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Author(s):   Adria Gallup-Black

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RURAL AND URBAN TRENDS IN FAMILY AND INTIMATE PARTNER HOMICIDE: 1980-1999

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Adria Gallup-Black, Ph.D.
New York University

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Biography:

Adria Gallup-Black, Ph.D., was formerly a Research Scientist/Research Assistant Professor at the New York University Center for Health and Public Service Research. She is currently Director of Research and Evaluation at the Institute of International Education.

Contact information:
Institute of International Education,
809 United Nations Plaza
New York, NY 10017
(p) 212-984-5347
(f) 212-984-5574
e-mail: agallup-black@iie.org
June 30, 2004

ABSTRACT

The research explores place-based trends in family and intimate partner homicide from 1980 through 1999. Using the FBI's Supplementary Homicide Report data, the construct of place serves as a backdrop against which changes in trends in family and intimate partner homicides are tracked and the independent variables that purportedly explain those trends are tested. The questions are the following: How and in what ways do the rates of family and intimate partner murder differ by place? What variables explain the differences in rates by place, and how and in what ways do they affect changes in rates?

"Place" is operationalized by population and proximity to a metropolitan area. Counties are classified as metropolitan, nonmetropolitan/adjacent to a metropolitan area, nonmetropolitan/not adjacent to a metropolitan area, and rural. Analyses are conducted for intimate partner murder; family murder; and, for comparative purposes, all other murders. Several independent variables are isolated and tested to understand the connections between place and murders.

There was a strong relationship between place and intimate partner murder, whereby the rates increased with rurality. Although intimate partner murders fell in the metropolitan and nonmetropolitan counties during our time period, they rose in the rural counties. Family murders were also higher in the rural counties, and rates rose with increased rurality; however, unlike intimate partner murders, they fell between 1980 and 1999 regardless of the county category. In comparison, other murder rates did not increase or decrease with rurality.

Multivariate analyses against a pooled 1980–99 data set showed that overall community socioeconomic distress played a major role in explaining family, intimate partner, and all other murders, but the particular aspects of this distress played out in different ways based on

population and proximity. What distinguished family and intimate partner murders from all other murders was the extent to which they were affected by population and density shifts. Community socioeconomic distress, when driven by population growth and household crowding, was negatively correlated with family and intimate partner murders, but not all other murders, in metropolitan areas. Population declines were associated with family murders in the nonmetropolitan counties adjacent to a metropolitan area, and with intimate partner murder in the metropolitan counties not adjacent to a metropolitan area. In the rural counties, population declines, even alongside improvements in community indicators, were correlated with increases in all murders; however, overall declines and young adult population declines alone were associated with intimate partner murder. The findings offer lessons for future research and policy.

ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

The research explores rural and urban trends in family and intimate partner homicide for the twenty-year period from 1980 through 1999. The construct of place serves as a backdrop against which changes in trends in family/partner homicide are tracked, and against which the independent measures that purportedly explain the variation in the rates are tested. "Place" is operationalized by population and proximity to a metropolitan area. The overall research questions are, How and in what ways do the rates of family and intimate partner murder differ by place—specifically, by a place's population size and proximity to a metropolitan area? What are the independent measures that explain the differences in rates by place, and how and in what ways do those measures affect changes over time?

The problem

Family and intimate partner murders differ from other types of murders in several ways. First, community and legal responses to family and intimate partner murders are compromised by societal norms that govern "proper" behavior among family members —that is, wife to husband, child to parent, and so on. Second, unlike stranger/acquaintance murders, family and intimate partner murders are usually the end result of a history of physical and/or emotional abuse.[1] Third, some research has linked some variables to stranger/acquaintance murder but not to family and intimate partner murder.[2] Fourth, gender differences exist in the breakdowns of victims and perpetrators: whereas males are far more likely to be murdered by a stranger or acquaintance, women are at far greater risk than men of being intimate partner murder victims.

There is one additional difference, which to date has only begun to be explored: mainly, that the difference between family and intimate partner and stranger/acquaintance murders is a function of place—or, more specifically, degree of urbanicity or rurality. Family and intimate

partner murder have been perceived as urban problems, requiring urban solutions, and this is most likely because the greatest number of murders overall are committed in urban areas (including family and intimate partner). However, mere counts do not reflect the true risk to individuals in any given community, based on a small but growing body of research that suggests that the smaller the population and the farther the distance from a major urban area, the greater the chances that a murderer will be a family member or intimate partner.

The importance of place

Several differences exist in urban and rural areas that can explain why the rate of family and intimate partner homicide might be higher in the latter than in the former. The geography of rural areas facilitates the kind of isolation that supports rural family violence.[3] The nature of interpersonal relationships in rural communities is very different from that in cities, where individuals are less likely to know each other. Along those lines, if the spatial isolation that shapes those interpersonal relationships can account for higher rates of family and intimate partner murders in rural areas, the spatial density that comes with urban disadvantage in urban areas might explain the higher rates of acquaintance and stranger murders in cities. With respect to crime control, many homicide reduction strategies (community policing, illegal firearm reduction, etc.) are most useful in larger, urban areas with greater support resources, and less so in rural areas.[4] Finally, regarding domestic and family abuse vis-à-vis rurality, the literature on rural women and children in the United States and abroad point to the following factors: social and physical isolation;[5] lack of education;[6] less political and social autonomy for women than for men,[7] along with a more traditionalist, conservative view of women and children;[8] poverty and economic distress;[9] population loss, and particularly the outmigration of young people;[10] and the inaccessibility of services to enhance the health and well-being of women and children.[11]

These rural-urban differences provide some support for the hypothesis that family and intimate partner murders will be more prevalent in rural rather than in urban communities. What would contribute to a better-defined theory of family and intimate partner homicide, where place and those characteristics associated with place are integral, is to determine if, in fact, population and proximity to a metropolitan area do matter.

Research strategy

The primary data source was the FBI's Supplementary Homicide Report (SHR) file from 1980 through 1999. The SHR data contain reporting agency-level details about murders and non-negligent homicide in the United States, including information about the geographic location and, when known, the relationship between the victim and the perpetrator.[12] Data from the 1980, 1990, and 2000 U.S. Census were used to calculate population-based rates: per 100,000 age 15 and over for intimate partner homicide, and per 100,000 for all ages for all other homicide types. Intimate partners were defined as current and former spouses (including common-law), current and former boyfriends and girlfriends (including same-sex relationships); family members were defined as parents, siblings, aunts/uncles, stepparents and stepchildren, in-laws, and "other" family. The data were adjusted for missing records on the SHR and for missing victim-offender relationship information.[13] The data were aggregated in 5-year averages to account for potential instabilities in the annual rates, particularly for the low-population counties. Our population and proximity indicator collapsed the 10-point Beale code scheme,[14] which identifies every county in the United States by population and proximity to a metropolitan area, from 0 for the most urban to 9 to the most rural:

- Metropolitan: Central counties of metropolitan areas of 250,000 to 1 million population

- Nonmetropolitan adjacent to a metropolitan area ("Nonmet/adjacent" hereafter):

Populations of 2,500 to 20,000 or more, adjacent to a metropolitan area

- Nonmetropolitan/not adjacent to a metropolitan area ("Nonmet/not adjacent" hereafter): Populations of 2,500 to 20,000 or more, not adjacent to a metropolitan area

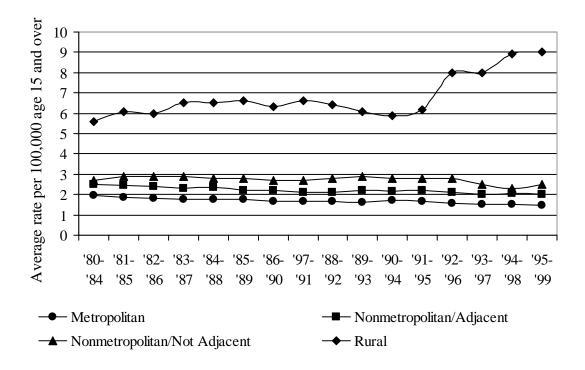- Rural: Completely rural or all population of under 2,500

We conducted two sets of analyses: a descriptive analysis that looked at the rates in the homicide types, and an exploration of the variables that purportedly explain the rates in family and intimate partner murder, through bivariate and factor analyses.

Findings from the Descriptive Analysis

Clearly, the population-based rates in the rural counties were far greater not only for family and intimate partner murders but for all other murders (Exhibits ES-1, ES-2, ES-3). However, while rates of intimate partner and family murder do increase with the decrease in population and greater distance from a metropolitan area, the case is not as linear when it comes to all other murders. In general, the answer to our first question—do rates of family and intimate partner murder rise with declines in population and proximity to a metropolitan area?—was a resounding yes. Among the key findings:

- Rates of intimate partner murder increased with rurality. When it came to the rural counties, not only were the rates considerably higher, but the increase was dramatic, particularly between the early-to-mid-1990s.

- Rate patterns of family murder were somewhat similar; that is, they were higher in the rural areas than in the other areas and tended to rise with rurality. However, in all cases, the rates fell from the start to the end of our time period of interest, regardless of population or proximity.

EXHIBIT ES-1: INTIMATE PARTNER MURDER TRENDS (AVERAGE RATES PER 100,000 AGE 15 AND ABOVE), ROLLING FIVE-YEAR AVERAGES

Source: FBI Supplemental Homicide Report (SHR) data file, 1976-1999; U.S. Census. All data were adjusted for nonreporting and missing relationship information on the SHR file (see "Appendix A: Technical Appendix," in the full text).

EXHIBIT ES-2: FAMILY MURDER TRENDS (AVERAGE RATES PER 100,000), ROLLING FIVE-YEAR AVERAGES

Source: FBI Supplemental Homicide Report (SHR) data file, 1976-1999; U.S. Census. All data were adjusted for nonreporting and missing relationship information on the SHR file (see "Appendix A: Technical Appendix," in the full text).

EXHIBIT ES-3: ALL OTHER MURDER TRENDS (AVERAGE RATES PER 100,000), ROLLING FIVE-YEAR AVERAGES

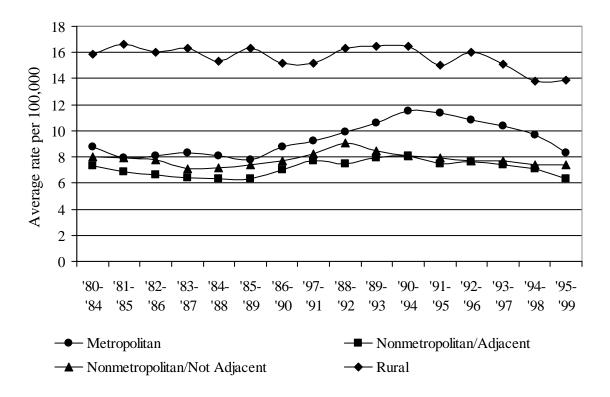Source: FBI Supplemental Homicide Report (SHR) data file, 1976-1999; U.S. Census. All data were adjusted for nonreporting and missing relationship information on the SHR file (see "Appendix A: Technical Appendix," in the full text).

In comparison, the rates of all other murders did not rise or fall with population or proximity. They were highest in the metropolitan and rural counties and lowest in the two nonmet counties for the entire 20-year period.

Examining the Correlates of Family and Intimate Partner Homicide

In light of the differences between rural and urban areas, several variables, culled from the literature, can help explain how rurality or urbanicity affects the rates of family and intimate partner murder:

- Community socioeconomic distress (poverty, per capita income, number of full- and part-time establishments, population change overall and of young adults; arrests for violent crime [except murder], percent nonwhite, racial segregation);

- Residential overcrowding (persons per housing unit);

- Isolation (persons per square mile);

- Traditional views about women and children as a function of educational attainment (percent 25 or older with 12 or more years of education);

- Lack of access to health care (hospitals per 100,000); and

- Substance abuse (arrests for alcohol-and drug-related offenses).

The analysis strategy involved a combination of bivariate analyses and structural equation modeling, which used second-order factor analysis to reduce the data to discrete latent variables or constructs, which each of which was then correlated with the three murder categories. Through this process we produced models for metropolitan (Exhibit ES-2), nonmet/adjacent (Exhibit ES-3), nonmet/not adjacent (Exhibit ES-4), and rural (Exhibit ES-5) counties. There were two key findings: one focused on the primacy of the primary latent construct that was isolated—overall community socioeconomic distress—and the other involved

the effects of population and density (i.e., isolation, household crowding) shifts on family and intimate partner murder in particular.

It was no surprise that some form of overall socioeconomic distress was associated with murder of any type. In most cases, the connections were intuitive: in the metropolitan areas, and, to some extent, the rural areas as well, this distress was associated with drugs and crime; in the nonmet/adjacent areas, it was driven by poor economic outcomes and population increases; and in the nonmet/not adjacent, it was a function of lack of education, poor economic outcomes, and isolation. However, in the rural counties, overall socioeconomic distress was negatively associated with murder but *only when it was tied in with population increases*. This suggests that rural counties are unique in that they are more sensitive to such overall population changes than the other county groups, and this sensitivity is tied into rates for murder.

Population and population density shifts played a huge role in explaining family and intimate partner murder in particular, whether within an isolated construct or on their own. Based on the latent constructs isolated through factor analysis or the bivariate analyses against the individual measures, family and/or intimate partner murders in all of the county categories were affected by either population declines, isolation (or smaller households), or both. The community socioeconomic distress factor that was driven primarily by population growth and household crowding was negatively correlated with family and intimate partner murders, but not all other murders, in metropolitan areas. In the nonmet/adjacent areas, the connection is the weakest, although the bivariate showed that overall and young adult population declines were associated with family murder. In the nonmet/not adjacent areas, the construct associated with isolation was correlated with all three murder types, but the bivariate analysis against household crowding was positively associated only with all other murders and not with family or intimate

partner murder, and, more importantly, overall population declines were linked to intimate partner murder. As noted above, population declines, even in light of improvements in the other measures, were correlated with increases in the three murder types, as was the isolation measure in and of itself; however, overall and young adult population declines alone were associated with intimate partner murder.
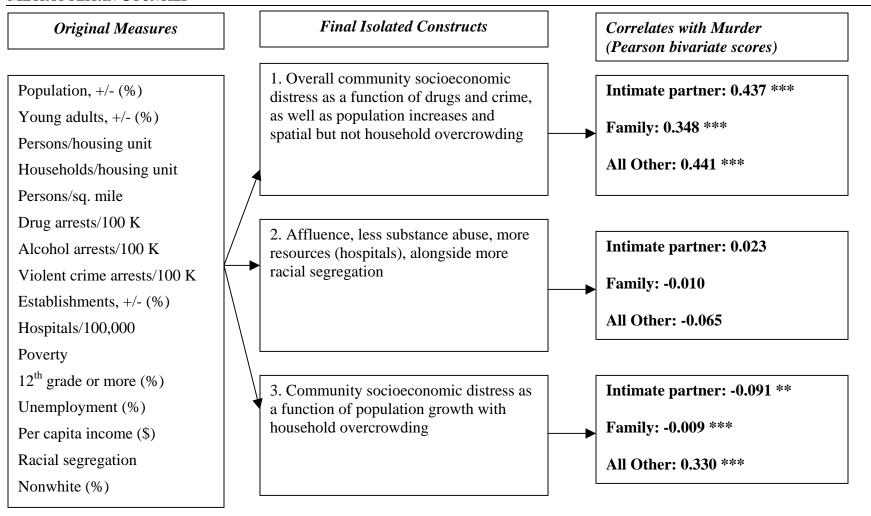
Conclusion

The differences and similarities in the correlates of family, intimate partner, and other murders can inform opportunities for policy and steps for future research. Our findings point to some form of universality given the fact that some aspect of socioeconomic distress was linked to the three murder types. But more important, as noted previously, what was usually within or linked with the construct of socioeconomic distress that underscored family murder and intimate partner murder in particular was tied in with population and density shifts, specifically, declines. Whether directly correlated with isolation in and of itself or connected to isolation and population declines by way of a latent factor derived from a battery of relevant measures, family and intimate partner murders were more affected than all other murders. Thus, we argue that crafting effective policies to deal with family and intimate partner violence must recognize the fact that although spatial isolation is a fact of life in rural communities by dint of geography, it can manifest itself anywhere and at any time—even in large metropolitan areas.

Whether it is spatial or social isolation, the most effective policy response to family and intimate partner violence and homicide will also consider whether that isolation is caused by geography, culture, or even socioeconomic distress. Such a policy response must be multifaceted in its approach. It cannot rely on one strategy for cure, particularly in the realm of law enforcement. In isolated communities, there is either poor policing or lack of resources for

good policing and effective prosecution.[15] Even the research community is mixed as to the effectiveness of the arrest mechanism to address family and intimate partner homicide.[16] However, one very promising strategy is the coordinated community response.[17] The coordinated community response is characterized as a multidisciplinary, synergistic approach involving multiple stakeholders and resources: law enforcement, public health (including mental health), child protective services, schools, eldercare facilities, advocates, and even former survivors of abuse. One major advantage of this approach is that it is more likely to reflect, or at least attempt to work within, the culture of the community.

EXHIBIT ES-4: FINAL MODEL FOR INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1990-99 POOLED AVERAGE: METROPOLITAN COUNTIES

Original Measures	*Final Isolated Constructs*	*Correlates with Murder (Pearson bivariate scores)*
Population, +/- (%)	1. Overall community socioeconomic distress as a function of drugs and crime, as well as population increases and spatial but not household overcrowding	**Intimate partner: 0.437 ***** **Family: 0.348 ***** **All Other: 0.441 *****
Young adults, +/- (%)		
Persons/housing unit		
Households/housing unit		
Persons/sq. mile		
Drug arrests/100 K	2. Affluence, less substance abuse, more resources (hospitals), alongside more racial segregation	**Intimate partner: 0.023** **Family: -0.010** **All Other: -0.065**
Alcohol arrests/100 K		
Violent crime arrests/100 K		
Establishments, +/- (%)		
Hospitals/100,000		
Poverty	3. Community socioeconomic distress as a function of population growth with household overcrowding	**Intimate partner: -0.091 **** **Family: -0.009 ***** **All Other: 0.330 *****
12th grade or more (%)		
Unemployment (%)		
Per capita income ($)		
Racial segregation		
Nonwhite (%)		

Note: Significance levels are indicated as *** p <0.001, ** p <=0.01, * p <=0.05

EXHIBIT ES-5: FINAL MODEL FOR INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1990-99 POOLED AVERAGE: NON-METROPOLITAN/ADJACENT COUNTIES

Original Measures	*Final Isolated Constructs*	*Correlates with Murder (Pearson bivariate scores)*

Population, +/- (%)

Young adults, +/- (%)

Persons/housing unit

Households/housing unit

Persons/sq. mile

Drug arrests/100 K

Alcohol arrests/100 K

Violent crime arrests/100 K

Establishments, +/- (%)

Hospitals/100,000

Poverty

12th grade or more (%)

Unemployment (%)

Per capita income ($)

Racial segregation

Nonwhite (%)

1. Overall community socioeconomic distress, driven by economics, population growth and spatial overcrowding, and segregation, with greater health care access (hospitals)

Intimate partner: 0.261 ***

Family: 0.097 ***

All Other: 0.454 ***

2. Affluence, alongside drug and alcohol abuse (or arrests for drug-and alcohol-related offenses

Intimate partner: 0.051

Family: 0.030

All Other: 0.034

Note: Significance levels are indicated as *** p <0.001, ** p <=0.01, * p <=0.05

EXHIBIT ES-6: FINAL MODEL FOR INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1990-99 POOLED AVERAGE: NONMETROPOLITAN/NOT ADJACENT COUNTIES
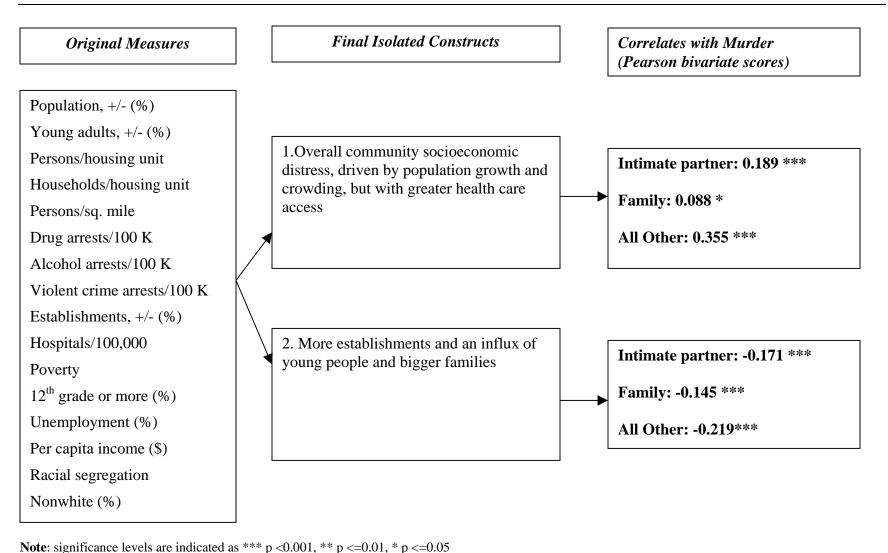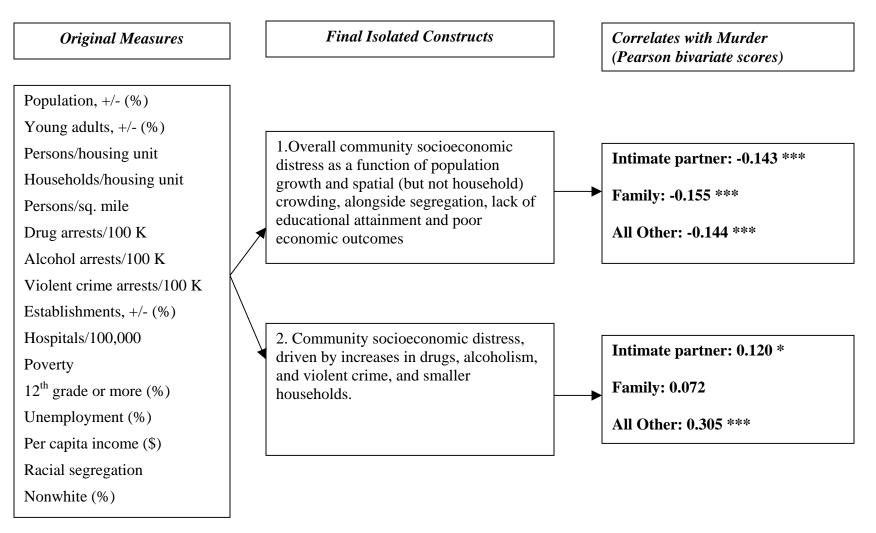
Original Measures	*Final Isolated Constructs*	*Correlates with Murder (Pearson bivariate scores)*
Population, +/- (%)		
Young adults, +/- (%)		
Persons/housing unit	1. Overall community socioeconomic distress, driven by population growth and crowding, but with greater health care access	**Intimate partner: 0.189 ***** **Family: 0.088 *** **All Other: 0.355 *****
Households/housing unit		
Persons/sq. mile		
Drug arrests/100 K		
Alcohol arrests/100 K		
Violent crime arrests/100 K		
Establishments, +/- (%)		
Hospitals/100,000	2. More establishments and an influx of young people and bigger families	**Intimate partner: -0.171 ***** **Family: -0.145 ***** **All Other: -0.219*****
Poverty		
12th grade or more (%)		
Unemployment (%)		
Per capita income ($)		
Racial segregation		
Nonwhite (%)		

Note: significance levels are indicated as *** p <0.001, ** p <=0.01, * p <=0.05

EXHIBIT ES-7: FINAL MODEL FOR INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1990-99 POOLED AVERAGE: RURAL COUNTIES

Original Measures	*Final Isolated Constructs*	*Correlates with Murder (Pearson bivariate scores)*

Population, +/- (%)

Young adults, +/- (%)

Persons/housing unit

Households/housing unit

Persons/sq. mile

Drug arrests/100 K

Alcohol arrests/100 K

Violent crime arrests/100 K

Establishments, +/- (%)

Hospitals/100,000

Poverty

12th grade or more (%)

Unemployment (%)

Per capita income ($)

Racial segregation

Nonwhite (%)

1.Overall community socioeconomic distress as a function of population growth and spatial (but not household) crowding, alongside segregation, lack of educational attainment and poor economic outcomes

Intimate partner: -0.143 ***

Family: -0.155 ***

All Other: -0.144 ***

2. Community socioeconomic distress, driven by increases in drugs, alcoholism, and violent crime, and smaller households.

Intimate partner: 0.120 *

Family: 0.072

All Other: 0.305 ***

Note: significance levels are indicated as *** p <0.001, ** p <=0.01, * p <=0.05

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I. INTRODUCTION

Murders of family members and intimate partners differ from stranger and acquaintance murders in several important ways. First, community and legal responses to family and intimate partner murders are complicated by societal norms that govern ostensibly proper behavior among family members—wife to husband, child to parent, and so on. Historically, violence against women and children in the family was tacitly accepted,[18] which cannot be said for other types of unlawful violence that can lead to murder.[19] Corporal punishment against children was (and is) condoned in the name of discipline.[20] And with regard to violence against women by their partners, until recently the legal system was loathe to intervene into what were considered private affairs within families, and the male's prerogative to do whatever necessary to assert control over his household.[21]

Second, unlike stranger/acquaintance murders, family and intimate partner murders are usually the end result of a history of abuse.[22] Mercy and Saltzman argue that the same demographic variables determine the risk of both fatal and nonfatal spousal abuse. Even in cases of murder of parents by children, or of one sibling by another, abuse is part of the family dynamic.[23]

Third, some of the variables that research has linked to stranger/acquaintance murder do not apply to family and intimate partner murder. Peterson and Krivo showed that while racial segregation was a major factor in stranger/acquaintance murders of African Americans in cities,[24] it fared poorly as a variable in explaining family/partner homicide, for which educational attainment, region, and the percentage of African American professionals in the community were better explanatory variables.

Fourth, there are differences with respect to gender breakdowns of victims and perpetrators. While males are far more likely to be murdered by a stranger or acquaintance,

women are at far greater risk than men of being victims of intimate partner murder. Between 1976 and 1996, intimate partner homicide accounted for 30 percent of female victims but only 6 percent of male victims.[25] During the same time period, males comprised over 90 percent of the perpetrators of stranger and acquaintance murder; however, when women kill it is typically within a family relationship.[26]

There is one additional factor that has just begun to be explored: mainly, that the difference between family and intimate partner and stranger/acquaintance murders is a function of place—more specifically, degree of urbanicity or rurality. However, our current understanding is constrained because, with rare exceptions,[27] the research is generally silent on the construct of place. In the cases where it is not, family and intimate partner violence and murder are seen as uniquely urban problems, probably because greatest numbers of murders are committed in urban areas, family and intimate partner murders included.[28] But do mere counts reflect the true risk to individuals in any given community? The answer is no, based on a small but growing body of research that suggests that the smaller the population and farther the distance from a major urban area, the greater the chances are that the person doing the killing will be a family member or an intimate partner.

The importance of place

There are several differences between urban and rural areas with respect to geography, community dynamics, crime control strategies, and approaches to family and intimate partner abuse that provide the underpinnings of rural-urban variations in the kinds of violence that can lead to family and intimate partner murder. The geography of rural areas facilitates the isolation that accompanies and supports rural family violence.[29]

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The nature of interpersonal relationships in rural areas is very different from that in cities, where individuals are less likely to know each other. While Kowalski and Duffield found that the kind of tight community controls that characterize rural areas tended to lower homicide rates, they did not control for intimate partner or family homicides.[30] In fact, the close-knit nature of rural life, which precludes anonymity, can have a chilling effect for those seeking help for domestic violence and child abuse,[31] which in turn can increase the chances of family and intimate partner murder. What complicates this somewhat in the discussion of family and intimate partner homicide (and abuse as well) is the seemingly contradictory coexistence of isolation with social cohesion. Both create a barrier against outside influences interfering with what are private concerns, whether that private sphere is the community, neighborhood, or home. In their own way, both perpetuate a system of risks and rewards: a community or family that sees few risks (e.g., arrests, community outcry) and many rewards (e.g., greater control, more obedient family members) with respect to abuse is not likely to be moved by outside influences that say that such behaviors are wrong.[32] By the same token, if the spatial geography of rural areas shaping those interpersonal relationships can account for higher rates of family and intimate partner murders, that of urban areas might explain the higher rates of acquaintance and stranger murders.

Several scholars have linked "urban disadvantage" with urban homicide rates in general.[33] For example, with respect to stranger or acquaintance homicide in particular, as noted earlier, black-white segregation in cities was positively associated with these types of murders when perpetrated by blacks.[34] However, this begs the question: Is the key independent variable the density of the urban place that exacerbates segregation's effects, or racial segregation (and racism) *per se*? Although the link between urban density and stranger/acquaintance crime has

not been categorically established to date, social disorganization theories do suggest that the disconnectedness, high family mobility, and overcrowding that comes with urban life can be linked to murders of acquaintances and strangers in urban areas.[35]

Donnermeyer posited that what leads to rural crime is the same as that for urban crime but that the degree is different.[36] With respect to crime control, many homicide reduction strategies (community policing, illegal firearm reduction, etc.) are most useful in larger, urban areas with greater support resources, and less so in rural areas.[37] For example, interventions designed to reduce the number of illegal firearms have little to no impact in rural areas, where many residents own legal firearms.[38] The distribution of law enforcement personnel is very different in rural communities; for example, one sheriff might be responsible for large geographic areas.[39] In addition, a greater distrust of law enforcement exists in rural communities, where some residents prefer to settle disputes privately.[40] This distrust may be particularly acute among domestic violence victims who at one point might have reached out to the local police, who may have treated them with indifference or who could not secure their safety because of a lack of resources.[41] Finally, regarding domestic and family abuse vis-à-vis rurality, the literature on rural women and children in the United States and abroad point to the following factors: social and physical isolation;[42] lack of education[43]; less political and social autonomy for women than for men,[44] along with a more traditionalist, conservative view of women and children;[45] population loss, particularly the outmigration of young people;[46] and the inaccessibility of services to enhance the health and well-being of women and children.[47]

Thus, in light of the differences between rural and urban areas, several variables emerge that can help explain how rurality or urbanicity affects the rates of family and intimate partner murder: community socioeconomic distress; residential overcrowding; isolation; traditional

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views about women and children as a function of educational attainment; lack of access to health care; and substance abuse.

Community socioeconomic distress. Research has connected several aspects of community socioeconomic distress to violence in and of itself, and the violence that leads to murder. Many studies have linked poverty with crime and violence in general, and to homicide, domestic violence, and child abuse in particular. For example, women whose income is less than $10,000 per year are at greater risk of abuse,[48] as are children in distressed communities.[49] Moreover, Braithwaite and Braithwaite, Krohn, and Crutchfield showed that poverty was strongly correlated with homicide.[50] Websdale suggested that the matter was not so much poverty but income dissimilarity, arguing that although the poor are more likely to commit family homicides, it is not so much because they lack means but because of the tensions that result as they compare themselves to those better off than themselves.[51] Poverty (or income dissimilarity) usually functions alongside other economic stressors that can contribute to violence, such as unemployment and job loss,[52] as well as population loss, especially the migration of young families and those who contribute most to the tax base.[53]

Earlier, we spoke of the linkage between "urban disadvantage" and urban homicide. Arguably, the relationship between violence and economic hardship[54] can be just as pronounced in rural or small population areas.[55] Job loss in particular can have devastating effects in rural areas, many of which are characterized by single economies (e.g., farming, mining, etc.). Matthews, Maume, and Miller found that the effects of 1990s deindustrialization in smaller, midsized rustbelt cities (i.e., populations under 150,000) drove overall homicide rates upward; although they did not control for homicide type, it is not unreasonable to assume that intimate and family homicide rates might be affected as well.[56]

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The rate of violent crime in a community can have devastating effects, by creating a climate where violence is seen as an acceptable and reasonable means of settling disputes in and outside of the home.[57] Although violent crime is portrayed in the media and elsewhere as an "urban scourge," rural areas are not immune at all: Weisheit et al. reported that acquaintance homicide, rape, and assault were more common in rural than in urban areas.[58]

Many studies have linked the percent nonwhite with community socioeconomic distress: cities that are predominantly nonwhite have fewer viable work opportunities and as such are less likely to have the necessary resources to fight crime and violence and are more likely to have the stressors associated with violent crime.[59] In addition, 2002 FBI statistics showed that nonwhites, African Americans in particular, were more likely to be victimized by violent crime and by murder than whites,[60] and, germane to this particular inquiry, the Office of Justice Programs reported that homicide was the leading cause of death among African American women aged 15 to 44.[61] The critical factor, however, is not race, in and of itself, but how racism may be playing out in a community, in other words, segregation. Above, we touched upon segregation and "urban disadvantage," and while some questions remain as to whether the problem is in the nature of urban areas or segregation itself, there are still important lessons from the literature on urbanism and segregation that can inform this inquiry. Urban areas where segregation exists—in particular, segregation of African Americans—fare more poorly in terms of economic and other indicators than less-segregated communities.[62] Peterson and Krivo showed that racial segregation had a greater effect than poverty on African American homicide rates in cities (however, as noted earlier, the effect was greater for stranger/acquaintance homicides than for other types of murders).[63] Research has also shown that suburban areas are not immune to the effects of racial segregation on crime in general.[64] Effects in rural areas, however, may not be as

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clear, as most rural communities are more likely to be racially homogeneous. They are also more likely to be white: as per the 2000 Census, 8.1 percent of residents in counties with populations of less than 2,500 were neither white nor white and another race.[65]

Residential overcrowding. Centerwall showed that, controlling for race, the level of crowding in cities was correlated with intimate partner homicide.[66] Residential overcrowding has also been linked to child abuse and to violence in general.[67] However, much of the evidence is urban based, although research is starting to emerge showing that residential overcrowding can also exist in rural areas and have similar stressor effects.[68]

Isolation. Isolation is a primary characteristic of intimate partner abuse. Abusive partners attempt to isolate their mates from family and friends and try to prevent them from attending work or school. Due to the geography of rural areas in themselves, isolation has been frequently cited as a key factor in rural family violence.[69] Wilkinson noted that social insularity stemming from isolation in rural areas actually precludes the kinds of constraints that a broader community can bear upon a troubled family, making family violence a more likely occurrence in those communities.[70] In addition, programs and services such as battered women's shelters and programs tailored to help batterers tend to be concentrated in cities, not in rural areas. For many years, all states have required all those responsible for the care of children—teachers, child care workers, physicians, as well as other social service providers—to report suspected cases of child abuse; because urban residents encounter the social service system at greater rates than their rural counterparts, this could have the effect of keeping the rates of family and intimate partner violence down in cities but not in rural areas. Isolation can be a factor in cities as well, particularly when intertwined with racial and/or economic segregation: Lee (2000) found that "spatial isolation," that which separates the poor from the nonpoor, is positively connected to

rates of murder in cities.

Traditionalist views as a function of educational attainment. Although the link between educational attainment, homicide, and family and intimate partner homicide and abuse has to date not been established categorically, studies suggest some sort of connection. For victims, lack of education compromises their ability to remove themselves (and their children) from harm's way and compromises their ability to become effective advocates for their own well-being.[71] While some studies have linked a batterer's lower educational attainment with domestic abuse,[72] others have found no connection.[73] Arguably, at the macro level, a community's tolerance of the kinds of corporal punishments of family members that could lead to murder might be linked to the collective educational level of that community, because research has shown that socially conservative and traditionalist views of women's and children's roles in the family, which are strongly associated with lower educational attainment,[74] create the philosophical underpinnings of family and intimate partner violence.[75] This might be found in rural areas, where there are fewer educational opportunities.[76]

Lack of access to health care. Websdale suggested that many homicides in rural communities were actually assaults that became murders because adequate and immediate medical care was not available.[77] Leading causes of injuries among inner city women between 1987 and 1990 was violence;[78] thus, the greater availability of medical resources may have prevented these injuries from becoming lethal. The rate of self-reported intimate violence victimizations per 1,000 females 12 and over in 1992–93 was 10.7 for urban residents, 9.2 for suburban residents, and 7.7 for rural residents.[79] Could the lack of medical facilities or their inaccessibility, account for higher murder rates for rural woman even though their victimization rates are lower? In 1998, 62 percent of rural counties were classified as "health professional

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shortage areas" (HPSAs) by the Council on Graduate Medical Education; in addition, there is a greater likelihood that rural residents will be uninsured.[80]

Substance abuse. Regarding the effects of substance abuse in communities, the proliferation of drugs in urban areas—particularly, heroin in the 1960s and 1970s and crack cocaine in the 1980s—came with violent crime (homicide in particular), especially among youth; of late, rural areas have not been immune to these dual influxes of drugs and crime.[81] Many have explored the higher rates of substance abuse—specifically, alcoholism—in rural areas.[82] Alcoholism has been linked to domestic and child abuse, as well as family murder overall, in both rural and urban areas.[83] This is not to say that alcoholism and drug use are in and of themselves causative; rather, they are powerful facilitators for those already inclined towards domestic abuse.[84] Moreover, victims of domestic abuse have higher rates of alcoholism as well as drug use.[85] The link, however, to family and intimate partner murder remains unclear.

Conclusion

These rural-urban differences provide some support for the hypothesis that family and intimate partner murders will be more prevalent in rural communities than in urban ones. However, none of this "proves" an irrefutable connection between place and family and intimate partner homicide, and at this juncture any theories would be highly speculative in scope. What would contribute to a better-defined theory of family and intimate partner homicide, where place and those characteristics associated with place are integral, are three steps. First, we need to determine if in fact population and proximity to a metropolitan area do matter. Thus, in chapter 2 we employ a descriptive yet empirical approach that does not rely on a simple count of murders. Instead, borrowing from the world of public health, we calculate a series of population-based rates in order to determine whether the rates of family and intimate partner murder, and,

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for comparison purposes, all other murder do in fact differ by place, and if so, how they differ

and whether any differences fluctuate or remain constant over time. Then, based on the

discussion in this chapter and the findings in chapter 2, in chapter 3 we present data for the

variables and measures, explore key trends, and determine the extent to which our variables can

explain the variations in the rates by means of a bivariate analysis. In chapter 4 we take our

analysis a step further by examining how our selected measures interact with one another by way

of structural equation modeling, which uses second-order factor analysis to produce a series of

constructs that can better explain the rates of family, intimate partner, and all other murders by

population and proximity. In chapter 5, we discuss how these steps can provide the springboard

for future researchers in their efforts to develop more cogent and theoretically defensible place-

based models of the correlates of family and intimate partner homicide, and how our findings can

inform policies that are truly tailored for the places they were designed to serve.

II. DESCRIPTIVE ANALYSES: TRENDS IN FAMILY AND INTIMATE PARTNER MURDER

At this juncture, the first and most obvious question is, does place really matter? To answer that question, we turn to a descriptive analysis of the 20-year trends. We begin with a brief explanation of the research methods, including our strategies for handling data that were missing critical variables, and then move on to the analysis itself. (A more detailed description of the data sources, processing, and imputation methods are contained in the Technical Appendix, below.)

Research Strategy

Our primary source is the FBI's Supplementary Homicide Report (SHR) data from 1980 through 1999. The SHR data contain reporting agency-level details about murders and non-negligent homicide in the United States, including information about the geographic location and, when known, the relationship between the victim and the perpetrator.[86] Data from the 1980, 1990, and 2000 U.S. Census were used to calculate population-based rates: per 100,000 age 15 and over for intimate partner homicide, and per 100,000 for all ages for all other homicide types. Intimate partners were defined as current and former spouses (including common-law), current and former boyfriends and girlfriends (including same-sex relationships); family members were defined as parents, siblings, aunts/uncles, stepparents and stepchildren, in-laws, and "other" family.

Handling missing data. By far, the most serious problem with respect to the SHR surrounds missing data—both in terms of missing records, or nonreporting by agencies, and of missing pieces of important information on the records that do exist on the files. Approximately 92 percent of all murders reported to the FBI Uniform Crime Report are represented on the SHR data files during any given year.[87] To correct for this, the SHR files themselves contain yearly

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nationwide and individual statewide weights. For greater precision, we went to the lowest unit of analysis possible—the reporting agency—and calculated an agency-wide adjusted weight, for each year separately, using the FBI's Uniform Crime Report (UCR) "Offenses Known and Clearances by Arrest" data files by the number of murders reported on the SHR. Our weight divided the number of murders in the SHR files by the number of murders on the UCR. Thus, a weight of "1" indicated that the number of murders on the SHR was identical to the number of murders on that SHR for any given reporting agency and year.

Additionally, and more important for our specific inquiry, in-house calculations on the SHR file revealed that approximately 32 percent of all of the records on the SHR are missing information about the victim-offender relationship. Therefore, we used a within-county adjustment strategy based on the weighted, within-city adjustment method outlined by Pampel and Williams.[88] After adjusting for nonreporting, as described above, we imputed the missing victim-offender relationship information by calculating a proportion based on five murder circumstance categories (felony, other felony, nonfelony, other nonfelony, unknown), the number of incidents per relationship category for each of the five circumstances for which the relationship is known and unknown, our three murder types (family, intimate partner, all others) and the population. Murders for which the circumstance itself was missing were adjusted using a simple proportion of known cases for that murder type. As with the case of missing murders on the SHR, each year was treated separately. (See "Appendix A: Technical Appendix," page 73, for a detailed discussion of the calculation used for the adjustment.)

Defining "rural," "urban," and places in between. There were several strategies from which to choose. A simple rural-urban split, which is based on the Census definition of urban (i.e., incorporated or Census-designated places with 2,500 or more residents) would have treated

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both small and large cities alike: for example, a 15,000-person factory town would be lumped in with a major metropolitan city. Along the same lines, a metropolitan-nonmetropolitan division, based on the U.S. Office of Management and Budget's identification as metropolitan those counties with cities or urbanized areas of over 50,000 (as well as surrounding counties based on population and commuting patterns), would have caused us to miss any low-population counties among those metropolitan counties.

At the other spectrum are more elaborate classification schemes, the most common of which is the Beale code system (also known as the "rural-urban continuum"), a 10-point scale that classifies every county in the United States by population size and proximity to a metropolitan area.[89] Beale codes, developed by the Economic Research Service of the U.S. Department of Agriculture, are based on Census county estimates and definitions of metropolitan and nonmetropolitan areas. Metropolitan counties are assigned one of four codes: 0 = Central counties of metropolitan areas of 1 million population or more; 1 = Fringe counties of metropolitan areas of 1 million population or more; 2 = Counties in metropolitan areas of 250,000 to 1 million population; and 3 = Counties in metropolitan areas of fewer than 250,000 population. The nonmetropolitan counties are designated as: 4 = Urban population of 20,000 or more, adjacent to a metropolitan area; 5 = Urban population of 20,000 or more, not adjacent to a metropolitan area; 6 = Urban population of 2,500 to 19,999, adjacent to a metropolitan area; 7 = Urban population of 2,500 to 19,999, not adjacent to a metropolitan area; 8 = Completely rural or fewer than 2,500 urban population, adjacent to a metropolitan area; and 9 = Completely rural or fewer than 2,500 urban population, not adjacent to a metropolitan area.

The rural-urban continuum's advantage is that it recognizes that proximity to a metropolitan area, alongside population, has real consequences in terms of economic and social

outcomes.[90] However, such a fine breakdown could be problematic for many analyses of rural areas because the population base of the rural categories becomes too small. Given that homicide is a relatively rare event, analyses of homicide patterns would be particularly prone to error. Focusing solely on proximity to a metropolitan area was another possibility; however, for our purposes we would not have been able to capture the effects of small population size. We therefore collapsed the 10 Beale code classifications into four categories that still captured both population and proximity to metropolitan areas while dealing with the "small base" issue: 1 = metropolitan counties (Beale codes 0-3), 2 = nonmetropolitan counties adjacent to a metropolitan area (Beale codes 4 and 6), 3 = nonmetropolitan counties not adjacent to a metropolitan area (Beale codes 5, and 7), and 4 = all rural, or population under 2,500 (Beale codes 8 and 9).[91]

Once all of the adjustments were made for missing data, the population-based rates calculated, and the place/proximity code attached to each record, there was one additional step. Within the 20-year time period, 5-year averages (1980–84, 1985–89, 1990–94, and 1995–99) were calculated to account for instability in both the annual murder counts and in the population, especially for low-population counties. Where appropriate, data are presented for these four 5-year groupings only; in others—in particular, the line charts—data are shown as rolling 5-year averages to better illustrate the trends. In addition, for most of the bivariate and all of the multivariate analyses to follow, we used a pooled data set, averaging 1980 through 1999 data.

Descriptive Analyses

Exhibit 2.1 contains the population-based rates of intimate partner; family; and, for comparative purposes, all murders between 1980 and 1999, broken down in 5-year and overall averages for each of the four place classifications. For the remainder of this report, the names of some of the categories will be shortened slightly within the text for greater readability:

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"metropolitan" and "rural" will remain as they are, but "nonmetropolitan/adjacent" and "nonmetropolitan/not adjacent" will be abbreviated as "nonmet/adjacent" and "nonmet/not adjacent."

Overall trends. Clearly, the population-based rates in the rural counties were far greater not only for family and intimate partner murders but for all other murders. Does this mean, then, that the risk of murder overall is greater the smaller the area and the further from a metropolitan area? It depends on the murder type. While rates of intimate partner and family murder do increase with rurality, the case is not as linear when it comes to all other murders; here, most of these murders are in the urban as well as the rural areas, with lower rates in the nonmet areas (the lowest rates are in the nonmet/adjacent counties for all years but 1990–94, where the rates in both nonmet categories are identical).

Intimate partner murder. As we examine the 5-year moving averages in the rates of intimate partner homicide, (Exhibit 2.2), what is striking is the difference between the rural rates and those of the other more populous, metropolitan counties, both in terms of actual rates as well as in movement patterns over time (Exhibit 2.2). Rates of intimate partner murder were clearly higher with rurality. The differences in the rates among the metropolitan three more populous county categories were marginal, as was the extent of the increases or declines over time. In addition, rates in all but the rural counties declined between 1980–84 and 1995–99. In sharp contrast, not only were the rates in the rural counties considerably higher, but the rates were quite variable and the rises were dramatic, particularly between 1991–95 and 1993–97, and rising even higher by the end of our period of interest. In fact, while all intimate partner murder rates fell (by varying degrees) for all of the population/proximity categories and time periods between
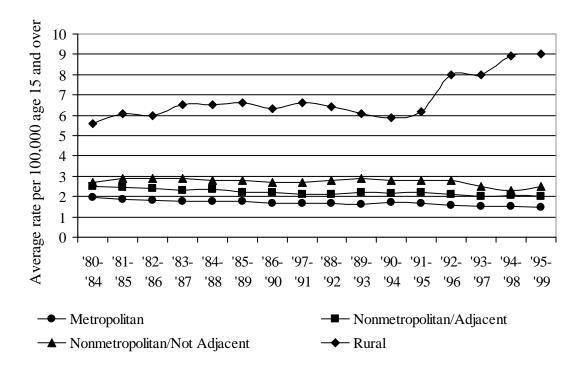
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EXHIBIT 2.1: AVERAGE RATES OF INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS PER 100,000, 1980-99

	Metropolitan	Nonmetropolitan/ adjacent	Nonmetropolitan/ not adjacent	Rural
Intimate Partner Murder*				
'80-'84	2.0	2.5	2.7	5.6
'85-'89	1.8	2.2	2.8	6.6
'90-'94	1.7	2.2	2.8	5.9
'95-'99	1.5	2.0	2.5	9.0
'80-'99	*2.0*	*2.3*	*2.8*	*8.3*
Family murder				
'80-'84	1.0	1.6	1.8	3.7
'85-'89	0.9	1.5	1.7	3.8
'90-'94	1.0	1.4	1.6	3.6
'95-'99	0.7	1.1	1.3	3.1
'80-'99	*1.0*	*1.5*	*1.7*	*4.3*
All other murder				
'80-'84	8.8	7.3	8.0	15.9
'85-'89	7.8	6.3	7.4	16.3
'90-'94	11.5	8.1	8.1	16.5
'95-'99	8.3	6.3	7.4	13.9
'80-'99	*8.8*	*7.1*	*7.8*	*17.7*

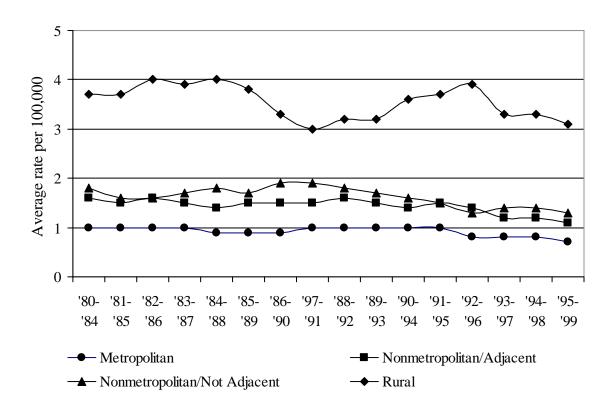* Calculated per 100,000 age 15 and over.

Source: FBI Supplemental Homicide Report (SHR) data file, 1976–1999; U.S. Census. All data were adjusted for non-reporting and missing relationship information on the SHR file (see "Appendix A: Technical Appendix," page 73).

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EXHIBIT 2.2: INTIMATE PARTNER MURDER TRENDS (AVERAGE RATES PER 100,000 AGE 15 AND ABOVE), ROLLING FIVE-YEAR AVERAGES

Source: FBI Supplemental Homicide Report (SHR) data file, 1976-1999; U.S. Census. All data were adjusted for nonreporting and missing relationship information on the SHR file (see "Appendix A: Technical Appendix," page 73).

1980–85 and 1995–99, the sole exceptions were the rural counties, where rates increased from

5.6 per 100,000 ages 15 and over to 9.0: an increase of over 60 percent.

Family murder. Rolling average rate patterns of family murder were somewhat similar to

those of intimate partner murder; that is, they were higher in the rural areas than in the other

areas and tended to rise with population and proximity (Exhibit 2.3). However, in all cases, the

rates fell from the beginning of our time period to the end, regardless of population or proximity.

Family murder rates in the rural areas were not as variable over time as they were in the case of

intimate partner murder. In addition, although the metropolitan counties had the lowest rates and

the rural the highest, the rates did not always rise or fall with rurality, as evidenced by the

intertwining patterns in the two nonmetropolitan groups of counties: the nonadjacent county rates

were higher than the adjacent rates in the early 1980s, lower from the mid-1980s until the mid-

1990s, and higher again through the end of the period. The metropolitan and rural rates fell and

rose in different patterns; however, the increases and decreases were within 0.1 per 100,000 until

1991–95, when declines were seen in both sets of counties. Rates in the two nonmet county

categories were higher than in the metropolitan counties, and the gap between them was slightly

wider than was the case with intimate partner murder. Still, consistent with intimate partner

murder, rates in the rural counties were markedly higher than in the other three county

categories.

All other murders. In comparison, the rolling average rate patterns of all other murders

differed from those of family and intimate partner murders in that the rates did not rise or fall

with population or proximity (Exhibit 2.4). Instead, the lowest rates were in the nonmet

counties. In addition, all but the rural counties seemed to operate in tandem with each other:

falling in the mid-1980s, rising in 1990–94, then falling again in 1995–99. In the rural counties,

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EXHIBIT 2.3: FAMILY MURDER TRENDS (AVERAGE RATES PER 100,000), ROLLING FIVE-YEAR AVERAGES

Source: FBI Supplemental Homicide Report (SHR) data file, 1976-1999; U.S. Census. All data were adjusted for nonreporting and missing relationship information on the SHR file (see "Appendix A: Technical Appendix," page 73).
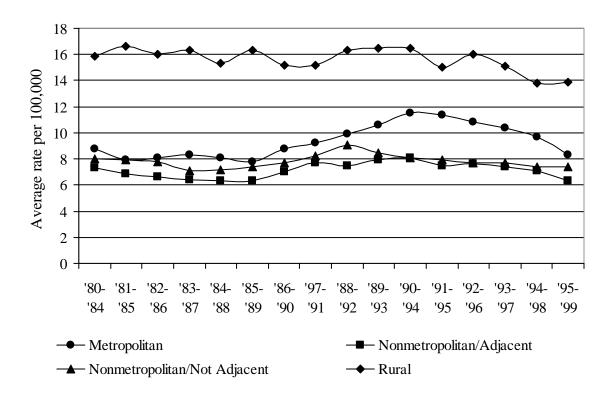
the rates steadily increased until the early 1990s before declining in the later part of the 1990s. This rise in the early 1990s and subsequent fall is perfectly consistent with the overall declines in murders in all counties; since all other murders comprised 81 percent of all murder on average for the 1980–99 time period,[92] it stands to reason that trends in all other murders would most closely resemble those of all murders in general.

Movement patterns. It seems as if the story is as much in the higher risk of murder in rural counties, as calculated by population, as in the degree to which the trends moved within each county category by year grouping, and how close or how far those rates were from those of the other county categories. This becomes clearer upon an examination of the percentage change for each murder category by county grouping (Exhibit 2.5).

One notable finding is that the largest percentage declines were experienced for family murder. However, family murder had the lowest rates to start with, so any percentage changes would appear to be bigger than for intimate partner or all other murders, in which the rates were larger.[93] The greatest declines in family murders were in the nonmet/not adjacent counties and the lowest in the rural counties.
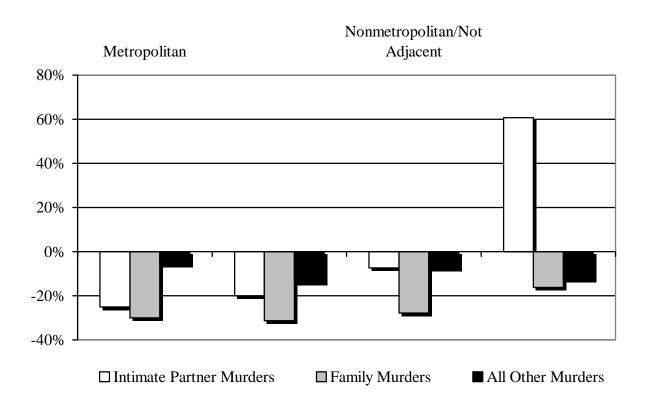
Another finding is that family and all other murder trends were similar in that there were declines across the board, whereas this was not the case with intimate partner murder for rural counties (which was noted previously). Patterns of decline were not uniform for all murder types: the greater the population and closer to a metropolitan area, the greater the decline in intimate partner murder; this linear pattern was not seen for family murder, and declines for all other murders seemed to fall in no particular pattern except by time. Yet another observation is that while declines for family and all other murders were largest in the nonmetropolitan/adjacent

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EXHIBIT 2.4: ALL OTHER MURDER TRENDS (AVERAGE RATES PER 100,000), ROLLING FIVE-YEAR AVERAGES

Source: FBI Supplemental Homicide Report (SHR) data file, 1976-1999; U.S. Census. All data were adjusted for nonreporting and missing relationship information on the SHR file (see "Appendix A: Technical Appendix," page 73).

EXHIBIT 2.5: PERCENT CHANGES FROM 1980 TO 1999 IN COUNTY-LEVEL RATES OF INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, BY POPULATION-PROXIMITY GROUPING

Source: FBI Supplemental Homicide Report (SHR) data file, 1976-1999; U.S. Census. All data were adjusted for nonreporting and missing relationship information on the SHR file.

counties, the largest declines in intimate partner murder were found in the metropolitan counties (which also had the lowest declines in all other murders).
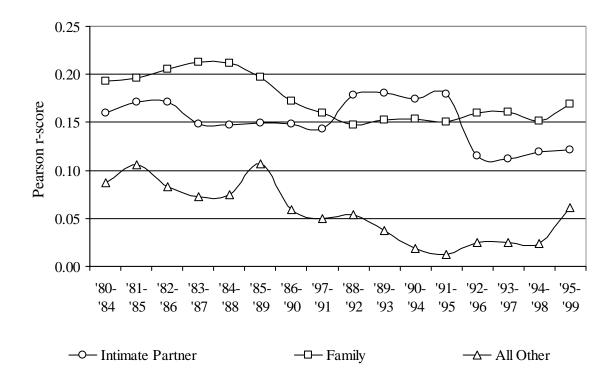
Bivariate analyses. One other way to approach, test, and thereby confirm the connection between place/proximity and rates of intimate partner, family, and all other murders is to test empirically the strength of the relationship and to see whether it is statistically significant. We do this by way of a bivariate Pearson correlational analysis. The bivariate scores, or r-scores (Exhibit 2.6), shown for the 1980–99 pooled average and the four 5-year averages, show that the relationship between place/proximity and all of our murder categories is modest but positive, and, with one exception (all other murders in 1990–94), statistically significant, most at the $p < = 0.001$ level. Both on averages and for the four 5-year groupings, the r-scores for both intimate partner and family murders were markedly higher than those for all other murders. Comparing intimate partner with family murders, however, the 1980–99 average and all but the 1990–94 averages for family murder were higher than those for intimate partner murder. Exhibit 2.7, which contains the rolling 5-year averages, shows these r-score patterns in more detail. Population and proximity had more of an effect of family murders from the beginning of our time period until the late 1980s; in 1992–96 the correlation with intimate partner murder plummeted by over 35 percent (however, the correlations remained statistically significant). Whether this fall is in any way connected to the early 1990s peak and subsequent fall in murders overall is a matter for speculation.[94]

EXHIBIT 2.6: BIVARIATE ANALYSES (PEARSON CORRELATIONS) OF POPULATION/PROXIMITY WITH INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 20-YEAR AND 5-YEAR TIME PERIODS

	1980–84		*1985–89*		*1990–94*		*1995–99*		*1980–99*	
Intimate partner	0.160	***	0.149	***	0.175	***	0.122	***	0.135	***
Family	0.193	***	0.198	***	0.154	***	0.169	***	0.220	***
All other	0.087	***	0.107	***	0.018		0.061	**	0.107	***

Note: Significance levels are indicated as *** $p < 0.001$, ** $p <= 0.01$, * $p <= 0.05$

EXHIBIT 2.7: BIVARIATE ANALYSES (PEARSON CORRELATIONS) OF POPULATION/PROXIMITY WITH INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, ROLLING 5-YEAR AVERAGES

Conclusion

Our first question was, do rates of family and intimate partner murder rise with declines in population and distance from a metropolitan area? The answer is yes. The reason why we cannot solely attribute this to an ecological fallacy—that is, lower population counts in smaller counties produce higher population-based rates—is because the patterns of increases and decreases are not identical for family and intimate partner murders, and they do not at all match the pattern of increases and decreases in all other murders in comparison. With respect to intimate partner murder, not only did rates increase with population declines/proximity from a metropolitan area, but the declines decreased when moving from metropolitan to nonmetropolitan/not adjacent and even increased for rural counties. Moreover, these patterns were consistent over time. Family murders were similar in that rates increased with population/proximity, but the patterns within each county grouping differed somewhat, and rates declined for all four county groups. Moreover, there was greater stability in movement than was the case with intimate partner murder. (This may be tempered by the fact that the rates themselves were very small to begin with, as noted earlier.) All other murder rates were largest in the metropolitan and rural counties, unlike those for family and intimate partner murders. That the lowest rates were seen in the two nonmet county groupings is of particular interest and warrants further investigation. However, we cannot attribute this solely to the decline of "street crime" the farther one moves from the city, because the rates are higher in the rural counties. Something else is happening, and perhaps an examination of the purported correlates of family and intimate partner murder will shed light on this and other issues.

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III. VARIABLES, MEASURES, AND CONNECTIONS TO MURDER

In our introductory discussion, we presented the reasons, based on the literature, why rates of family and intimate partner murders may be higher in general rural communities: socioeconomic distress, geography, lack of access to health and other services, differing crime control strategies, and education. Now that we've taken a look at the rates of family, intimate partner, and all other murders and further found that the rural areas in particular had the highest rates of family and intimate partner homicide (along with the second highest rates of all other murders), the question now becomes, did any of these variables worsen over time in rural communities within the time period of interest? To answer that, we now turn to a fuller examination of the variables that purportedly related to place, and their connections to murder.

Variables and Measures

Exhibit 3.1 lists the variables and groups the measures used to capture them. For some of the variables, we used more than one measure not only for the purposes of capturing a more nuanced effect but also because any given measure that may work in a rural analysis may not fare as well in an exploration of inputs in an urban or suburban setting: for example, the literature on substance abuse, cited earlier, demonstrated that alcoholism might be a bigger problem in rural communities than drug abuse, which might be more of a concern in metropolitan areas. The measures are by and large self-explanatory; for the violent crime measure, however, it should be noted that the figure includes only rape, robbery, and assault and excludes murder and non-negligent manslaughter in order to avoid problems associated with endogeneity with our dependent measures (our three murder rates). For the sake of consistency, the data are grouped by the same population/proximity and 5-year grouping categories as the homicide rate data shown earlier.

EXHIBIT 3.1: SELECTED CONSTRUCTS AND MEASURES

Construct	*Measure(s)*
Community socioeconomic distress	Annual percent population change and annual change in the percentage of individuals 18–34
	Poverty
	Unemployment
	Per capita income (1982–84 dollars)
	Annual percent change in the number of establishments
	Arrests per 100,000 for all violent crime other than murder and non-negligent homicide (i.e., forcible rape, robbery, assault)
	Racial segregation (dissimilarity index) and percent nonwhite
Residential overcrowding:	Persons per housing unit
Isolation	Persons per square mile
Traditionalist views of women and the family	Percentage of adults with 12 or more years of education
Lack of access to health care	Number of hospitals per 100,000
Substance abuse	Arrests per 100,000 for alcohol-related offenses (drunk driving, liquor law offenses, and public drunkenness) and arrests per 100,000 for drug-related offenses

Note: For detailed explanations of the sources and calculations for each measure, see "Appendix A: Technical Appendix" on page 73

Exhibit 3.2 contains a simple descriptive analysis of each measure, by way of a 1980–99 average, and the rate of change between 1980–85 and 1995–99. Most the averages in each of the population/proximity county categories generally fell into one of two categories: in some cases, they operated in tandem with each other, which meant that if the nonmetropolitan and rural counties started off as worse than their metropolitan counterparts, these county groups remained worse even if conditions improved—such was the case with arrests for violent crime, and poverty; in other cases, the two nonmetropolitan counties and rural counties were similar to one another and very different from those of the metropolitan counties (even if the metropolitan and nonmet/rural trends moved in the same direction); this was seen for the annual percent in the population change for young adults (18–34), hospitals per 100,000 (particularly for the two nonmetropolitan/adjacent and non-adjacent categories), per capita income, and segregation. The percent of adults 25 or older with 12 or more years of education fell into both of these categories.

There are two ways to approach the discussion of explanatory variables: examining trends for each measure and comparing to trends in murders, and empirically linking each variable/measure and then performing bivariate correlational analyses against our three murder types. The former would indeed be informative but would introduce unnecessary complexity to the process: put another way, "trending out" each variable, by year (or even our collapsed 5-year groupings), and then comparing by each type of murder, and then by population/proximity, would result in 720 different analyses (15 measures by three types of murders by four 5-year time periods by four county categories = 720) At the end, given the number of cells to deal with, we would still be unable to determine the extent to which place affected the three murder rates by way of the explanatory variables. A more effective method would involve a two-step process, both using a pooled 1980–99 data set: a test of our hypothesis that these variables are in fact

EXHIBIT 3.2: 1980–99 AVERAGES FOR SELECTED INDEPENDENT MEASURES, 1980–99 POOLED AVERAGE, AND PERCENT CHANGE FROM 1980–85 TO 1995–99

	Metropolitan		*Nonmetropolitan/ adjacent*		*Nonmetropolitan/ not adjacent*		*Rural*	
	Average	*% change*	*Average*	*% change*	*Average*	*% change*	*Average*	*% change*
Population, +/- (%)	1.4%	0.1%	0.7%	0.6%	0.3%	0.6%	0.2%	0.8%
Young adults, +/- (%)	0.1%	-1.0%	-0.4%	-0.1%	-0.9%	0.3%	-1.3%	-0.1%
Persons/housing unit	2.5	-5.9%	2.3	-7.5%	2.2	-8.5%	2.1	-10.2%
Persons/sq. mile	706.3	11.3%	77.6	8.4%	41.5	6.8%	16.5	8.4%
Drug arrests/100 K	543.0	105.1%	426.0	118.7%	418.9	109.9%	412.8	76.1%
Alcohol arrests/100 K	1096.0	-29.8%	1241.0	-19.0%	1359.0	-16.0%	1009.0	-22.5%
Violent crime arrests/100K	160.7	29.2%	129.5	42.4%	118.7	25.1%	110.5	16.1%
Establishments, +/- (%)	10.5%	4.6%	2.7%	-1.0%	4.6%	1.0%	1.3%	-2.2%
Hospitals/100,000	4.9	-10.5%	1.4	-15.3%	1.4	-11.0%	0.6	-13.0%
Poverty	8.9%	-6.6%	12.6%	-8.5%	13.5%	-5.2%	15.0%	-14.2%
12th grade or more (%)	72.0%	21.8%	65.0%	27.3%	66.5%	24.4%	65.4%	27.4%
Unemployment (%)	6.0%	-36.4%	7.5%	-30.2%	7.3%	-24.6%	7.0%	-26.4%
Per capita income ($)	$12,609	38.2%	$10,450	29.7%	$10,529	31.8%	$10,329	25.8%
Racial segregation	0.276	-4.1%	0.189	5.2%	0.177	5.0%	0.190	-2.2%
Nonwhite (%)	15.1%	20.0%	15.5%	12.8%	13.8%	23.5%	11.9%	18.2%

Sources: See "Appendix A: Technical Appendix," page 73.

proximity were connected to murders, as we found in the last chapter), followed by a bivariate analyses of our measures against our murder types. (Nonetheless, we do provide an extensive table of each of our variables and 5-year trends in Appendix B, on page 86.).

The purported explanatory measures and connections to place. The variables and the measures therein were selected because of the purported connection to place; that is, we expected that changes in the measures were in some form dependent on population and proximity. As the data shown in Exhibit 3.3 illustrate, this was very much the case for our entire time period on average and for the selected 5-year groupings, with few exceptions.

In some cases, the relationship was stronger than in others, and in most of these cases, the reason was obvious: the measures themselves were population based (e.g., changes in overall and young adult population, persons per housing unit, hospitals per 100,000). But the connection to population-based measures was not always strong or even significant: there were relatively weak connections to the rates of arrests for drug and alcohol related offenses and for violent crime offenses. (The 1980–99 r-score for alcohol-related arrests was the only one that was not significant.) By the same token, some of the stronger measures were not population based: poverty was the most notable example, followed by per capita income. The weaker relationships throughout were for unemployment; the change in the number of establishments; arrests per 100,000 for violent crime; the aforementioned arrests for both substance-abuse categories; percent adults 25 and over with less than 12 years of education; percent nonwhite; and, curiously, persons per square mile.

With the exception of the change in the number of establishments and the arrest rates for alcohol- and drug-related offenses, all of the measures were significant throughout the entire

EXHIBIT 3.3: BIVARIATE ANALYSES (PEARSON CORRELATIONS) OF POPULATION/PROXIMITY WITH SELECTED INDEPENDENT MEASURES, 20-YEAR AND 5-YEAR TIME PERIODS

	1980–84		1985–89		1990–94		1995–99		1980–99	
Population, +/- (%)	-0.361	***	-0.371	***	-0.247	***	-0.265	***	-0.335	***
Young adults, +/- (%)	-0.386	***	-0.394	***	-0.178	***	-0.204	***	-0.347	***
Establishments, +/- (%)	-0.105	***	-0.259	***	-0.016		-0.031		-0.036	*
Unemployment (%)	0.057	**	0.141	***	0.055	**	0.157	***	0.112	***
Per capita income ($)	-0.230	***	-0.248	***	-0.242	***	-0.360	***	-0.291	***
Poverty	0.379	***	0.338	***	0.333	***	0.311	***	0.346	***
Violent crime arrests/100K	-0.120	***	-0.116	***	-0.174	***	-0.164	***	-0.161	***
Racial segregation	-0.239	***	-0.234	***	-0.228	***	-0.219	***	-0.234	***
Nonwhite (%)	-0.071	***	-0.058	**	-0.060	***	-0.073	***	-0.066	***
Persons/housing unit	-0.343	***	-0.385	***	-0.419	***	-0.451	***	-0.404	***
Persons/sq. mile	-0.165	***	-0.168	***	-0.170	***	-0.173	***	-0.169	***
12th grade or more (%)	-0.171	***	-0.252	***	-0.161	***	-0.230	***	-0.160	***
Hospitals/100K	-0.287	***	-0.298	***	-0.309	***	-0.314	***	-0.303	***
Drug arrests/100K	-0.065	***	-0.019		-0.110	***	-0.103	***	-0.087	***
Alcohol arrests/100K	-0.015		-0.041	*	0.023		0.033		-0.014	

Note: Significance levels are indicated as *** $p < 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$

time period shown. In addition, most of the measures moved in expected ways: the more rural the area, the lower the population increases, number of new establishments, per capita income, percent nonwhite, persons per square mile, percentage of adults 25 years or older with a 12th grade education, and hospitals per 100,000; too, the more rural, the higher the poverty and unemployment rates. Based on the literature, we could conclude that the rates of segregation would be higher in metropolitan areas, and that is confirmed in these data. We hypothesized that drug arrests might be greater in metropolitan than in rural areas, and this is somewhat shown by the data, although the relationships are very weak (i.e., r-scores of 0.1 or below), and in some cases they are not even significant. Arrests per 100,000 for violent crime (other than murder) were higher in metropolitan areas; this could mean that rural areas are either less violent, or this could reflect the diminished law enforcement capacity discussed earlier.

One-to-One Relationships to Family, Intimate Partner, and All Other Murders

Now that we've established that, to one extent or another, each of our measures is in fact correlated to population and proximity, what is their explanatory power when it comes to our three murder types? At this juncture, another bivariate analysis would be helpful to discern patterns and to perhaps determine which might play a stronger role in the multivariate analysis to come. Given the extent of variation in each variable, a more helpful analysis will employ the capacity that having 20-years' worth of data brings, and we will use a pooled data set, using 1980–99 averages. (Exhibit 3.4).

Metropolitan. In the metropolitan counties, most of the economic, racial, and "quality of life" (i.e., violent crime) aspects of community economic distress were strong indicators of all types of murder, along with educational attainment, spatial overcrowding (but not population increases or bigger households), and substance abuse. Murders were also associated with larger

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numbers of hospitals, but this could be a trait of metropolitan areas in general rather than an explanation for murder. Of the 15 measures, 11 were significant for at least one of the murder categories, and of the 11, 8 were significant for all of them. Put another way, more than half of the selected measures were significant for murder regardless of the type. This means that in the metropolitan counties there were more commonalities than differences in the explanations for murder.

All of our murder types were correlated with higher rates of poverty, violent crime arrests, percent nonwhite, persons per square mile, hospitals per 100,000, and drug arrests per 100,000, along with lower rates of persons per housing unit, and persons 25 or older with 12 or more years of education. With the exception of hospitals per 100,000, the measures went in expected directions: it is unclear as to why more hospitals per 100,000 were associated with higher rates of murder, unless this reflects an indirect effect of another measure.

The differences were fewer, but notable. Lower rates of per capita income were associated with intimate partner murders, but the opposite was true for all other murders (there was no connection with family murders). There was a weak but significant and positive relationship between family murder and racial segregation, and a stronger but similarly positive and significant connection for all other murders. Arrests per 100,000 for drug-related offenses were correlated with rates of intimate partner and family murder, but not all other murders. Even among the cases in which the same measure was significant for all murder types, there were some items of interest. For example, there is the very strong positive correlation between persons per square mile and all other murders (r = .810), which is not seen for the other murder types. By the same token, the relationship between our measure for educational attainment and all other murders is the weakest among the three murder types. Similarly, our measure for health

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care access was more strongly correlated with family and all other murders than with intimate partner murders.

Nonmet/Adjacent. In the nonmet/adjacent counties, there were fewer commonalities among the explanatory variables than in the metropolitan counties. At the same time, all but the change in the number of establishments and residential overcrowding (persons per housing unit) were significant for at least one of the three murder types. In these counties, intimate partner murders had more in common with all other murders than with family murders. Two other notable points of departure from murders in the metropolitan counties are that family and all other murders were more sensitive to changes in populations, and that less, not more, racial segregation was connected to murders of all types.

Per capita income, racial segregation, higher educational attainment, and the number of hospitals per 100,000 were significantly connected to all three murder categories. While the relationship of per capita income, educational attainment, and hospitals per 100,000 moved in expected directions (that is, poorer outcomes in the measures came with higher rates of murder), the same cannot be said for racial segregation, whereby lower and not higher rates were connected to murder in the nonmet/adjacent counties.

There were other differences. Population declines (both overall and of young adults) were associated with family murder, while increases in the number of young adults were linked to all other murders. Several measures were connected to intimate partner and all other murders but not family murder: poverty, arrests for violent crime, and arrests for drug and alcohol related offenses; for both murder types the relationship manifested in expected ways. The variable "persons per square mile" was positively associated with family and all other murders but not intimate partner murder. The most notable surprise is the negative relationship between

unemployment and family murder, unless this is a reflection of the stressor of employment onto a family.

Nonmet/not adjacent. While there were some similarities to the patterns found in the other county groups discussed thus far—for example, more commonalities between intimate partner and all other murders than with family murders, the significance of lower educational attainment and fewer hospitals for all murder categories—what distinguished the nonmet/nonadjacent counties from the two more populous county groups is that more arrests for alcohol-related offenses were significant for all three types of murders. Another difference is the lack of significance of all but three measures when it came to family murder (the aforementioned alcohol-related arrests, lack of educational attainment, and fewer hospitals per 100,000). In general, the strengths of the significant relationships—particularly for intimate partner and family murders—were weaker than they were for the other two populous counties discussed so far.

Among the commonalities between intimate partner and all other murders is the connection with poorer outcomes for per capita income, poverty, arrests for violent crime, and arrests for drug-related offenses. These two murder types were also associated with higher rates of percent nonwhite and less racial segregation (the same nonintuitive connection that we saw for the nonmet/adjacent counties, above). Among the differences was how aspects of population increases and spatial dynamics played out: while overall population declines were slightly correlated with intimate partner murder, slightly more persons per household were associated with increases in all other murders.

Rural. The one variable consistently positively associated with all murder types is *isolation*, or persons per square mile, which is in sharp contrast to the other three county

categories, where it was either positive, as was the case for the metropolitan and nonmet/adjacent counties, or negative but not significant, as seen for the nonmet/not adjacent counties. In fact, what further distinguished the rural counties from the others is that isolation was the only measure that was significantly connected with family and intimate partner murders. What also differentiated the rural counties is that, at least for family and all other murders, some of the measures moved in surprising ways.

In the rural counties, intimate partner murders were linked to population declines, isolation, the lack of hospitals, and arrests for drug-related offenses. Unlike the two nonmet counties, where there were more similarities between intimate partner and family murder, many similarities in the rural counties were found between family and all other murders. For example, family and all other murders were more associated with economic outcomes than were intimate partner murders but, with one exception, not in expected ways, as evidenced by the negative and positive correlations with unemployment and per capita income, respectively (whether this is an effect of the stressors of employment is highly debatable). That one exception is declining numbers of new establishments for family murders, which is somewhat consistent with Matthews, Maume, and Miller's finding, cited earlier, of the link between murders and the industrialization of rust-belt areas.[95] Another nonintuituve finding was that higher, not lower, educational attainment was associated with family and all other murders. The one unsurprising finding with respect to family and all other murders is that they were both also associated with declines in household size, which is consistent with the increase in spatial isolation.

Although family and all other murders had more in common, intimate partner and all other murders shared a connection between fewer hospitals per 100,000 and more arrests from

EXHIBIT 3.4: BIVARIATE ANALYSES (PEARSON CORRELATIONS) OF INDEPENDENT MEASURES AGAINST INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1980–99 POOLED AVERAGE

	Intimate Partner		Family		All Other Murders	
Metropolitan						
Population, +/- (%)	0.021		-0.020		-0.072	
Young adults, +/- (%)	0.065		0.024		-0.021	
Establishments, +/- (%)	-0.022		-0.016		-0.010	
Unemployment (%)	0.004		0.032		0.054	
Per capita income ($)	-0.215	***	-0.028		0.177	***
Poverty	0.286	***	0.275	***	0.205	***
Violent crime arrests/100K	0.300	***	0.208	***	0.204	***
Racial segregation	0.016		0.091	**	0.209	***
Nonwhite (%)	0.376	***	0.272	***	0.344	***
Persons/housing unit	-0.100	**	-0.133	***	-0.152	***
Persons/sq. mile	0.324	***	0.549	***	0.810	***
12th grade or more (%)	-0.391	***	-0.202	***	-0.069	*
Hospitals/100 K	0.074	*	0.144	***	0.262	***
Drug arrests/100 K	0.251	***	0.159	***	0.186	***
Alcohol arrests/100 K	0.145	***	0.088	*	-0.024	
	0.021		-0.020		-0.072	
Nonmetropolitan/Adjacent						
Population, +/- (%)	-0.018		-0.140	***	0.031	
Young adults, +/- (%)	0.034		-0.098	**	0.096	**
Establishments, +/- (%)	-0.037		-0.019		-0.029	
Unemployment (%)	-0.012		-0.089	*	0.029	
Per capita income ($)	-0.140	***	-0.123	***	-0.268	***
Poverty	0.161	***	0.037		0.282	***
Violent crime arrests/100K	0.189	***	0.030		0.374	***
Racial segregation	-0.197	***	-0.095	*	-0.225	***
Nonwhite (%)	0.162	***	0.031		0.330	***
Persons/housing unit	-0.037		0.016		0.030	
Persons/sq. mile	0.040		0.100	**	0.116	**
12th grade or more (%)	-0.195	***	-0.163	***	-0.361	***
Hospitals/100 K	-0.197	***	-0.179	***	-0.215	***
Drug arrests/100 K	0.104	**	-0.012		0.296	***
Alcohol arrests/100 K	0.134	***	0.064		0.227	***

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	Intimate Partner		Family		All Other Murders	
Nonmetropolitan/Not Adjacent						
Population, +/- (%)	-0.088	*	-0.018		0.003	
Young adults, +/- (%)	-0.070		-0.021		0.034	
Establishments, +/- (%)	-0.018		-0.042		-0.071	
Unemployment (%)	0.023		-0.029		0.017	
Per capita income ($)	-0.145	***	-0.069		-0.177	***
Poverty	0.082	*	0.057		0.270	***
Violent crime arrests/100K	0.140	***	0.067		0.276	***
Racial segregation	-0.096	**	-0.046		-0.112	***
Nonwhite (%)	0.146	***	0.008		0.245	***
Persons/housing unit	0.006		-0.010		0.073	*
Persons/sq. mile	-0.034		-0.062		-0.052	
12th grade or more (%)	-0.176	***	-0.171	***	-0.358	***
Hospitals/100 K	-0.155	***	-0.128	***	-0.220	***
Drug arrests/100 K	0.136	***	0.012		0.180	***
Alcohol arrests/100 K	0.155	***	0.086	*	0.251	***
Rural						
Population, +/- (%)	-0.123	**	-0.053		0.046	
Young adults, +/- (%)	-0.130	**	-0.077		-0.061	
Establishments, +/- (%)	0.011		-0.105	*	0.007	
Unemployment (%)	-0.061		-0.140	***	-0.086	*
Per capita income ($)	0.067		0.178	***	0.089	*
Poverty	0.000		0.011		-0.008	
Violent crime arrests/100K	0.044		0.000		0.187	***
Racial segregation	-0.076		-0.044		-0.186	***
Nonwhite (%)	0.015		0.022		0.012	
Persons/housing unit	-0.066		-0.084	*	-0.216	***
Persons/sq. mile	-0.134	**	-0.194	***	-0.192	***
12th grade or more (%)	0.074		0.095	*	0.105	*
Hospitals/100 K	-0.086	*	-0.017		-0.165	***
Drug arrests/100 K	0.131	**	0.048		0.184	***
Alcohol arrests/100 K	0.003		0.073		0.103	*

Note: Significance levels are indicated as *** $p < 0.001$, ** $p <= 0.01$, * $p <= 0.05$

drug related offenses. Only for all other murders were arrests for violent crime and alcohol-related offenses, as well as racial segregation (albeit negative) significant.

Conclusion

As stated previously, each of our measures was significantly related to each of our murder types for each of our year groupings at any given point. At this point, it might be tempting to end the analysis here and move on to implications for future research and policy. After all, it is not unreasonable to argue in favor of, say, more stringent and less discretionary policies with respect to arrests for substance abuse as a cure for family, intimate partner, and all other murders, given the strong and consistent bivariate correlations. In addition, we could discuss the need to reconsider our ecological assumptions about rural areas and their characteristics in an effort to inform policies and programs that serve women and children, given the counterintuitive findings for many of our measures (particularly for family murder). Or, in an attempt towards parsimony, given the similarities in the significance of the measures for three murder types in the metropolitan counties, or between intimate partner and all other murders in the nonmet counties, or between family and all other murders in the rural counties, could it not be argued that steps to deal with all other murders would have beneficial spillover effects? The reasonable answer, of course, is no. But to end the conversation here would not be prudent, for one very critical reason: each of these measures and the variables each represents operates within a larger system of interrelationships (some of them symbiotic, such as education and employment), which needs to be examined before moving further.

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IV. A REFINED STRATEGY FOR EXAMINING FAMILY AND INTIMATE PARTNER MURDER

It would be a relatively simple and straightforward process to include all of our measures using standard regression techniques (i.e., ordinary least squares analysis), and determine the extent to which the model explains family and intimate partner murder by each of the 5-year groupings. The major flaw with that strategy is that several of these independent variables are intercorrelated. For example, based on a series of Pearson bivariate correlations for the 1980–99 average, per capita income was correlated with educational attainment at $r = 0.705$ ($p < = 0.001$); the percent nonwhite was correlated with poverty at $r = -0.494$ ($p < = 0.001$). Arrests for violent crime, drug offenses, and alcohol-related offenses were very highly intercorrelated, typically in the 0.95 range. There are more modest but still significant relationships between some of the other measures: for example, the 1980–99 rate of the number of establishments was correlated with the rise in the population in general and with the rise in the number of young people in particular ($r = 0.374$, $r = 0.390$, respectively, both $p < = 0.05$). We should assume, then, that is it not so much any given variable that affected the rates of murders but that the measure played against one or more of the other independent variables to cause the effect. To examine this further, then, we employ a modified structural equation modeling strategy that involves a two-step process that reduces the data into discrete latent factors or constructs by way of a second order factor analysis in preparation for a simple Pearson bivariate correlational analysis of the final extracted latent variable against our three murder types.[96]

Step One: Isolating the Critical County-Based Constructs

Rationale for Factor Analysis. The purpose of factor analysis is to explore the interrelations among a series of measures in order to identify an underlying or latent construct or a series of latent constructs. Depending on the research goals and the hypotheses being tested,

the latent constructs may or may not be correlated with each other. Earlier, in our discussion of constructs and measures, we isolated the measures based on the literature, which were grouped under several variables; in this sense, what we were doing intuitively was what factor analysis achieves empirically. The advantage of using factor analysis for our purposes is that the results—that is, the extracted factors or constructs—can then be tested against our dependent variables.

Depending on the hypotheses about how the variables interrelate, each latent construct may or may not be discrete. In some cases, particularly when one wishes to search for a more general and comprehensive construct, the resulting constructs are further factor analyzed. As we saw earlier, almost all of the measures that we selected had some connection to our three murder types for our entire 20-year period. But given the number of measures and the complex ways in which they operated, it was difficult to pinpoint what exactly was driving the place-based rates of family, intimate partner, and other homicides. Our strategy, therefore, was to reduce our measures by way of first and second-order factor analysis, using a pooled 1980–99 data set.

Method. We took all of the independent measures and conducted factor analyses for using an oblique rotation, which meant that the extracted factors could possibly be correlated with each other. Factors were selected by means of the *eigenvalue*, which indicates how much of the variation in the original group of measures is accounted for by any given factor. We selected only factors with an eigenvalue of 1.0 or better, which is used by most researchers as a significance threshold. Then, each factor was analyzed based on how (or if) any given measure loaded, or correlated with the other measures, using a loading cut-off of 0.40.[97] Separate analyses were conducted by county category.

Then, for each county category, the extracted factors were interpreted and went through a

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second factor analysis (second-order factor analysis). This time, the rotation was orthogonal, which assured that none of the extracted factors was correlated with each other. Put another way, each second-order factor represented a unique, discrete reality for any given county group and time period. The decision to do this was not arbitrary; we wanted to isolate those two (or three) traits of a county grouping that we could then test against our murder types, and if these traits were intercorrelated, it may have introduced more complexity and ambiguity than desired. When isolating the second order factors, we followed the same rules with respect to the eigenvalues and loadings (i.e., only factors with an eigenvalue of 1.0 or better were selected, and only the first order factors with loadings of 0.40 or better were analyzed). When examining the isolated factors in the first or second order, we considered not just the eigenvalues and the loadings but also the cumulative variance explained, which is simply the percent of the phenomena in any given county group, using the 1980–99 pooled data, that was explained by the combination of the isolated factors. After isolating the factors through the second-order analysis, we constructed a final model for each of the county categories. Each isolated factor was correlated, by way of a Pearson bivariate analysis, to each murder type, to determine which factor or latent construct had the greatest explanatory power.

Metropolitan. The results of the first factor analysis isolated four factors, with a cumulative variance explained of 61 percent (Exhibit 4.1). The first factor represented a measure of overall community socioeconomic distress that was driven primarily by arrests for drugs and violent crime (based on the higher loadings for these measures). The measures that intercorrelated with this first factor were spatial overcrowding, poverty, lack of educational

EXHIBIT 4.1: FIRST AND SECOND ORDER FACTOR ANALYSES FOR THE METROPOLITAN COUNTIES, 1980-99 POOLED AVERAGE

First Order	Factor 1	Factor 2	Factor 3	Factor 4
Population, +/- (%)	-0.297	-0.226	**0.875**	0.163
Young adults, +/- (%)	-0.175	-0.265	**0.877**	0.182
Persons/housing unit	-0.163	-0.039	0.070	**0.535**
Persons/sq. mile	**0.529**	0.355	0.150	-0.141
Drug arrests/100 K	**0.730**	0.160	0.386	-0.276
Alcohol arrests/100 K	0.341	**-0.408**	0.182	-0.135
Violent crime arrests/100 K	**0.786**	0.148	0.303	**-0.426**
Establishments, +/- (%)	-0.022	-0.039	0.035	0.084
Hospitals/100,000	**0.420**	**0.530**	0.113	0.085
Poverty	**0.681**	-0.341	-0.166	**0.420**
12th grade or more (%)	**-0.418**	**0.655**	0.150	0.281
Unemployment (%)	**0.416**	-0.196	-0.369	**0.516**
Per capita income ($)	-0.231	**0.836**	0.226	0.067
Nonwhite (%)	**0.573**	-0.163	0.277	**0.415**
Segregation	**0.423**	**0.590**	-0.139	0.129
Eigenvalue	3.242	2.402	2.183	1.370
Variance explained (cumulative)	0.216	0.376	0.522	0.613

Second Order	Factor 1	Factor 2	Factor 3
1. Overall community socioeconomic distress, particularly as a function of drugs and crime	**0.795**	0.316	0.058
2. Affluence, less substance abuse, more resources (hospitals), alongside more racial segregation	-0.208	**0.939**	0.172
3. Population growth (including young adults)	**0.643**	-0.168	**0.621**
4. Community distress as a function of household overcrowding and unemployment; less alcoholism	**-0.537**	-0.098	**0.763**
Eigenvalue	1.377	1.020	1.000
Variance explained (cumulative)	0.344	0.599	0.849

Note: Loadings of 0.40 or better are in **boldface**.

EXHIBIT 4.2: FINAL MODEL FOR INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1990-99 POOLED AVERAGE: METROPOLITAN COUNTIES

Original Measures	*Final Isolated Constructs*	*Correlates with Murder (Pearson bivariate scores)*
Population, +/- (%) Young adults, +/- (%) Persons/housing unit Households/housing unit Persons/sq. mile Drug arrests/100 K Alcohol arrests/100 K Violent crime arrests/100 K Establishments, +/- (%) Hospitals/100,000 Poverty 12th grade or more (%) Unemployment (%) Per capita income ($) Racial segregation Nonwhite (%)	1. Overall community socioeconomic distress as a function of drugs and crime, as well as population increases and spatial but not household overcrowding	**Intimate partner: 0.437 ***** **Family: 0.348 ***** **All other: 0.441 *****
	2. Affluence, less substance abuse, more resources (hospitals), alongside more racial segregation	**Intimate partner: 0.023** **Family: -0.010** **All other: -0.065**
	3. Community socioeconomic distress as a function of population growth with household overcrowding	**Intimate partner: -0.091 **** **Family: -0.009 ***** **All other: 0.330 *****

Note: significance levels are indicated as *** $p < 0.001$, ** $p < =0.01$, * $p < =0.05$

attainment, racial segregation and a higher percentage of nonwhite residents. However, more access to health care was also connected, which, as mentioned earlier, might well be a trait of metropolitan areas in and of itself and unrelated to socioeconomic distress. The second factor is an affluence and well-being measure, connected with high per capita income, high educational attainment, fewer arrests for alcohol-related offenses, more hospitals, and more racial segregation. The third factor represented population growth, both overall and of young adults. The fourth factor represented another aspect of community socioeconomic distress, this time as a function of residential overcrowding and unemployment, as well as poverty and racial segregation; there were also fewer violent crime arrests, however, which may or may not represent a relative lack of law enforcement resources.

When these four factors were further factor analyzed, three factors emerged with a cumulative variance of almost 85 percent. The first second-order factor was a combination of community socioeconomic distress fueled by violence and drugs, population growth, and further distress from overcrowding and unemployment. This factor is a measure of severe distress in metropolitan areas, combining most of the poorer economic outcomes, educational outcomes, segregation, along with population growth and crowding. The second second-order factor is identical to that extracted from the first factor analysis: mainly, affluence in cities. The third second-order factor is another measure of socioeconomic distress but while we also see poverty, unemployment, and segregation (as we did in the first second-order factor), this one is driven primarily by the combined effects of population increases and household crowding. In all, the metropolitan areas were by and large defined by the contrasts between distress and affluence.

In our final model, where our three extracted factors, or constructs, were correlated with the three murder categories, it was clear that distress and not affluence was the primary

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explanatory factor (Exhibit 4.2). The severe distress construct had the highest Pearson correlation scores for all other, intimate partner, and family murder (in descending order of magnitude), and the effects were positive and significant. The only differences were in the effects of community distress as a function of population increases and crowding: in this case, the effects were positive for all other murders but negative for family and intimate partner murders. Moreover, for these two murder types, the scores were very low ($r = -0.091$ for intimate partner murder and $r = -0.009$ for family murder), even though both were significant. This might indicate that, unlike all other murders, intimate partner and family murder, to some degree, is affected more by population *declines*—which, as noted in the introductory discussion, is but another measure of distress in and of itself—and smaller households.

Nonmet/Adjacent. The first factor analyses isolated five factors from the 15 measures, with a cumulative variance explained of almost 67 percent (Exhibit 4.3). As was the case in the metropolitan counties, the first factor represents overall community socioeconomic distress; unlike the metropolitan counties (where the key indicators were drugs and crime), the primary drivers here are poverty, lack of educational attainment, low per capita income, and higher percentages of nonwhite residents. Connected to this factor were also arrests for violent crime, drugs, and alcohol, as well as unemployment. The second factor reflects population growth, overall and of young adults. The third factor is another distress measure, here driven by spatial isolation combined with unemployment. The fourth factor combines affluence with arrests for drugs and alcohol; this might be a measure of more resources for arrests, or of affluent suburbs battling the problems of substance abuse. The fifth factor reflects more health resources (hospitals), combined with more racial segregation; this might be similar to the metropolitan factor that also combined these measures, in that more resources is a trait of these areas, which

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EXHIBIT 4.3: FIRST AND SECOND ORDER FACTOR ANALYSES FOR THE NONMETROPOLITAN/ADJACENT COUNTIES, 1980–99 POOLED AVERAGE

First Order

Nonmetropolitan/Adjacent	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Population, +/- (%)	0.192	**0.857**	0.267	-0.314	0.067
Young adults, +/- (%)	0.366	**0.745**	0.271	-0.385	0.072
Persons/housing unit	0.206	-0.391	0.140	-0.192	0.016
Persons/sq. mile	0.241	0.072	**-0.809**	-0.216	0.283
Drug arrests/100 K	**0.573**	0.283	-0.050	**0.549**	0.124
Alcohol arrests/100 K	**0.471**	0.211	-0.309	0.313	0.209
Violent crime arrests/100 K	**0.636**	0.109	0.144	**0.423**	0.048
Establishments, +/- (%)	-0.030	0.231	0.095	-0.106	-0.270
Hospitals/100,000	-0.237	0.035	0.177	0.191	**0.724**
Poverty	**0.748**	-0.337	0.391	-0.004	-0.091
12th grade or more (%)	**-0.768**	0.160	0.385	0.261	-0.035
Unemployment (%)	**0.410**	-0.368	**0.507**	-0.246	0.120
Per capita income ($)	**-0.703**	0.180	0.282	**0.459**	-0.044
Nonwhite (%)	**0.718**	-0.156	0.259	0.240	-0.038
Racial Segregation	-0.317	-0.232	0.152	-0.243	**0.581**
Eigenvalue	3.710	2.026	1.706	1.412	1.114
Variance explained (cumulative)	0.247	0.382	0.496	0.590	0.665

Second Order

	Factor 1	Factor 2
1. Overall community socioeconomic distress, particularly as a function of lack of educational attainment, poverty/low per capita income, and high percentage of nonwhite	**0.668**	0.003
2. Population growth (including young adults)	**0.663**	-0.130
3. Community socioeconomic distress as a function of spatial isolation and unemployment	**-0.571**	-0.303
4. Affluence, alongside drug and alcohol abuse	-0.162	**0.945**
5. More resources (hospitals) alongside more racial segregation	**0.692**	0.092
Eigenvalue	1.716	1.010
Variance explained (cumulative)	0.343	0.545

Note: Loadings of 0.40 or better are in **boldface**.

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EXHIBIT 4.4: FINAL MODEL FOR INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1990-99 POOLED AVERAGE: NONMETROPOLITAN/ADJACENT COUNTIES

Original Measures	*Final Isolated Constructs*	*Correlates with Murder (Pearson bivariate scores)*

Original Measures		
Population, +/- (%)		
Young adults, +/- (%)	1. Overall community socioeconomic distress, driven by economics, population growth and spatial overcrowding, and segregation, with greater health care access (hospitals)	**Intimate partner: 0.261 *****
Persons/housing unit		
Households/housing unit		**Family: 0.097 *****
Persons/sq. mile		
Drug arrests/100 K		**All Other: 0.454 *****
Alcohol arrests/100 K		
Violent crime arrests/100 K		
Establishments, +/- (%)		
Hospitals/100,000	2. Affluence, alongside drug and alcohol abuse (or arrests for drug-and alcohol-related offenses	**Intimate partner: 0.051**
Poverty		
12th grade or more (%)		**Family: 0.030**
Unemployment (%)		
Per capita income ($)		**All Other: 0.034**
Racial segregation		
Nonwhite (%)		

Note: Significance levels are indicated as *** p < 0.001, ** p < = 0.01, * p < = 0.05

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also happened to be more segregated.

The second-order factor analyses further condensed the measures into two extant factors, with a cumulative variance of 55 percent. The first second-order factor combines all but the affluence-substance abuse arrests measure to form a larger, overall distress measure. The loadings are positive for the first-order overall distress and population growth measures, and negative for the spatial isolation measure, which in combination makes intuitive sense. This measure, however, is also connected to the resources/race factor (as it was in the metropolitan counties), which may indicate that with increased population there is also more access to health care and higher percentages of nonwhites, in spite of the poorer outcomes for the other measures. The second second-order factor reflects the aforementioned affluence with substance abuse (or substance abuse arrests).

When the two second-order factors are correlated with the three murder types in the final model, we find that only overall community socioeconomic distress is correlated to any type of murder in the nonmet/adjacent counties (Exhibit 4.4). Affluence, even when combined with substance abuse arrests, is not correlated at all. The correlation with overall distress is weakest for family murder (yet still significant), stronger for intimate partner murder, and strongest for all other murders.

Nonmet/Not Adjacent. The 15 measures combined into 6 factors for the nonmet/not adjacent counties, and the variance explained was 70 percent (the highest of the four county groups). (Exhibit 4.5). The first factor is somewhat similar to that isolated for the nonmet/adjacent counties, in that it reflects a measure of overall socioeconomic distress as a function of poverty, lack of educational attainment, and low per capita income; also loading quite highly is the percent nonwhite and unemployment. There are two points of departure, however:

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EXHIBIT 4.5: FIRST AND SECOND ORDER FACTOR ANALYSES FOR THE NONMETROPOLITAN/NOT ADJACENT COUNTIES, 1980–99 POOLED AVERAGE

First Order	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Population, +/- (%)	0.116	**0.856**	0.377	0.163	-0.108	-0.053
Young adults, +/- (%)	0.351	**0.752**	**0.448**	0.099	-0.141	0.007
Persons/housing unit	**0.401**	-0.217	0.193	-0.144	0.082	**0.499**
Persons/sq. mile	0.194	0.240	0.111	**-0.779**	0.229	-0.090
Drug arrests/100 K	0.397	0.307	**-0.546**	0.239	0.236	-0.125
Alcohol arrests/100 K	0.398	0.282	**-0.558**	0.197	0.191	-0.004
Violent crime arrests/100 K	**0.549**	0.170	-0.283	-0.218	0.290	-0.085
Establishments, +/- (%)	-0.052	0.064	0.082	0.016	0.294	**0.763**
Hospitals/100,000	-0.141	0.050	0.301	0.143	**0.769**	-0.073
Poverty	**0.782**	-0.328	0.083	0.241	-0.036	-0.031
12th grade or more (%)	**-0.769**	0.067	0.000	0.356	0.114	0.044
Unemployment (%)	**0.547**	-0.346	0.253	0.232	-0.015	-0.150
Per capita income ($)	**-0.774**	0.155	-0.195	0.301	0.110	0.027
Nonwhite (%)	**0.690**	-0.034	-0.018	0.364	0.006	0.140
Racial segregation	-0.002	-0.319	**0.463**	0.032	0.389	-0.387
Eigenvalue	3.553	1.971	1.502	1.291	1.122	1.065
Variance explained (cumulative)	0.237	0.368	0.468	0.555	0.629	0.700

Second Order	Factor 1	Factor 2
1. Overall community socioeconomic distress, particularly as a function of lack of educational attainment, poverty/low per capita income, and high percentage of nonwhite	**0.701**	-0.165
2. Population growth (including young adults)	**0.498**	0.157
3. Less substance abuse, alongside an influx of young people and more racial segregation	-0.367	**0.619**
4. Spatial isolation	**0.444**	0.317
5. More resources (hospitals)	**0.645**	0.003
6. Larger households as a function of a growth of establishments in the area	0.174	**0.702**
Eigenvalue	1.518	1.028
Variance explained (cumulative)	0.253	0.424

Note: Loadings of 0.40 or better are in **boldface**.

EXHIBIT 4.6: FINAL MODEL FOR INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1990-99 POOLED AVERAGE: NONMETROPOLITAN/NOT ADJACENT COUNTIES

Original Measures	*Final Isolated Constructs*	*Correlates with Murder (Pearson bivariate scores)*

Population, +/- (%)

Young adults, +/- (%)

Persons/housing unit

Households/housing unit

Persons/sq. mile

Drug arrests/100 K

Alcohol arrests/100 K

Violent crime arrests/100 K

Establishments, +/- (%)

Hospitals/100,000

Poverty

12th grade or more (%)

Unemployment (%)

Per capita income ($)

Racial segregation

Nonwhite (%)

1. Overall community socioeconomic distress, driven by population growth and crowding, but with greater health care access

Intimate partner: 0.189 ***

Family: 0.088 *

All Other: 0.355 ***

2. More establishments and an influx of young people and bigger families

Intimate partner: -0.171 ***

Family: -0.145 ***

All Other: -0.219***

Note: Significance levels are indicated as *** p < 0.001, ** p < = 0.01, * p < = 0.05

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the connections to residential overcrowding and arrests for violent crime. The second, identical to that isolated for the other two county groups discussed thus far, is a population growth measure. The third factor was driven by fewer arrests for drugs and alcohol-related offenses, combined with an influx of young adults and more racial segregation. Only one measures loaded in the fourth factor—persons per square mile—and the negative loading makes this a spatial isolation measure. Similarly, a single measure loaded into the fifth factor, a positive loading for hospitals per 100,000. The final factor seems to be another aspect of growth, given the positive loadings for the rise in the number of establishments and the increase in household size.

The two factors that were extracted in the second-order process, with a cumulative variance of 42%, reflected the positive and negative effects of growth in general (Exhibit 4.6). The first is the negative growth measure, represented by overall distress, population growth, and more access to health care. Spatial isolation loads here as well, which may seem counter-intuitive; however, additional analyses performed to investigate this further (not shown in the Exhibit) revealed a connection between spatial isolation and the first overall distress factor (r = 0.16, p < = 0.01), which we earlier hypothesized might be the case in smaller communities. (Clearly, more analyses are needed to do this justice.) The second extracted second-order factor reflects the more positive aspects of growth: more establishments, influx of young people (including more nonwhites), less substance abuse or at least fewer arrests for substance abuse.

As seen in the diagram of our final model, both of the second-order factors were connected to our three murder types, and all in the same way but not to the same degree (Exhibit 4.6). The results were intuitive: the aspects of negative growth (distress, etc.) were positive correlated with family, intimate partner, and all other murders (in the order of magnitude), and the positive growth factor was negatively correlated for the same three murder types in the same

order. Despite the positive and significant correlation between overall distress and family murder, the connection was very weak (r = 0.088); similar to that between the first overall distress measure in the nonmet/adjacent counties and family murder.

Rural. The first factor analysis produced four factors, with a cumulative variance of 58 percent, which were in some ways similar but in many ways different from those isolated for the other three population/proximity categories (Exhibit 4.7). One point of departure is the prevalence of community socioeconomic distress measures, as three of the four isolated factors deal with some aspect of this construct. As was the case with the other three county groups, the first factor is an overall, severe community socioeconomic distress measure, driven by a lack of educational attainment, low per capita income, and poverty, alongside more violent crime arrests, more persons per square mile, and more nonwhite residents. Where rural counties differ is the connection with overall and young adult population increases. The second factor captures another nuance of distress, this time as a function of increases in arrests for violent crime and substance abuse; this is seen alongside overall population increases but smaller households, as well as less segregation. The third factor is a population increase measure, also seen for the other three county categories; the difference here is that these increases are tied into other measures, such as fewer arrests for alcohol-related offenses and less poverty, suggesting positive community growth. The fourth factor is yet another aspect of community socioeconomic distress, driven by racial segregation, declining nonwhite populations, more unemployment, and smaller families.

Our second-order factor analysis produced two factors, with a combined variance of almost 66 percent. Due to the predominance of distress factors from the first factor analysis, both of the second-order factors also captures distress in some measure. The first factor was our

EXHIBIT 4.7: FIRST AND SECOND ORDER FACTOR ANALYSES FOR THE RURAL COUNTIES, 1980-99 POOLED AVERAGE

First Order	Factor 1	Factor 2	Factor 3	Factor 4
Population, +/- (%)	**0.476**	**0.433**	**0.682**	-0.023
Young Adults, +/- (%)	**0.638**	0.204	**0.612**	-0.075
Persons/housing unit	0.313	**-0.476**	-0.177	**-0.406**
Persons/sq. mile	**0.495**	-0.231	0.383	0.152
Drug arrests/100 K	0.152	**0.664**	-0.323	0.204
Alcohol arrests/100 K	0.263	**0.549**	**-0.413**	-0.041
Violent crime arrests/100 K	**0.426**	**0.550**	-0.356	0.352
Establishments, +/- (%)	0.168	0.104	0.240	0.043
Hospitals/100,000	-0.285	-0.316	-0.055	0.143
Poverty	**0.677**	-0.310	**-0.425**	0.009
12th grade or more (%)	**-0.767**	0.216	0.224	0.029
Unemployment (%)	**0.617**	-0.223	-0.009	**0.420**
Per capita income ($)	**-0.741**	0.331	-0.016	-0.220
Nonwhite (%)	**0.544**	0.027	-0.271	-0.493
Segregation	-0.195	**-0.431**	-0.020	**0.515**
Eigenvalue	3.669	2.153	1.785	1.118
Variance explained (cum.)	0.245	0.388	0.507	0.582

Second Order	Factor 1	Factor 2
1. Overall community socioeconomic distress, particularly as a function of lack of educational attainment, poor economic outcomes, and population increases alongside household overcrowding	**0.672**	**-0.541**
2. Community socioeconomic distress as a function of increases in drugs, alcoholism, violent crime, overall population increases but declining household size	0.217	**0.785**
3. Population increases, alongside less alcoholism and poverty	**0.849**	-0.051
4. Community socioeconomic distress as a function of growing racial segregation with declines in percent nonwhite), smaller households, rising unemployment	**0.551**	**0.429**
Eigenvalue	1.523	1.096
Variance explained (cumulative)	0.381	0.655

Note: Loadings of 0.40 or better are in **boldface**.

EXHIBIT 4.8: FINAL MODEL FOR INTIMATE PARTNER, FAMILY, AND ALL OTHER MURDERS, 1990-99 POOLED AVERAGE: RURAL COUNTIES

Original Measures	*Final Isolated Constructs*	*Correlates with Murder (Pearson bivariate scores)*

Population, +/- (%)

Young adults, +/- (%)

Persons/housing unit

Households/housing unit

Persons/sq. mile

Drug arrests/100 K

Alcohol arrests/100 K

Violent crime arrests/100 K

Establishments, +/- (%)

Hospitals/100,000

Poverty

12th grade or more (%)

Unemployment (%)

Per capita income ($)

Racial Segregation

Nonwhite (%)

1.Overall community socioeconomic distress as a function of population growth and spatial (but not household) crowding, alongside segregation, lack of educational attainment and poor economic outcomes

Intimate partner: -0.143 ***

Family: -0.155 ***

All Other: -0.144 ***

2. Community socioeconomic distress, driven by increases in drugs, alcoholism, and violent crime, and smaller households.

Intimate partner: 0.120 *

Family: 0.072

All Other: 0.305 ***

Note: Significance levels are indicated as *** $p < 0.001$, ** $p <= 0.01$, * $p <= 0.05$

overall distress measure, driven by population growth, spatial (but not household) crowding, and segregation. The second captured distress as well, but this measure was less tied in with poorer economic outcomes (save for unemployment), and more with increases in arrests for substance abuse and violent crime. Where population was concerned, there was a negative loading for our "distress with population increases" factor; however, there was another, stronger loading for our factor capturing increases in overall population alongside declines in family size, suggesting an influx of single, older individuals.

As the diagram of the final model shows, the overall distress measure was negatively associated with rates of intimate partner, family, and all other murders in rural areas (Exhibit 4.8). Thus, given this factor's emphasis on population, it might seem as if population *declines* lead to increases in murders of all types in rural areas, even in light of improvements in the conditions of the other distress measures (poverty, education, per capita income, etc.). Because this seemed counterintuitive, we examined the bivariate Pearson analyses on population against the other measures in rural areas (see "Appendix B: Bivariate Correlations of Selected Measures, 1980–99 Average," page 86), and found that population increases overall and of young people in rural counties are accompanied with declines in arrests for substance abuse and violent crime, poverty (overall population increases only), educational attainment, per capita income, and segregation, and increases in unemployment, establishments, and the percent in nonwhites. So, while there is still much "gray area," we can confirm that, all other things being equal, population is driving the murder rates. The second factor, our other distress measure, was positively associated with intimate partner murder and all other murders, but not with family murder. This seemed slightly more intuitive, given the connections with substance abuse, crime, and unemployment; smaller households were also a big part of this factor.

Discussion

Our method of structural equation modeling—whereby we isolated factors or latent constructs from our measures by way of a second-order factor analysis, which were then correlated against our rates of family, intimate partner, and other murders—provided a series of frameworks by which we can examine rates of our three murder types.

It should come as no surprise that some form of overall socioeconomic distress was associated with murder of any type. In most cases, the connections were intuitive: in the metropolitan areas, and, to some extent, the rural areas as well, this distress was associated with drugs and crime; in the nonmet/adjacent areas, it was driven by poor economic outcomes and population increases; and in the nonmet/not adjacent, it was a function of lack of education, poor economic outcomes, and isolation. By the same token, affluence, or even positive growth (as seen in the nonmet/not adjacent counties) was either not significantly connected to murder or it was negatively associated. However, in the rural counties, overall socioeconomic distress was negatively associated with murder but only when it was tied in with population increases. This suggests that rural counties are unique in that they more sensitive to such overall population increases than other county groups, and this sensitivity is tied into rates for murder. We can further interpret this as an isolation measure in rural communities.

Earlier, in the descriptive analysis, we were able to compare and contrast rates of the three murder types by county category. We found some explanations here—most of which generated more questions than answers. In the metropolitan area, the chief drivers of the aspect of socioeconomic distress most associated with murder (or any type) were drugs and crime, both of which increased between 1980 and 1999. However, there were also improvements in some of the other measures: per capita income, education, poverty, and unemployment (for trends, see

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"Appendix B: Bivariate Correlations of Selected Measures, 1980–99 Average," page 86). We suspect that the declines in the three murder rates in the metropolitan counties might have been the result of the indirect effects of these improvements.

In the metropolitan areas, spatial overcrowding was associated with all three murder types, but household overcrowding was positively associated with all other murder and negatively connected to family and intimate partner murder. This contradicts theories relating to household crowding as a stressor for families living in metropolitan areas, and suggests that those in smaller households may be more at risk in cities. However, given that the negative relationship between household crowding and family and intimate partner murders is small (albeit significant), we should approach this finding with caution.

In the nonmet/adjacent areas, which also experienced declines in the three murder categories, only overall community socioeconomic distress was associated with all murder types. This factor was driven by poor economic outcomes, population increases, spatial overcrowding, and segregation. The nonmet/adjacent counties experienced improvements in all of these measures except for segregation (which increased by 5 percent between 1980 and 1999; see Exhibit 3.2) and the annual change in the number of young adults (which declined slightly, by less than 1 percent). This suggests that those counties just outside the cities were more sensitive to changes in the economy, and, to a lesser extent, population, which in turn affected the rates of murder. That said, while this might explain the declines in intimate partner and all other murders, the connection to family murder was extremely weak even if it was significant. By way of possible explanation, in the bivariate analysis against the individual measures discussed in the previous chapter, we found that overall population and young adult population declines were associated only with family murder in the nonmet/adjacent areas; because these phenomena were

not integral to the socioeconomic distress factor that was isolated, perhaps these drove the declines in family murder outside of the model. Needless to say, further and more sophisticated analyses are necessary to make a final determination.

In the nonmet/not adjacent counties, both of the isolated constructs were associated with murders, and in expected ways. The primary measures within the community socioeconomic distress construct were lack of educational attainment, poor economic outcomes, and spatial isolation. As with the nonmet/adjacent counties, the positive association with this distress factor was weakest for family murders. In fact, the negative association with beneficial growth was more strongly associated with family murders than was community economic distress. (This, in a small sense, confirms the argument made by Duncan et al., who suggested that when it came to child outcomes, wealth had a stronger effect on child well-being than poverty.)[98] These counties also experienced declines in the three murder types. This is most likely because there were improvements between 1980 and 1999 in many of the primary measures that drove both of the isolated constructs: for example, spatial isolation (6.8 percent more people per square mile), educational attainment (up by 24 percent), poverty (down by 14 percent), per capita income (up by 32 percent), and in the number of establishments (up by 1 percent). We might even argue that even this slight increase in the number of establishments had more of an effect on the decline in family murders than in the decline in family and all other murders; again, given the relatively low Pearson r-scores to begin with, caution and further investigation is called for to figure out exactly why this might be the case.

As noted several times, the rural counties were quite different. The rates of all of the murder types were markedly higher than in the other three county categories, intimate partner murders rose here and only here, and the constellation of measures within both the first- and

second-order factors was unique. Perhaps the most compelling finding is the extent to which population changes affect the murder rates. However, this presents an enigma. Between 1980 and 1999, overall populations increased, but that of young adults did not. Household crowding declined, but so did spatial isolation. There were increases in arrests for violent crimes and drug-related offenses but not for alcohol-related offenses. The number of establishments declined, as did the number of hospitals per 100,000 (a function, of course, of population increases absent the necessary development to serve growing communities), but there were improvements in poverty rates, educational attainment, unemployment, per capita income, and racial segregation. Recalling that population growth, spatial but not household crowding, alongside lack of education, poor economic outcomes, and segregation were part of the overall community socioeconomic distress measure, we would expect declines in family and intimate partner homicide, and the negative association between those murder types and this factor bear this out.

However, there was also a negative association with intimate partner murder rates, which unlike those of the other two murder types rose. The answer might be in the second isolated factor, which is another measure of community socioeconomic distress, but one driven by increases in arrests for violent crime, alcohol and drug-related offenses, unemployment, populations (but not of young people), and household-size declines. The same time period saw rises in violent crime and drug-related arrests (although not in alcohol-related arrests). As noted above, unemployment declined, but so did household crowding. Perhaps the combination of smaller households, more violent crime and drugs, alongside population increases of those less able to contribute to the tax base might have contributed to the increases in intimate partner murder. However, another element of the aforementioned enigma is that that this factor was also associated with all other murders (which declined), and the absolute value of the Pearson

bivariate score for this second factor was greater than that for the first community distress factor. The only possible explanation that can be gleaned from the data presented is perhaps it was more the effects of some measures at the expense of others that were more instrumental in driving those declines in all other murders: specifically, the increase in persons per square mile, which, as seen in the bivariate correlational analyses in the previous chapter, was negatively associated with all other murders; at the risk of repetition, more research is called for to better tease out these effects.

While our attempt to explain declines in murder rates (or rises, in the case of intimate partner murders in the rural counties) left us with more questions than answers, this does not mean that some initial commonalities could not be found. We've shown that our initial series of measures are affected by population and proximity, so it was reasonable to include them in our model. We've spoken already, and at length, about the impact of overall community socioeconomic distress, and how that is manifested by county category, with interesting contrasts therein. We've seen the effects of the economy on this measure, and the variations by place; more importantly, we've seen that improvements in the economy alone does not always "lift all boats," particularly in rural areas.

Most important, we've also seen the effects of movements in population and crowding or, its converse, isolation (both spatial and household), and it is here where family and intimate partner murders are distinguished from all other murders. Based on the isolated constructs presented in this chapter or the bivariate analyses against the individual measures presented in the last, family and/or intimate partner murders in all of the county categories were affected by either population declines, isolation (or smaller households), or both. The community socioeconomic distress factor that was driven primarily by population growth and household

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crowding was negatively correlated with family and intimate partner murders, but not all other murders, in metropolitan areas. In the nonmet/adjacent areas, the connection is the weakest, although the bivariate analyses in the previous chapter showed that overall and young adult population declines were associated with family murder. In the nonmet/not adjacent areas, the construct associated with isolation was correlated with all three murder types, but the previous bivariate analysis against household crowding was positively associated only with all other murders, and, more important, overall population declines were linked to intimate partner murder. As we noted above, population declines, even in light of improvements in the other measures, were correlated with increases in the three murder types, as was the isolation measure in and of itself; however, overall and young adult population declines alone were associated with intimate partner murder. Thus, what seemed to distinguish family and intimate partner murders from all other murders is the extent to which they were affected by the intricacies of population and density shifts, and in turn how those shifts intercorrelated with the other measures in our model.

Conclusion

The differences and similarities in the correlates of family, intimate partner, and other murders may not have been overwhelming—as evidenced by the variance explained by each of the models in the second-order factor analyses and the modest bivariate Pearson scores—but arguably are compelling enough to inform opportunities for policy and especially steps for future research. It is to these efforts that we devote the next and final chapter.

V. LESSONS FOR FUTURE RESEARCH AND POLICY

Clearly, place—population and proximity—matters when it to comes to types of homicide. Although the influences of various configurations of constructs were not as powerful as we would have predicted for family and intimate partner homicide, there are still lessons to be learned with implications for future research and for policy.

Next Steps for Future Research: Building upon the Theoretical Framework

While this modest first step demonstrates the need to distinguish family and intimate partner murders by rurality or urbanity, many questions are left unanswered, as demonstrated at the end of the discussion in the last chapter. Given the prominence of the economic and educational measures within the construct of community socioeconomic distress for all of the county categories, what exactly was behind some of the interrelationships of the relevant measures? For example, were there gender differences in these variables? The literature is mixed in this respect. The research on welfare-to-work, for example, show that as women in abusive relationships take steps toward independence by attending school or finding jobs, the abuse becomes more severe.[99] Browne et al. found that women experiencing domestic violence were not necessarily more likely to be unemployed than women who are not abused, only that they had shorter and more frequent spells of employment.[100] To introduce even greater complexity to the issue, findings by Fink indicate that rural women's higher educational attainment did not necessarily bring about higher earnings and that gender in and of itself might have been explained the lower salaries.[101] In order to disentangle these effects, a new model might include women's labor force attachment and educational attainment as a measure, or at least control these variables by gender.

Another way in which the model could be refined is in the domain of health care. Given

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that the rate of hospitals per 100,000 had modest effects at best for all murder types, one might also control for the quality and not just the availability of medical facilities in any given county, in order to truly discern the effects of timely medical attention. Recent research by Harris et al. suggest that improvements in medical care may have contributed to the decline in homicide rates from 1960 to 1999: was there a rural-urban differential in such improvements as to explain the higher rates of rural family and intimate partner homicide?[102] It would be helpful to break down rural areas by road access—obviously, those living in areas with roads would have far greater access than those without (however, the disadvantage to such an analysis is that it would greatly reduce the population to be studied, which, as explained in chapter 2 where we discussed methodology, would make analyses or murder even more problematic). We might also explore the role of health insurance in its role as a facilitator or constraint to adequate access to health care, especially in rural communities: according to the Rural Policy Research Institute, the rural non-elderly uninsured rate rose from 16.5 percent to 18.2 percent between 1993 and 1999.[103]

Although we did establish a link between socioeconomic distress and murder, it was not particularly stronger for intimate partner or family murder than for all other murders. This is intuitively unsatisfying, as there is something about the interpersonal relationships that underscore family and intimate partner murders that remains unexplored, at least by quantitative methods. One possible move in the right direction is the conceptualization of a model that more fully incorporates and reflects what sociologists call "social disorganization theories" (discussed briefly earlier), which primarily involve disconnectedness, high family mobility, racism/segregation, and overcrowding. In the literature, these variables have been associated with urban life and to murders of acquaintances and strangers in urban areas,[104] although the direct link has not been categorically established to date. For example, an analysis of African

American killings in St. Louis showed that residential instability and concentrated disadvantage were significant factors only in some types of murder.[105]

Conversely, the presence of social capital appears to mitigate deleterious effects in some instances. Browning found that collective efficacy—neighborhood cohesion and the capacity for informal social control—was negatively associated with intimate homicide rates and nonlethal partner violence in Chicago.[106] Galea et al. obtained similar results in a series cross-sectional analyses of state homicides but concluded that the relationship between social capital and violence is likely dynamic and bidirectional, for example, with violence impacting perceived trust levels over time.[107] The work of Lederman et al. examined this question in terms of country-level homicide, and found that a sense of trust had a significant negative impact on homicide rates, even after controlling for income inequality, economic growth, and various reverse causation models.[108]

Clearly, one of the challenges is refining a description of the mechanism between social factors and crime. As Lee et al. note, this need is particularly acute in nonmetropolitan areas, as much research to date has focused on homicide as an urban problem.[109] Central to these efforts is the development of useful, consistent indicators of social capital across various geographic areas. The Centers for Disease Control's current efforts to institute a National Violent Death Reporting System may offer progress in this endeavor.[110]

Arguably, the treatment of social disorganization theories has been more amenable to studies of urban life than of rural or suburban life. However, this does not mean that the constructs and measures that comprise the construct of social disorganization are unknown anywhere but in cities. Rather, these variables play out in very different ways. For example, isolation can be as much a part of social disorganization in rural areas as overcrowding is in the

cities. High neighborhood cohesion, found to be negatively associated with intimate partner homicide in the cities, might create the kind of "chilling effect" spoken of earlier in rural areas that prevents women and children in crises from seeking help. Less racial segregation, connected to positive outcomes in cities, may be a negative outcome in a suburban community resistant to integration. We can take what we have learned through our multi-step approach to conditions in the cities, suburbs, and rural communities and use that expand on theories of social disorganization, which in turn may improve on the theoretical framework on which rates of family, intimate partner, and other murders can be studied and, more important, addressed.

Implications for Policy: The Universality of Place-Based Responses

To speak of a "universality of place-based responses" may seem contradictory and at odds with our original premise of place-based differences in the variables affecting family, intimate partner, and all other murders. However, our findings point to some form of universality given the fact that some aspect of socioeconomic distress was linked to the three murder types. But more important, as we noted previously, what was usually within or linked with the construct of socioeconomic distress that underscored family and intimate partner murder in particular was tied in with population and density shifts— specifically, declines. Whether directly correlated with isolation in and of itself or connected to isolation and population declines by way of a latent factor that was derived from a battery of relevant measures, family and intimate partner murders were more affected than all other murders. As such, there are implications that are unique to family and intimate partner murders. Here, we argue that crafting effective policies to deal with family and intimate partner violence must recognize the fact that although spatial isolation is a fact of life in rural communities by dint of geography, it can manifest itself anywhere and at any time—even in large metropolitan areas.

As noted in the chapter 1, metropolitan areas are more likely to have the kinds of resources and interventions available to women and families who are in the kinds of abusive situations that can lead to murder. However, not all cities necessarily have the means or the capacity for dealing with these problems, as they must grapple with a plethora of compelling concerns, which in turn become exacerbated by socioeconomic distress. Another factor of urban life is that many cities are segregated by race, ethnicity, and even culture, creating a scenario wherein some residents may live in their own enclaves and rarely travel outside their neighborhoods.

This has been seen particularly among immigrants who settle within a large city; when they arrive they are reliant on their own ethnic networks for the necessities of life, including housing and employment.[111] New female immigrants and their children, particularly from countries where the battering of women and children are tacitly accepted, are especially vulnerable.[112] Rapid acculturalization does not necessarily solve the problem, in that it may even exacerbate tensions within the family.[113] The resources that nonimmigrant women and families may take for granted are rarely used by immigrants, because there is a real fear of losing family or community support on which the victim is highly dependent, combined with the fear of deportation or retaliation from the batterer if help is sought from outside the community; even when there is no danger, there is the perception (sometimes not unfounded) that American-style interventions will be ineffective due to language and cultural barriers.[114] These perceptions are analogous to those held by some women in rural communities, who are less likely to use social service resources because they are seen as coming in from the outside.[115] In addition, there is the tension between keeping women and families safe from abuse and the so-called cultural prerogative, which is best illustrated as "let us decide—then value our decisions."[116] This can be

a problem in the metropolitan areas where immigrants have settled, but for nonmetropolitan and rural communities, it poses just as much of a challenge; moreover, it is not confined to immigrant communities. Thus, even the presence and availability of resources cannot mitigate the effects of social isolation.

The kind of closed environment that seems to nurture family and intimate partner violence that we spoke of earlier can have insidious consequences wherever it is found. Kubrin and Weitzer found that the effects of neighborhood economic disadvantage and community response thereof, combined with poor policing in urban areas, create scenarios ripe for what they call "cultural retaliatory homicide;" they note that residents in these communities tend to settle issues among themselves, which is very similar to approaches to crime and policing in rural areas. This is nothing new. Studies have shown that urban communities with the highest prevalence of child abuse were characterized by isolation, social disorganization, and a lack of social cohesiveness, even after controlling for race and SES.[117] Whether it is spatial or social isolation, the most effective policy response to family and intimate partner violence and homicide will also consider whether that isolation is caused by geography, culture, or even socioeconomic distress.

Such a policy response must be multifaceted in its approach. It cannot rely upon one strategy for cure, particularly in the realm of law enforcement. As stated earlier, in isolated communities, there is either poor policing or lack of resources for good policing and effective prosecution.[118] Even the research community is mixed as to the efficacy of the arrest mechanism to address family and intimate partner homicide.[119] However, one very promising strategy is the coordinated community response.[120] The coordinated community response is characterized as a multidisciplinary, synergistic approach involving multiple stakeholders and resources: law

enforcement, public health (including mental health), child protective services, schools, elder care facilities, advocates, and even former survivors of abuse. One major advantage of this approach is that it is more likely to reflect, or at least attempt to work within, the culture of the community.

While such strategies have been most commonly employed in urban areas where geography facilitates such collaboration, they have been attempted in rural communities and small towns as well.[121] Here, health care providers have been particularly active participants in the process. According to the Office of Rural Health Policy, "Coordinated community response to domestic violence is not a new idea, but in many settings, health care providers are new participants in such cooperative efforts. Effectively integrating the health care response into the larger community response is another policy challenge, that may not seem new to many rural providers. Wearing multiple hats and sharing limited resources are familiar experiences for more rural providers".[122]

Perhaps because of the documented problems in timely health care access for rural women and families, these providers embrace these kinds of collaborative efforts as opportunities to improve their outreach capacity. There are many creative strategies that can move this forward: emergency personnel/EMTs in rural communities might receive enhanced life-saving instruction in order to compensate for the lack of local emergency room facilities; medical personal might be trained to perform more aggressive outreach and early intervention.

Conclusion

The problem of family and intimate partner homicide may arguably be rooted not in the economy, the educational system, spatial isolation or density, law enforcement capacity, or any of the other measures we selected. Rather, the problem may be one of *complacency*. As we

argued in the beginning, a mere count of murders masks the true problem of family and intimate partner homicides. If the population-based rates seem like an ecological fallacy—that the murder rates of larger communities will necessarily be smaller than that of rural areas due to population size—we would strongly disagree and contend that simply counting the number of murders is equally as fallacious. Websdale wrote of the effects of a "rural collective conscience" that states that because violent crime is ostensibly less of an issue in rural communities, so it is the case with violent crimes perpetrated against family members and intimate partners.[123] The controversies surrounding the metrics and the perception of the problem can potentially lead to a question that lies at the very core of complacency: if the number of family and intimate partner murders in small population areas is low relative to those of the nation as a whole, and if violent crime isn't much of a problem to begin with (at least in small towns and rural areas), is there a reason to be concerned? And if there is no reason to be concerned, why spend valuable resources and energy on the problem?

It is only recently that domestic and family violence and homicide have been called "public health emergencies." Underscoring the rhetoric is a political reality, that in order to capture the attention of the public and policymakers, the sense of urgency must be heightened. This is critical in the nonmetropolitan counties, which are usually far from the radar screen, as they do not command the interest or the imagination of the big metropolitan areas, or that of the so-called safe and seemingly idyllic rural communities. By taking these problems out of the narrow confines of law enforcement and the judicial system—where the successes have been modest at best family and intimate partner abuse and homicide become problems that require a more coordinated approach, one that usually involves the public health community but also many others. Ideally, and theoretically, this approach can strengthen the law enforcement response.

The downside to this strategy is that this too may backfire, as many public health concerns tend to go through cycles of crisis to cure to complacency and then back to crisis once the interest is lost, as is what is happening with the AIDS and tuberculosis epidemics.[124] It is difficult to sustain the sense of urgency, lest public and policymakers become cynical and move on the next big problem. Moreover, the level of effort involved in maintaining the kinds of collaborations necessary to produce effective place-based strategies is not insubstantial. Nonetheless, the consequences of complacency may very well increase the risk of murder for women and families in rural areas, small towns, and any place where family and intimate partner violence is allowed to flourish.

APPENDIX A: TECHNICAL APPENDIX

This section describes the sources for the data used in this report, any imputation procedures, rate calculations, and analysis procedures.

Data Sources

All but two of the data files came from public-use sources, and all were downloaded from the World Wide Web through various sources. The exceptions were the Area Resource File (ARF), which was purchased from Quality Resource Systems, Inc., and the FBI Report A Arrest File, purchased from the U.S. Federal Bureau of Investigation.

FBI Supplementary Homicide Report

We used the FBI Supplementary Homicide Report (SHR) file, 1976–1999.[125] The file was downloaded from the Inter-university Consortium for Political and Social Research (www.icpsr.umuch.edu). The SHR data come as two files, one with victim information and the other with offender information. In-house analyses of both files revealed that the offender file contained more complete (inasmuch as possible) data on both victims and offenders, and that is what was used for this report. Pages 77–79, below, contain a complete description of how missing data were accounted for. The SAS definition data sets were used as the basis for reading the file.

FBI Report A file (Arrests).

The file was purchased directly from the U.S. Federal Bureau of Investigation. In-house comparisons against the free, downloadable county-level arrest data and the Offenses Known and Clearances by Arrest data (see below) revealed that when it came to arrests, the FBI Report A data were far more complete.[126] There is one record per reporting agency. Our data for arrests for violent crime, drug, and alcohol-related offenses were taken from this file, after which

we calculated a population-based rate; although agency-level population appears on these files, we opted instead to use the population from the U.S. Census (below) for the sake of consistency (i.e., all of our other population-based rates use the Census data).

Offenses Known and Clearance by Arrest

The Offenses Known and Clearances by Arrest data for 1980 through 1999 were downloaded from the ICPSR website (ICPSR No. 9028: 1975–97; ICPSR No. 2904: 1999, ICPSR No. 3158: 1999) These files contain agency-level data and were used to create a weight that would correct for the 8 percent of murders that reportedly do not appear on the SHR.[127] See the section on adjustments, below, for more details on the creation of this weight.

Law Enforcement Agency Identifiers Crosswalk (United States, 1996)

The Law Enforcement Agency Identifiers Crosswalk file was created by the U.S. Bureau of Justice Statistics and downloaded from ICPSR (ICPSR No. 2876), to allow users to cross-walk FBI data with Census data, by matching FBI agency codes with FIPS (Federal Information Processing Standard) codes. This file was used to match the SHR, FBI arrest, and UCR crimes known to the police data with the other public use data used for the report (such as the U.S. Census, Area Resource File, County Business Patterns, and Beale codes).

U.S. Census

The population, population density, and race (and racial segregation) data used in this report came from the decennial U.S. Census for 1980, 1990, and 2000. Census data for 1980 and 1990 were obtained by Claritas (which also contained estimates for 1997 and 2002); Census 2000 data were downloaded directly from www.census.gov; all were matched by FIPS code.

Area Resource File

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The Area Resource File (ARF) contains data not only for health care resources (number of hospitals, doctors, outpatient and inpatient health care facilities, etc.) but also valuable population, education, and economic data, which comes from the U.S. Census. The 2002 file, which contains cumulative data with some elements going back to the mid-1970s, was used for this report (arf0202.asc) and was prepared by and purchased from Quality Resource Systems, Inc., who is responsible for the maintenance of the ARF system under funding from Department of Health and Human Services (www.arfsys.com). There is one record per county. The data on hospitals, educational attainment (persons 25+ with 12 or more years of education), unemployment, and per capita income came from this file.

Regional Economic Profiles

The data are available from the U.S. Department of Commerce's Bureau of Economic Analysis site (www.bea.gov) through their interactive data retrieval system. The specific series containing our data of interest was "Detailed county annual tables of income and employment by SIC industry, transfer payments, farm income and expenses, 1969–2001 (CA30-CA45), 1969–2000 (CA05 and CA25): Regional Economic Profiles." The variables extracted were the total number of proprietors, which included farm and non-farm and the county FIPS code necessary for matching. The data were copied and pasted onto an Excel spreadsheet by state/county, which was then turned into a file that could be linked to the others. These were the only data that needed to be handled in this fashion. Our measure of the number of establishments was obtained through these data.

Beale codes.

The Beale codes, also known as the "Rural-Urban Continuum" codes, were developed by the Economic Research Service of the U.S. Department of Agriculture, are based on Census

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county estimates and definitions of metropolitan and nonmetropolitan areas. The ERS web site

provides an Excel spreadsheet with the Beale codes

(http://www.ers.usda.gov/Data/RuralUrbanContinuumCodes/1993/code93.xls); the 1993 file was

used for this report. The site also contains documentation for handling certain county/cities (for

example, such as those in Virginia), which was used to make manual adjustments before the

codes were attached to the rest of our data (via the FIPS code). Comparisons of the 1983 and

1993 codes (which, along with codes from 1974, were the only ones available at the time that the

analyses were performed) showed that fewer than 20% (593 out of 3,141) of the counties

changed their codes in that time period; of those, less than half, 42%, (250) jumped from one

Beale code to two or more Beale codes on either side of the continuum (which would have

affected our combined simplified groupings). At the very end of the analysis period, the 2003

codes, based on the 2000 Census, became available. However, we made the decision to use the

1993 codes for our entire analysis, given the relatively small number of counties that switched

codes, and, more important, because the new methodologies used to classify Metropolitan areas

made the 2003 codes not directly compatible with previous codes

(http://www.ers.usda.gov/data/RuralUrbanContinuumCodes).

As noted in the main text, metropolitan counties are assigned one of four codes: 0 =

Central counties of metropolitan areas of 1 million population or more; 1 = Fringe counties of

metropolitan areas of 1 million population or more; 2 = Counties in metropolitan areas of

250,000 to 1 million population; and 3 = Counties in metropolitan areas of fewer than 250,000

population. The nonmetropolitan counties are designated as: 4 = Urban population of 20,000 or

more, adjacent to a metropolitan area; 5 = Urban population of 20,000 or more, not adjacent to a

metropolitan area; 6 = Urban population of 2,500 to 19,999, adjacent to a metropolitan area; 7 =

Urban population of 2,500 to 19,999, not adjacent to a metropolitan area; 8 = Completely rural or fewer than 2,500 urban population, adjacent to a metropolitan area; and 9 = Completely rural or fewer than 2,500 urban population, not adjacent to a metropolitan area.

Calculations, Imputations, and Adjustments

Several calculations, imputations, and adjustments needed to be made until the data were ready for analysis. Some were discussed briefly in the text; we will go into greater detail here.

Pre-processing interpolations

The U.S. Census data needed to be interpolated for intercensal years. We used a simple straightline interpolation, one which calculated the percent change from one decennial Census to the next. For total population, population of young adults, residential crowding and isolation, we used the 1980, 1990, and 2000 Census. For race, we needed to employ a different approach, due to the issues surrounding the comparison of race data from the 1990 to the 2000 Census (the latter of which allowed respondents to classify themselves as more than one race); therefore, we used the 1997 and 2002 Census estimates from Claritas to calculate 1991 through 1999 counts for race, using the same straightline interpolation method.

This strategy needed to be used for some of the ARF data as well, for persons 25+ with 12 or more years of education (interpolated for all intercensal years) and unemployment (interpolated for 1981 through 1984 only). The hospital, poverty, and per capita income data from the ARF needed no interpolation. After the pre-processing interpolations, the calculations and adjustments were performed.

Calculating the murder rates

The two major flaws in the Supplementary Homicide Report data are in the undercount in the numbers of murders themselves and in the degree to which critical data elements are missing

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(specifically, victim-offender relationship). Fox and Zawitz estimated that 92 of all of the murders known to the police were on the SHR data.[128] Our strategy to account for this serious problem was to take the numbers of homicides by year and by reporting agency on the SHR, and assign a weight based on the same data on the Uniform Crime Report data, "Offenses Known and Crimes Known to the Police." Our weight was as follows:

a/b, where

a = SHR Murders and b = UCR Murders

Weights were calculated by agency and by year. A weight of 1.0 indicates that the number of murders for any given year and agency on the SHR was identical to that on the UCR; anything lower meant that the number of murders on the UCR were greater than the number on the SHR. For the 20-year period, we calculated a ratio of 0.9763—or, a rate of slightly over 2 percent missing data on the SHR.

The other problem, and one more difficult to cure, was that of missing data—specifically, information pertaining to the relationship between the victim and offender. On the 1976–99 file used for this report, we found missing relationship data for approximately 32 percent of the cases (using a pooled data file). Therefore, we used a within-county adjustment strategy based on the weighted, within-city adjustment method outlined by Pampel and Williams.[129] First, we created five circumstance categories: felony, other felony, nonfelony, other nonfelony. Then, after weighting for nonreporting as per the strategy above, we adjusted for each type of murder —intimate partner, family, all other murders ($i = 3$)—by taking each circumstance ($j=5$) and using the following formula:

$$\text{adjusted rate}_i = \{[\Sigma_{j=1..5} (a_{ij} + (a_{ij}/n_j)*m_j)]/P\} * 100{,}000, \text{ where}$$

a_{ij} = the number of incidents in a relationship category i for circumstance j

n_j = the number of circumstances $_j$ for which a relationship is known

m_j = the number of circumstances for which a relationship is unknown

P = the population.

Murder types for which the circumstance was missing were adjusted using a simple proportion of the known cases for that murder type. Each year was treated separately.

Calculating the independent measures

The rest of the measures were calculated as follows:

Overall population, annual percent change: per cent change from one year to the next (this was actually part of our interpolation strategy).

Young adult population (age 18-34), annual percent change: see "Overall population change," above.

Number of establishments, annual percent change: per cent change from one year to the next.

Unemployment: no adjustments made (the figure came on the file as a percentage).

Per capita income: adjusted for 1982–84 dollars.

Poverty: no adjustments made.

Arrests for violent crime: the number of forcible rapes, robberies and assaults from the FBI Arrest File by 100,000, from the U.S. Census. As noted in the text, the number of murders and non-negligent homicides were not included due to endogeneity issues (that is, in order for a murder arrest to occur there had to have been a murder, and murder is our dependent variable).

Race: the number of nonwhites over the number of whites.

Segregation: Index of Dissimilarity, calculated as

0.5 * Σ |(g1/G1)-(g2/G2)|, where

$g1$ = zip code proportion of nonwhites in the county$^\backslash$

$G1$ = county proportion of nonwhites

$g2$ = zip code proportion of whites in the county

$G2$ = county proportion of whites

Persons per housing unit: all persons (minus institutionalized) per household unit

Households per household unit: all households per housing unit

Isolation (and, its converse, spatial density): all persons per square mile

Adults 25+ with 12 or more years of education: apart from the intercensal interpolations (see above), no adjustments made

Hospitals per 100,000: number of hospitals from the ARF per 100,000, from the U.S. Census

Arrests for drug-related offenses: number of offenses for drugs (use, possession, sale, manufacturing) from the FBI Arrest A file per 100,000 from the U.S. Census

Arrests for alcohol-related offenses: number of offenses for alcohol (including driving while intoxicated, public intoxication, driving with an open container, unlawful sale or supply of alcohol; unlawful purchase, possession, or consumption of alcohol; unlawful permitting of consumption of alcohol by minors; and unlawful consumption of alcohol in public places) from the FBI Arrest A file per 100,000 from the U.S. Census

Analyses

All analyses were conducted using SAS (versions 8.0 and 9.0). Various procedures were used, including PROC FREQ for simple frequencies, PROC MEANS for simple means and other descriptive statistics, PROC CORR for bivariate correlations, and PROC FACTOR for the first and second order factor analyses (with the Harris-Kaiser oblique rotation for the first order and

the default orthogonal rotation for the second order). As described in the text, all data were aggregated by 5-year average groupings prior to analysis to account for possible instability in the rates of various variables, particularly in small population areas.

PROC REG, for ordinary least squares analyses, was attempted against the second order factors and the dependent variables; these analyses were less useful for our purposes, as we were more concerned with how discrete aspects within any given community correlated with murder than with how a particular model of variables could explain murder. We also experimented with a time series (PROC AUTOREG), to see if changes in a variable in the past was connected to rates in murders. For this procedure, we did not use the 5-year average groupings but the single year data values for the dependent and independent variables. However, given the number of variables to be tested and the varying rates of change in the 20-year period, the results of these analyses were not particularly useful, and, if they were, did not contradict anything found through the method of choice—that is, structured equation modeling, which allowed for a richer and more nuanced analysis.

APPENDIX B: TREND DATA FOR SELECTED MEASURES

	Metropolitan	Nonmetropolitan/ adjacent	Nonmetropolitan/ not adjacent	Rural
Population change (%)				
'80–'84	1.3%	0.4%	0.0%	-0.2%
'85–'89	1.1%	0.3%	-0.1%	-0.3%
'90–'94	1.6%	1.1%	0.7%	0.7%
'95–'99	1.4%	1.0%	0.6%	0.6%
'80-'99	*1.4%*	*0.7%*	*0.3%*	*0.2%*
Young adult (18–34) population change (%)				
'80–'84	0.7%	-0.4%	-1.1%	-1.3%
'85–'89	0.5%	-0.5%	-1.3%	-1.6%
'90–'94	-0.2%	-0.3%	-0.6%	-1.1%
'95–'99	-0.4%	-0.4%	-0.8%	-1.4%
'80–'99	*0.1%*	*-0.4%*	*-0.9%*	*-1.3%*
Number of establishments, increase/decrease (%)				
'80–'84	4.8%	3.2%	3.3%	3.6%
'85–'89	2.6%	1.0%	0.1%	0.4%
'90–'94	1.9%	1.4%	1.5%	1.7%
'95–'99	9.4%	2.1%	4.3%	1.4%
'80–'99	*10.5%*	*2.7%*	*4.6%*	*1.3%*
Unemployment rate (%)				
'80–'84	7.1%	8.5%	8.1%	7.9%
'85–'89	6.2%	8.1%	8.0%	7.7%
'90–'94	6.1%	7.4%	7.0%	6.6%
'95–'99	4.5%	6.0%	6.1%	5.8%
'80–'99	*6.0%*	*7.5%*	*7.3%*	*7.0%*

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APPENDIX B: CON'T

	Metropolitan	Nonmetropolitan/ adjacent	Nonmetropolitan/ not adjacent	Rural
Per capita income (1982–84 dollars)				
'80–'84	$10,572	$9,053	$9,077	$8,900
'85–'89	$12,274	$10,211	$10,109	$10,222
'90–'94	$12,983	$10,798	$10,965	$10,997
'95–'99	$14,607	$11,738	$11,964	$11,196
'80–'99	*$12,609*	*$10,450*	*$10,529*	*$10,329*
Poverty (%)				
'80–'84	9.1%	12.7%	13.5%	15.8%
'85–'89	9.1%	13.2%	14.2%	15.6%
'90–'94	9.0%	12.9%	14.1%	15.1%
'95–'99	8.5%	11.7%	12.8%	13.6%
'80–'99	*8.9%*	*12.6%*	*13.5%*	*15.0%*
Arrests for violent crime (except murder) per 100,000				
'80–'84	140.4	111.1	104.9	103.6
'85–'89	143.1	110.2	108.3	105.4
'90–'94	186.5	150.3	130.5	118.8
'95–'99	181.3	158.2	131.2	120.3
'80–'99	*160.7*	*129.5*	*118.7*	*110.5*
Segregation (Dissimilarity index)				
'80–'84	0.284	0.184	0.173	0.195
'85–'89	0.275	0.186	0.174	0.187
'90–'94	0.272	0.190	0.179	0.187
'95–'99	0.272	0.194	0.181	0.190
'80–'99	*0.276*	*0.189*	*0.177*	*0.190*

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APPENDIX B: CON'T

	Metropolitan	Nonmetropolitan/ adjacent	Nonmetropolitan/ not adjacent	Rural
Percent nonwhite				
'80–'84	13.9%	14.7%	12.2%	10.9%
'85–'89	14.5%	15.2%	13.5%	11.8%
'90–'94	15.5%	15.8%	14.4%	12.4%
'95–'99	16.7%	16.6%	15.0%	12.8%
'80–'99	*15.1%*	*15.5%*	*13.8%*	*11.9%*
Persons per housing unit				
'80–'84	2.5	2.4	2.4	2.2
'85–'89	2.5	2.3	2.3	2.1
'90–'94	2.4	2.3	2.2	2.0
'95–'99	2.4	2.2	2.2	2.0
'80–'99	*2.5*	*2.3*	*2.2*	*2.1*
Persons per square mile				
'80–'84	672.2	74.9	40.5	16.0
'85–'89	690.8	76.2	40.7	16.1
'90–'94	714.9	78.2	41.5	16.4
'95–'99	748.4	81.2	43.3	17.4
'80–'99	*706.3*	*77.6*	*41.5*	*16.5*
Persons 25+ with12+ years of education (%)				
'80–'84	65.3%	57.7%	59.8%	57.6%
'85–'89	72.4%	64.7%	66.4%	64.1%
'90–'94	74.4%	68.0%	68.7%	67.8%
'95–'99	79.6%	73.4%	74.3%	73.4%
'80–'99	*72.0%*	*65.0%*	*66.5%*	*65.4%*

APPENDIX B: CON'T

	Metropolitan	Nonmetropolitan/ adjacent	Nonmetropolitan/ not adjacent	Rural
Hospitals per 100,000				
'80–'84	5.1	1.5	1.5	0.6
'85–'89	5.1	1.5	1.4	0.6
'90–'94	4.9	1.4	1.4	0.6
'95–'99	4.6	1.3	1.3	0.6
'80–'99	*4.9*	*1.4*	*1.4*	*0.6*
Arrests for drug-related offenses per 100,000				
'80–'84	385.3	305.5	319.3	321.1
'85–'89	477.7	359.3	333.7	428.4
'90–'94	555.7	414.9	375.1	409.6
'95–'99	790.1	668.2	670.1	565.5
'80–'99	*543.0*	*426.0*	*418.9*	*412.8*
Arrests for alcohol-related offenses per 100,000				
'80–'84	1282.0	1392.0	1488.0	1167.0
'85–'89	1139.0	1265.0	1330.0	978.3
'90–'94	1067.0	1257.0	1383.0	1057.0
'95–'99	899.4	1127.0	1249.0	904.8
'80–'99	*1096.0*	*1241.0*	*1359.0*	*1009.0*

Sources: See "Appendix A: Technical Appendix," page 73.

APPENDIX C: BIVARIATE PEARSON CORRELATIONS OF SELECTED MEASURES, 1980–99 AVERAGE

Metropolitan

	Population		Young adults		Person/unit		Persons/sq.mile		Drug arrests		Alcohol arrest		Violent crime	
Population	1.000	***	0.956	***	0.120	***	-0.109	**	0.077	*	0.012		0.086	*
Young adults			1.000	***	0.130	***	-0.035		0.051		-0.003		0.065	
Person/unit					1.000	***	-0.081	*	-0.016		-0.026		-0.036	
Persons/sq.mile							1.000	***	-0.169	***	-0.155	***	-0.198	***
Drug arrests									1.000	***	0.890	***	0.922	***
Alcohol arrests											1.000	***	0.864	***
Violent crime													1.000	***
# Establishments														
Hospitals														
Poverty														
Education														
Unemployed														
Per cap. income														
Segregation														
% nonwhite														

	Establishments		Hospitals		Poverty		Education		Unemployed		Per Cap. Inc.		Segregation		% nonwhite	
Population	0.023		-0.109	**	-0.187	***	0.135	***	-0.230	***	0.068	*	-0.261	***	0.099	**
Young adults	0.039		-0.054		-0.058		0.049		-0.182	***	0.003		-0.203	***	0.146	***
Person/unit	0.024		-0.051		-0.039		0.048		0.029		-0.016		-0.113	***	0.106	**
Persons/sq.mile	-0.010		0.295	***	0.142	***	-0.079	*	0.009		0.219	***	0.264	***	0.210	***
Drug arrests	-0.020		-0.314	***	-0.019		-0.290	***	-0.022		-0.297	***	-0.383	***	-0.095	**
Alcohol arrests	-0.011		-0.281	***	0.013		-0.302	***	0.014		-0.330	***	-0.339	***	-0.109	**
Violent crime	-0.009		-0.331	***	0.066		-0.335	***	0.023		-0.360	***	-0.392	***	-0.006	
Establishments	1.000	***	-0.011		0.001		0.012		0.006		-0.018		-0.016		-0.003	
Hospitals			1.000	***	0.106	**	0.105	**	0.018		0.300	***	0.438	***	0.227	***
Poverty					1.000	***	-0.269	***	0.593	***	-0.354	***	0.177	***	0.508	***
Education							1.000	***	-0.045		0.735	***	0.135	***	-0.204	***
Unemployed									1.000	***	-0.183	***	0.140	***	0.180	***
Per cap. income											1.000	***	0.311	***	-0.121	***
Segregation													1.000	***	0.116	***
% nonwhite															1.000	***

Note: Significance levels are indicated as * = p<=0.05, ** = p <=0.01, *** = p<=0.001.

APPENDIX C: BIVARIATE CORRELATIONS OF SELECTED MEASURES, 1980–99 AVERAGE , CON'T

Nonmetropolitan/Adjacent

	Population		Young adults		Person/unit		Persons/sq.mile		Drug arrests		Alcohol arrest		Violent crime	
Population	1.000	***	0.881	***	-0.149	***	-0.043		-0.017		-0.144	***	-0.025	
Young adults			1.000	***	0.002		-0.007		0.007		-0.092	*	0.042	
Person/unit					1.000	***	-0.010		-0.160	***	-0.129	***	-0.124	***
Persons/sq.mile							1.000	***	0.055		0.030		0.016	
Drug arrests									1.000	***	0.868	***	0.875	***
Alcohol arrests											1.000	***	0.787	***
Violent crime													1.000	***
# Establishments														
Hospitals														
Poverty														
Education														
Unemployed														
Per cap. income														
Segregation														
% nonwhite														

	Establishments		Hospitals		Poverty		Education		Unemployed		Per Cap. Inc.		Segregation		% nonwhite	
Population	0.140	***	0.003		-0.073	*	0.033		-0.009		-0.016		-0.110	**	0.028	
Young adults	0.077	*	-0.052		0.135	***	-0.165	***	0.046		-0.181	***	-0.114	**	0.122	***
Person/unit	-0.059		-0.041		0.203	***	-0.156	***	0.202	***	-0.123	***	-0.002		0.217	***
Persons/sq.mile	-0.015		-0.060		-0.208	***	-0.542	***	-0.213	***	-0.483	***	-0.045		-0.039	
Drug arrests	-0.040		-0.263	***	0.187	***	-0.266	***	-0.081	*	-0.170	***	-0.315	***	0.238	***
Alcohol arrests	-0.038		-0.292	***	0.134	***	-0.231	***	-0.108	**	-0.151	***	-0.235	***	0.123	***
Violent crime	-0.051		-0.251	***	0.346	***	-0.359	***	0.001		-0.231	***	-0.315	***	0.413	***
Establishments	1.000	***	-0.009		-0.042		0.084	*	0.021		0.019		-0.057		-0.048	
Hospitals			1.000	***	-0.128	***	0.257	***	0.004		0.242	***	0.172	***	-0.085	*
Poverty					1.000	***	-0.433	***	0.563	***	-0.454	***	-0.141	***	0.646	***
Education							1.000	***	-0.148	***	0.756	***	0.184	***	-0.406	***
Unemployed									1.000	***	-0.265	***	0.109	**	0.245	***
Per cap. income											1.000	***	0.118	***	-0.308	***
Segregation													1.000	***	-0.207	***
% nonwhite															1.000	***

Note: Significance levels are indicated as * = p<=0.05, ** = p <=0.01, *** = p<=0.001.

APPENDIX C: BIVARIATE CORRELATIONS OF SELECTED MEASURES, 1980–99 AVERAGE, CON'T

Nonmetropolitan/Not Adjacent

	Population	Young adults	Person/unit	Households/unit	Persons/sq.mile	Drug arrests	Alcohol arrest	Violent crime
Population	1.000 ***	0.810 ***	-0.113 **	-0.302 ***	0.083 *	-0.070	-0.226 ***	-0.103 **
Young adults		1.000 ***	0.069	-0.079 *	0.167 ***	-0.102 **	-0.225 ***	-0.064
Person/unit			1.000 ***	0.791 ***	0.072 *	-0.256 ***	-0.199 ***	-0.162 ***
Persons/sq.mile				1.000 ***	-0.154 ***	-0.132 ***	-0.143 ***	
Drug arrests					1.000 ***	0.857 ***	0.853 ***	
Alcohol arrests						1.000 ***	0.782 ***	
Violent crime							1.000 ***	
# Establishments								
Hospitals								
Poverty								
Education								
Unemployed								
Per cap. income								
Segregation								
% nonwhite								

	Establishments	Hospitals	Poverty	Education	Unemployed	Per Cap. Inc.	Segregation	% nonwhite
Population	0.028	0.038	-0.155 ***	-0.020	-0.048	0.000	-0.075 *	0.082 *
Young adults	0.020	-0.001	0.130 ***	-0.171 ***	0.024	-0.206 ***	-0.081 *	0.213 ***
Person/unit	0.066	0.011	0.335 ***	-0.235 ***	0.087 *	-0.261 ***	0.052	0.306 ***
Persons/sq.mile	0.005	0.051	-0.055	-0.234 ***	-0.051	-0.228 ***	0.002	-0.056
Drug arrests	-0.055	-0.265 ***	0.045	-0.077 *	-0.067	0.020	-0.220 ***	0.066
Alcohol arrests	-0.059	-0.269 ***	0.043	-0.049	-0.092 *	0.024	-0.199 ***	0.011
Violent crime	-0.080 *	-0.265 ***	0.230 ***	-0.195 ***	0.029	-0.095 **	-0.215 ***	0.247 ***
Establishments	1.000 ***	0.055	-0.078 *	0.078 *	0.016	0.013	-0.046	-0.041
Hospitals		1.000 ***	-0.040	0.208 ***	0.001	0.155 ***	0.168 ***	-0.031
Poverty			1.000 ***	-0.383 ***	0.571 ***	-0.524 ***	0.079 *	0.588 ***
Education				1.000 ***	-0.231 ***	0.711 ***	-0.027	-0.381 ***
Unemployed					1.000 ***	-0.409 ***	0.175 **	0.276 ***
Per cap. income						1.000 ***	-0.080 *	-0.362 ***
Segregation							1.000 ***	-0.039
% nonwhite								1.000 ***

Note: Significance levels are indicated as * = p<=0.05, ** = p <=0.01, *** = p<=0.001.

APPENDIX C: BIVARIATE CORRELATIONS OF SELECTED MEASURES, 1980–99 AVERAGE, CON'T

Rural

	Population		Young adults		Person/unit		Households/unit		Persons/sq.mile		Drug arrests		Alcohol arrest		Violent crime	
Population	1.000	***	0.852	***	-0.121	***	-0.271	***	0.312	***	-0.096	**	-0.148	***	-0.106	**
Young adults			1.000	***	0.124	***	-0.013		0.410	***	-0.240	***	-0.273	***	-0.235	***
Person/unit					1.000	***	0.898	***	0.218	***	-0.223	***	-0.185	***	-0.178	***
Persons/sq.mile									1.000	***	-0.270	***	-0.251	***	-0.239	***
Drug arrests											1.000	***	0.956	***	0.957	***
Alcohol arrests													1.000	***	0.968	***
Violent crime															1.000	***
# Establishments																
Hospitals																
Poverty																
Education																
Unemployed																
Per cap. income																
Segregation																
% nonwhite																

	Establishments		Hospitals		Poverty		Education		Unemployed		Per Cap. Inc.		Segregation		% nonwhite	
Population	0.182	***	-0.178	***	-0.068		-0.122	***	0.180	***	-0.230	***	-0.197	***	0.164	***
Young adults	0.129	***	-0.150	***	0.169	***	-0.288	***	0.276	***	-0.382	***	-0.140	***	0.252	***
Person/unit	-0.025		0.019		0.353	***	-0.365	***	0.073	*	-0.247	***	0.075	*	0.272	***
Persons/sq.mile	0.089	*	-0.011		0.090	*	-0.324	***	0.337	***	-0.258	***	0.005		0.031	
Drug arrests	0.002		-0.184	***	-0.085	*	0.118	***	-0.086	*	0.325	***	-0.199	***	-0.005	
Alcohol arrests	-0.013		-0.164	***	-0.099	**	0.113	**	-0.089	*	0.318	***	-0.181	***	-0.030	
Violent crime	-0.003		-0.175	***	-0.062		0.075	*	-0.057		0.298	***	-0.193	***	0.038	
Establishments	1.000	***	-0.075	*	-0.004		-0.081	*	0.062		-0.061		-0.012		0.047	
Hospitals			1.000	*	-0.071	*	0.130	***	-0.090	***	0.141	***	0.173	***	-0.082	**
Poverty					1.000	***	-0.483	***	0.473	****	-0.579	***	0.032		0.492	***
Education							1.000	***	-0.352	***	0.600	***	0.068		-0.376	***
Unemployed									1.000	***	-0.533	***	0.037		0.236	***
Per cap. income											1.000	***	-0.056		-0.267	***
Segregation													1.000	***	-0.124	***
% nonwhite															1.000	***

Note: Significance levels are indicated as * = p<=0.05, ** = p <=0.01, *** = p<=0.001.

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