Age Structure and Neighborhood Homicide: Testing and Extending the Differential Institutional Engagement Hypothesis

By: Cindy Brooks Dollar, Patricia L. McCall, Kenneth C. Land, Joshua Fink

Dollar, C.B., McCall, P., Land, K., & Joshua Fink, J. (2017). Age Structure and Neighborhood Homicide: A Test and Elaboration of the Differential Institutional Engagement Hypothesis. *Homicide Studies*, *21*(4), 243-266. doi:10.1177/1088767917702474

Abstract:

We examine the empirical applicability of differential institutional engagement in explaining the youth age structure effect on neighborhood homicide. Using the National Neighborhood Crime Study and Census data, we conduct a multilevel spatial analysis of homicides in 8,307 census tracts. We find support for three indicators of differential institutional engagement (disengaged youth, educational engagement, employment engagement). An additional dimension of institutional engagement (familial engagement) operates in the expected direction but is not statistically significant. We argue that previous cross-sectional studies reporting a null or negative relationship between percentage of young and homicide are due to omitting measures of institutional youth (dis)engagement.

Keywords: homicide | age structure | neighborhood | institutional engagement | spatial analysis | multilevel modeling

Article:

Criminologists have a rich history in examining the link between age and crime. Dating back hundreds of years, social scientists have been involved in identifying patterns of age structure and delinquency (e.g., Durkheim, 1897/1951; Quetelet, 1831/1984). Interest in age structure effects on crime rates partially stems from individual-level studies of criminal offending. Although some divergences in individual-level patterns of criminal offending have been identified, researchers generally conclude that both participation in, and victimization by, crime increases from the mid-teens to late 20s and then begins to steadily decline over the life course. Abstracting these individual-level findings to population aggregates of various levels (e.g., states, metropolitan areas, cities, and neighborhoods), a positive relationship between the relative size of youth populations and rates of crime is expected. However, researchers have produced a vast body of inconsistent findings for the youth age structure–crime rate relationship often citing negative or null relationships between the two (Marvell & Moody, 1991; Pratt & Cullen, 2005).

Although various theoretical frameworks have been used to explain the association between youth age structure and crime, scholars have recently begun focusing on certain ecological contingencies to explicate varying age structure effects on crime (e.g., Phillips, 2006; Thomas & Shihadeh, 2013). In their recent article, McCall, Land, Dollar, and Parker (2013) proposed the concept of *differential institutional engagement* to explain the incongruous findings of the youth age structure–crime relationship.[1] Contending that youth populations are heterogeneous in their level of institutional attachment and relying on theoretical arguments and empirical evidence suggesting that engagement in prosocial institutions deters criminal involvement, McCall et al. (2013) hypothesized that the link between age structure and crime rates would become consistent and operate in the expected direction if the youth population's relative involvement was considered and specified. Their city-level analysis of homicide rates in 1980, 1990, and 2000 provided support for their postulations and purports to move us forward in resolving the age–crime puzzle.

The notion of differential institutional engagement relies heavily on social control mechanisms theorized to occur through neighborhood or community relations, but the question remains as to whether or not differential institutional engagement can explain spatial variation in crime rates in more localized units. The goal of the present article is twofold. First, we elaborate the concept of differential institutional engagement by examining additional measures of the construct. Second, we assess the ability of this construct to explain the youth age structure–crime relationship (as measured by the homicide rate) at a lower level of aggregation (neighborhoods, as measured by census tracts) than analyzed in McCall et al. (2013). In short, we examine whether the relationship of neighborhood youth age structure to homicide becomes consistently positive when youth institutional (dis)engagement is controlled. In doing so, we are suggesting that previous homicide studies reporting null or negative relationships between percentage of young and homicide may be due to omitted variable bias (i.e., neglecting measures of institutional youth (dis)engagement).

Inconsistencies of Youth Age Structure Effects in Ecological Studies of Crime

Criminologists generally agree that criminal offending and victimization peaks from mid-teens to young adulthood after which it decreases with age across the life course. Following Hirschi and Gottfredson's (1983) conjecture of an invariant age–crime relationship across time, space, social groups, and cultural conditions, researchers developed a renewed interest in investigating age effects on crime, with many finding that although the age–crime relationship is relatively consistent, it is not invariant (e.g., Farrington, Ohlin, & Wilson, 1986; Greenberg, 1985; Moffitt, 1993; Phillips, 2006; Piquero, 2008; Steffensmeier & Streifel, 1991; Tittle, 1988; Tittle & Grasmick, 1997). An accumulated body of evidence, particularly with latent trajectory analyses of longitudinal cohort data, largely establishes that most offenders' involvement in crime peaks in young adulthood and declines in their twenties (Blokland, Nagin, & Nieuwbeerta, 2005; Bushway, Thornberry, & Krohn, 2003; D'Unger, Land, McCall, & Nagin, 1998; Eggleston, Laub, & Sampson, 2004; Nagin & Land, 1993), although there is some indication that homicide events peak at a later age and declines less rapidly than other crimes (e.g., Loeber & Farrington, 2011; Messner & Rosenfeld, 1999). Based on these individual-level findings, it is expected that areas with a relatively large youth age population size should have relatively high rates of crime. In short, the age composition of a population is expected to influence crime such that rates of criminal offending are positively related to the proportion of the population of this crime-prone age.

Yet, many ecological studies of crime report inconsistent age effects (Marvell & Moody, 1991; Parker, McCall, & Land, 1999; Pratt & Cullen, 2005; Steffensmeier & Harer, 1987, 1991). Researchers note that youth age structure is positively related (Land, McCall, & Cohen, 1990; Loftin & Hill, 1974; McCall et al., 2013), negatively related (Land et al., 1990; Lee & Ousey, 2005; Lee & Slack, 2008; Loftin & Parker, 1985; McCall, Land, & Parker, 2010; Ousey, 1999), and sometimes unrelated (Huff-Corzine, Corzine, & Moore, 1986; Messner, 1983; Parker, 1989) to crime rates. Even when focusing on relatively small spatial units, inconsistencies in the age structure–crime relationship are evident. In their analysis of metropolitan statistical areas, Crutchfield, Geerken, and Gove (1982) revealed that the proportion of the population that is young male is negatively associated with crime rates, but using the same unit of analysis, DeFronzo (1983) found no age effect on various crimes, including homicide. Whereas these researchers examined the percentage of young male population, other researchers have observed null age structure effects on homicide when including the percentage of young adult (male and female) population (e.g., Messner, 1983).

Recent studies of the youth age structure effect on crime rates have argued that the level of engagement in prosocial or “conventional” activities among the youth population may account for incongruent findings. Consistent with systemic disorganization models (Bursik & Grasmick, 1993; Kasarda & Janowitz, 1974; Sampson, 1988; Sampson & Groves, 1989), this work—whether implicitly or explicitly—posits that the youth population is heterogeneous in regard to its attachment and commitment to community institutions. Phillips (2006), for example, noted that the size of the youth population is positively related to homicides between 1970 and 1999 when socioeconomic conditions, including family structure and median income, are estimated. McCall, Land, and Parker’s (2011) examination of latent trajectories of homicide rate trends from 1976 to 2005 concluded that cities with high proportions of college students have consistently low homicide rates, suggesting that homicide rates are inversely related to populations that are attached to, and engaged in, educational institutions. More recently, Thomas and Shihadeh (2013) introduced the concept of “floaters,” which is conceptualized as the youth population who are institutionally isolated (defined as the proportion of the youth population that is simultaneously not enrolled in school, not enlisted in the military, and not employed in the civilian labor market). They found that higher proportions of youth floaters are positively related to violent and property crime rates and attribute this to the communities’ inability to direct the youth into normative routines. Collectively, these studies suggest countervailing forces underlying the age–crime relationship and advance our understanding of the oft-cited inconsistent relationship between the size of the youth population and rates of criminal offending by demonstrating the importance of estimating how community relations may influence area-based crime.

Differential Institutional Engagement

McCall et al.'s (2013) concept of differential institutional engagement is rooted in control perspectives. Control frameworks emphasize the criminogenic effect of weak social control. Social control proponents argue that social bonds to others create interpersonal ties and institutional affiliations that restrain crime and criminal offending (e.g., Hirschi, 1969; Laub, Nagin, & Sampson, 1998; Laub & Sampson, 1993; 2003). The mechanisms by which bonds deter criminal behaviors are varied. Some scholars emphasize conventional bonds as encouraging socialization toward conforming behaviors, whereas others focus on prosocial bonds' reduction of opportunities to routinely interact with antisocial others. The concept of differential institutional engagement does not prioritize which mechanism is most important in explicating the bond–crime relationship. Rather, it highlights that each of these mechanisms are activated by "conventional" institutional engagement and the subsequent implications of this lifestyle, which includes stakes in conformity.

Ecological control perspectives posit that places with weak or disrupted social ties produce a criminogenic force that mediates the relationship between structural factors and crime (Shaw & McKay, 1942; Wilson, 2009). Emphasizing the importance of community controls, Bursik and his colleagues (Bursik, 1988; Bursik & Grasmick, 1993; Bursik & Webb, 1982) posit that strong public and parochial ties inhibit crime through a cultural transmission of prosocial values and behaviors. In other words, communities that are severed from conventional educational and work opportunities may become socially isolated and lack collective efficacy, leaving persons more susceptible to criminal offending (Sampson & Wilson, 1995). Providing some support for this argument, Welsh, Stokes, and Greene (2000) found that areas with limited social and economic resources available to schools contribute to school instability and increased violence among youth populations. Nevertheless, young populations are not the only populations affected as such areas are often marked by relatively low rates of marriages and high rates of family disruption, which are further associated with higher levels of crime (Porter & Purser, 2010; Schwartz, 2006; Wilson, 1987; Wooldredge & Thistlewaite, 2003).

Following these arguments, differential institutional engagement is not exclusive to youth homicide rates. Indicators of youthful institutional (dis)engagement are indicative of the community's (in)capacity to control criminal involvement among community members (McCall et al., 2013). Thus, differential institutional engagement is concerned with examining aggregated effects of youth (dis)engagement, suggesting that places where young populations have relatively low levels of "conventional" institutional engagement will have higher homicide within the ecological unit.

The differential institutional engagement hypothesis specifically holds that areas with high proportions of unattached youth populations, including those not participating in "conventional" social institutions, such as school and work, are less constrained by conventional commitments, less able to promote strong prosocial networks, and more likely to be involved in criminal behaviors. Relatedly, areas characterized by high proportions of attached youth populations in such social institutions are expected to be more constrained, resulting in lower crime rates. The size of the youth population, then, is associated with crime rates through relative involvement (or lack thereof) in prosocial institutions, including school, military, labor market, and family.[2]

McCall et al.'s (2013) city-level analysis found that differential institutional engagement clarified the age structure–homicide relationship—that is, the youth age–homicide relationship was positive in cities with high levels of institutional *dis*engagement of youth and was negative in cities with high levels of institutional engagement. However, it is unclear whether these findings apply to more locally defined areas. In fact, larger ecological units, such as cities, may not be able to fully capture proximate processes that link structural conditions to criminal offending (Sampson & Groves, 1989). To address this question, control mechanisms must be examined as operating at the neighborhood level (Bursik, 1988; Bursik & Grasmick, 1993; Morenoff, Sampson, & Raudenbush, 2001; Sampson, Morenoff, & Earls, 1999; Sampson, Raudenbush, & Earls, 1997).

Because the differential institutional engagement concept relies on community bond formations that function as institutional controls, the primary objective of this study is to assess the empirical applicability of the models analyzed by McCall et al. (2013) at a more localized ecological unit—that of the neighborhood, which is measured in this study as census tracts.[3] The significance of this assessment should not be overlooked. Research commonly shows that ecological effects vary across different units of analysis (e.g., Chiricos, 1987; Land et al., 1990; Pratt & Cullen, 2005). Accordingly, an examination of criminogenic factors at the level in which they are hypothesized to occur is crucial. Because the differential institutional (dis)engagement hypothesis relies on engagement in a relatively confined ecological community, a localized unit of analysis is ideal. Nonetheless, we recognize that neighborhoods are embedded in larger units, which further differentially sort engagement resources across space (Sampson et al., 1999). In light of this recognition, our neighborhood-level analysis accounts for city-level factors and spatial autocorrelation. In addition, we also extend the concept of differential institutional engagement by modeling additional age-specific dimensions of institutional engagement. Specifically, our research incorporates a measure of familial ties along with labor force and school attachments and age-specific measures of differential institutional engagement. This elaboration allows us to better assess the influence of engagements and involvements in various institutional structures.

Data and Method

Data Sources and Measures

The conceptual basis for differential institutional (dis)engagement requires community-level analyses for adequate tests of the hypotheses. Data obtained from the National Neighborhood Crime Study (NNCS) merged with age-specific Census information for 2000 are used in the analyses reported here. This data set compiled tract-level official crime data for seven of the Federal Bureau of Investigation's (FBI) crime index offenses with sociodemographic information obtained from the 2000 United States Census of Population and Housing. The primary purpose of the data set was to compile tract-level crime and demographic data to allow researchers to investigate ecological predictors of crime at the community level (Krivo, Peterson, & Kuhl, 2009). The NNCS includes nearly all tracts within sampled cities. Tracts were only excluded if no crime data were reported for that tract (n = 303), the tract had above 50% of the population that was housed in group quarters (n = 164), or less than 300 people lived in the census tract (*n* = 623; see NNCS, 2000, *Description Citation and Codebook*, for more information).

City-level census information for the city in which the tract is located is also included. Thus, the NNCS contains multilevel data from a representative sample of 91 large U.S. cities and the corresponding 9,593 census tracts for the year 2000. Missing data among our regressors reduced the sample for our analyses to 8,307 tracts nested within 89 cities.[4]

Because the NNCS did not contain operationalizations of age-specific concepts underlying differential institutional engagement, we supplemented the NNCS data with 2000 U.S. Census data obtained from the National Historical Geographical Information system (NHGIS).

Dependent variable

In remaining consistent with prior studies of structural covariates and aggregated crime, the dependent variable is the 3-year sum of the number of homicides occurring between 1999 and 2001 at the tract level. Homicides are used for comparison with previous ecological studies of crime and because they represent the most reliable crime measure among the FBI's official crime statistics. The 3-year sum serves to reduce annual fluctuations of rare events, such as homicide, which are especially rare when measured at the tract level.

Tract-level covariates

We include classic covariates of homicide as well as measures of differential institutional engagement in our models. *Youthage structure* (or age composition) is measured as the percentage of the population aged 15 to 29 years. We select this age band because it is often cited as the most crime-prone age group, particularly in regard to violent criminal offending (e.g., Greenberg, 1985; Hirschi & Gottfredson, 1983; Tittle & Grasmick, 1997).

We operationalize differential institutional engagement—conceptualized as youth's institutional engagement and participation in mainstream society—with four indicators of various dimensions of engagement: (a) disengaged youth, (b) educational engagement, (c) labor force engagement, and (d) familial engagement. These indicators are based on prior areal-level criminogenic research, which suggests that areas with relatively few school resources (Welsh et al., 2000), low college enrollment (McCall et al., 2013; McCall et al., 2011), limited labor force opportunities (McCall et al., 2013; Shihadeh & Thomas, 2007; Wilson, 1996), and high rates of family instability (Parker & Johns, 2002; Sampson & Groves, 1989; Schwartz, 2006; Tcherni, 2011) are marked with higher levels of serious, violent crime.

Disengaged youth is an indicator of institutional disengagement and is calculated as the percentage of persons aged 16 to 19 years who are simultaneously not enrolled in school, unemployed, or not participating in the labor market, and not active in the military (McCall et al., 2013; Thomas & Shihadeh, 2013). Although a more extended age range may be relevant for the present analyses, these measures are only readily available for this age group. The three other dimensions represent institutional engagement, including *educational engagement* (the percentage of the population enrolled in public and private colleges), *labor force* *engagement* (the percentage of persons aged 16-24 years employed in the civilian labor force or the Armed Forces), and *familial engagement* (the percentage of persons aged 15-24 years married with a spouse present).

We also control for classic structural covariates of homicide rates (Land et al., 1990; McCall et al., 2013; McCall et al., 2010); measured at the tract level. The *population size* of tracts was included as the exposure measure in the Poisson regression analyses. Financial strain associated with economic deprivation is measured using an additive *economic deprivation/affluence index* of the factor score-weighted component variables: percentage of families living below the poverty level, median family income (log-transformed), the percentage of families with children that are headed by females, and the unemployment rate, operationalized as the percentage of persons aged 16 to 64 years who were unemployed or out of the labor force[5] (Cronbach's α = .75). As in prior studies, these variables are combined to reduce problems associated with collinearity and the partialling fallacy. Because extant research indicates that supervision of youth is a significant predictor of homicide, we include a measure of *family disruption*, the percentage of divorced males aged 15 and older. In addition, we also control for the *sex ratio* as the number of males to females aged 15 to 34 and population heterogeneity, captured with a *racial heterogeneity* index measure comprised of non-Latino Whites and non-Latino Blacks. Finally, we include a measure of the proportion of the population that is *foreign born* because prior work theorizes a relationship between immigration concentration and crime rates (e.g., Lee & Martinez, 2002; Lee, Martinez, & Rosenfeld, 2001; Light & Ulmer, 2016; Shihadeh & Barranco, 2010; Stowell, Messner, McGeever, & Raffalovich, 2009).

City-level covariates

Prior ecological studies of homicide have included measures of racial discrimination and racial inequality, especially in studies of urban crime. Conceptually, the social forces of racial segregation and racial inequality in an urban setting set the climate for race relations and contextualize the influence of tract-level covariates of crime (Hipp, 2011; Massey & Denton, 1993; Wilson, 1987). Traditional measures used to capture these racial dynamics—that is, racial income inequality and racial residential segregation, are incorporated into our analytical models at the city level. *Racial income inequality* is measured using the ratio of White to Black per capita income, and *racial segregation* is operationalized using the dissimilarity index comprised of two racial categories, Whites and Blacks. We also conceptualized *income inequality* as having contextual relevance as more local tract-level measures may not accurately capture the broader income inequality present in the city. Therefore, the Gini Index of income inequality is incorporated among our city-level indicators of homicide. Finally, a dichotomous measure of *Southern region*, as defined by the Bureau of the Census, is included because it has been more consistently found to be related to homicide than other regional indicators. All the covariates included in these analyses are theoretically predicted to be positively related to homicide. Details for these data sources and operationalizations are provided in Appendix A.

Statistical Methods

Neighborhoods are embedded within the spatial and social contexts of the cities in which they are located. Accordingly, neighborhoods and relationships among structural characteristics of neighborhoods and of the relationships thereof to homicide rates may be affected by the cities in which they are located (e.g., Ludwig et al., 2008; Sampson, 2008). To account for the potential for clustering effects within cities, we employ multilevel modeling with tracts (Level 1) nested within cities (Level 2) using R software. Multilevel statistical models can be specified in a variety of forms. Because this is an initial exploration of whether institutional engagement predictors explain variations in homicide counts at the neighborhood level of analysis, the models studied and reported allow the intercept of the Level 1 regression models to have a random component, but not the slopes of the Level 1 predictors.

Despite their ability to use group-level data to explain variations in lower level parameters, multilevel models do not explicitly adjust for spatial autocorrelation. Prior research, however, demonstrates spatial clustering of ecological factors, especially in urban areas.[6] Ignoring such spatial patterns in statistical analyses may lead to erroneous findings of statistical significance and substantive inferences; therefore, multicity tract level should investigate the presence of spatial effects (Anselin, Cohen, Cook, Gorr, & Tita, 2000; Baller, Anselin, Messner, Deane, & Hawkins, 2001). We examine the presence of spatial autocorrelation by constructing Euclidean distance matrices. Statistical methods used for obtaining spatial weights were drawn from Bivand and Piras (2015).

Moran's *I* statistics reveal significant spatial dependency in 51 of the 89 cities; more than 75% of the sampled tracts are located in these 51 cities (see Appendix B). Because a relatively large proportion of the tracts contained evidence of spatial autocorrelation, city-specific spatial weights were generated, and the spatial lag variable was included in the models. Thus, the multilevel models reported herein include spatial autocorrelation correction weights.[7] In addition, preliminary analyses confirmed the rare nature of homicide at the tract level among our sample. Even using the sum of homicides over the 3-year decennial period, almost 50% of the tracts had zero homicides. Poisson models are well suited for predicting rare events and are able to predict nonnegative expected counts. Thus, we estimate a series of hierarchical generalized linear models (HGLM). Statistical analyses reveal significant overdispersion, which violate the Poisson model assumption of equal mean and variance of the dependent variable (Krivo et al., 2009; Raudenbush & Bryk, 2002). As such, we employ negative binomial regression, which extends the Poisson model by adding a parameter that allows for overdispersion and by not assuming independence among outcome events (Long, 1997).

We specify the model with tract-level population size as the exposure variable for homicides, which, in essence, produces a homicide rate (Osgood, 2000). All regressors with the exception of the dichotomous region measure are grand-mean centered. Grand-mean centering allows us to center the explanatory variables around the overall mean to establish a meaningful zero point and assess any differential influence of our covariates at Level 1 and Level 2 (Enders & Tofighi, 2007; Raudenbush & Bryk, 2002). We estimate a series of models beginning with a model that includes our control measures. This serves as a baseline model to which subsequent models are compared—models that include indicators of differential institutional engagement. By examining across model effects, we can assess the age structure effect on neighborhood homicide along with various measures of differential institutional engagement.[8]

Results

Table 1 displays the descriptive statistics for the outcome measure and for Level 1 (tract) and Level 2 (city) covariates of interest. The average homicide count is 1.56 homicides per tract, but tract-level homicide counts range greatly from 0 to 33. Although the average size of the youth population (ages 15-29) is approximately 23%, some tracts have a significantly higher proportion of youth population—one of which approaches 95%. The descriptive statistics indicate the mean of tract-level disengaged youth is about 12%, although the measure ranges from 0% to 100%, suggesting considerable variation in this measure as well. Measures of engaged youth also show notable variation. The percentage enrolled in college ranges from 0% to nearly 95% with a mean of about 9%. The proportion of the population aged 16 to 24 who is employed ranges from 0% to 100% with a tract-level average of about 63%. Finally, the proportion of the population who is married and aged 15 to 24 ranges from 0% to 74%, but the average falls at just above 8%.

Table 1. Descriptive Statistics for Dependent and Independent Variables.

	M	SD	Minimum	Maximum
Level 1—Tract (n = 8,307)				
Homicides, 1999-2001	1.56	2.55	0	33
Population size (exposure)	3,922.22	2,073.60	301	23,134
% aged 15-29	23.43	8.09	1.52	94.84
Disengaged youth	12.23	11.34	0	100
% enrolled in college	8.88	7.59	0	94.44
% employed youth, aged 16-24	63.13	13.14	0	100
% married youth, aged 15-24	8.33	7.08	0	73.67
Economic deprivation	-0.02	1.00	-1.88	5.87
% divorced males	9.68	4.38	0	34.40
Sex ratio	1.02	0.24	0.19	11.81
Racial heterogeneity	0.39	0.20	0	0.80
% foreign born	16.91	16.20	0	83.78
Level 2—City (n = 89)				
White–Black racial segregation	47.11	18.29	14.28	85.19
White/Black ratio median income	1.49	0.28	0.91	2.82

Gini index	0.45	0.05	0.36	0.58
South	0.35	0.48	0	1

Statistical estimates for our multilevel regression models are displayed in Table 2. Model 1 of Table 2 presents the results of the unconditional model, which includes no covariates (i.e., only the random error term is included). This model assesses whether the Level 2 (city) units, on average, differ on the homicide outcome. As shown, the variance of the random component of the intercept is statistically different from zero ($\tau^2 = .053$, $p < .05$); thus, cities have significantly varying mean homicide counts. The results of this unconditional model provide a baseline for estimating the statistical importance of Level 1 predictors in subsequent models.

Table 2. Multilevel Negative Binomial Regression Coefficients (*SE*s) Estimating Differential Institutional Engagement on Tract-Level Homicides, 2000.

	Model 1	Model 2	Model 3	Model 4	Model 5
Level 1—Tract (n = 8,307) % aged 15-29	—	.001 (0.002)	.025* (0.003)	-.001 (0.002)	.030 (0.003)
% disengaged youth	—	—	.003* (0.001)	.006* (0.001)	.003* (0.001)
% enrolled in college	—	—	-.033* (0.003)	—	-.035* (0.003)
% employed youth, 16-24	—	—	—	—	-.006* (0.001)
% married youth, 15-24	—	—	—	—	-.002 (0.002)
Control variables					
Economic deprivation	—	.391* (0.013)	.323* (0.014)	.363* (0.014)	.293* (0.015)
% divorced males	—	.016* (0.003)	.017* (0.003)	.016* (0.003)	.019* (0.003)
Male to female sex ratio	—	.137* (0.048)	.007 (0.055)	.088† (0.051)	.036 (0.054)
Racial heterogeneity	—	.179* (0.075)	.243* (0.075)	.162* (0.075)	.269* (0.076)
% foreign born	—	.007* (0.001)	.003* (0.001)	.006* (0.001)	.002* (0.001)
Spatial weight		2.57* (0.150)	2.43* (0.149)	2.50* (0.150)	2.31* (0.150)
Level 2—City (n = 89)	—	.008* (0.003)	.006† (0.003)	.008* (0.003)	.006* (0.003)

White–Black racial segregation					
White/Black ratio median income	—	-.158 (0.199)	-.114 (0.197)	-.153 (0.199)	-.118 (0.195)
Gini Index	—	.325 (1.36)	1.47 (1.36)	.468 (1.36)	1.08 (1.35)
South	—	.076 (0.088)	.018 (0.088)	.075 (0.088)	.018 (0.087)
Intercept	-1.12 (0.076)	-1.28* (0.479)	-1.89* (0.481)	-1.36* (0.479)	-1.37* (0.485)
Variance components	.053*	.044*	.040*	.044*	.039*

Note. Estimated regression coefficients from population-average model (with robust SEs in parentheses). †$p \leq .10$. *$p \leq .05$ (two-tailed test).

Model 2 of Table 2 includes the parameter estimates for the control variables, which are classic covariates of homicide established in prior ecological studies. As found in some prior studies, the relationship between percentage of young (ages 15-29) and homicide is positive, although it is not statistically significant. The remaining tract-level covariates are significant in the theoretically posited direction. In Level 2, only the White–Black racial segregation measure is a statistically significant predictor of homicide counts. In addition, as shown at the bottom on Table 2, the variance components for Model 2 are substantially lower than Model 1, indicating that these covariates contribute to explaining neighborhood homicide variation. In fact, about 17% of the variation in neighborhood homicide can be explained by these predictors ([.053 − .044] / .053); however, even after controlling for these predictors, significant variation among neighborhood homicide remains to be explained.

The specification shown in Model 3 closely approximates the model estimated by McCall et al. (2013) in their city-level study of homicide. This model introduces two measures of differential institutional engagement: the percentage of disengaged youth and the percentage enrolled in college. The estimates of this model are consistent with those reported by McCall et al. (2013). The differential institutional engagement measures are statistically significant in the hypothesized direction—positive for disengaged youth and negative for college enrollment. In addition, the coefficient for percentage of young is now positive and statistically significant as theoretically predicted. The control variables overwhelmingly maintain their directional and statistical relationships with homicide. Because this remains true in the subsequent models, we focus our discussion below on the additional Level 1 institutional (dis)engagement measures, which are the central focus of this study.

As shown in Appendix C, the bivariate relationship between the percentage of young and the percentage enrolled in college shows a fairly high correlation of .708, which suggests that the countervailing force of percentage of college enrollment is captured by the percentage of youth variable in previous studies wherein a null relationship has been found between percentage of young and homicide. Model 4 substantiates this concern. As shown, when college enrollment is omitted from the model, leaving age structure and disengaged youth with controls, the percentage of young is no longer statistically significant.

Nevertheless, as illustrated in Model 5, when other measures of institutional engagement (percentage of employed youth and percentage of married youth) are included with percentage of college enrollment, the findings provide convincing evidence for the positive and significant relationship between percentage of young population and homicide. All measures of differential institutional engagement are related to homicide in the anticipated direction. Specifically, the disengaged youth indicator is positively related to homicide and the engaged youth indicators (college enrollment, youth employment, and youth marriage) are negatively related to homicide although only college enrollment and youth employment are statistically significant.[9] Again, the variance components for Model 5 continue to decrease as compared with Models 2 and 3 suggesting that this full model, which includes various measures of institutional (dis)engagement, best explains variation among neighborhood homicide.

By using the descriptive statistics in Table 1 to establish common metrics for the explanatory variables together with the estimated regression coefficients of Table 2, the relative strength of the regressors in explaining variation in the homicide counts can be calculated. For example, if the predictors change by one standard deviation as reported in Table 1 (e.g., suppose the percentage of disengaged youth predictor changes by its standard deviation of 11.34), this change can be multiplied by the corresponding estimated regression coefficient from Model 5 of Table 2 (.003 for % disengaged youth) to obtain the corresponding estimated change in the expected value of the outcome variable (.034 for % disengaged youth). By doing this calculation, it can be seen that the largest effects (ordered from largest to smallest for those predictors with statistically significant coefficients in Model 5) are for percentage of disengaged youth, economic deprivation, percentage enrolled in college, and percentage aged 15 to 29.

The effects of economic deprivation have been widely studied and established in prior studies of the structural covariates of homicide rates (see McCall et al., 2010). However, the analyses we report in Tables 1 and 2 contribute two significant points to the current literature. First, we establish the additional statistically significant net effects of institutionally (dis)engaged predictors—percentage of disengaged youth, percentage enrolled in college, and percentage of employed youth—at the neighborhood level of analysis. Second, we show that the percentage of young (ages 15-29) operates in the theoretically expected, positive direction when these engagement variables are controlled.

Discussion and Conclusion

The concept of differential institutional engagement was proposed to account for inconsistent findings on the directionality and statistical significance of the relationship of percentage of young to homicide (and other crimes) in ecological studies. The theoretical underpinning of differential institutional engagement emphasizes the importance of institutional bonds in controlling crime. Although social and economic correlates of crime find support at many levels of aggregation (Land et al., 1990), the daily interactions of individuals are relatively localized, so the control mechanisms emphasized by McCall et al.’s (2013) notion of institutional (dis)engagement seem especially relevant at the neighborhood level where social control processes act as a community characteristic that links structural factors to criminal outcomes.

The present study examines the predictive ability of differential institutional engagement in explaining spatial variations in neighborhood homicide and assesses its ability to account for the relationship between youth age structure and homicide at the community level. Specifically, we elaborate the differential institutional engagement construct by adding a familial dimension to the concept. In addition, we provide a test of the differential institutional engagement hypothesis at a relatively local level of analysis. Investigations of local areal units are desirable because they help establish the robustness of relationships found at larger ecological units.

Using spatial, multilevel regression analyses to examine tracts clustered within cities, our study provides further support for the differential institutional engagement hypothesis. By estimating a series of models that examine youth age structure's effect on neighborhood homicide when accounting for various measures of differential institutional engagement, we conclude that previous homicide studies reporting null or negative relationship between percentage of young and homicide rates at the neighborhood level of analysis are likely due to omitted variable bias, particularly due to neglected measures of institutional youth (dis)engagement. Our findings are consistent with an interpretation that differential institutional engagement suppresses age structure effects on crime. That is, when measures of differential institutional engagement are not included in the specification of the regression model, the effect of age structure on ecological measures of crime is suppressed. When such measures are included in the model, their inclusion serves to "lift" the suppression so that the expected positive relationship of youth age structure to crime is found. Indeed, J. Cohen and Cohen (1983) stated,

> When any one of three correlations, r_{Y1}, r_{Y2}, or r_{12} is less than the product of the other two, the relationship is what is commonly referred to as *suppression*. In this case the partialled coefficients of X_1 and X_2 will be larger in value than the zero-order coefficients and one of the partialled (direct effect) coefficients may become negative.
>
> The term *suppression* can be understood to indicate that the relationship between the independent or causal variables is hiding or suppressing their real relationship with Y, which would be larger or possibly of opposite sign were they not correlated. (pp. 94-95)

In the models estimated and presented here, the outcome variable Y is the 3-year neighborhood homicide count, X_1 is the youth age structure structural variable, percentage of the population aged 15 to 29, and X_2 is one of the institutional engagement measures, such as the percentage enrolled in college. Because the correlation of the percentage aged 15 to 29 with the neighborhood homicide count is less than the product of the correlations of the percentage aged 15 to 29 with the percentage enrolled in college and the percentage enrolled in college with the homicide count, the condition for suppression stated by J. Cohen and Cohen (1983) is satisfied. Substantively speaking, our findings suggest that the tract-level relationship between youth age structure and homicide is suppressed due to hidden heterogeneity among tract-level institutional engagement factors. As our results indicate, when multiple institutional engagement are included in the regression equation, the hidden heterogeneity is reduced and the youth age structure becomes consistently positive and statistically significant as prior criminological theory and research expects. In other words, the suppression is lifted when regression models include all institutional engagement components because a general sample of ecological units, such as the tracts examined in this article, includes areas with varying levels of institutional engagement.

Although the research reported in this article is designed to assess the extent to which the findings of McCall et al. (2013) are substantiated at the neighborhood level and our findings indicate that measures of institutional engagement remain salient in explaining homicide at this lower level of aggregation, additional examinations are necessary. A multilevel analysis of individuals nested within communities would provide an assessment of the social processes underlying this conceptual model and could demonstrate the extent to which disengaged youth disproportionately reside in areas marked by institutional disengagement, which could account for spatial variations in crime. Subsequent research could also investigate how ecological context conditions youth employment's effect on participation in frequent, serious crime. Prior research indicates that persons living in relative socioeconomic isolation lack "conventional" cultural standards (e.g., Anderson, 1999; Berg, Stewart, Brunson, & Simons, 2012; Harding, 2007). Because our results contradict some findings about youth employment effects on crime (e.g., Uggen, 2000), additional inquires investigating whether institutional (dis)engagement moderates the percentage of young effect on crime or alternative conceptual models better explain identified patterns would be beneficial. As stated earlier, the data used herein do not contain individual-level measures, thus precluding our investigation of this form of cross-level interaction. Finally, we acknowledge that the present analysis relies on a measure of homicide count that is not age-bound. As argued previously, we posit that the impact of youth age structure on homicide levels is not limited to victims of that same age range. Moreover, we submit that the age group of interest (15-29) traditionally has the highest homicide rate in the United States (Fox & Zawitz, 2010). Nonetheless, future studies may wish to rely on an age-bound crime measure to assess age structure effects on disaggregated crime measures.

The present study extends the applicability and relevance of differential institutional engagement in explaining macrolevel variations in crime and should encourage scholars to remain attentive to contextualizing demographic factors and to recognize the omitted variable bias on parameter estimates of age structure when such mechanisms are not included in their specification. For practitioners and lawmakers, the policy implications echo those established by other scholars—that is, ties to prosocial activities that establish collective efficacy and encourage the realization of common goals are essential to restraining criminal activities (e.g., Messner & Rosenfeld, 2007; Morenoff et al., 2001; Sampson et al., 1997; Wilson, 2009). Policies that bolster individuals' ties to local neighborhood and political organizations may encourage institutional engagement for individuals and the communities in which they live. Although the benefits of establishing and maintaining institutional ties among youth populations is evident in the present analysis, the significance of institutional engagement in deterring crime likely applies to populations of all ages. Future studies of individuals' institutional engagement should investigate and further demonstrate the importance of institutional engagement for various types of policy directives.

Appendix A

Data Definitions and Sources

The data source from which most covariates were collected is Peterson and Krivo's National Neighborhood Crime Study (NNCS; Peterson & Krivo, 2000). Other covariates were collected from the Minnesota Population Center's National Historical Geographic Information System (NHGIS). The variables in these analyses were obtained from sources specified below. More specific information is available upon request from the authors.

Data definitions

Tract-level variables

- *Homicides*: Sum of officially reported homicides, 1999-2001. Source: NNCS.
- *Population size*: Number of total resident population. Source: NNCS.
- *Youth age structure*: (number of 15- to 29-year-olds / total resident population) × 100. Source: NHGIS.
- *Disengaged youth*: ([high school graduates, not in labor force, ages 16 to 19 + high school graduates, unemployed, ages 16 to 19 + non–high school graduates, not in labor force, ages 16 to 19 + non–high school graduates, unemployed, ages 16 to 19] / population ages 16 to 19) × 100. Source: NHGIS.
- *Educational engagement*: (college enrollment, private and public / total resident population aged 15 and over) × 100. Source: NHGIS.
- *Youth labor force engagement*: (persons aged 16 to 24 in civilian labor force / total resident population aged 16 to 24) × 100. Source: NHGIS.
- *Youth familial engagement*: (persons 15 to 24 married, spouse present / total resident population aged 15 to 24) × 100. Source: NHGIS.
- *Economic deprivation/affluence index*: factor-score-weighted *z* scores of following four measures:

    1. Percentage of families with children less than 18 years old that are female-headed families: (female single-parent households with children / [married couple families with children + married couple families without children + male single-parent households with children + male single-parent households without children + female single-parent households with children + female single-parent households without children]) × 100. Source: NHGIS.
    2. Natural log of median family income (in 2000 U.S. dollars). Source: NHGIS.
    3. Percentage of families living below the official poverty level. Source: Census NHGIS.
    4. Unemployment rate: (number of persons 16 to 64 who are unemployed / number of persons 16 to 64 in civilian labor force) × 100. Source: NNCS.

- *Family disruption*: (number divorced males / number males 15 years old and over) × 100. Source: NHGIS.
- *Sex ratio*: (males aged 15 to 34 / females aged 15 to 34) × 100. Source: NHGIS.
- *Racial heterogeneity*: (1 − [proportion of population non–Latino Whites + proportion non–Latino Blacks]). Source: NNCS.
- *Percentage of foreign born*: (foreign born population / total resident population) × 100. Source: NNCS.

City-level variables

- *Ratio of White-to-Black per capita income*: (per capita income for Whites / per capita income for Blacks). Source: NNCS.
- *Racial segregation*: Dissimilarity Index between non–Hispanic Whites and non–Hispanic Blacks. Source: NNCS.
- *Gini index of income concentration for households:* $G_i = (\Sigma X_i Y_i + 1) - (\Sigma X_i + 1 Y_i)$, where X_i and Y_i are respective cumulative percentage distributions of household income (Shryock & Siegel, 1976). Source: NNCS.
- *South region*: Dummy variable for southern geographic location as defined by U.S. Census bureau. Source: NHGIS.

Source. Peterson and Krivo (2000) and Minnesota Population Center (2004).

Appendix B

List of Cities With Spatial Autocorrelation (n = 51).

Albuquerque, NM	Memphis, TN
Anchorage, AK	Miami, FL
Aurora, CO	Milwaukee, WI
Austin, TX	Minneapolis, MN
Boston, MA	Nashville, TN
Buffalo, NY	Newport News, VA
Charlotte, NC	Oakland, CA
Chicago, IL	Oklahoma City, OK
Cincinnati, OH	Phoenix, AZ
Cleveland, OH	Pittsburgh, PA
Columbus, OH	Portland, OR
Dallas, TX	Rockford, IL
Dayton, OH	San Bernardino, CA
Denver, CO	San Diego, CA
Fort Wayne, IN	Seattle, WA
Fort Worth, TX	St. Louis, MO
Glendale, AZ	St. Petersburg, FL
Hartford, CT	Tampa, FL
Houston, TX	Toledo, OH
Jacksonville, FL	Topeka, KS
Kansas City, MO	Tucson, AZ
Knoxville, TN	Waco, TX
Lexington, KY	Washington, DC
Long Beach, CA	Waterbury, CT
Los Angeles, CA	Worcester, MA
Louisville, KY	

Note. Moran’s I $p < .05$.

Appendix C

Bivariate Correlations Between Tract-Level Variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Murder	1.00	.046*	.262*	-.136*	-.239*	-.050*	.144*	.446*	.040*	-.062*	-.092*	.036*
2. Youth pop		1.00	.095*	.708*	.199*	.144*	.084*	.175*	-.113*	.219*	.262*	.209*
3. Youth diseng			1.00	-.208*	-.211*	.114*	-.062*	.466*	.128*	.081	.055*	.099*
4. Youth college				1.00	.157	-.121*	.056*	-.112*	-.143*	.057*	.169*	.030*
5. Youth labor					1.00	.198	.031*	-.328*	.159*	.035*	.069*	-.193*
6. Youth married						1.00	1.56	-.058*	.066*	.161*	.244*	.226*
7. Population size							1.00	-.156*	-.164*	.028*	.195*	.280*
8. Econ depriv								1.00	.163*	-.185*	-.063*	.012*
9. Divorce male									1.00	-.037*	.001*	-.342*
10. Sex ratio										1.00	.231*	.271*
11. Racial hetero											1.00	.380*
12. Foreign born												1.00

*p ≤ .05.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Notes

1.Consistent with prior age–crime literature, we use the term *youth age structure* to refer to populations with higher concentrations in the late-teen to young adult ages.

2.As noted in the prior discussion, the differential institutional engagement hypothesis is rooted in control theory perspectives, especially Hirschi's (1969) social bonding concepts of *attachments* to others (family, friends), *commitments* to conventional achievements, *beliefs*in normative rules of conduct, and *involvements* in socially acceptable activities (e.g., school, work). Of these four bonding mechanisms, empirical indices of involvement in prosocial activities are the measures underlying differential institutional engagement. Because higher levels of these involvements at the individual level may be associated with increased levels of attachments, commitments, and beliefs, the concurrent operation of these bonding mechanisms cannot be ruled out. It similarly cannot be ruled out that other processes may be occurring. For example, the institutional engagement measures could be indicating that young people are able to achieve socially inculcated success goals through legitimate means, resulting in less deviance (e.g., Merton, 1938), or the measures could be indicating a degree of self-control (Hirschi & Gottfredson's, 1983) whereby low-controlled individuals would be more likely to commit homicide and simultaneously less likely to be in school, or working, or married. Operational measures for strain and self-control theories require measures for variations among individuals, and those are not available in the data analyzed herein. What is more, the differential institutional engagement perspective examines variations in levels of involvements in conventional social institutions among *ecological* units—hence the differential institutional engagement label.

3.Although there has been some concern about whether or not census tracts can accurately identify community relations (Hipp, 2007; for a review, see Sampson, Morenoff, & Gannon-Rowley, 2002), most scholars agree that tracts are reasonable proxies for neighborhoods.

4.Descriptive statistics for all measures included in these analyses were computed for the sample of tracts analyzed in this study and the group of tracts omitted due to missing data. The values between the two samples were compared and do not provide evidence that the omitted cases would result in missingness bias; thus, missingness appears to be random (i.e., the predictor effects reported herein are likely not an artifact of a nonrandom missing pattern). A table displaying these comparisons is available upon request.

5.The tract-level unemployment rate (divisor is number in the civilian labor force, ages 16-64) is not entirely empirically distinct from the disengaged youth rate because the latter includes information about youth unemployment (percentage of youth aged 16-19 who are unemployed). Although there is some overlap in these variables, the correlation is not statistically problematic (r = .40).

6.Although it is possible that longitudinally there is some degree of reverse causality from time period to time period between measures of differential institutional engagement and homicide, the potential for this joint endogenous process is not salient for the present cross-sectional analyses. The regression models estimated herein condition on the values of the tract-level differential engagement covariates and the potential for joint endogeneity, which would imply spatially correlated errors, are statistically adjusted by our spatial correlation estimates and corrections.

7.We also examined a grand-weight specification that calculated a spatial weight score across the entire sample of 8,307 tracts. The city-specific and grand-sample specifications were highly correlated (r = .88). Findings from models including the grand-weight specification produced one substantive difference from models including the city-specific weight specification—the percentage of married youth was statistically significant as theoretically predicted using a one-tailed test of significance in the grand-weight model. We report findings from models with the city-specific weights because it is the more conservative test for our variables of interest.

8.We estimated an unconditional model (not shown) and find that there is significant variation in the outcome measure. We also estimate the intercept random effect but random effects for all other variables are constrained to zero.

9.In the model that used the spatial grand-weight specification, the percentage of married youth was statistically significant in the expected direction.

References

Anderson, E. (1999). Code of the street: Decency, violence, and the moral life of the inner-city. New York, NY: W. W. Norton.

Anselin, L., Cohen, J., Cook, C., Gorr, W., Tita, G. (2000). Spatial analyses of crime. In Duffee, D. (Ed.), Criminal justice: Vol. 4: Measurement and analysis of crime and justice (pp. 213-262). Washington, DC: National Institute of Justice.

Baller, R. D., Anselin, L., Messner, S. F., Deane, G., Hawkins, D. F. (2001). Structural covariates of U.S. County Homicide Rates: Incorporating spatial effects. Criminology, 39, 561-590.

Berg, M. T., Stewart, E. A., Brunson, R. K., Simons, R. L. (2012). Neighborhood cultural heterogeneity and adolescent violence. Journal of Quantitative Criminology, 28, 411-435.

Bivand, R., Piras, G. (2015). Comparing implementations of estimation methods for spatial econometrics. Journal of Statistical Software, 63(18), 1-36.

Blokland, A. J., Nagin, D. S., Nieuwbeerta, P. (2005). Life span offending trajectories of a Dutch conviction cohort. Criminology, 43, 919-954.

Bursik, R. J. (1988). Social disorganization and theories of crime and delinquency: Problems and prospects. Criminology, 26, 519-551.

Bursik, R. J., Grasmick, H. G. (1993). Neighborhoods and crime: The dimensions of effective community control. Lanham, MD: Lexington Books.

Bursik, R. J., Webb, J. (1982). Community change and patterns of delinquency. American Journal of Sociology, 88, 24-42.

Bushway, S. D., Thornberry, T. P., Krohn, M. D. (2003). Desistance as a developmental process: A comparison of static and dynamic approaches. Journal of Quantitative Criminology, 19, 129-153.

Chiricos, T. G. (1987). Rates of crime and unemployment: An analysis of aggregate research evidence. Social Problems, 34, 187-212.

Cohen, J., Cohen, P. (1983). Applied multiple regression/correlation analysis for the behavioral sciences. Mahwah, NJ: Lawrence Erlbaum.

Crutchfield, R. D., Geerken, M. R., Gove, W. R. (1982). Crime rate and social integration: The impact of metropolitan mobility. Criminology, 20, 467-478.

DeFronzo, J. (1983). Economic assistance to impoverished Americans: Relationship to incidence of crime. Criminology, 21, 119-136.

D’Unger, A. V., Land, K. C., McCall, P. L., Nagin, D. S. (1998). How many latent classes of delinquent/criminal careers? Results from mixed Poisson regression analyses of the London, Philadelphia, and Racine Cohort Studies. American Journal of Sociology, 103, 1593-1630.

Durkheim, E. (1951). Suicide: A study in sociology (Spaulding, J. A., Simpson, G., Trans.). New York, NY: Free Press. (Original work published 1897)

Eggleston, E. P., Laub, J. H., Sampson, R. J. (2004). Methodological sensitivities to latent class analysis of long-term criminal trajectories. Journal of Quantitative Criminology, 20, 1-26.

Enders, C. K., Tofighi, D. (2007). Centering predictor variables in cross-sectional multi-level models: A new look at an old issue. Psychological Methods, 12, 121-138.

Farrington, D. P., Ohlin, L. E., Wilson, J. Q. (1986). Understanding and controlling crime: Toward a new research strategy. New York, NY: Springer-Verlag.

Fox, J. A., Zawitz, M. W. (2010). Homicide trends in the United States. Washington, DC: Bureau of Justice Statistics.

Greenberg, D. F. (1985). Age, crime, and social explanation. The American Journal of Sociology, 91, 1-21.

Harding, D. J. (2007). Cultural context, sexual behavior, and romantic relationships in disadvantaged neighborhoods. American Sociological Review, 72, 341-364.

Hipp, J. R. (2007). Block, tract, and levels of aggregation: Neighborhood structure and crime and disorder as a case in point. American Sociological Review, 72, 569-680.

Hipp, J. R. (2011). Spreading the wealth: The effect of the distribution of income and race/ethnicity across households and neighborhoods on city crime trajectories. Criminology, 49, 631-665.

Hirschi, T. (1969). Causes of delinquency. Berkeley: University of California Press.

Hirschi, T., Gottfredson, M. (1983). Age and the explanation of crime. American Journal of Sociology, 89, 552-584.

Huff-Corzine, L., Corzine, J., Moore, D. C. (1986). Southern exposure: Deciphering the South's influence on homicide rates. Social Forces, 64, 906-924.

Kasarda, J. D., Janowitz, M. (1974). Community attachment in mass society. American Sociological Review, 39, 328-339.

Krivo, L. J., Peterson, R. D., Kuhl, D. C. (2009). Segregation, racial structure, and neighborhood violent crime. American Journal of Sociology, 114, 1765-1802.

Land, K. C., McCall, P. L., Cohen, L. E. (1990). Structural covariates of homicide rates: Are there any invariances across time and social space? American Journal of Sociology, 95, 922-963.

Laub, J. H., Nagin, D., Sampson, R. J. (1998). Trajectories of change in criminal offending: Good marriages and the desistance process. American Sociological Review, 63, 225-238.

Laub, J. H., Sampson, R. J. (1993). Turning points in the life course: Why change matters to the study of crime. Criminology, 31, 301-325.

Laub, J. H., Sampson, R. J. (2003). Shared beginnings, divergent lives: delinquent boys to age 70. Cambridge, MA: Harvard University Press.

Lee, M. T., Martinez, R. (2002). Social disorganization revisited: Mapping the recent immigration and Black homicide relationship in Northern Miami. Sociological Focus, 35, 363-380.

Lee, M. T., Martinez, R., Rosenfeld, R. (2001). Does immigration increase homicide? Negative evidence from three border cities. The Sociological Quarterly, 42, 559-580.

Lee, M. T., Ousey, G. (2005). Institutional access, residential segregation, and urban Black homicide. Sociological Inquiry, 75, 31-54.

Lee, M. T., Slack, T. (2008). Labor market conditions and violent crime across the metro-nonmetro divide. Social Science Research, 37, 753-768.

Light, M. T., Ulmer, J. T. (2016). Explaining the gaps in White, Black, and Hispanic violence since 1990: Accounting for immigration, incarceration, and inequality. American Sociological Review, 81, 290-315.

Loeber, R., Farrington, D. P. (2011). Young homicide offenders and victims: Risk factors, prediction, and prevention from childhood. New York, NY: Springer.

Loftin, C., Hill, R. H. (1974). Regional subculture and homicide: An examination of the Gastil-Hackney thesis. American Sociological Review, 39, 714-724.

Loftin, C., Parker, R. N. (1985). An errors-in variable model of the effect of poverty on urban homicide rates. Criminology, 23, 269-287.

Long, J. S. (1997). Regression models for categorical and limited dependent variables. Thousand Oaks, CA: Sage.

Ludwig, J., Kling, J. R., Katz, L. F., Sanbonmatsu, L., Liebman, J. B., Duncan, G. J., . . . Kessler, R. C. (2008). What can we learn about neighborhood effects from the moving to opportunity experiment? American Journal of Sociology, 114, 114-188.

Marvell, T. B., Moody, C. E. (1991). Age structure and crime rates: The conflicting evidence. Journal of Quantitative Criminology, 7, 237-273.

Massey, D. S., Denton, N. A. (1993). American apartheid: Segregation and the making of the underclass. Cambridge, MA: Harvard University Press.

McCall, P. L., Land, K. C., Dollar, C. B., Parker, K. F. (2013). The age structure-crime rate relationship: Solving a long-standing puzzle. Journal of Quantitative Criminology, 29, 167-190.

McCall, P. L., Land, K. C., Parker, K. F. (2010). An empirical assessment of what we know about structural covariates of homicide rates: A return to a classic 20 years later. Homicide Studies, 14, 219-243.

McCall, P. L., Land, K. C., Parker, K. F. (2011). Heterogeneity in the rise and decline of city-level homicide rates, 1976–2005: A latent trajectory analysis. Social Science Research, 40, 363-378.

Merton, R. K. (1938). Social structure and anomie. American Sociological Review, 3, 672-682.

Messner, S. F. (1983). Regional and racial effects on the urban homicide rate: The subculture of violence revisited. American Journal of Sociology, 88, 997-1007.

Messner, S. F., Rosenfeld, R. (1999). Social structure and homicide: Theory and research. In Smith, M. D., Zahn, M. A. (Eds.), Homicide: A sourcebook of social research (pp. 27-41). Thousand Oaks, CA: Sage.

Messner, S. F., Rosenfeld, R. (2007). Crime and the American dream (4th ed.). Belmont, CA: Wadsworth Publishing.

Minnesota Population Center. (2004). National historical geographic information system: Pre-release Version 0.1. Minneapolis: University of Minnesota. Retrieved from http://www.nhgis.org

Moffitt, T. E. (1993). Life-course-persistent and adolescence-limited antisocial behavior: A developmental taxonomy. Psychological Review, 100, 674-701.

Morenoff, J. D., Sampson, R. J., Raudenbush, S. W. (2001). Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. Criminology, 39, 517-558.

Nagin, D. S., Land, K. C. (1993). Age, criminal careers, and population heterogeneity: Specification and estimation of a nonparametric, mixed Poisson model. Criminology, 31, 327-362.

National Neighborhood Crime Study. (2000). Description citation and codebook for more information. Retrieved from http://www.icpsr.umich.edu/icpsrweb/RCMD/studies/27501

Osgood, D. W. (2000). Poisson-based regression analysis of aggregate crime rates. Journal of Quantitative Criminology, 16, 21-43.

Ousey, G. C. (1999). Homicide, structural factors, and the racial invariance assumption. Criminology, 37, 405-426.

Parker, K. F., Johns, T. (2002). Urban disadvantage and types of race-specific homicide: Assessing the diversity in family structures in the urban context. Journal of Research in Crime & Delinquency, 39, 277-303.

Parker, K. F., McCall, P. L., Land, K. C. (1999). Determining social structural predictors of homicide: Unit of analysis and other methodological concerns. In Smith, M. D., Zahn, M. A. (Eds.), Homicide: A sourcebook of social research (pp. 107-124). Thousand Oaks, CA: Sage.

Parker, R. N. (1989). Poverty, subculture of violence, and type of homicide. Social Forces, 67, 983-1007.

Peterson, R. D., Krivo, L. J. (2000). The National Neighborhood Crime Study: 2000 [Computer file] (ICPSR 27501-v1). Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor]. doi:10.3886/ICPSR27501

Phillips, J. A. (2006). The relationship between age structure and homicide rates in the United States, 1970 to 1999. Journal of Research in Crime & Delinquency, 43, 230-260.

Piquero, A. R. (2008). Taking stock of developmental trajectories of criminal activity over the life course. In Liberman, A. M. (Ed.), The long view of crime: A synthesis of longitudinal research (pp. 23-78). New York, NY: Springer.

Porter, J. R., Purser, C. W. (2010). Social disorganization, marriage, and reported crime: A spatial econometrics examination of family formation and criminal offending. Journal of Criminal Justice, 28, 942-950.

Pratt, T. C., Cullen, F. T. (2005). Assessing macro-level predictors and theories of crime: A meta-analysis. In Tonry, M. (Ed.), Crime and justice: A review of research, Volume 32 (pp. 373-450). Chicago, IL: The University of Chicago Press.

Quetelet, A. (1984). Research on the propensity for crime at different ages. Cincinnati, OH: Anderson Publishing. (Original work published 1831)

Raudenbush, S. W., Bryk, A. S. (2002). Hierarchical linear models: Applications and data analysis methods (2nd ed.). Thousand Oaks, CA: Sage.

Sampson, R. J. (1988). Local friendship ties and community attachment in mass society: A multi-level systemic model. American Sociological Review, 53, 766-779.

Sampson, R. J. (2008). Moving to inequality: Neighborhood effects and experiments meet social structure. American Journal of Sociology, 114, 189-231.

Sampson, R. J., Groves, W. B. (1989). Community structure and crime: Testing social disorganization theory. American Journal of Sociology, 94, 774-802.

Sampson, R. J., Morenoff, J. D., Earls, F. (1999). Beyond social capital: Spatial dynamics of collective efficacy for children. American Sociological Review, 64, 633-660.

Sampson, R. J., Morenoff, J. D., Gannon-Rowley, T. (2002). Assessing “neighborhood effects”: Social processes and new directions in research. Annual Review of Sociology, 28, 443-478.

Sampson, R. J., Raudenbush, S., Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. Science, 277, 918-924.

Sampson, R. J., Wilson, W. J. (1995). Toward a theory of race, crime, and urban inequality. In Peterson, H. J. (Ed.), Crime and inequality (pp. 37-54). Stanford, CA: Stanford University Press.

Schwartz, J. (2006). Effects of diverse forms of family structure on female and male homicide. Journal of Marriage and Family, 68, 1291-1312.

Shaw, C. R., McKay, H. (1942). Juvenile delinquency and urban areas. Chicago, IL: The University of Chicago Press.

Shihadeh, E. S., Barranco, R. E. (2010). Leveraging the power of the ethnic enclave: Residential instability and violence in Latino communities. Sociological Spectrum, 30, 249-269.

Shihadeh, E. S., Thomas, S. A. (2007). Institutional attachment and violence: The concentration of youth disengagement and serious crime. Paper presented at the 2007 annual meeting of the American Society of Criminology. Retrieved from http://citation.allacademic.com/meta/p201784_index.html

Shryock, H. S, Siegal, J. S. (1976). The methods and materials of demography. New York, NY: Academic Press.

Steffensmeier, D., Harer, M. D. (1987). Is the crime rate really falling? An “aging” U.S. *population and its impact on the nations crime rate*, 1980-1984. Journal of Research in Crime & Delinquency, 24, 23-48.

Steffensmeier, D., Harer, M. D. (1991). Did crime rise or fall during the Reagan presidency? The effects of an “aging” U.S. population on the nation’s crime rate. Journal of Research in Crime & Delinquency, 28, 330-359.

Steffensmeier, D., Streifel, C. (1991). The distribution of crime by age and gender across three historical periods: 1935, 1960, and 1985. Social Forces, 69, 869-894.

Stowell, J. I., Messner, S. F., McGeever, K. F., Raffalovich, L. E. (2009). Immigration and the recent violent crime drop in the United States: A pooled, cross-sectional time-series analysis of metropolitan areas. Criminology, 47, 889-928.

Tcherni, M. (2011). Structural determinants of homicide: The big three. Journal of Quantitative Criminology, 27, 475-496.

Thomas, S. A., Shihadeh, E. S. (2013). Institutional isolation and crime: The mediating effect of disengaged youth on levels of crime. Social Science Research, 42, 1167-1179.

Tittle, C. R. (1988). Two empirical regularities (maybe) in search of an explanation: Commentary on the age/crime debate. Criminology, 26, 75-85.

Tittle, C. R., Grasmick, H. (1997). Criminal behavior and age: A test of three provocative hypotheses. The Journal of Criminal Law and Criminology, 88, 309-342.

Uggen, C. (2000). Work as a turning point in the life course of criminals: A duration model of age, employment, and recidivism. American Sociological Review, 65, 259-546.

Welsh, W. N., Stokes, R., Greene, J. (2000). A macro-level model of school disorder. Journal of Research in Crime & Delinquency, 37, 243-283.

Wilson, W. J. (1987). The truly disadvantaged: The inner city, the underclass and public policy. Chicago, IL: The University of Chicago Press.

Wilson, W. J. (1996). When work disappears: The world of the new urban poor. New York, NY: Random House.

Wilson, W. J. (2009). More than just race: Being Black and poor in the inner city. New York, NY: W.W. Norton.

Wooldredge, J., Thistlewaite, A. (2003). Neighborhood structure and race-specific rates of intimate assault. Criminology, 41, 393-422.