Deadly Violence in the Heartland

Comparing Homicide Patterns in Nonmetropolitan and Metropolitan Counties

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In the study of homicide, one common research finding is the strong association between urbanization and homicide rates. The strength of the association between urbanism and homicide rates should have led to a large body of research comparing rural and urban homicide, but it has not. This is an exploratory study using the FBI's Uniform Crime Reports *data on homicide and the FBI's* Supplemental Homicide Reports *merged with data from the U.S. Bureau of the Census to examine predictors of nonmetropolitan and metropolitan homicide rates and to consider the implications of these findings. Although homicides display some general patterns across the United States, rural-urban differences modify the typical attributes of homicide incidents as well as the community dynamics of homicide rates. The analysis shows that models with very high predictive power in the largest metropolitan areas have much less success in accounting for homicide differences in the most rural areas.*

Keywords: *homicide; rural; nonmetropolitan; metropolitan*

Among serious crimes, homicide is relatively rare, accounting for only about one tenth of 1% of index crimes reported by the FBI. Although it is among the crimes most often solved through an arrest, only about 14 of every 10,000 arrests made by the police are for homicide. Its absolute frequency is low, but the impact of homicide on society is substantial. Consequently, few crimes have been so thoroughly researched or been the focus of so much attention by the public and by policy makers. There has been considerable attention to situational factors, characteristics of offenders,

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and the victim-offender relationship (e.g., Wilson, 1993) as well as structural factors associated with homicide, such as income inequality and deindustrialization (Baller, Anselin, Messner, Deane, & Hawkins, 2001; Cubbin, Pickle, & Fingerhut, 2000; Fingerhut, Ingram, & Feldman, 1998; Kaplan, Pamuk, Lynch, Cohen, & Balfour, 1996; Ousey, 2000; Parker, McCall, & Land, 1999; Pridemore, 2002; Wilkinson, Kawachi, & Kennedy, 1998). Although there have been many studies of homicide, the amount of research on rural homicide is extremely limited (Land, McCall, & Cohen, 1990; Parker et al., 1999; Pridemore, 2002). This study will consider both situational factors and structural factors associated with metropolitan and nonmetropolitan homicide rates, proceeding in two steps. First is a series of bivariate analyses of situational factors surrounding homicide incidents. The second step uses multivariate analysis to consider the ability of situational and contextual factors combined to predict homicide rates.

WHY STUDY NONMETROPOLITAN HOMICIDE?

There are several good reasons to compare patterns of urban and rural homicides. First, the rates of homicide in rural and urban areas are different, and this difference has persisted over time. Second, the few studies of nonmetropolitan homicide that have been done consistently suggest that the correlates of homicide may be different than those found in urban areas. Finally, studies suggest that the social dynamics of rural communities are very different from those in urban communities. These, in turn, can be expected to influence either the characteristics of homicide or the social dynamics of homicide events.

Data from the *Uniform Crime Reports* (*UCR*) consistently indicate that for the country as a whole, homicide rates are higher in urban areas than in rural areas. In the year 2000, for example, homicide rates in cities of 250,000 or more was 13.2 per 100,000 people, but in the most rural counties the rate was only 3.9 (FBI, 2000). Studies have consistently found a positive association between urbanization and homicide rates (Cubbin et al., 2000; LaFree, 1998; Pridemore, 2002). In their overview of homicide research, Parker et al. (1999) noted the absence of research on rural homicide and observed that even within urban areas of varying

sizes, some factors correlated with homicide rates in the largest urban areas are not statistically significant when less urbanized areas are examined. Still other research has concluded that the manner in which rural is defined influences which variables are important correlates of rural homicide (Kowalski & Duffield, 1990).

Perhaps the most thorough examination of rural homicide and rural violence has been conducted by Augustine Kposowa and colleagues (Kposowa & Breault, 1993; Kposowa, Breault, & Harrison, 1995). They persuasively argue that homicide studies drawing on only the largest metropolitan areas may be biased because of the empirical limitations of such data. They note that urbanism is generally associated with homicide, but by focusing on only the largest metropolitan areas, researchers substantially limit the variation in urbanism in their samples. Similarly truncated variation may be found with other variables commonly associated with homicide, including poverty and percentage of the population that is African American (Kposowa & Breault, 1993). By including rural cases in the study of homicide, many problems resulting from truncated variation can be resolved. Significantly, the authors also found that of the 30 United States counties with the highest homicide rates, 23 had populations of fewer than 20,000 people. Thus, although the most rural counties had lower homicide rates overall, there was substantial variation among rural counties in the rate of homicide, a range of variation unmatched in purely metropolitan samples. Kposowa and Breault (1993) concluded that the model that best accounted for variance in urban homicide rates was not the model that best accounted for homicide rates in rural areas. Economic inequality, for example, "was a predictor of homicide in urban counties, [but] it failed to be related to homicide in rural areas" (Kposowa & Breault, 1993, p. 44).

In addition to empirical reasons why it is important to include rural samples in national studies of homicide, there are also conceptual justifications. Several features of rural areas suggest that rural and urban homicide patterns may differ. For example, rural areas are characterized by higher density of acquaintanceship than are urban areas (Freudenburg, 1986). That is, social networks are smaller and tighter. It might be expected from this that rural homicides are more likely to involve acquaintances or family

members than are urban homicides. Density of acquaintanceship may also help explain changes over time in rural and urban clearance rates. In the late 1960s, homicide clearance rates, at about 85%, were essentially the same in the largest cities and the most rural counties. By the year 2000, the clearance rate had declined to 56% in the largest cities but to only 77% in the most rural counties (FBI, 2000).

Another variable for which rural-urban differences might be expected is in the use of guns to commit homicide. Guns are generally more available in rural areas and are used more for sport than for protection. At the same time, there is evidence that in rural areas, guns may be less often used in the commission of many crimes (Weisheit, Falcone, & Wells, 1999). At least one report suggests that guns in rural areas are less often used in homicide, although the frequency of gun use in suicides is similar to that in urban areas ("Firearm-Related Suicides Similar," 1998). These findings suggest that the availability of guns may be a necessary but not a sufficient condition for explaining variations in the rate of gun-related homicides.

There are also reasons to expect rural-urban differences by region. It is well known that homicide rates tend to be higher in the South and West, but researchers have struggled to account for this regional pattern. Perhaps the most thorough and thoughtful consideration of this issue has been conducted by Nisbett and Cohen (1996). They argue that the South and parts of the West live in a "culture of honor" that can be traced to the means of production used by those who first settled there. Significant for this analysis, they also argue that the culture of honor remains in a much purer form in the most rural areas of the South, and thus regional differences should be most pronounced in rural settings.

In addition to the work of Nisbett and Cohen (1996), there is other evidence that the effects of race are different in rural and urban areas (Cubbin et al., 2000). In general, rural areas are more racially homogenous than are large cities. In central cities, Whites comprise about 66% of the population, but in rural areas they account for more than 90% of the population (Weisheit & Donnermeyer, 2000). Bachman's (1992) examination of National Crime Victimization Survey data found that in urban areas, Blacks had higher victimization rates than Whites for violent crimes. However, in rural areas, the reverse pattern held: The

violent crime victimization rate was higher for Whites. Taken together, these studies suggest that the discrepancy in violence rates between the South and the North is largely a product of very high rates among White rural males in the South and that studies must simultaneously consider race, gender, and community size to understand Southern violence.

Thus, existing research and factors unique to rural areas all suggest that general theories of homicide must take rural-urban differences into account. Failing to do so will yield theories of limited scope produced using variables with limited variance. The limits of these urban-based explanations may become apparent when rural data are included in the analysis. For example, Blumstein, Rivara, and Rosenfeld (2000) speculated that declining homicide rates are the product of changes in drug markets and a police crackdown on youthful gun possession. However, rates also declined in rural areas where neither of these conditions appear to have been present.

Existing research suggests factors accounting for homicide rates in large urban centers may be different from those accounting for homicide rates in rural areas. Our attention now shifts to an empirical consideration of this possibility. This study examines two questions. First, how similar are the characteristics of homicide events in rural and urban areas? Second, how similar are the social dynamics of homicide rates in rural and urban areas?

THE DATA

The data for this study come from four sources. For homicide, two data sources are used, both drawn from the *UCR.* The first source, which allowed for a consideration of situational factors of individual homicide events, was the *Supplemental Homicide Reports* (SHR) (Fox, 2000). The *SHR* data include incident-specific information about 92% of all homicides reported to the FBI and include information about state, county, year of offense, basic demographics of the victim and of the offender, the victim-offender relationship, and weapon used in the homicide. The *SHR* incident data are provided in two data sets, one based on offenders and the other based on victims. Because there are many

homicide instances in which the offender is unknown, the present analysis used the victim data file to provide the most complete data set. There were 439,954 cases in the full 1976-1998 *SHR* victim file. However, this study is focused only on those homicides occurring in the years 1994 through 1998, which included 89,153 cases. Focusing on the most recent 5-year interval allowed for matching homicide data with the most recent census data while still leaving enough cases to adequately represent more rural areas. The 5-year period was chosen because our interest was in stable patterns of homicide (rather than yearly fluctuations or shifts) and because the smallest counties will have few homicides in any single year; thus, a 5-year average provided a more reliable estimate.

The *SHR* victim file also included a measure of the size of the population of the jurisdiction in which the offense took place, using categories developed by the FBI. Although population size is commonly used as an indicator of urban or rural location, this is an inadequate indicator for our purposes because it is common for small jurisdictions to be located within large metropolitan areas (see Weisheit et al., 1999). Thus, although they are small communities, they are metropolitan in location and social context. For this reason, the population categories provided in the *SHR* were abandoned in this analysis in favor of a more sensitive classification system developed by the Economic Research Service of the U.S. Department of Agriculture (Economic Research Service, 1995). This system uses the county as the unit of measure and classifies counties along a continuum from 0 through 9, with 0 representing the largest metropolitan counties and 9 representing the most rural (those with no incorporated areas of 2,500 or more persons). The ERS codes (also referred to as Beale codes) are sensitive to both the population size of a county and to its proximity to and economic dependence on larger metropolitan counties. By combining *SHR* data with that from the ERS, it was possible to correctly match 83,852 cases of the original 89,153 homicides with community-level data (94.1% matched).

The second source of homicide data from the *UCR* is the *Program Reporting Data*, which are aggregated data reports of offenses recorded by the police and reported to the FBI for the years 1994 through 1998 (U.S. Department of Justice, 1997a, 1997b, 1998, 1999, 2000). These annual reports provided figures

for the number of homicides committed each year by community, the county within which the community is located, and the state within which the county is located. The *UCR* also reports the population covered by the reporting jurisdictions. Both homicide and population data were aggregated at the county level by the Interuniversity Consortium for Political and Social Research (ICPSR). Homicide and population figures were combined to compute annual homicide rates for each county for which police provided information.

In another step, homicide rates based on the program reporting data were merged with more detailed data about each homicide from the *SHR* and with data from the Census Bureau reflecting the social and economic context of each county. Although using mortality data from the National Center for Health Statistics, Centers for Disease Control and Prevention would provide slightly more coverage of homicide deaths in the U.S. population (Riedel, 1999; Wiersma, Loftin, & McDowall, 2000), the differences do not seem significant for the comparative analysis in this study.

A final source of data for this analysis was county-level economic and demographic data from the U.S. Department of Commerce's *USA Counties, 1998* (U.S. Department of Commerce, 2000). The variables used from this source and the manner in which they were combined into indices will be addressed in the next section.

Homicide and population variables from individual years of the *UCR* were extracted into separate data files and then combined using the Federal Information Processing Standards code for each county. Average yearly crime rates were computed using all years in which crime data were reported for each county and the population covered by each year's crime data. Counties reporting less than 2 years of *UCR* homicide data in the 1994-1998 interval were treated as missing cases. This resulted in excluding 441 counties (14% of the total sample of 3,137 counties) from the analysis, about a third of which (34%) were in the most rural category of counties. Because homicides are relative rare events, the distributions of homicide counts and rates are highly skewed across counties—markedly so in nonmetropolitan counties with smaller populations—with large numbers of cases having zero values. To deal with the statistical problems this creates, we

computed and used the natural logarithm of the average annual homicide rate (plus a .5 offset to avoid zero values) rather than the raw rates, a procedure following Land et al. (1990).

County-level census-related variables were extracted from the *USA Counties 1998* data file (U.S. Department of Commerce, 2000) to represent the dominant substantive dimensions identified in prior aggregate studies of homicide rate patterns. The number of potentially relevant social context variables to be considered in the analysis is rather large, and different studies have focused on different sets of variables, confounding efforts to identify stable and general patterns in homicide rates. Initial variables were selected because prior research had suggested that they were of either theoretical or empirical value. To improve reliability and reduce redundancy, six indices were computed to summarize the major social, economic, demographic, and ecological constructs cited in the available theory and research on homicide patterns. We used factor analysis and item analysis to identify the most coherent and consistent clusters of items, which were converted to standard metrics (dividing each item by its standard deviation) and averaged together. Because none of the predictor variables has an intrinsically meaningful metric, all indices were converted to a common metric by dividing each by its standard deviation in the total sample. This transformation facilitated comparisons of the relative influences among the various causal or predictive factors. Combining items into indices also reduced problems of multicollinearity, following suggestions of Land et al. (1990) and Parker et al. (1999).

Six computed indices were used in this analysis (see Appendix A): A racial composition index combined the percentage of non-Whites with a racial heterogeneity score used in Blau (1977) (alpha = .93). An economic resources index combined the median household income, the percentage of families above poverty, and the percentage of adults having a high school education in each county (alpha = .90). A cultural capital index reflecting mainly ethnic/language factors combined the percentage of Hispanics in the county, the percentage of foreign-born, and the percentage speaking non-English at home (alpha = .91). A housing instability index combined the percentage of housing units that were renter-occupied (versus owner-occupied), the percentage of households that were nonfamily households, and the percentage of housing

units hooked to public sewer (alpha = .76). A population instability index combined the amount of population change in the county between 1985 and 1995 with the percentage of the county population that had moved there in the previous 5 years (alpha = .69). A family disorganization index combined the percentage of ever-married who were divorced with the percentage of family households that were single-parent headed (alpha = .67).

In developing these six indices, several relevant items did not consistently and meaningfully cluster into any index on either the factor analysis or the item analysis. These items were the population density, the unemployment rate, and the percentage of the population in the crime-prone ages of 15 to 24. Because they had proved to be empirically and theoretically important in other research, these items were included in the analysis as separate individual indicators with metrics standardized to be comparable with the indices. Appendix A shows descriptive statistics on these indices as well as their reliability. All independent variables in the analysis were transformed (by dividing by their standard deviations for the total sample) to yield variables with common metrics, so that the unstandardized coefficients would be directly comparable across variables as well as to allow meaningful analysis of differences across subsamples. Geographic region was operation- alized as a simple South/non-South dichotomy.

For purposes of aggregate comparisons among the predictive models of homicide rates, two different versions of the rural-urban classification were analyzed. The first was a simple metropolitan-nonmetropolitan dichotomy similar to that used in prior homicide studies. This simply collapses the four levels of metropolitan counties defined by the ERS into one metro category and the six ERS levels of nonmetropolitan into a single nonmetro category. The second was a four-level continuum that used one ERS metro category but divided the nonmetropolitan counties into three different categories based on the size of the largest city in the county: (a) having a city of at least 20,000 population in the county, (b) having cities of at least 2,500 population but less than 20,000, (c) having no cities of at least 2,500 population (i.e., completely rural). We treated the question of the most appropriate version of the rural-urban classification as an empirical question: preferring the most parsimonious classification where it adequately accounted for important differences but using more

detailed classifications when the data suggested important differences within larger categories.

PLAN OF ANALYSIS

The analysis proceeded in several stages. First, data from the *SHR* for 1994-1998 were analyzed to compare situational and interpersonal patterns of homicide across levels of metropolitan and nonmetropolitan. The aim here was to identify how important features of homicides may differ between rural and urban contexts as well as vary across different levels of nonmetropolitan settings. This step uses the homicide incident as the unit of analysis. For this phase of the analysis, the effective sample size is 83,852.

The second phase of the analysis considers county-level characteristics as predictors of homicide rates. The analytic aim here was to examine how the ecological dynamics of homicide rates vary across metropolitan and nonmetropolitan settings. This step required aggregating the *SHR* victim data by county and then merging the aggregated file with the file reflecting the homicide rate for the county and with the file containing county-level social and economic measures provided by the U.S. Department of Commerce. This step uses the county as the unit of analysis and the effective sample size is 3,037; however, missing data on some variables (especially reported homicide rates) generally reduced the effective sample size down to as few as 2,525 for many analyses.

For each stage in the process, the analysis was guided by issues indicated by prior research (e.g., Parker et al., 1999; Pridemore, 2002) as most likely to reveal important rural-urban differences: victim attributes, offender attributes, victim-offender relationship, circumstances of the homicide event, and region. Because it was impossible to determine homicide rates by race with the *SHR* victim file alone, race was only considered with the file in which *SHR* data had been aggregated by county and merged with other data showing the proportional representation of minorities in each county.

FINDINGS: CHARACTERISTICS OF HOMICIDE INCIDENTS

Using the four categories derived from ERS urban-rural continuum codes, it was possible to consider rural-urban differences in the variables included in the *SHR*. Our focus now shifts to this descriptive analysis, as shown in Table 1.

Victim Attributes

Table 1 shows clear patterns of differences in victim attributes across categories of metropolitan and nonmetropolitan. As one moves from metropolitan areas to the most rural areas, there are more likely to be multiple victims, victims are more likely to be female, and victims are more likely to be younger. The pattern is most striking for female victims, with a substantial difference between metropolitan jurisdictions and the various levels of nonmetropolitan. For multiple victims and youthful victims, the patterns are less striking but are linear across jurisdiction size.

Offender Attributes

Offender attributes follow a consistent linear pattern across sizes of jurisdiction. As one moves from metropolitan areas to the most rural jurisdictions, the homicide event becomes less likely to involve multiple offenders, less likely to involve younger offenders, and more likely to involve a female offender. All these associations are statistically significant, but the differences are most striking for the female offender and young offender variables.

Victim-Offender Relationship

Given the greater density of acquaintanceship that is more characteristic of rural areas, it was expected that rural homicides would less often involve strangers and more often report the offender as a family member. Table 1 shows that this expected pattern was strongly reflected in the data. Except for the variable acquaintance, all these patterns are linear. For every variable, the difference between metropolitan and the various categories of

TABLE 1
Homicide Characteristics by Nonmetropolitan Classification *Supplemental Homicide Reports* 1994-1998

Comparison Variable	*Metro*	*Nonmetro City*	*Nonmetro Small Town*	*Nonmetro Rural*
Victims				
Multiple victims	8.2	9.7	10.8	11.3
Female victim	21.5	32.1	30.0	32.0
Young victim (< 18 years)	10.7	9.7	9.0	8.7
Offenders				
Multiple offenders	12.7	12.7	11.6	10.9
Young offender (< 18 years)	12.0	9.5	8.6	6.0
Female offender	9.3	10.9	12.8	15.2
Victim-offender (V-O) relationship				
Family members	18.7	25.5	30.6	34.6
Acquaintances	45.2	55.8	54.1	53.1
Strangers	24.9	12.9	9.7	8.4
V-O same sex	71.8	61.7	61.4	57.4
V-O same race	86.3	88.9	90.6	94.5
Circumstances				
Committed with other crimes	27.0	20.7	17.8	16.5
Outcome of conflict	42.1	48.6	53.1	53.5
Committed with guns	72.3	64.3	68.2	69.8
Alcohol/drugs involved	2.9	4.0	5.3	5.3

NOTE: All numbers are percentages of homicides in each metro–nonmetro category; for each variable, differences across categories are significant at the .000 level, except for "multiple offenders," which is significant at the .05 level. Total number of homicides reported in the 1994-1998 period for all metro–nonmetro categories was 83,852.

nonmetropolitan is greater than differences within categories of nonmetropolitan. As one moves from metropolitan to nonmetropolitan jurisdictions, victims and offenders are more likely to be family members or acquaintances. Also, as one moves from metropolitan to nonmetropolitan, victims and offenders are less likely to be of the same sex and more likely to be of the same race.

Circumstances of the Event

Variables reflecting circumstances of the event also show substantial differences across jurisdiction size, and except for the use of guns, this pattern is linear. Compared with homicides in nonmetropolitan areas, those in metropolitan jurisdictions are more likely to be committed in conjunction with other crimes, less likely to be the outcome of an interpersonal conflict, more likely to be committed with a gun, and less likely to be the primary result

of alcohol or drugs. The pattern for the use of guns in homicide is the only pattern in Table 1 that is curvilinear. The percentage of homicides involving guns is highest in the most metropolitan and in the most rural jurisdictions and lowest in small and medium nonmetropolitan cities.

Region

Studies rather consistently show that region is an important correlate of homicide in the United States, with higher rates generally being observed in the South. The inclusion of a rural-urban continuum code allows for a simultaneous consideration of both region and rural setting. This is consistent with the argument that to understand Southern violence, race, gender, and community size must all be considered simultaneously (Nisbett & Cohen, 1996). Race will be included in the next phase of the analysis, in which homicide cases are aggregated by county and then examined by region. For now, other case-level variables will be addressed.

Following the lead of Nisbett and Cohen, Table 2 shows incident-level variables broken down by jurisdiction size (metro versus nonmetro) and region (South vs. non-South).

Table 2 shows that for most variables, the difference between South and non-South are in the same direction for both metropolitan and nonmetropolitan counties. However, for 6 of the 15 variables, the difference between South and non-South are in opposite directions in metropolitan and nonmetropolitan counties. The biggest of these inconsistent differences is for the percentage of homicides that are the "outcome of conflict." In metropolitan counties, the difference is very small and the percentage is greater outside the South (41.9% for Southern counties versus 42.1% for non-Southern counties), but in nonmetropolitan counties homicides in the South are much more likely to be the outcome of a conflict (54.6% in Southern counties versus 44.8% for non-Southern counties). This is consistent with Nisbett and Cohen's (1996) expectation that South/non-South differences will be greatest outside metropolitan areas. For other variables, such as homicides among acquaintances, the effects of county size and region are clearly additive, again consistent with Nisbett and Cohen's model.

TABLE 2
Homicide Characteristics by Region by Nonmetropolitan Classification *Supplemental Homicide Reports* 1994-1998

	Metro Counties		*Nonmetro Counties*	
Comparison Variable	*South*	*Non-South*	*South*	*Non-South*
Victims				
Multiple victims	7.6	8.6	9.3	13.4
Female victim	22.2	21.1	28.7	36.2
Young victim (< 18 years)	9.5	11.4	8.1	11.8
Offenders				
Multiple offenders	12.2	13.1	11.5	12.9
Young offender (< 18 years)	11.5	12.3	8.4	9.0
Female offender	10.4	8.6	13.0	10.8
Victim-offender (V-O) relationship				
Family members	21.2	17.2	27.9	32.7
Acquaintances	51.7	41.2	57.8	47.3
Strangers	21.4	27.1	10.1	11.7
V-O same sex	70.4	72.8	62.3	58.6
V-O same race	87.4	85.6	89.7	92.0
Circumstances				
Committed with other crimes	26.6	27.3	18.8	18.2
Outcome of conflict	41.9	42.1	54.6	44.8
Committed with guns	74.2	71.2	69.8	60.3
Alcohol/drugs involved	5.5	1.5	5.4	3.7

NOTE: All numbers are percentages of homicides in each metro–nonmetro/South–non-South category; for each variable, South–non-South differences are significant at the .001 level. Total number of homicides reported in the 1994-1998 period for all metro–nonmetro categories was 83,852.

Finally, including the South–non-South distinction exaggerates metropolitan/nonmetropolitan differences for some variables. This is true for the variables family members, victim and offender of same race, and female victims. For each of these variables, the percentages are highest for nonmetropolitan/non-South and lowest for metropolitan/non-South. Although Nisbett and Cohen (1996) suggested that metropolitan/nonmetropolitan differences would magnify differences between the South and non-South, these variables suggest an inverse pattern—the South magnifies differences between metropolitan and nonmetropolitan.

In another table (not presented here), differences between metropolitan and nonmetropolitan were compared with differences between South and non-South across the 15 variables presented in Table 2. These comparisons revealed that for most variables, metropolitan/nonmetropolitan differences were greater than were

South/non-South differences. Although most researchers grant the importance of region in describing homicide rate patterns, these data suggest that rurality may be an even more important predictor of patterns of homicide rates. Overall, the findings concerning region and rurality reaffirm the importance of considering both county size and region in understanding patterns of homicide rates.

COUNTY-LEVEL ANALYSIS

The second step in the analysis required aggregating *SHR* data by county and merging that data with county-level rates of homicide and with data on social and economic characteristics of each county. This matched data set allowed us to use homicide rates for each county and to differentiate counties not reporting any crime data to the *UCR* from those reporting counties in which no homicides occurred in the years 1994 to 1998. Of the 3,137 counties in the United States, homicide data could be successfully matched for 2,696 counties, for a rate of 86% matched.

Following the example of Kposowa and Breault (1993), we identified the 30 counties with the highest homicide rates. Of these 30 high-rate counties, 19 were nonmetropolitan. Of these 19 nonmetropolitan counties, 11 were completely rural—that is, the county contained no municipality of 2,500 or more. Of these 11 rural counties, 6 were in the South, 4 were in the West, and 1 was in the Midwest. Of the remaining 8 nonmetropolitan counties, 6 had no municipality with more than 20,000, and most were in the South. The 11 metropolitan counties in the list of counties with the highest rates were less concentrated in the South than was true for nonmetropolitan counties with high homicide rates. About half (6) of the high-rate metropolitan counties were in the South, 4 were in the Midwest, and 1 was in the Northeast. Furthermore, because these rates were averaged over a 5-year period, the findings were not the result of an unusual single-year reporting pattern. Thus, although nonmetropolitan counties have lower homicide rates on average, there are pockets of rural America with rates exceeding those in the largest cities.

Table 3 shows the unstandardized regression coefficients for indices of social and economic contextual factors as predictors of

TABLE 3
Regressions by Nonmetro Subsamples Logged Homicide Rates (1994-1998) on Community Characteristics

Variable	*Metro*	*NM > 20K*[a]	*NM < 20K*[b]	*Rural*[c]
Population change index	.009[d]	.026	.109*	.240**
Family instability index	.328***	.175*	.224***	.177
Household instability index	.014	.096	–.182***	–.096
Cultural capital index	.071	–.019	.080*	.099
Racial diversity index	.384***	.270***	.250***	.107
Economic resources index	–.225***	–.305***	–.224***	–.328***
Percentage of population 15 to 24 ($\log_e$)	–.118***	–.143***	–.043	.094
Employment rate ($\log_e$)	.005	.014	–.096**	.074
Urban density ($\log_e$)	–.020	–.191**	.004	.143
South/non-South	.137*	.360**	.293***	.059
Variance explained (adjusted R^2)	.638	.555	.391	.167
N of counties (with complete data)	725	240	1,026	534

a. Nonmetropolitan county with city of 20,000 to 50,000 population.
b. Nonmetropolitan county with city of 2,500 to 19,999 population.
c. Nonmetropolitan county containing no city or urban area of 2,500 population.
d. Dependent variable is the $\log_e$ of average annual homicide rate for the years 1994-1998.
All coefficients are unstandardized partial regression coefficients.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

county-level homicide rates. Ordinary least squares (OLS) regression was used in this analysis because its coefficients are familiar and readily interpretable and also because it yields an overall R^2 statistic that allows comparing explanatory power of the model across metropolitan/nonmetropolitan subsamples. However, because OLS procedures assume normally distributed numeric variables, although homicide counts or rates are usually highly skewed variables (with many zero values, especially in less metropolitan populations), alternative statistical regression estimations were also used. As a check on the robustness of the OLS results, the regressions in Table 3 were replicated using negative binomial regression procedures as outlined in Allison (1991) and Osgood (2000). These alternative results are provided in Appendix B, but they duplicate very closely the OLS patterns shown in Table 3; and they essentially confirm the validity of our use of OLS regressions of logged 5-year average homicide rates to make comparisons across metropolitan and nonmetropolitan counties.[1]

Several things about Table 3 are worth noting. First, although the combined variables do an excellent job of explaining the variance in homicide rates for the largest metropolitan areas, the ability of these variables to predict homicide (as reflected in the R^2 statistic for each regression) declines dramatically and in a linear pattern as one moves from the most urban to the most rural counties.[2] In other words, the explanatory model that best accounts for variation in homicide rates in the most densely populated metropolitan counties is less powerful in larger nonmetropolitan counties and weakest in the most rural counties. There are several reasons to believe that this pattern is not simply a methodological artifact of restricted variances in key variables or of small numbers of homicides in rural areas.

Regarding the issue of restricted variance, Appendix A shows the declining value of R^2 is not an artifact of smaller variance among the dependent and independent variables in the most rural counties. The variance of the (logged) murder rate is largest in the least urban categories, and this pattern was true for about half of the independent variables. Furthermore, the alternative negative binomial analysis specifically deals with dependent variables with very small numbers. The result of the negative binomial analysis was essentially the same as that of the OLS regression analysis, again suggesting that our findings were not artifacts of restricted variance or unusual distributions.

This pattern of declining predictive power is the most substantial finding in this study and has not been reported in previous reviews of the homicide literature (Parker et al., 1999; Pridemore, 2002). The findings are, however, consistent with those of two other studies. Kposowa and Breault (1993) did not discuss the sizeable difference in R^2 values across county sizes, but it is readily apparent in Table 3. Jackson's (1984) comparison of homicide rates in smaller and larger cities reports a reduction in variance explained in the smaller cities, although her work does not include rural areas.

The second striking pattern in Table 3 is the importance of economic resources among counties of all sizes. No other variable was so consistently and significantly predictive of homicide rates. This pattern is congruent with prior research. As noted in Pridemore's (2002) review of homicide research,

> the positive relationship between poverty and homicide rates is the most consistent finding in the literature. Moreover, these positive findings are consistent across time periods, levels of analysis, various measures of poverty, cross-sectional and longitudinal analyses, and model and relationship specifications. (p. 144)

These data show the relationship is also consistent across all county sizes. Thus, poverty appears to be a universally important causal factor in accounting for homicide rates.

Table 3 also indicates that age composition and racial diversity matter less in predicting homicide in the most rural counties, whereas population change matters more. Finally, family instability is most important in the most urban areas but has a measurable influence on homicide rates in other areas as well. Thus, there are important differences in the social dynamics of homicide rates that depend on the urbanicity/rurality of the community's location and that require separate analyses in differentially urban or metropolitan contexts.

Third, region (as indicated by the dummy variable representing the South as a region) has some predictive power in metropolitan areas and matters a great deal in nonmetropolitan counties with small to medium cities. However, region has no predictive power in the most rural counties. This qualifies the findings from a number of studies that have found region, particularly the South, to be important. This pattern is consistent with the arguments of Nisbett and Cohen (1996) that violence in the South is distinct from that in other regions but not for the most rural areas.

Fourth, contrary to expectations, urban density shows a highly variable and inconsistent pattern of association across county size. This suggests the categories selected to represent the metropolitan-nonmetropolitan continuum are good predictors in themselves, with little additional variance accounted for by adding a measure of urbanization.

DISCUSSION

Rural homicide has been the subject of many true crime books and movies, perhaps because the idea of homicide may seem incongruent with images of rural life. Although the popular literature seems enamored by rural homicide, social scientists have

paid scant attention to the issue. One impediment has been a lack of directly relevant data, particularly measures of rurality that adequately represent the concept as well as geographically inclusive samples that represent nonmetropolitan as well as metropolitan populations. A second impediment is methodological and reflects the added measurement difficulties of including rural areas in analyses because of their small populations and relatively small number of rare but important events, such as homicide. The results of this study affirm that including such areas is analytically, as well as empirically, important.

This study has contributed to knowledge about rural homicide by using several data sets created by merging official police data on homicides with county-level data reflecting different categories of rurality. The first data set, drawn from the *SHR*, allowed for the descriptive analysis of the situational and interpersonal features of homicide incidents across levels of rurality; and the second, drawn from county-level *UCR*, used census data on demographic features of counties to predict differences in county homicide rates across levels of rurality. The data sets were used to address two distinct research questions: (a) How different are the homicides that occur in rural or nonmetropolitan areas from those in urban areas? (b) Do rural homicide rates reflect different aggregate social dynamics than urban homicide rates?

Regarding homicide incidents, the data reveal that there are differences between metropolitan counties and the various levels of nonmetropolitan for every category of variable: victim attributes, offender attributes, victim-offender relationships, and circumstances of the event. For many of these variables, the differences follow a linear pattern as one moves from the metropolitan to the most rural areas. This descriptive analysis of homicide incidents also suggests that rurality may be a more important consideration than region and that the effects of region are not always the same in rural and urban areas. This finding runs counter to the practice of researchers who study homicide, who have generally focused far more attention on region than on rurality.

The county-level multivariate analysis provided even stronger evidence of the importance of including rurality in models predicting patterns of homicide rates. The ability of county population characteristics to predict county homicide rates is very good

for urban areas but declines precipitously and linearly as one moves to increasingly rural counties. The multivariate analysis also confirmed the importance of economic factors in predicting homicides in counties of all sizes, suggesting that poverty may be a universally important causal factor in accounting for homicide rates. Furthermore, age composition and racial diversity of counties matter less in predicting homicide in the most rural counties, whereas population change matters more. Finally, regional location matters little in accounting for differences in homicide rates in the most rural areas but has a substantial influence on homicide differences in larger nonmetropolitan counties.

Current reliance on samples from the largest urban areas to study patterns of homicide is a reflection of the urban myopia that characterizes so much research in criminology. A more comprehensive analysis (that includes nonmetropolitan areas as well as metropolitan) shows the stereotype of rural areas as crime-free is simply in error. Although homicide rates are on average lower in nonmetropolitan areas, most (19 of 30) of the counties with the highest homicide rates were in nonmetropolitan areas and most of those were in the most rural category. These pockets of rural violence deserve further examination.

This research also highlights the utility of using the county as the unit of analysis. Surprisingly, although researchers have used cities, states, and even nations to study patterns of homicide, a very small number of studies have focused on the county. This oversight is difficult to understand given the wealth of county-level data available, the tremendous improvement in sample size over state-level analyses or analyses using city-level data, and the improved variability of such factors as urbanization. Furthermore, in nonmetropolitan areas, the county is a significant social and political unit. Many government units, including the courts and social welfare, are organized around the county as a unit.

These findings also highlight the importance of using a nationwide sample of data, rather than data limited to a particular region, a particular state, or a particular municipality. The patterns that were uncovered in this analysis could not have been studied with data drawing only on these more limited samples (which represent the bulk of available homicide research; see Parker et al., 1999; Pridemore, 2002).

Finally, many of the county-level variables used in this analysis are consistent with what have been generally described as theories of social disorganization. The findings suggest that although such factors might do a good job of predicting homicide rates in the most urban counties, variables reflecting social disorganization may be of limited use in predicting homicide rates in the most rural areas. What is perhaps most frustrating about our findings is that no variable or combination of variables proved to be strong predictors of rural homicide. Thus, although the current research suggests that urban models of homicide rates may be inadequate for explaining rural homicide rates, nothing in the analysis points to a particular configuration of factors or a particular theoretical model that might yield a powerful predictive model of rural homicide rates.

The findings of this study have implications for policy as well as for research. It suggests that policies or interventions designed to respond to urban homicide events may have little impact in rural areas because the content and underlying dynamics of rural homicides are measurably different. Ultimately, this study points to an important question that future research must address in more detail. If the variables that so effectively predict urban homicide rates don't do well in predicting rural homicide rates, what particular factors are important in the latter contexts and how do these fit into our current theories of criminal violence?

APPENDIX A
Descriptive Statistics on the Dependent and Independent Variables

Variable		*Metro*	*Nonmetropolitan Counties*		
			NM > 20K	*NM < 20K*	*Rural*
Dependent variable					
Annual homicide rate	*M*	1.524	1.398	1.211	.713
($\log_e$)	*SD*	.784	.761	1.061	1.382
	N	732	245	1,093	626
Independent variable					
Unstable housing index	*M*	30.448	30.463	29.967	29.669
(alpha = .763)	*SD*	1.032	.774	.622	.653
	N	788	290	1281	778
Cultural capital index	*M*	1.590	1.410	1.080	.890
(alpha = .913)	*SD*	.920	.834	.909	.820
	N	788	290	1,279	775
Racial diversity index	*M*	1.215	.987	.867	.619
(alpha = .926)	*SD*	.838	.872	.989	1.003
	N	782	290	1,211	678
Economic resources index	*M*	5.145	4.753	4.288	2.954
(alpha = .895)	*SD*	.808	.725	.825	.940
	N	788	290	1,281	778
Family disorganization index	*M*	3.876	3.774	3.420	2.954
(alpha=.668)	*SD*	.793	.616	.742	.940
	N	788	290	1,280	775
Population change index	*M*	1.990	1.756	1.448	1.378
(alpha = .683)	*SD*	.968	.803	.703	.872
	N	786	286	1,271	773
Population density ($\log_e$)	*M*	3.395	2.658	2.064	1.421
	SD	.795	.602	.615	.700
	N	788	290	1,281	778
% Employed ($\log_e$)	*M*	4.582	4.202	4.030	4.230
	SD	.818	.934	.952	1.155
	N	788	289	1,278	778
% 15 to 24 years old ($\log_e$)	*M*	12.224	12.372	11.813	11.209
	SD	.825	1.205	.858	.886
	N	788	290	1,281	778

NOTE: NM = nonmetropolitan; *M* designates the item's mean value; *SD* designates the standard deviation; *N* indicates valid cases.

APPENDIX B
Negative Binomial Regressions by Subsamples: Reported Homicides (1994-1998) on County Characteristics and Population

Independent Variable [a]	*Metro*	*NM > 20K*	*NM < 20K*	*Rural*
Population change index	.013[b]	.033	.087*	.157*
Family instability index	.396***	.217**	.236***	.246*
Household instability index	–.026	.050	–.086	–.050
Cultural capital index	.081	–.030	.031	.013
Racial diversity index	.448***	.290***	.222***	.112
Economic resources index	–.298***	–.331***	–.224	–.350***
Percentage in ages 15-24 (log)	–.126***	–.125**	–.050	.079
Employment rate (log)	.025	–.012	–.101***	.072
Population density (log)	–.022	–.230**	.076	–.315**
South/non-South (dichotomy)	.076	.341**	.401***	.221
N of counties (w/complete data)	725	240	1,026	534

a. The $\log_{(e)}$ of the population covered by homicide reporting data during the years 1994-1998 was included in the regressions as an "offset" (i.e., variables with a fixed coefficient of 1.0) to convert the regression to a prediction of homicide rates (standardized by population size).
b. Dependent variable is the number of homicides reported during the years 1994-1998. Regression coefficients shown are unstandardized.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

NOTES

1. Of the 40 regression coefficients in Table 3, only 1 substantially changed in the negative binomial results. That variable, population density in the most rural counties, changed sign and magnitude. There is no obvious theoretical explanation for this shift, and given that it occurs in only 1 of 40 coefficients, the likelihood that it reflects sampling error is very high. More likely, it reflects the larger number of counties with zero homicides in the rural subsample, although of the 10 independent variables used in this particular regression, population density was the only variable that was appreciably affected by this.

2. All differences between the multiple correlations (for the regression in all four metro–nonmetro subsamples) in Table 3 are statistically significant, according to the common *z* test for difference between correlation coefficients using Fisher *z* transformations (Cox, 1967, p. 121). The difference between the metro and nonmetro-city > 20,000 regression is significant at the .05 level, although all other comparisons are significant at the .001 level (or smaller).

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