects of immigration on overall homicide rates of urban areas without considering separate effects on white, black, and Hispanic homicide rates when one might well expect different effects for different racial/ethnic subgroups when immigrants themselves belong to particular racial or ethnic subgroups and tend to settle in neighborhoods that disproportionately include certain racial/ethnic subgroups. It is particularly surprising that there was no effort to measure separate effects on racial/ethnic subgroups considering that Steffensmeier et al. (2011) had previously reported different effects for different racial/ethnic subgroups. Pyrooz et al. (2016) examined whether there was a “Ferguson effect” (crime increase due to reduced police activity in response to highly publicized events in Ferguson, MO) without disaggregating by race, even though the theoretical argument would suggest that police would specifically back off from confrontations with blacks and that would potentially result in increased crime among blacks in particular.

### Analyzing Overall Homicide Rates Can Badly Misrepresent Underlying Subgroups

In this section, we provide an empirical example of an analysis of overall homicide rates that badly misrepresents the underlying race-specific relationships. In particular, we examine the relationship between location in the South and homicide rates. We use the standard census definition of Southern states (Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Washington, D.C.) to identify all Southern cities and then fit bivariate regression models to predict the total homicide rates, white homicide rates, and black homicide rates for location in the South (see Table 2).

We find that the estimated effects of location in the South on overall homicide rates substantially differs from the respective estimated effects on white and black homicide rates. In particular, we find that location in the South has a positive effect on overall homicide rates, but that underestimates the effect on homicide rates for whites and indicates the wrong direction for effect for blacks, who experience lower homicide rates in Southern cities. In addition, we find that location in the South accounts for a relatively high proportion of the variance in white homicide rates (R² = .34) but a much lower proportion of the variance in black homicide rates (R² = .08).

### Table 2. Models Regressing Homicide Rates on Southern Cities (N = 177).

|            | Total  | White  | Black  |
|------------|--------|--------|--------|
| South      | 2.85 (.45) | 1.90 (.20) | −5.19 (1.36) |
| Constant   | 4.03 (.35) | 2.05 (.15) | 22.83 (1.05) |
| R²         | .19    | .34    | .08    |
| Correlation| .48    | .77    | −.37   |

Note: Analysis sample restricted to metropolitan statistical areas with at least 20,000 black residents. Unstandardized estimates with standard errors in parentheses. The correlations reported are polychoric correlations between homicide rates and an indicator for Southern metropolitan statistical areas.

Earlier studies of region and homicide relied on overall homicide rates to draw conclusions about the effects of region without considering white and black homicide rates separately (e.g., Gastil 1971; Smith and Parker 1980). It was only later that researchers realized that one might anticipate important differences in effects of region on black and white homicide rates. Our present findings are consistent with other recent findings of substantial differences in the effects of region on homicide rates for whites and blacks (cf. Felson and Pare 2010; Lee, Thomas, and Ousey 2009).

In this example, estimates from the regressions of overall homicide rates on region produce a weighted average (of sorts) of the estimates from regressions for blacks and whites separately. As such, the overall analysis at least tends to indicate an “average” effect for the two separate groups.

The primary reason why it is important to analyze the associations between black and white homicide rates and other variables separately is that the associations may be quite different (even in opposite directions) and therefore each one would need to be interpreted separately. In addition, it is important to recognize that when black and white homicide rates are uncorrelated, then the analysis of the relationship between overall homicide rates and some other variable will in general misrepresent even the average of the correlations with black and white homicide rates.

We illustrate this with a simple numerical example and refer readers to the Appendix for an analytical treatment. Table 3 provides the data for our numerical example and a correlation matrix among the variables. The data represent eight metropolitan areas and include black homicide rates, white homicide rates, the overall homicide rates that are computed as the average of the black and white homicide rates, and then another covariate (Y). We see that in this simple case, the correlation between the black homicide rate and Y is .5, as is the correlation between the white homicide rate and Y. The correlation between the overall homicide rate and Y, however, is .7, which is greater than either of the subgroup-specific correlations.
Within a regression framework, if we treat homicide rates as the dependent variable, then we find that the coefficients are all equal. That is, regressing overall homicide rates on Y, black homicide rates on Y, and white homicide rates on Y all produce a coefficient of .5. This is consistent with our previous observation that the bivariate regression coefficient with overall homicide rates as the dependent variable represents a weighted average of the subgroup-specific regression coefficients (see Appendix for more details).

By contrast, if we treat Y as the dependent variable, then the regression coefficients based on the overall homicide rate is 1, compared with regression coefficients of .5 with either white or black homicide rate used as the independent variable (see Appendix for more details).

This simple example illustrates that relationships using the overall homicide rate can misrepresent the relationships based on the race-specific homicide rates even in a bivariate analysis and in a context in which all of the metropolitan areas have the same weights for blacks and whites (.5 in this case). When the proportions of blacks and whites vary across metropolitan areas or additional covariates are included in the analysis, there is potential for further complications. The present point is that the analysis of overall homicide rates can substantially misrepresent even the average of the separate associations for black and white homicide rates.

### Discussion and Conclusions

Our finding that there is essentially no correlation between the homicide rates experienced by whites and blacks across American metropolitan areas today is both surprising and important to recognize. While it is well known that blacks in American metropolitan areas continue to be exposed to much higher risks of homicide than whites, there are many reasons to expect common influences on whites and blacks in the same metropolitan areas (e.g., local and state government policies, tax base, political and social history, recent reduction or closings of large employers, local reputation, etc.), and there are reasons to expect that the outcomes for whites and blacks within the same metropolitan areas would be becoming increasingly interdependent (e.g., lower geographical segregation and converging homicide rates). Thus, one might expect a clear positive association such that some metropolitan areas were more dangerous for everyone than others. Our findings, however, indicate that there is no such association; rather, the risk of homicide for blacks is essentially unrelated to the risk for whites in the same metropolitan area.

We contrast this to homicide patterns associated with gender and age. While we know that there is not residential segregation associated with gender or age that is comparable to that associated with race in American metropolitan areas, we know that the differences in lifestyles and times and places of activities associated with gender and age allow for very different risks of homicide by gender and age within metropolitan areas. Males generally have higher risks of homicide than females, and young adults experience much higher risks of homicide than other age groups. Thus, it could be that there would be many factors that could increase the risks of males differently from the risks for females in the same metropolitan area and many other factors that could increase the risks for young adults differently from the risks for other age groups within the same metropolitan area. Our analyses, however, clearly show that rates for males and females and young adults and other age groups are highly correlated across metropolitan areas, in direct contrast to the absence of correlation for blacks and whites. This suggests that there are more common causes and interdependencies between homicide rates for males and females and young adults and other age groups within metropolitan areas despite their differences in lifestyles and exposures to various risks.

Our finding that race-specific homicide rates are essentially uncorrelated across metropolitan areas suggests that race-specific conditions underlying homicide may not be strongly correlated. It may be that race-specific measures of other key indicators of urban living are also not strongly correlated across metropolitan areas. Further research will be required to determine the extent to which this is the case. This paper has been based on especially good measures of homicide rates for metropolitan areas. Obtaining valid reliable measures of other race-specific conditions may be more challenging, but research using such measures will contribute further to our understanding of the nature and extent of the relationships between the separate worlds of blacks and whites in American metropolitan areas.

It is important to recognize that our findings of near independence are based on race-specific homicide rates at the MSA level. One might expect that conditions experienced by blacks and whites living within geographic units would tend to be more shared as the geographic aggregation units became smaller (e.g., cities within political

### Table 3. Data and Correlation Matrix for Illustrative Example.

| Metro ID | BH | WH | OH | Y |
|----------|----|----|----|---|
| 1        | 0  | 0  | 0  | 0 |
| 2        | 0  | 0  | 0  | 0 |
| 3        | 0  | 1  | .5 | 0 |
| 4        | 0  | 1  | .5 | 0 |
| 5        | 1  | 0  | .5 | 1 |
| 6        | 1  | 0  | .5 | 0 |
| 7        | 1  | 1  | 1  | 1 |
| 8        | 1  | 1  | 1  | 1 |

Correlation matrix:

|     | BH | WH | OH | Y  |
|-----|----|----|----|----|
| BH  | 1.0| .7 | .5 |
| WH  | .0 | 1.0| .7 | .5 |
| OH  | .7 | .7 | 1.0| .7 |
| Y   | .5 | .5 | .7 | 1.0|

Note: BH = black homicide rate; WH = white homicide rate; OH = average of BH and WH; Y = another covariate.
boundaries or neighborhoods) and therefore that the correlation would be more positive for geographically smaller units. That could be a useful subject for further research. The low correlation, however, based on metropolitan areas is important in itself because MSAs are often the units on which aggregate statistics are reported and for which policies are made even as observers are generally aware of large differences among smaller geographic areas within those metropolitan areas. In addition, research on smaller geographic units with respect to homicide raises other methodological and substantive issues. For example, the low incidence of homicide makes homicide rates very unreliable for most neighborhoods, and there are very few neighborhoods that include sufficient numbers of both blacks and whites to meaningfully measure separate race-specific homicide rates.

Finally, we suggest that analyses of metropolitan area homicide rates that do not disaggregate by race can be very misleading about the underlying associations for the different underlying subgroups. There is often good reason to expect different associations for whites and blacks, and there are rarely strong reasons to expect no differences. Thus, analyzing overall homicide rate tends at the very least to misrepresent the different experiences of the different subgroups. In addition, we note that for some analyses there are no assurances that analyses based on overall homicide rates will even accurately indicate the average of the associations among the subgroups. Thus, we suggest that an accurate understanding of causes and consequences of metropolitan area homicide rates requires analyses of race-specific homicide rates.

The research on region and homicide follows a typical pattern of research in social science, where analyses are not disaggregated by race unless there is a specific identified reason to expect racial differences. However, we suggest that the overall noncorrelation between black and white homicide rates across places makes it more likely that the effects of other variables on homicide rates are not even likely to be in the same direction for blacks and whites much more than half of these other variables. Furthermore, the noncorrelation indicates that even if they are in the same direction, there is not good reason to expect them to be of similar strength. Researchers have not adequately recognized the broader implication that discrepancies in the correlates of homicide rates may be misrepresented by the analysis of overall homicide rates more often than not.

### Appendix

In this appendix, we provide a few analytical results to illustrate the potential bias that can arise from analyzing an overall measure that is composed of two subgroups. Suppose we have a variable \( y \), another variable \( x \), and that \( x \) can be decomposed into two groups such that \( w_1x_1 + w_2x_2 = x \) where \( w_1 \) and \( w_2 \) are weights for the two groups. The covariance between \( y \) and \( x \) is given by

\[
\text{cov}(y, x) = \text{cov}(y, w_1x_1 + w_2x_2) = w_1\text{cov}(y, x_1) + w_2\text{cov}(y, x_2). \tag{1}
\]

The variance of \( x \) is given by

\[
\text{var}(x) = \text{var}(w_1x_1 + w_2x_2) = w_1^2\text{var}(x_1) + w_2^2\text{var}(x_2) + 2w_1w_2\text{cov}(x_1, x_2). \tag{2}
\]

We first consider the simple case that \( x \) is a dependent variable (e.g., overall homicide rates) and \( y \) is a predictor in a bivariate regression model with constant weights \( w_1 \) and \( w_2 \). In this case, it is easy to see that the regression coefficient from regressing \( x \) on \( y \) will be a weighted average of the regression coefficients from regressing \( x_1 \) and \( x_2 \), respectively, on \( y \):

\[
\beta_{xy} = \frac{\text{cov}(y, x)}{\text{var}(y)} = \frac{\text{cov}(y, x_1)}{\text{var}(y)} + \frac{\text{cov}(y, x_2)}{\text{var}(y)}. \tag{3}
\]

If, however, there are other variables included in the model or the weights are not equal across cases (as is the case for the proportion of blacks across metropolitan areas), then in general, the regression coefficient based on \( x \) will not be a simple weighted average of the regression coefficients based on \( x_1 \) and \( x_2 \).

The second case we consider is estimating a correlation between \( x \) and \( y \). This case has been explored over 100 years ago in a paper by Spearman (1913). In this case, the correlation between \( x \) and \( y \) will in general not be a simple weighted average of the correlations between \( x_1 \) and \( x_2 \) and \( y \), respectively, even in the special case of constant weights. This is because the correlation coefficient requires dividing by the square root of the variance of \( x \) and the variance of \( x \) does not decompose into a simple weighted average of the variances of \( x_1 \) and \( x_2 \). For interested readers, Spearman (1913:419–20) provides an analytical expression relating the correlation of \( x \) and \( y \) to the correlations of \( x_1 \) and \( y \) and \( x_2 \) and \( y \).

Finally, the third case we consider is again a simple bivariate regression model with constant weights, but in this case, \( y \) is the dependent variable and \( x \) is the independent variable. This represents a simplified version of using overall homicide rates to predict some other outcome. As with the result for the correlation, the coefficient from regressing \( y \) on \( x \) will not in general be a simple weighted average of the coefficients from regressing \( y \) on \( x_1 \) and \( x_2 \), respectively. Once again, this is due to the presence of the variance of \( x \) in the denominator of the equation for the regression coefficient,

\[
\beta_{yx} = \frac{\text{cov}(y, x)}{\text{var}(x)} = \frac{w_1\text{cov}(y, x_1) + w_2\text{cov}(y, x_2)}{w_1^2\text{var}(x_1) + w_2^2\text{var}(x_2) + 2w_1w_2\text{cov}(x_1, x_2)}. \tag{4}
\]

\footnote{We thank Paul Allison for bringing this paper to our attention.}
which does not permit a simple decomposition as in (3). Therefore, we see that even in simplified cases involving just two variables and constant weights, estimates of correlation coefficients and certain regression coefficients based on an overall measure can depart from representing a weighted average of the coefficients based on separate subgroups. Furthermore, all of the aforementioned problems occur when examining associations with another variable that is not itself a composite of subgroup-specific variables (e.g., location in the South, number of local political demonstrations in the news, or size of the police force). When examining associations with variables that themselves are decomposed into separate values for blacks and whites (e.g., poverty rates, unemployment rates, or the amount of exposure to guns), then there are additional problems with using overall analyses to represent the processes in the separate groups.

References

Felson, Richard B., and Paul-Philippe Pare. 2010. “Gun Cultures or Honor Cultures? Explaining Regional and Race Differences in Weapon Carrying.” Social Forces 88(3):1357–78.

Ferraro, Vincent. 2016. “Immigration and Crime in the New Destinations, 2000–2007: A Test of the Disorganizing Effect of Migration.” Journal of Quantitative Criminology 32(1):23–45.

Gastil, Raymond D. 1971. “Homicide and a Regional Culture of Violence.” American Sociological Review 36(3):412–27.

Harris, Casey T., and Ben Feldmeyer. 2013. “Latino Immigration and White, Black, and Latino Violent Crime: A Comparison of Traditional and Non-traditional Immigrant Destinations.” Social Science Research 42(1):202–16.

Intrator, Jake, Jonathan Tannen, and Douglas S. Massey. 2016. “Segregation by Race and Income in the United States 1970–2010.” Social Science Research 60:45–60.

Kriv, Lauren J., and Ruth D. Peterson. 2000. “The Structural Context of Homicide: Accounting for Racial Differences in Process.” American Sociological Review 65(4):547–59.

LaFree, Gary, Eric P. Baumer, and Robert O’Brien. 2010. “Still Separate and Unequal? A City-level Analysis of the Black-white Gap in Homicide Arrests Since 1960.” American Sociological Review 75(1):75–100.

Lee, Matthew R., Shaun A. Thomas, and Graham C. Ousey. 2009. “Southern Culture and Homicide: Examining the Cracker Culture/Black Rednecks Thesis.” Deviant Behavior 31(1):60–96.

Light, Michael T., and Jeffery T. Ulmer. 2016. “Explaining the Gaps in White, Black, and Hispanic Violence Since 1990: Accounting for Immigration, Incarceration, and Inequality.” American Sociological Review 81(2):290–315.

Liker, Toya Z. 2011. “Urban Inequality and Racial Differences in Risk for Violent Victimization.” Crime & Delinquency 57(3):432–57.

Loflin, Colin, David McDowall, and Matthew D. Fetzer. 2008. “A Comparison of SHR and Vital Statistics Homicide Estimates for US Cities.” Journal of Contemporary Criminal Justice 24(1):4–17.

McCoy, Patricia L., Kenneth C. Land, and Karen F. Parker. 2010. “An Empirical Assessment of What We Know about Structural Covariates of Homicide Rates: A Return to a Classic 20 Years Later.” Homicide Studies 14(3):219–243.

McCoy, Patricia L., Kenneth C. Land, and Karen F. Parker. 2011. “Heterogeneity in the Rise and Decline of City-level Homicide Rates, 1976–2005: A Latent Trajectory Analysis.” Social Science Research 40(1):363–78.

McPherson, Miller, Lynn Smith-Lovin, and James M. Cook. 2001. “Birds of a Feather: Homophily in Social Networks.” Annual Review of Sociology 27(1):415–44.

Ousey, Graham C. 1999. “Homicide, Structural Factors, and the Racial Invariance Assumption.” Criminology 37(2):405–26.

Pyrooz, David C., Scott H. Decker, Scott E. Wolfe, and John A. Shinar. 2016. “Was There a Ferguson Effect on Crime Rates in Large US Cities?” Journal of Criminal Justice 46:1–8.

Riedel, Marc. 1999. “Sources of Homicide Data.” Pp. 75–95 in Homicide: A Sourcebook of Social Research, edited by M. D. Smith and M. Zahn. Thousand Oaks, CA: Sage.

Smith, M. Dwayne, and Robert Nash Parker. 1980. “Type of Homicide and Variation in Regional Rates.” Social Forces 59(1):136–47.

Spearman, Charles. 1913. “Correlations of Sums or Differences.” British Journal of Psychology 5:417–426.

StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LP.

Steffensmeier, Darrell, Ben Feldmeyer, Casey T. Harris, and Jeffrey T. Ulmer. 2011. “Reassessing Trends in Black Violent Crime, 1980–2008: Sorting out the ‘Hispanic Effect’ in Uniform Crime Reports Arrests, National Crime Victimization Survey Offender Estimates, and US Prisoner Counts.” Criminology 49(1):197–251.

Tyler, Tom R. 2005. “Policing in Black and White: Ethnic Group Differences in Trust and Confidence in the Police.” Police Quarterly 8(3):322–42.

Voigt, Rob, Nicholas P. Camp, Vinodkumar Prabhakaran, William L. Hamilton, Rebecca C. Hetey Camilla M. Griffiths, David Jurgens, Dan Jurfisky, and Jennifer L. Eberhardt. 2017. “Language from Police Body Camera Footage Shows Racial Disparities in Officer Respect.” Proceedings of the National Academy of Sciences 114(25):E5216–26.

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