

SOCIAL SUPPORT, INEQUALITY, AND HOMICIDE: A CROSS-NATIONAL TEST OF AN INTEGRATED THEORETICAL MODEL*

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Social support, institutional anomie, and macrolevel general strain perspectives have emerged as potentially important explanations of aggregate levels of crime. Drawing on insights from each of these perspectives in a cross-national context, the analyses show that 1) our measure of social support is inversely related to homicide rates, 2) economic inequality also maintains a direct relationship with homicide rates, and 3) social support significantly interacts with economic inequality to influence homicide rates. The implications of the analysis for ongoing discourse concerning the integration of these criminological theories and the implications for the development of effective crime control policies are discussed.

KEYWORDS: Social support, inequality, macro-level crime rates.

Beginning in the late 1970s and early 1980s, macrolevel (or “ecological”) criminological theory and research “reemerged” and has since earned sustained attention from the academic community. Indeed, following the dominance of individual-level explanations of crime and deviance during the 1960s and 1970s, Bursik and Grasmick (1993:ix) argue that “the pendulum has begun to swing in the other direction, and there has been a relatively recent acceleration in the number of studies that have been conducted with an explicit focus on [macrolevel] dynamics.” At least in part, this resurgence of interest in macrolevel approaches has been encouraged by four primary contributions: Cohen and Felson’s (1979) development of routine activities theory; the seminal work of Blau and Blau (1982) on inequality and violent crime; the rediscovery in the 1980s of Shaw and McKay’s social disorganization theory by scholars such as Bursik (1986,

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1988), Sampson and Groves (1989), and Wilson (1987); and, finally, brought on by rational choice theorists such as Gary Becker (1968) and by a concern over what impact the growing level of imprisonment has on crime rates, the late 1970s and early 1980s experienced a renewed interest in deterrence-rational choice theory at the macro level (see, e.g., Blumstein, Cohen, and Nagin, 1978; Wilson, 1983).

As a result of these important works, new theoretical vistas have been explored, including social support (or "altruism") theory (Chamlin and Cochran, 1997; Cullen, 1994), institutional-anomie theory (Messner and Rosenfeld, 2001), and even a macrolevel variant of general strain theory (Agnew, 1999). Each of these perspectives is distinct in their own right, and yet there is considerable conceptual overlap between them. To be sure, to a certain extent, these theories—either explicitly or implicitly—draw upon each other when specifying their core theoretical propositions. Although still relatively new on the criminological scene, empirical tests of the social support and institutional anomie perspectives have begun to emerge in the published literature (see, e.g., Chamlin and Cochran, 1997; Chamlin et al., 1999; Messner and Rosenfeld, 1997; Piquero and Piquero, 1998; Savolainen, 2000). Agnew's macrolevel general strain theory, however, has yet to be formally tested on a sample of social aggregates;¹ thus, the present analysis represents the first effort toward building a body of empirical tests of this paradigm.

Drawing on each of these three theoretical perspectives, this article has two major objectives. First, we wish to demonstrate how each of these three criminological theories—social support, institutional anomie, and macrolevel general strain—specify similar relationships among measures of social support, economic inequality, and crime. It is not the purpose of the work presented here to play arbiter over which theories may rightfully claim "ownership" over these empirical relationships. Rather, our discussion seeks to highlight the similarities across these theories in terms of how they view—albeit for different reasons—the dynamics of social support, inequality, and crime. Accordingly, the second objective of this article is to empirically test the core propositions shared by these theories concerning the relative effects of social support and economic inequality on homicide rates, and the interaction effect between social support and economic inequality on homicide rates. In particular, our analysis addresses the following three issues: 1) whether social support and economic inequality

1. The multilevel analysis of youths' aggressive behavior in school conducted by Brezina et al. (2001)—which was guided by Agnew's (1999) discussion of community strain—was not an explicitly macrolevel study (the dependent variable was measured at the individual level) and is therefore not considered here to be a macrosocial test of the theory.

maintain significant *independent* effects on homicide rates, 2) whether controlling for the effects of either social support or economic inequality *moderate* the effects for either variable, and 3) whether there is a significant *interaction* effect between social support and economic inequality on homicide rates in the cross-national setting.

THEORETICAL FRAMEWORK

Consistent with the first objective of this article, this section outlines the major tenets of the social support, institutional anomie, and macrolevel general strain perspectives. In describing the core propositions specified by each theory, two interrelated issues will be addressed: how each theory 1) specifies a direct effect for both social support and economic inequality on crime, and 2) how each specifies an interaction between measures of social support and economic inequality on crime.

SOCIAL SUPPORT THEORY

Social support/altruism theory is rooted primarily in the works of Braithwaite's (1989) theory of reintegrative shaming, Coleman's (1990) discussion of social capital, Cullen's (1994) development of social support as an organizing concept for criminology, Messner and Rosenfeld's (2001) institutional anomie theory, and Chamlin and Cochran's (1997) discussion and empirical test of "social altruism" theory. Each of these theoretical statements is somewhat conceptually distinct when viewed in isolation, and yet they all draw on the common proposition that social aggregates—from communities to nations—vary in their degree of cohesiveness, support, shared values, and willingness to come to the aid of those in need (Cullen and Wright, 1997; Etzioni, 1993). Such variations, in turn, are assumed to be related to crime (Barrera and Li, 1996; Sampson et al., 1997; Wilson, 1987).

Defined as "the perceived or actual instrumental and/or expressive provisions supplied by the community, social networks, and confiding partners" (Lin, 1986:18; see also Apter and Propper, 1986; Cullen et al., 1999), the exact mechanisms by which higher levels of social support should reduce criminal involvement are numerous. Indeed, a higher level of social support may increase family efficacy and promote better parenting practices (Currie, 1985; Loeber and Stouthamer-Loeber, 1986; Wright et al, 2001), it may aid in the prosocial adaptation to criminogenic strains (Agnew, 1992, 1999), it may facilitate earlier criminal desistance patterns over the life course (Sampson and Laub, 1993), and it may even be a necessary precondition for effective social control (Braithwaite, 1989). Regardless of the precise processes that may be the result of higher levels of social support, Cullen (1994:537) is clear in his statement that "across

nations and across communities, crime rates vary inversely with the level of social support.”

As such, much of the scholarly discussion surrounding social support theory focuses on the potential “main effects” of social support—often in the form of measures of economic assistance—on crime (e.g., compare Chamlin and Cochran, 1997; Chamlin et al., 1999; DeFronzo, 1983, 1996, 1997; Devine et al., 1988; Hannon and DeFronzo, 1998a; Zuravin, 1989). Less attention has been paid, however, to the possible interaction effects that levels of social support may have with other structural characteristics of social aggregates. In particular, social support theorists are well aware of the link between economic inequality and crime. Cullen (1994:534) notes that “economic inequality can generate crime not only by exposing people to relative deprivation but also by eviscerating and inhibiting the development of social support networks” (see also Colvin, 2000; Currie, 1985). In essence, therefore, the core tenets of social support theory—when taken to the next logical step—indirectly specify an interaction effect between levels of economic deprivation and social support on crime. Indeed, the theoretical statements of Cullen (1994) and of Chamlin and Cochran (1997) both center on the notion that the effect of economic deprivation (i.e., economic inequality) on crime should be most pronounced within macrosocial units characterized by low levels of social support.²

Although not necessarily couched in the language of social support theory, the recent work of Hannon and DeFronzo (1998b) reveals a certain measure of empirical support for this interaction hypothesis. Their analysis of large U.S. counties indicated that the effect of resource/economic deprivation on crime rates was significantly reduced in areas with higher levels of welfare assistance (even when disaggregated to violent and property crime rates).

INSTITUTIONAL ANOMIE THEORY

Messner and Rosenfeld published *Crime and the American Dream* in 1994. In this important work, Merton's (1938) anomie/strain theory was extended and partially reformulated. Although Messner and Rosenfeld agreed with Merton's view of an American culture obsessed with economic success, they found his analysis of social structure incomplete. Merton held that the American system of *stratification* was responsible for

2. Cullen's (1994) work also seems to indicate a potentially indirect relationship among inequality, social support, and crime, where inequality may lead to low levels of social support and, in turn, higher levels of crime—a proposition that researchers may address in the future. Nevertheless, he is clear in his assertion that the criminogenic effects of economic deprivation (inequality) should be most intense when coupled with low levels of social support. It is this latter statement that guides the present analysis.

restricting individuals' access to legitimate opportunities for upward socioeconomic mobility, which, in turn, resulted in high levels of criminogenic anomie in society. What was missing from the anomie tradition, argued Messner and Rosenfeld (2001), was an understanding of how the American Dream creates and reproduces an institutional structure in which one social institution—the economy—assumes dominance over all others. This apparent imbalance in the institutional structure limits the ability of other social institutions, such as the family, education, or the political system, to insulate members of society from the criminogenic pressures of the American Dream. What Messner and Rosenfeld have created, therefore, is a version of anomie/strain theory that sees crime rates as a function of the American Dream's cultural emphasis on economic success in combination with an institutional structure dominated by the economy.

Accordingly, Messner and Rosenfeld (2001) explicitly cite inequality as an indicator of the presence of structural barriers to the universal access of social collectives to the legitimate means to achieve economic success. Furthermore, their theoretical statement indicates that an emphasis on promoting social support may alter the institutional imbalance of power (i.e., the dominance of the economy over other social institutions), where the strengthening of noneconomic institutions should translate into stronger "institutional controls" (Messner and Rosenfeld, 2001:77). Thus, consistent with the major propositions set forth by social support theory, institutional anomie theory also predicts that social support and inequality should exert direct independent effects on crime rates across macrosocial units.

Using "indirect" measures of the central concepts, there have been four explicit tests of institutional anomie theory conducted thus far (Chamlin and Cochran, 1995; Messner and Rosenfeld, 1997; Piquero and Piquero, 1998; Savolainen, 2000)—all of which at least partially support the main propositions of the theory (cf. Jensen, 1996).³ Although these tests are certainly not identical methodologically, a common thread running across each is the analytical approach involving estimating main effects and interaction terms between the proxy for the strength of noneconomic institutions and some measure of economic deprivation. Indeed, Messner and Rosenfeld (2001) are clear in their assertion that the effects of economic deprivation should be most pronounced when coupled with weak noneconomic institutions (see also Chamlin and Cochran, 1996).

3. This is not to say that other macrolevel studies have not been conducted that may bear, to a degree, some importance to anomie theory. Indeed, many studies have included measures of economic deprivation—in some form—to predict crime rates (e.g., for comprehensive reviews of the poverty and inequality literature, see Hsieh and Pugh, 1993; Vieraitis, 2000; and see Chiricos, 1987 for a review of the unemployment-crime literature).

Accordingly, each of these empirical tests revealed—albeit somewhat inconsistently—an inverse interaction effect between various measures of economic deprivation (including measures of poverty, economic inequality) and the strength of noneconomic institutions (including various measures of family dynamics, educational support, and indicators of religious and political participation). Thus, to the extent that indicators of “social support” can be reasonably substituted as indicators of the “strength of noneconomic institutions,” social support and institutional anomie theories may be reasonably integrated with regard to their similar stances on the dynamics of social support, inequality, and crime.

MACROLEVEL GENERAL STRAIN THEORY

Another branch that has recently grown out of the resuscitated anomie tradition is Agnew's macrolevel version of general strain theory. Originally conceptualized as an individual-level explanation of crime and delinquency (see, e.g., Agnew, 1985, 1992), general strain theory views crime primarily as the result of frustration-induced anger. Although the micro-level version of the theory has been fairly well tested in recent years (e.g., see the discussion by Mazerolle and Maahs, 2000), Agnew (1999) has also set forth a macrolevel variant of general strain theory as an explanation of aggregate crime rates that has yet to be formally tested on a sample of social aggregates.

Consistent with the individual-level version of general strain theory, Agnew (1999) argues that strain (or stress) is a major source of the motivation to commit crime. In particular, variations in crime across macrosocial units can be explained in terms of “differences in strain and in those factors that condition the effect of strain on crime” (Agnew, 1999:126). This perspective draws heavily on the relative deprivation tradition (Bernard, 1990; Blau and Blau, 1982; Hagan and McCarthy, 1997a) in that “high levels of income or socioeconomic inequality lead some individuals to experience stress or frustration” (Agnew, 1999:123). Such feelings of relative deprivation, argues Agnew (1999:127), can lead to high levels of “negative affect” among social collectives and to increased frequencies of interactions between “angry/frustrated individuals,” which, in turn, lead to higher rates of crime. As such, social aggregates characterized by high levels of crime “are more likely to select and retain strained individuals, produce strain, and foster criminal responses to strain” (Agnew, 1999:126).

Agnew (1999) is also extremely clear in terms of what the relationships should look like between crime rates and variables assumed to both induce (inequality) and condition (social support) strain. Economic inequality is specified by Agnew (1999:127) as a structural source of strain in that inequality tends to “increase one's absolute level of goal blockage

[and may] also increase one's feelings of relative deprivation." Furthermore, Agnew (1999:134) contends that "when inequality is high, people compare themselves to advantaged others, decide that they want and deserve what these others have, and decide that they cannot get what these others have through legitimate channels." Thus, a direct effect of economic inequality on aggregate crime rates should be found according to macrolevel general strain theory.

In addition to the main effects of economic inequality on crime rates, Agnew (1999) holds that indicators of social support should also maintain a direct effect on crime. To be sure, social support is implicated in general strain theory as having "an important effect on the ability of individuals to cope with strain" (Agnew, 1999:144; see also Hagan and McCarthy, 1997b). As such, macrolevel general strain theory—similar to the social support and institutional anomie perspectives—also specifies a direct and inverse effect of social support on crime. Consistent with the theoretical framework thus far, macrolevel general strain theory also specifies an interaction effect between measures of inequality and social support on crime. Indeed, as social support is viewed as a "conditioning variable" between aggregate structural characteristics (e.g., inequality) and crime, Agnew (1999) therefore contends that the effect of inequality on crime rates should be most pronounced when coupled with low levels of social support (see also Cullen and Wright, 1997; Hagan and McCarthy, 1997a).

RESEARCH STRATEGY

Given this integrated theoretical framework, our analysis addresses three main issues that emerge out of the social support, institutional anomie, and macrolevel general strain paradigms. First, we examine whether social support and economic inequality maintain significant *independent* effects on homicide rates. Second, we assess whether controlling for the effects of either social support or economic inequality *moderate* the effects for either variable. In other words, we are interested in whether controlling for either variable dampens—or "washes out"—the effects of the other. Finally, our analysis uncovers whether there is a significant *interaction* effect between social support and economic inequality on homicide rates in the cross-national setting.

METHODS

UNIT OF ANALYSIS

Criminologists have long debated the relative merits of various levels of aggregation for criminological research. Part of the problem often lies in the ambiguities contained in macrolevel criminological theories as to what the appropriate unit of analysis should be (Short, 1998). In the present

case, we test the integrated theoretical model discussed above in the cross-national setting. Although it is certainly true that considerable within-nation variation exists with regard to social support, economic inequality, and homicide rates, our choice of nations as the unit of analysis was based on propositions contained in the theories under investigation. In particular, institutional anomie theory is explicit about how American social organization causes the United States to have high crime rates "compared with those of other developed nations" (Messner and Rosenfeld, 2001:42). Indeed, Messner and Rosenfeld (2001:80) themselves note how their perspective is "proposed for explaining the distinctive position of the United States when considered in [an] international perspective."

Furthermore, although perhaps slightly less explicit about optimal level of aggregation for theory testing, Cullen (1994:531) notes that the tenets of social support theory are applicable to "communities and *larger ecological units* in which individuals are enmeshed" (emphasis added). Following suit, Agnew (1999:124) states that his macrolevel general strain theory can "explain differences in crime rates across units like cities, SMSAs, and *beyond*" (emphasis added). Thus, although we acknowledge the existence of substantial within-nation heterogeneity with regard to the key variables of interest in the present case, testing this integrated perspective in the cross-national context is most appropriate for institutional anomie theory and is, at minimum, compatible with the social support and macrolevel general strain perspectives.

SAMPLE

Given the limited existence of reliable national-level proxies of social-structural characteristics, researchers are typically handcuffed by the availability of data when generating cross-national samples (Barclay, 2000; Kilias and Rau, 2000; Neapolitan, 1997, 2001). Although sample sizes vary among the cross-national studies that have appeared in the criminological literature, reliable data that could be used in a multivariate statistical context is generally available for fairly well-developed industrialized nations only (LaFree, 1999; see also Gartner and Parker, 1990; Marenin, 1997; Messner and Rosenfeld, 1997; Savolainen, 2000). Accordingly, the data for the variables used in the analysis were drawn from the World Health Organization (2000) and the United Nations Statistics Division (2000). Thus, our sample of nations was based on our ability to gather reliable values for the dependent and independent variables of interest from these well-established cross-national data sources. Given the nature of our research question and the availability of data to measure our key concepts

(i.e., the ability to obtain data for our independent and dependent variables for each nation in the sample),⁴ the present sample is composed of 46 nations.⁵

DEPENDENT VARIABLE

The dependent variable of violent crime is operationalized using each nation's *homicide rate* (homicides per 100,000 citizens) drawn from the World Health Organization's (WHO) 2000 report. Homicides are used as a proxy for violent crime in this setting for three reasons. First, researchers have long noted the relative reliability of cross-national homicide rates over data on other types of offenses (LaFree, 1999; Neapolitan, 1997, 1999; see also Bennett and Lynch, 1990; Boswell and Dixon, 1993; Fiala and LaFree, 1988; Gartner, 1990; Lynch, 1995; Merriman, 1991; Neapolitan, 1998). Second, although recent data from the International Crime Survey (Lee, 2000) on offenses other than homicide (e.g., assault, burglary, theft) are now available for a select group of nations, there is little overlap between the nations included in this dataset with those from the WHO and United Nations Statistics Division sources. In the end, victimization data from the International Crime Survey were available for only 17 of the nations in the present sample, which would make any multivariate modeling techniques inappropriate.

Finally, it would seem that the institutional anomie and social support perspectives—with their similar emphases on the consequences of economic deprivation and cultural arrangements stressing the desirability of achieving economic success—would be most suited to the explanation of property offenses.⁶ Messner and Rosenfeld (2001:86), however, explicitly

4. Given the limitations on the availability of data covering the time frame for the study, the listwise deletion of cases due to missing data would have dropped our sample size to 39. Using LISREL 8.50 for Windows and the EM algorithm, we imputed values for the missing cases. The EM algorithm generates values based on the covariance structure of the full set of variables included in the analysis. Thus, as opposed to an alternative method such as mean replacement, the variance estimates produced through imputation methods are not biased downward (which would otherwise increase the probability of obtaining statistically significant results).

5. The nations comprising the sample include Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Costa Rica, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Finland, France, Germany, Greece, Guatemala, Ireland, Israel, Italy, Jamaica, Japan, Kuwait, Mauritius, Mexico, The Netherlands, New Zealand, Norway, Panama, Peru, Portugal, Russian Federation, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Syria, Thailand, Trinidad (and Tobago), United Kingdom, United States, Uruguay, and Venezuela.

6. Relative to the institutional anomie and social support perspectives, Agnew's (1999) focus on the role of negative affect—or anger—in the explanation of aggregate crime rates appears on the surface to be most directly applicable to the explanation of homicide rates.

discuss how factors such as economic deprivation may inhibit “long-term integration in the economic, social, and *moral* life of a community” (emphasis in the original) in their explanation of the youth violence (primarily homicide) “epidemic” in the United States during the 1990s. In particular, in social contexts characterized by an absence of legitimate economic opportunities, illegitimate opportunities—particularly those associated with drug markets—become the preferred vehicle for securing the American Dream. As a result, Messner and Rosenfeld (2001:84) note how economic deprivation, inner city drug markets, and levels of homicide and other forms of firearm violence are not only intertwined, but “causally symmetrical: they account for both the increase and decrease in violence.” Thus, institutional anomie theory does provide a plausible explanation for why social aggregates vary in terms of their homicide rates.

Similarly, Cullen’s (1994) discussion of social support theory emphasizes the “generality” of how social support—at any level of aggregation—reduces crime and victimization. Indeed, Cullen (1994) notes that social support may be treated as an “organizing concept for criminology” (p. 529), and that it “*generally* reduces lawbreaking” (emphasis added, p. 551). Accordingly, although Cullen’s perspective is not necessarily a theory of homicide, it has been articulated as a general theory of crime that, like institutional anomie theory, should account for differences in homicide rates across nations.

INDEPENDENT VARIABLES

SOCIAL SUPPORT MEASURE

In the absence of direct measures for key theoretical concepts, macrolevel researchers are generally faced with the task of developing proxy measures of the constructs under investigation. Although certain researchers have been able to “aggregate up” individual-level responses within particular social and geographic settings (see, e.g., Rosenfeld et al., 2001; Sampson and Groves, 1989), it is the norm in cross-national research to employ proxy measures of key concepts because of the inability to obtain direct measures due to the limited availability of reliable data—an approach that is also taken here (see also Chamlin and Cochran, 1995, 1997; Chamlin et al., 1999; Hoskin, 2001; Messner and Rosenfeld, 1997; Savolainen, 2000).

The research literature does not currently specify a uniform measure of social support at any level of aggregation. Although researchers have used creative measures such as charitable contributions (Chamlin and Cochran, 1997) and tax ratios (Chamlin et al., 1999) at lower levels of aggregation within the United States, it is questionable whether such indicators would be applicable in the cross-national setting even if they were available

(which they are not). Even so, our reading of the social support perspective indicates that the concept could be measured in terms of the importance—or “value”—that social collectives will afford social institutions that, when emphasized, may combat the criminogenic effects of certain social-structural arrangements. Accordingly, our indicator of social support is the percent of the nation’s gross domestic product (GDP) spent on health care. As the World Bank database provides disaggregated estimates of health care spending—including private, public, and total spending—we use the estimates of public spending on health care because it more closely approximates the concept of social support articulated above (as opposed to either private or total health care expenditures, which could simply be driven by individual spending).

Although we certainly admit that such an indicator comes with a degree of estimation error, we believe that our measure serves as a reasonably valid proxy of social support for three reasons. First, researchers have noted that the spending priorities of nations are generally reflective of the social priorities of their citizens (Aaron, 1992; Kingdon, 1999; Skocpol, 1992; Steinmo, 1993). Thus, we are operating on the working assumption that supportive societies are more likely to devote higher levels of economic resources toward supportive, noneconomic social institutions than those that are characterized by low levels of social support. Second, and relatedly, we view health care as a supportive, noneconomic social institution (see also Galbraith, 1996; Wilson, 1999). Indeed, scholars have noted the importance of health-related issues for promoting and enhancing intellectual and social development—especially among children—yet such efforts are often undermined by the lack of access or cultural preference for linking such programs to crime reduction (Currie, 1998; Yoshikawa, 1994). Finally, previous research has included a health care component in measures of “decommodification” (Esping-Anderson, 1990), a concept that has recently appeared in the criminological literature (Messner and Rosenfeld, 1997; Savolainen, 2000). In short, as stated above, nations that are “decommodified” are more likely to emphasize the importance of social support (Messner and Rosenfeld, 1997), and should therefore be less likely to create and maintain a criminogenic social structure.

ECONOMIC INEQUALITY MEASURE

Consistent with the theoretical framework outlined above, our analysis includes a measure of economic inequality (Blau, 1977; Blau and Blau, 1982). Researchers have noted that the Gini index of economic inequality—the most common measure of inequality employed in aggregate studies of crime—tends to be unreliable in the cross-national setting (e.g., see the discussions by Hsieh and Pugh, 1993; Vieraitis, 2000). To improve the

reliability (and predictive validity) of this measure, therefore, our indicator of economic inequality is measured as the ratio of the median incomes of the richest to the poorest 20% of citizens (for similar reasons, income differential-based inequality measures have been used by others; see, e.g., Blau and Blau, 1982; Blau and Golden, 1986; Braithwaite, 1979; Messner and South, 1986; Parker and McCall, 1999; Smith and Bennett, 1985; Vieraitis, 2000).

STRUCTURAL COVARIATES

A number of structural covariates were included in the analysis as statistical controls in order to isolate the effects of the social support index and levels of economic inequality on homicide rates. The control variables included in the analysis are those typically employed by researchers when conducting cross-national analyses of crime (for reviews, see LaFree and Kick, 1986; Neuman and Berger, 1988). In particular, to maximize the available degrees of freedom and to minimize the potential problems associated with multicollinearity (Land et al., 1990), the structural covariates included in our models are intended to generally mirror those found in the most recent cross-national tests of the major criminological theories (Messner and Rosenfeld, 1997; Savolainen, 2000).

The first structural characteristics controlled in the analysis is each nation's *sex ratio* (measured as the number of men per 100 women), which has been shown to be related to national-level crime rates in prior criminological research (see Avakame, 1999; Guttentag and Secord, 1983; O'Brien, 1991). Consistent with prior research in this area, our analyses also control for the *percentage of the population living in urban areas* (Fischer, 1975). Finally, we also control for the effect of general socioeconomic development with the *human development index* (for similar approaches, see Messner and Rosenfeld, 1997; Bennett, 1991). Controlling for development is important for determining whether or not the theoretical propositions discussed above are limited to fully developed nations only (see also Savolainen, 2000). The four factors comprising the human development index (HDI), which is compiled by the WHO, include average life expectancy at birth; adult literacy rates; combined primary, secondary, and tertiary education enrollment, and the GDP per capita measured in U.S. dollars. Aside from serving as a control for socioeconomic development, by taking into account the average life expectancy at birth—which is based on age cohort trajectories over time—the HDI also adjusts for the age composition of each nation. This is critically important for the current study because Savolainen (2000:1030) notes that “nations with a large elderly population are likely to spend a larger proportion of the budget on . . . health care programs.” Controlling for the HDI, therefore, removes the potentially spurious shared variation between our social

support measure and homicide rates that may be due to differences in the age structures across the nations in our sample.

RESULTS

Table 1 contains the descriptive statistics for the variables included in the analysis. As indicated, the natural log of each nation's homicide rate was taken to correct for skewness in the variable's univariate distribution. Furthermore, prior to presenting the results of the multivariate model testing the relationship between social support and homicide, it is first necessary to explore whether the problems associated with multicollinearity between the independent variables may be present. Following the section addressing the collinearity diagnostics we conducted, the results of the multivariate analysis are presented. Finally, this section concludes with a series of additional statistical diagnostic analyses intended to determine the adequacy of the multivariate statistical models when subjected to changes in model specification and sample composition.

Table 1. Descriptive Statistics and Zero-Order Correlations for Variables Included in the Analysis ($N = 46$).

Variable	1	2	3	4	5	6	7
1. Homicide Rate (ln)	—						
2. Sex Ratio	.094	—					
3. Percent Urban	.027	-.114	—				
4. HDI	-.205	-.089	.302*	—			
5. Social Support	-.407**	-.330*	.326*	.424**	—		
6. Economic Inequality	.477**	.168	-.117	-.293*	-.380**	—	
Support-Inequality							
7. Interaction	-.553**	-.122	-.259†	.121	.281†	-.325*	—
Mean	1.383	98.13	70.00	.831	0.00	0.00	.630
SD	1.169	3.28	19.28	.009	1.00	1.00	.488

* = $p < .05$; ** = $p < .01$; † = $p < .10$

TESTING FOR MULTICOLLINEARITY

Table 1 also contains the zero-order correlation coefficients between each of the variables to be included in the multivariate analysis. Extremely high intercorrelations between independent variables in a multivariate context may result in unstable and biased parameter estimates (Blalock, 1972; Hanushek and Jackson, 1977). Although it is certainly not the final step for identifying whether multicollinearity will be present in a statistical model, examining the bivariate correlations between the predictor variables may be a useful first step in this process (Fox, 1994).

A zero-order correlation of at least .70 between two independent variables is generally treated as the threshold for when multicollinearity becomes a mathematical certainty (where each variable explains more than of the variation in the other; see Hanushek and Jackson, 1977). As indicated in Table 1, none of the bivariate correlations exceed .70. Nevertheless, in a multivariate model, when the effects of each of the covariates are controlled statistically, multicollinearity may still emerge between predictor variables that were highly correlated—although not above .70—at the bivariate level (Farrar and Glauber, 1967; Maddala, 1992). Accordingly, the correlations between economic inequality and social support ($r = -.380$), and between the human development index and social support ($r = .424$) are both high enough that the risk of multicollinearity may still be present in a multivariate model.

As an explicit test for multicollinearity, therefore, we computed the variance inflation factors (VIFs) for each of the weighted least-squares (WLS) regression models presented in Tables 2 and 3. None of the VIFs exceed the threshold of 4—the standard “cutoff” point indicating when multicollinearity is present (Fox, 1991).⁷ Given the potential limitations of VIF values (see Maddala, 1992)—in particular, the restricted relevance of the VIF to individual coefficients of direct interest with no applicability to “sets” of regressors (Fox and Monette, 1992:478)—we also examined the condition index scores from each predictor. Each of these scores fell well below the threshold of 30 specified by Belsley et al. (1980). Thus, despite the relatively large bivariate correlations between certain predictors included in the multivariate models, we are confident that the parameter estimates were not biased due to multicollinearity.

THE MULTIVARIATE MODELS

Table 2 contains the results of the WLS regression models testing the relationship among social support, economic inequality, and homicide at the national level. The square root of each nation's population size is used as the weight variable in the WLS models to adjust for the problems associated with heteroscedasticity that often accompany aggregate-level research when ordinary least-squares (OLS) regression is used (Lyon and Tsai, 1996).⁸

7. Some researchers hold that a VIF value of over 10 indicates the presence of multicollinearity (Neter et al., 1990). To err on the side of statistical conservatism, we have chosen the lower threshold of 4 as our indicator of multicollinearity.

8. Residual analysis did reveal unequal variances across fixed values of the dependent variable using studentized score tests proposed by Breusch and Pagan (1979) and by Cook and Weisberg (1983)—an approach generally considered to be considerably robust because it does not require the assumption of normally distributed error terms in the OLS solution (Lyon and Tsai, 1996).

Table 2. WLS regression models of social support, economic inequality, and structural covariates predicting homicide rates (ln). Standardized effects (β) shown ($N = 46$).

Independent Variable	Model 1	Model 2	Model 3	Model 4
Sex Ratio	-.321*	-.213†	-.311*	-.220†
Percent Urban	.274†	-.018	.112	-.047
HDI	.075	.061	.157	.206
Social Support	-.690**	—	-.399*	-.281†
Economic Inequality	—	.688**	.541**	.383**
Social Support-Economic Inequality Interaction	—	—	—	-.359*
Model F	5.141**	8.812**	9.336**	10.21**
Model R-square	.334	.462	.539	.611

NOTE: all WLS regression models estimated using the square root of each nation's population as the weight. * = $p < .05$; ** = $p < .01$; † = $p < .10$

Model 1 is fairly robust (r -square = .334; $p < .01$). In this equation, we are interested in whether social support is significantly related to homicide rates after controlling for the specified structural characteristics of each nation. As can be seen in Table 2, a statistically significant inverse relationship between social support and homicide rates was revealed by the multivariate model. Furthermore, the strongest relationship contained in the model was between social support and homicide (standardized $\beta = -.690$). Thus, net of statistical controls, the analysis reveals a strong inverse effect of social support on homicides at the national level.

Model 2 assesses whether economic inequality significantly predicts homicide rates after controlling for the structural covariates. Like the previous equation, the full model is robust (r -square = .462, $p < .01$). Furthermore, model 2 indicates that economic inequality also exerts a strong independent effect on homicides ($\beta = .688$), where higher levels of economic inequality are associated with higher homicide rates.

In model 3, we are interested in what happens to the effects of both social support and economic inequality on homicide rates when controlling for the effects of both key theoretical variables. In essence, model 3 addresses whether social support or economic inequality moderate the effects of the other variable (i.e., does controlling for the effects of each dampen the predictive capacity of either variable?). In answering this question, both social support and economic inequality still maintain statistically significant relationships with homicide rates after controlling for the effects of each, and the full statistical model explains a substantially larger proportion of the variation in the dependent variable (r -square = .539, $p < .01$). Nevertheless, the magnitudes of the effects for both variables are

reduced (social support $\beta = -.399$, economic inequality $\beta = .541$) in this model. Even so, the direct effects of both social support and economic inequality on homicide rates in model 3 suggest that both variables still exert a strong and fairly stable influence on homicide rates.

Aside from these “main effects,” the theoretical integration presented above suggests that social support, institutional anomie, and macrolevel general strain theories all posit a significant interaction effect between social support and economic inequality on crime. Accordingly, model 4 adds a social support-economic inequality interaction term to the WLS regression equation. Taking the approach suggested by Jaccard et al. (1990), the variables contributing to the interaction term were centered—a practice generally assumed to reduce multicollinearity among predictor variables. Nevertheless, a VIF above 4.00 emerged in the WLS model using the centered interaction term ($VIF = 4.265$), which suggests the presence of multicollinearity with the constituent components of the interaction term—a finding not uncommon in aggregate research using relatively small sample sizes. To avoid the estimation problems associated with multicollinearity for these analyses, the interaction term was recoded into a dummy variable where a value of 0 reflects high levels of economic inequality and low levels of social support relative to all others in the sample.

As with each of the three previous equations, the full model is certainly robust ($r\text{-square} = .611, p < .01$). Also, consistent with the theoretical integration, the interaction between social support and economic inequality is both strong and significant ($\beta = -.359, p < .05$). The negative sign of the coefficient for the interaction term indicates that the effect of economic inequality on homicide rates is significantly reduced in the presence of high levels of social support. Finally, including the interaction term did not “wash out” the main effects for either social support ($\beta = -.281, p < .10$) or economic inequality ($\beta = .383, p < .05$). Thus, taken together, the four WLS regression models presented in Table 2 indicate that social support and economic inequality are strongly and independently related to homicide rates and that the interaction between the two variables also plays a role in explaining variation in national-level homicide rates.⁹

MODEL SPECIFICATION DIAGNOSTICS

In addition to the collinearity diagnostics discussed above, two sets of additional statistical diagnostic analyses were conducted to examine the

9. It is important to note that the sex ratio also maintained a consistent inverse effect on homicides across each of the models presented in Table 2. This means that a higher proportion of males relative to females in the population is associated with lower levels of homicide—a finding that is consistent with Messner and Sampson's (1991) discussion of the supply of marriage partners in a given social context.

adequacy of the multivariate models presented in Table 2. The results of these analyses are presented in Table 3. First, in model 1, we reestimated the full main and interaction effects model from Table 2 after deleting the United States from the analysis. This was done to test for whether the United States—which is often viewed as “exceptional” with regard to limited access to public social support along with high rates of violent crime (see, e.g., Kingdon, 1999; Zimring and Hawkins, 1997)—is really “driving” the results. None of the parameter estimates differed significantly from the previous model using equality of coefficients tests (for detailed discussions of the method for comparing the equality of parameter estimates, see Clogg et al., 1995).¹⁰ This may not be terribly surprising. Indeed, Rose (1991) and Wilson (1998) have argued that a number of European and Pacific Rim nations, including Switzerland, Finland, Canada, Japan, and Australia, are similar to the United States in terms of their general economic structure and the overall scope of the state. Thus, despite the American desire to view itself as such, it may not be essentially unique.¹¹

The second set of analyses concerned the issue of potential spuriousness. We addressed this issue by estimating three additional WLS regression models under different specifications. First, model 2 in Table 3 includes an explicit measure for the *age structure* of each nation (proportion of the population aged 15 to 59). As stated above, researchers have noted the potential problem that nations with a larger proportion of older residents are more likely to spend more on health care (Savolainen, 2000). Although our measure of overall development—the HDI—contains an item related to each population’s age structure, it is possible that when included in such an index, its potential effects on homicides are obscured. Upon including the measure of age structure in model 2 the direct effect of social support is no longer statistically significant. The inclusion of the age structure, however, does not fully moderate either the direct effect of economic inequality or the social support-inequality interaction effect on homicides. Thus, the overall pattern of significance-nonsignificance for the relationships among social support, economic inequality, and the interaction between the two on homicides—although fairly consistent—is not completely invariant across this alternative model specification.

10. This method differs from that discussed by Brame et al. (1998) in that the Clogg et al. (1995) test is designed for coefficient comparisons using the same sample. The test discussed by Brame et al. (1998) is intended for independent samples.

11. Similar analyses were conducted after deleting the Russian Federation, Trinidad and Tobago, and The Netherlands (all of which contained either extreme values on key variables of interest) with results that did not significantly differ from those presented in model 1 from Table 3.

Table 3. Standardized WLS regression coefficients for social support and economic inequality (main and interaction effects) on homicide rates across sample specifications. Standardized effects (β) shown.

Independent Variable	Model 1	Model 2	Model 3	Model 4
Sex Ratio	-.246*	-.302*	—	-.220†
Percent Urban	.001	.031	—	-.054
HDI	.033	—	—	.213
Percent Measles Immunized	—	—	—	-.021
Age Structure	—	.394*	—	—
Incarceration Rate	—	—	.292**	—
Disorganization Index	—	—	-.089	—
Social Support	-.308*	-.042	-.255†	-.287†
Economic Inequality	.298*	.202†	.344*	.381**
Social Support-Economic Inequality Interaction	-.433**	-.337*	-.348*	-.357*
Model F	14.036**	11.488**	11.599**	8.546**
Model R-square	.689	.639	.641	.612

NOTE: Model 1: United States excluded from the analysis. * = $p < .05$; ** = $p < .01$; † = $p < .10$

In taking this inquiry a step further, model 3 in Table 3 includes a composite measure of factors typically used in macrolevel criminological studies limited to the United States referred to as a *disorganization index*. The disorganization index is a factor consisting of five items: age structure, the sex ratio, the infant mortality rate, the percent of the population (aged 15–19 never married), and a five-year rural-urban population change (as a proxy for residential mobility). Each of these items was highly correlated and loaded onto a single factor (64.25% explained variance)—each with a factor loading above .70. This factor is assumed to tap into the social problems that tend to be associated with urbanization, high levels of family disruption, and increased residential mobility (see, e.g., Bursik and Grasmick, 1993; Sampson, 1986; Shaw and McKay, 1972).¹² This model also includes a measure of each nation's *incarceration rate*—a measure that, in addition to being a proxy for the general punitiveness of a society (Young and Brown, 1993), has also been interpreted to be an indicator of the degree to which social collectives experience intense social and political conflict (Donziger, 1996; Rose and Clear, 1998; Tonry, 1995). The

12. As the sex ratio, age structure, and urbanism variables were included in the disorganization index, they were excluded from model 2 to avoid multicollinearity.

results of this analysis are generally consistent with those revealed in Table 2. Specifically, although the incarceration rate emerges as a significant predictor of homicides (the disorganization index was not), the general trends for statistical significance and strength for the measures of social support, economic inequality, and the interaction between the two remained consistent.

Finally, we reestimated the final WLS regression model from Table 2 using an "identification restriction" (Fisher, 1966; see also Nagin, 1998a) to remove the potentially spurious portion of shared variation between our measure of social support and homicide rates (see also Nagin, 1998b). In particular, as our proxy of social support includes a health care component, an inverse association between social support and homicides may reflect, in part, a "hospital effect," where citizens living in nations with a higher quality of health care are less likely to die as a result of a potentially fatal interpersonal encounter (similar arguments and methodological approaches have been taken by Loftin and Hill, 1974; Nagin, 1978, 1998a). Thus, to control for the risk of a hospital effect, we use the *proportion of one-year-olds that have been immunized for measles* as our identification restriction, the results of which are presented in model 4 in Table 3. Upon doing so, equality of coefficients tests again revealed that none of the parameter estimates differed significantly as a result of including the identification restriction.¹³

DISCUSSION

Criminological theorists have made major strides in recent years, including the emergence of new theoretical traditions, the development of sophisticated multilevel explanations of crime, and the refinement and reformulation of well-established (even if not well-tested) criminological theories. One of the most visible trends in the development of macrolevel criminological theory is movement toward theoretical integration. Social support (Chamlin and Cochran, 1997; Cullen, 1994), institutional anomie

13. In additional analyses, we created a composite index for social support that included an item for the percent of the GDP spent on education in addition to health care. These additional models generally mirrored the results of the original analyses with two minor exceptions. First, the direct effects of social support were slightly weaker (yet still statistically significant) in all of the models presented in Table 2 (and the first two models in Table 3). This is likely because of the introduction of a certain degree of measurement error with this index (the two items are strongly, yet not extremely highly, correlated at .54). Second, the effects of the composite index were slightly stronger in the final model presented in Table 3. As the identification restriction employed in model 4 in Table 3 was specifically directed to the health care component of the social support measure, it is not surprising that its corrective effects were dampened a bit with the composite measure.

(Messner and Rosenfeld, 2001), and macrolevel general strain theory (Agnew, 1999) all exist as integrated alternatives to the more narrowly defined perspectives such as routine activity, subcultural, deterrence/rational choice, and relative/absolute deprivation theories. According to a recent discussion by Tittle (2000:86), the advantage of the integrated approach is that it has "led to overlaps among various theories, along with wider recognition of the advantages of bringing diverse ideas together and of borrowing from various extant accounts to create theories with more scope and more precise explanatory application." Tittle (2000:87) goes on to note, however, that "there is an emerging awareness that research practice is now lagging behind theory." Thus, it is critical that we not only seek to clarify such theoretical integration efforts on conceptual grounds, but that we subject them to empirical analysis as well (see also Hay, 2001; Liska, 1987).

With this goal in mind, the central purpose of this article was not to settle the debate concerning which criminological theory may rightfully claim "ownership" over the relationships among social support, inequality, and crime. To be sure, one of the major objectives of this article was to demonstrate how social support, institutional anomie, and macrolevel general strain theories can be successfully integrated with regard to these key concepts. What the present analysis does show is that significant relationships among social support, inequality, and crime rates do in fact exist. In particular, measures of both social support and economic inequality maintain strong and stable main and interaction effects with homicide rates. Even more important, the interaction effects revealed in the analyses indicate that the criminogenic effects of economic inequality are enhanced when found in conjunction with low levels of social support (see also Hannon and DeFronzo, 1998b). Furthermore, these relationships remained stable when assessed under different sampling conditions and under different methodological specifications.

Taken together, we are therefore confident that our results were not idiosyncratic to a particular sample or method of estimation; rather, they reflect ongoing social phenomena in the cross-national context. Nevertheless, it still remains to be seen whether similar results would be found regarding the dynamics of economic inequality, social support, and crime in cross-national tests when using crime measures other than homicides. To a certain extent, this process has already begun. Lee's (2000) analysis of the 1992 wave of the International Victimization Survey for 15 nations revealed a fairly consistent inverse effect for "community cohesion"—a concept akin to Sampson et al.'s (1997) "collective efficacy"—on the victimization risk for robbery and assault. In the absence of comparative

data on homicide victimization, however, it is still unclear (both theoretically and empirically) whether the general pattern of statistical significance/nonsignificance of the relationships found in the present study would hold when predicting crime types other than homicides (see also the review by LaFree, 1999).

Accordingly, scholars should continue to clarify the core propositions of the theories tested here—possibly with the intent of further integration (Bernard and Snipes, 1996; Liska et al., 1989). Colvin's (2000) integrated perspective on crime and coercion, coupled with the emerging research on the relationship between social capital and crime (Rosenfeld et al., 2001), are both illustrative of the trend toward merging concepts from alternative criminological perspectives under a common umbrella. It is still, however, incumbent upon researchers to subject the core propositions specified by these theories to empirical analysis—only in doing so can the relative empirical validity of these theories be established.

In addition to these implications for the continued development of criminological theory, the policy implications of the research presented here are fairly straightforward. First, our analysis echoes the statement by Chamlin et al. (1999:441) in their test of social support (referred to as altruism) theory that “unlike the crime reduction strategies one might deduce from motivational and opportunity theories of crime, social [support] theory does not call for a radical transformation of the social structure.” This is not to say that crime rates could not be substantially reduced within and across macrosocial units by altering certain social-structural arrangements. Indeed, ample empirical evidence exists that points to the criminogenic effects of both absolute (poverty) and relative (inequality) economic deprivation at multiple levels of aggregation (see, e.g., Bailey, 1999; Blau and Blau, 1982; Carroll and Jackson, 1983; Crutchfield, 1989; Fowles and Merva, 1996; Harer and Steffensmeier, 1992; Kovandzic et al., 1998; Land et al., 1990; Piquero and Piquero, 1998; Pratt and Lowenkamp, 2002; Warner and Roundtree, 1997). Even so, the present research affirms the notion that increases in levels of social support are capable of producing a concomitant reduction in crime rates even in the absence of a social and economic revolution, and that higher levels of social support can help to reduce the harmful effects of economic inequality on crime.

We also hasten to note that an emphasis on social support does not necessarily render social control mechanisms—when either formal or informal in nature—as unimportant in explaining variations in crime rates. To be sure, there is ample empirical evidence demonstrating the ability of certain types of policing practices (Nagin, 1998b; cf. Eck and Maguire, 2000), situational crime prevention strategies (e.g., see Brantingham and Brantingham, 1991; Felson and Clarke, 1997; Mazerolle et al., 1998), and other institutions of informal social control (e.g., the dynamics of family

disruption and “collective efficacy”) to affect levels of crime within macrosocial units (Bursik, 1986; Friedman, 1998; LaFree, 1998; Sampson, 1986; Sampson and Groves, 1989; Sampson et al., 1997; Veysey and Messner, 1999). Nevertheless, the problem—at least according to social support theorists—is that macrolevel theories premised on notions of control often err in their assumption that the only effective approach to crime prevention “requires doing something *to* a person rather than *for* a person” (Cullen et al., 1999:189; emphasis in the original).

In the case of the United States, the “control” perspective has been translated (or perhaps perverted) into a series of repressive crime control policies aimed at increasing the potential risks associated with crime (Beckett, 1997; Gordon, 1990). Rooted in the “common sense” notion that would-be offenders are sufficiently contemplative in the moments before typical criminal events, the architects of such policies assume that the fear of incarceration, harsh community-level sanctions, or intense physical exercise (e.g., boot camps) will keep crime rates in check (Bennett et al., 1996; Reynolds, 1997; cf. Clear, 1994; Cullen and Gilbert, 1982; Cullen et al., 1996). As a conceptual alternative to this theoretical framework (and concomitant policy prescriptions), a core proposition shared by the social support, institutional anomie, and macrolevel general strain paradigms is that a more useful method for increasing our understanding of why crime rates vary across macrosocial units is to assess how crime may be, in part, a function of the degree of social support that is afforded to social collectives.

On a related note, this study also indicates that state-based crime control efforts do not necessarily have to come in a punitive form. Nevertheless, a nagging barrier holding back the momentum of a more progressive crime control policy agenda—especially in the United States—is the considerable amount of scholarly attention that academics have devoted toward attempting to demonstrate the ineptitude and potentially coercive nature of the “softer” side of public policies aimed at reducing crime (e.g., correctional rehabilitation programs; see Logan and Gaes, 1993; Martinson, 1974; Whitehead and Lab, 1989; cf. Cullen and Gendreau, 2001; Pratt, 2002). Additional empirical research addressing the emerging social support, institutional anomie, and macrolevel general strain paradigms may, however, help to show that collective efforts to provide social support to citizens represents a promising and progressive method for reducing crime.

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