

DEVELOPMENT, GENDER, AND CRIME: THE SCOPE OF THE ROUTINE ACTIVITIES APPROACH*

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In the past 15 years, the routine activities approach has gained considerable popularity in explaining crime rates. Its explanations are offered, however, without considering the approach's theoretical scope. Recent research suggests that the explanatory power of the perspective might differ across level of economic development and men's and women's arrest rates. To address the issue of theoretical applicability, separate regression equations are estimated for the scope conditions of development and gender, using cross-national time-series analyses. The findings suggest that the explanatory power differs when the scope conditions of development and gender are applied. The routine activities approach appears to explain minor theft arrest rates most accurately for men in developed nations. In less developed nations, none of the four routine activities indicators showed a relationship with men's theft arrest rates. Two indicators, motivation and guardianship, evidenced a relationship with women's minor theft rates. The implications for the generalizability of the routine activities concepts across development and gender are discussed.

The proliferation of research based on the routine activities approach has earned for this perspective, as articulated by Cohen and Felson (1979), a prominent place in criminology in the past 15 years. To date, scholars have used both social structural and social psychological versions of the perspective to explain how changes in society (e.g., industrialization and modernization) or activity patterns (e.g., leisure activities or lifestyles) affect rates of crime and victimization (Bennett 1991a; Cantor and Land 1985; Cohen and Cantor 1980; Cohen and Felson 1979; Lynch 1987; Messner and Blau 1987; Miethe and Meier 1990; Miethe, Stafford, and Long 1987; Stahura and Sloan 1988).¹ This extensive body of research,

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however, contains little articulation of the social, economic, and/or political conditions under which the tenets of the approach are said to explain phenomena. Model development activities tend to focus on operationalizing the central concepts or tenets of the approach.

The relative inattention to the scope of the approach might lead some observers to assume falsely that the perspective can explain criminality in all its forms and variations.² Most research testing the applicability of its central tenets—a pool of motivated offenders, the presence of suitable targets, and the absence of capable guardians—draws its samples from Western, industrialized societies (specifically the United States), addresses theft, and does not differentiate offenders by gender (men predominate in the samples).³ By testing the approach with such samples, research has defined the approach's scope conditions only implicitly. That is, routine activities literature suggests that the approach applies to developed nations and to male crime rates but is unclear on its applicability to nations at other levels of development and to female crime rates.

Without investigating and articulating the approach's scope, it is impossible to ascertain how well the approach would explain criminality across levels of economic development or other structural arrangements. Similarly, it is unclear how well the approach would explain and predict theft arrest rates of subpopulations of offenders such as women, juveniles, and members of different ethnic, racial, or religious groups. Therefore, at the present, the information in the literature is insufficient to clarify whether the routine activities approach is simply an immensely popular ad hoc explanation or whether it has the realistic potential to become a mid-range theory (Merton 1967).⁴

² A scope condition is defined as the condition (e.g., population, setting, time period) in which a given theory is said to predict and explain a phenomenon (Cook and Campbell 1979). Gibbs suggests that scope conditions are an essential part of any theory's explanatory power. He states:

Now suppose that a particular theory makes an assertion about variation in the suicide rate but only among countries, while another makes assertions about the variation not only among countries but also by sex, age, and marital status. As such, the "range" of the latter theory is greater than the former, meaning that it makes assertions about more types of social units. If a theory makes assertions about only one type of social unit, then it has identified or created less order than a theory that makes assertions about two or more types of social units (1972:68).

³ This body of research does not deliberately single out men for study. Yet because most research focuses on common theft and because most thefts are committed by men, the results relate realistically only to men.

⁴ The origins of the approach might help to explain why theorizing about scope has not been prominent in its development. The approach has its roots in grounded theory or inductive theory; thus it is more a reflection of the unintentional selection of the data employed to "ground" it than a consideration of the time, population, and situation to which it is most applicable (Hindelang, Gottfredson, and Garofalo, 1978).

Articulating the scope of the routine activities approach is important not only because of these theoretical concerns but also because of the need to account for observations from current criminological research that reveals a relationship between the level of economic development and gender. Research by Bennett (1991b), LaFree and Kick (1986), Messner (1982), and Shelley (1982), among others, shows that societal development is related to the form and prevalence of criminality. These findings suggest that development is associated with 1) an overall increase in crime and 2) an increase in the ratio of theft to crimes of violence. In a similar vein, research suggests that explanations for men's and women's offense rates differ (Chesney-Lind and Sheldon 1992, Steffensmeier, Allan, and Streifel 1989) both in prevalence and in the nature of the acts. These U.S.-based findings are echoed in cross-national research (Danner, Young, and Fort 1991). Finally, the writings on women and development (Afshar 1991; Leahy 1986; Momsen and Townsend 1987; Waring 1988) bring together crime, gender, and development literatures by pointing to structural disparities (e.g., economic and domestic) between men and women which lead to different routine activities in developed and in less developed nations, and therefore to different combinations of target accessibility, offender proximity, and guardianship.

The purpose of this research is to explore the explanatory power of the routine activities approach by assessing the effects of two theoretically and empirically important scope conditions: economic development and gender. Consideration of these two scope conditions produces three research questions:

- 1) What is the effect of development on the ability of the approach to explain minor theft arrest rates?
- 2) What is the effect of gender on the ability of the approach to explain minor theft arrest rates?
- 3) Is there an interaction between development and gender that affects the ability of the approach to explain minor theft arrest rates?

To address these questions, we used pooled time-series analyses to estimate the effects of the three central concepts of routine activities on minor theft arrest rates in four separate equations: 1) men in developed nations, 2) women in developed nations, 3) men in less developed nations, and 4) women in less developed nations. Our model and analyses emphasize the social structural tradition of the routine activities approach. We follow Cohen and Felson

(1979), Cantor and Land (1985), and Bennett (1991a) in investigating how social structural change, assuming the mediating or intervening effects of routine activities, affects minor theft arrest rates across gender and levels of development.⁵

DEVELOPMENT AND ROUTINE ACTIVITIES

If social structure affects routine activities, then significant shifts in this structure should produce significant changes in the nature, distribution, and frequency of routine activities. Except for a few studies, however, researchers have not adequately explored the explanatory power of the routine activities approach beyond developed nations (Bennett 1991a). Cohen and Felson's (1979) original work analyzed U.S. data and maintained that structural change toward modernization escalates offense rates because 1) it increases exposure to suitable targets and the attractiveness of such targets and 2) it decreases guardianship as activity patterns move away from households. Cohen and Felson concluded that modernization affected activities and therefore offense rates. Extending this conclusion, we hypothesize that if small changes at one level of development generate such effects, a comparison across qualitatively different levels of development should reveal large differences in activities of daily life and offense rates.

The three core concepts of the approach manifest themselves in substantially different ways between less developed and developed nations. First, development affects the availability and accessibility of suitable targets for theft. In less developed nations, potential targets of theft are not readily available: citizens who are wealthy and who possess attractive consumer goods are usually protected well by residential segregation and security measures (such as high walls topped with razor wire, 24-hour armed guards, and attack dogs), and thus are not readily accessible targets of crime. Therefore we expect that level of development affects the approach's predictions and that its concepts will explain theft arrest rates more accurately in developed than in less developed nations.

Second, the proximity of pools of motivated offenders differs between developed and less developed nations in two significant ways. First, except for enclaves of wealthy citizens, there is usually less spatial segregation among citizens in less developed nations. Desperately poor people may live next door to middle-class households. Suburban residential areas of a single socioeconomic level, as found throughout the developed world, are not common in less developed

⁵ See Garofalo (1987), Lynch (1987), Maxfield (1987), and Miethe et al. (1987) for investigations on the social psychological model.

nations. This situation brings pools of offenders closer to accessible and attractive targets of crime. Second, the motivation to commit theft is more pronounced in less developed nations, where economic and status inequality are significantly greater than in developed nations. Thus the concept of proximity of a motivated pool of offenders should be more applicable to theft in less developed than in developed nations.

Third, formal and informal guardianships vary dramatically between developed and less developed nations (Bennett and Wiegang 1994). Formal guardianship, or the protection that citizens receive from the police, is more universal in developed nations. The level of service is based more on the seriousness of the offense than on the victim's status. This is not necessarily true in less developed nations, where the victim's status often determines the speed and quality of the police response. Informal guardianship is more common in less developed nations because households tend to consist of multiple generations and of extended families using or watching over the household's limited possessions. In developed nations, households tend to consist of nuclear families, and the adults hold jobs away from home. Thus, in developed nations, fewer adults are available to provide guardianship over a household's goods. Accordingly, we predict that informal guardianship has a greater impact on theft arrest rates in less developed than in developed nations.

In summary, the literature suggests that the three concepts of routine activities may apply differently across levels of development. We expect the concept of accessible and attractive targets to explain theft arrest rates more fully in developed than in less developed nations. Yet we expect informal guardianship and proximity to pools of motivated offenders to have greater explanatory power in less developed nations.

GENDER AND ROUTINE ACTIVITIES

Cornish and Clark (1986) and Miethe and Meier (1990) found that the level of guardianship and attractiveness of the target determined the choice of particular crime targets in a given sociospatial context. Their "structural choice" theory of crime features a criminal opportunity structure with increased contact between potential offenders and crime targets. Like Cohen and Felson (1979),

⁶ Since its inception (Cohen and Felson 1979), the routine activities literature has conceptualized guardianship against crime as both formal (e.g., Bennett 1982; Chaiken 1978; Feins 1983; Skogan and Maxfield 1981) and informal social control (e.g., Bennett 1991a, 1991b; Cantor and Land 1985; Cohen 1981; Cohen et al. 1981; Cohen and Land 1987; Miethe et al. 1991). We follow the more common tradition and conceptualize guardianship as informal social control.

they hypothesize that men and women are similarly motivated to commit minor theft.

Adler (1975) and Simon (1975) claim that structural changes following the women's movement in the 1960s and 1970s produced an increase in women's crime rates because women began to be exposed to potential crime targets (i.e., target suitability and a pool of motivated offenders) similar to those confronting men. Adler states:

As women invade the business world, there is no reason to expect them to be any more honest than men, and to the extent that crime is related to motivation and opportunity, the incidence of such white collar offenses as embezzle-

ment and fraud should achieve par with men (1975: 252).

A reasonable conclusion of this "emancipation" hypothesis is that the routine activities perspective should explain men's and women's theft arrest rates equally well.

Another body of work, however, suggests a different conclusion. Research by Austin (1982), Box and Hale (1984), Chesney-Lind and Sheldon (1992), Steffensmeier et al. (1989), and Steffensmeier and Cobb (1981) reveals ambiguities in emancipation theorists' claims that structural changes increase both women's access to criminal opportunity structures and their motivation to offend. In a review of gender and crime studies, for instance, Steffensmeier (1980, 1983) points out that structural changes toward gender equity (e.g., increased labor force participation) actually may inhibit women's participation in crime by lessening economic, psychological, and emotional motivations. These findings imply that changes in the criminal opportunity structure, in the subjective value of crime targets, and in the level of guardianship affect men's and women's theft arrest rates in different ways, and that the routine activities approach might not explain women's arrest rates as easily as men's.

INTERACTION BETWEEN DEVELOPMENT AND GENDER

Other research in gender and development implies an "interaction effect," which disproportionately decreases the explanatory power of the approach for women in less developed nations. Afshar (1991) argues that development processes are often gender-specific; that is, they deprive poorer women of ready access to reliable revenue from the paid work force. Momsen and Townsend (1987) and Waring (1988) note that women in less developed nations work both inside and outside the home in subsistence production. Unlike the work of their male counterparts, however, much of these women's work is not counted as part of the paid labor force. Instead it is service-oriented and produces "goods" that are rarely exchanged on

the open market. Moreover, Afshar (1991) observes that capitalist development projects in less developed nations increase opportunities for men while reinforcing women's subordination. Women in less developed nations are still expected to perform traditional guardianship over the household and its occupants and to engage in subsistence production at the same time. Therefore, because the women do not have the same exposure to goods in the marketplace as do men, or the same exposure as do men and women in developed nations, one would expect that placement outside of the market would weaken routine activities (especially the concepts of suitable targets and proximity) as a viable explanation of women's theft arrest rates in less developed nations.

Figure 1 summarizes our prediction about the effect of development and gender on men's and women's theft arrest rates. We hypothesize that the routine activities perspective explains men's theft arrest rates (Cells A and B) more accurately than women's rates (Cells C and D). We hypothesize further that the "attractive and accessible targets" element of the approach explains theft arrest rates in developed nations (Cells A and C) more accurately than in less developed nations (Cells B and D), but that proximity, motivation, and informal guardianship explain the rates better in less developed than in developed nations. Finally, we hypothesize that an interaction exists between development and gender, and that the approach has the least predictive value in explaining women's theft arrest rates in less developed nations (Cell D). That is, the effects of gender and development, taken together, have a greater effect on the explanatory power of the approach than does development or gender alone.

Figure 1. Hypothesized Explanatory Power of the Routine Activities Approach

		<u>Level of Development</u>	
		<u>Developed</u>	<u>Less Developed</u>
<u>Gender</u>	<u>Male</u>	<u>A</u> <u>Very High</u> <u>Explanatory Power</u>	<u>B</u> <u>Medium-High</u> <u>Explanatory Power</u>
	<u>Female</u>	<u>C</u> <u>High</u> <u>Explanatory Power</u>	<u>D</u> <u>No</u> <u>Explanatory Power</u>

MODEL SPECIFICATION

Following Cohen and Felson (1979), we explored changes in structural factors and offense rates using time-series analysis. This analytic method not only allowed us to remain consistent with their original objective of explaining how structural changes affect crime rate trends; it also kept us in line with our objective of assessing how well the perspective explains women's and men's theft arrest rates in less developed and developed nations. Our approach differs from Cohen and Felson's in one regard: because we analyze the perspective using cross-national time-series data, we employ a pooled time-series cross-sectional method. The time-series method resolves weaknesses found in the cross-national literature in which cross-sectional, cross-national data are used to analyze hypotheses involving change.⁷

This research draws on a data archive containing crime (by offense and offender), social, political, and economic indicators covering the 25-year period from 1960 to 1984 for a diverse sample of 52 nations. The Correlates of Crime (COC) data set includes data from the International Criminal Police Organization (INTERPOL), the United Nations, the World Bank, the International Labour Organization, and other national and international sources.⁸

The COC includes those nations which consistently reported crime data to INTERPOL from 1960 to 1984. Thus the sample is non random: it consists of nations with a tradition of collecting and reporting crime data. Of the 60 to 76 nations that reported data in any given year over the 1960-1984 span, 52 fit the selection criterion. This data base includes nations from every region and represents both the developed and the less developed nations of the world. The archive does not include nonmarket nations such as Russia and China. INTERPOL's *International Crime Statistics* has been published biannually since 1950; the statistics have varied in quality and quantity over the 40-plus years of publication.⁹ Because of missing data (by nation on either the two dependent or the

⁷ For a more detailed discussion of the problems of using cross-sectional data to analyze hypotheses concerning change, see Bennett (1991a).

⁸ For a complete set of documentation material on the COC data file as well as the data, please contact the second author. The data and documentation are also available from the inter-University Consortium for Political and Social Research (ICPSR).

⁹ Cross-national researchers express four major concerns about the use of INTERPOL data. First, *they* believe that INTERPOL data contain systematic bias due to the reporting countries' failure to employ consistent operational definitions. Recent investigations of this problem suggest that the consequences of possible inconsistencies are less important when analyses are longitudinal, correlational, and *within-nation* (Bennett and Lynch 1990; Kalish 1988; Vigderhous 1978). In particular, Bennett and Lynch compared data from INTERPOL, Archer and Gartner (1984), the World Health Organization, and the United Nations. They found that regression estimates did not differ significantly when theft over time and within nations was

four independent variables), we employ 20 of the 52 nations in the data set for these analyses. (For a list of the nations included by level of development, see Table 2.) In addition, because of missing data for unemployment, we use only 20 years (1965-1984) of data here.

Using crime data from the COC Archive, we created two dependent variables. WOMEN'S MINOR THEFT ARREST RATES and MEN'S MINOR THEFT ARREST RATES were constructed from arrest data for lesser thefts, such as petty theft and theft without force. We transformed the variables into rates by dividing them by the population of each nation as reported by the United Nations.

Our classification of nations as developed and less developed follows past work based on both Durkheimian (Krohn 1978; Messner 1982; Shelley 1981) and routine activities (Kick and Lafree 1985; Lafree and Kick 1986) perspectives. We use the percentage of labor force employed in industry (employment in industry/total employment) to divide our sample into the two different levels of development. To do so, we take the mean value for labor force

regressed on a criterion variable. Thus, although the source and possibly the definition of property crime were allowed to vary, the resultant findings did not.

The second concern is the bias that may be introduced by differences in citizens' reporting practices. Do citizens report offenses at different rates based on the characteristics of their nation? Ample cross-national evidence suggests that citizens' reporting of crimes is not affected by national or cultural factors. Findings from Bennett and Wiegand (1994), Skogan (1984), and Van Dijk, Mayhew, and Killias (1990) suggest that the reporting of crime is based on the seriousness of the offense, not on national or cultural characteristics. These studies also report that across countries similar percentages of crimes committed are reported to the police.

Third, a potential bias results from differences in the operations of national justice reporting systems. This concern is especially pertinent when social structural variables included in the analysis model may interact with police recording procedures. For example, if developed nations have more systematic recording systems than less developed nations, level of development *per se* might determine the completeness of official crime statistics. Very little cross-national research has been conducted on the variation in police recording of incidents (Mayhew and Smith 1985). Although cross-national differences in recording practices probably exist, we do not yet know their direction, magnitude, or sources. To compensate for these possible effects, we employed statistical adjustment techniques coupled with within-nation longitudinal analyses (e.g., employing nation-specific and/or time-specific dummy variables). These procedures should lessen the effects of constant but differential police recording practices. In sum, although the data might contain systematic biases, we do not consider their effect great enough to invalidate INTERPOL data in multivariate analyses.

Fourth, the use of arrest statistics to determine gender-specific commission rates assumes a constant ratio of offenses to arrests across genders. If development is related to gender differences in the arrest/offense ratio, the resultant coefficients will be biased. Although we cannot test the existence of this bias, we can reasonably assume that within level of development, the arrest/offense ratio is constant and that the introduction of nation-specific dummy variables in the model reduces or controls potential bias.

For an in-depth discussion of error structure in cross-national data, see Archer and Gartner (1984), Bennett and Lynch (1990), and Kalish (1988). These works discuss the reliability of data as it relates to uses of the data and to the design methods employed.

participation in industry for 1972 and create two categories: developed countries (defined as those falling above the 1972 mean) and less developed countries (defined by those falling below the 1972 mean).

We constructed four independent variables from COC data to measure the three central concepts of the routine activities approach. Following Cohen, Kluegel, and Land (1981) and, to some degree, Bennett (1991a, 1991b), we operationalize ATTRACTIVE AND ACCESSIBLE TARGETS as the gross domestic product (GDP) of a nation divided by that nation's population. This measure taps the dimension of attractiveness and accessibility of crime targets by asserting that the greater the nation's wealth, the more valuable and accessible the targets of crime. We used GDP instead of the more common gross national product (GNP) because GDP measures only those goods and services which are rendered within the nation's boundaries, whereas GNP included goods and services produced elsewhere but claimed by a nation's residents.¹⁰ Cohen and Felson (1979) originally noted that the increased wealth and availability of consumer goods (which represent potential crime targets) in a nation leads to an increase in the theft rate. Subsequent investigations (Bennett 1991a, 1991b; Hansmann and Quigley 1982; Lafree and Kick 1986) also have employed GDP per capita to measure the same or similar concepts. Because the study is longitudinal, we further refined the measure to adjust for inflation. The World Bank's consumer price index, adjusted for 1980, was employed for this purpose.

Next, we follow Bennett (1991a), Cohen et al (1981), and Lynch (1987) and operationalize the second concept, proximity to a pool of motivated offenders, with two indicators that tap the cluster's dimensions of proximity and motivation. These authors point out that a sufficient proxy for Cohen and Felson's concept requires indicators representing areas where large pools of offenders are found (e.g., urban areas) and reflecting motivation to commit crimes (e.g., inequality). The first indicator, which attempts to capture the PROXIMITY dimension of the concept, is defined as urbanization, or the yearly proportion of population living in cities or towns in a nation. The second indicator taps the dimension of motivation. The level of status inequality within a nation can be viewed as a necessary (although not sufficient) condition for the desire to steal, and thus can also be viewed as a structural-level surrogate measure of

¹⁰ Since November 1991, the U.S. Commerce Department has used GDP as its primary economic measure rather than the traditionally employed GNP. This change indicates the importance of this measure in an increasingly internationalized world.

motivation. We constructed the variable MOTIVATION from UNESCO data employing Ray and Singer's (1973) index of concentration (CON),¹¹ in which educational disparity serves as the base. We selected this measure over the Gini index because CON is a normalized measure of variation and thus has an upper limit of unity, whereas a Gini with three elements would have an upper limit of .667. The fractional shares constituting the status inequality measure were derived from primary school, secondary school, and college enrollment figures standardized by population. Steffensmeier et al. (1989) employed a similar measure of educational inequality in their cross-national analysis of female arrest rates.

The final indicator, that of guardianship, is constructed from International Labour Organization (ILO) data. We measure GUARDIANSHIP by a nation's total unemployment rate. It is defined as the rate per 100,000 population of those individuals who

¹¹ The measure of educational inequality used in this analysis is the coefficient of concentration, defined as:

where P equals the fractional share of the i th category and N is the number of categories.

In most cross-national studies investigating crime and inequality, the latter has been measured by income inequality. In this analysis we used educational disparity rather than income disparity to measure status inequality. We did so 1) because of the deficiencies in international data on income inequality and 2) because of evidence that educational and income inequality are highly correlated and therefore are interchangeable as measures of status inequality. Because national-level data on income disparity are not available for the nations and the time period examined here, we must use available aggregate measures.

The nation-level indicator most widely used in cross-national research is Jain's (1975) international Gini Index (see Messner 1989; Stack 1984). This indicator is suspect, however, because the level of coverage (e.g., national, urban versus rural) within nations varies across nations. Moreover, the data are not available for each country for each year during the period 1955 to 1972. These reporting years also vary from nation to nation. Therefore it would be inappropriate to use such data in a longitudinal analysis of the type proposed here.

Blau (1977) offers evidence that educational and income inequality are highly correlated and that either could be used to measure status inequality. He argues that inequality manifests itself in the shape of the status distribution, which is based on wealth, power, and prestige, and he defines prestige as educational attainment. Because each dimension of status is closely related empirically and conceptually to each of the others, an indicator using one of these dimensions should be an unbiased indicator of the more general concept.

To test this assertion, we correlated Jain's index with our measure of educational inequality for those nation-years in the COC data set for which Jain's income data are available. The two measures of status inequality correlate at .865. This finding suggests that our use of education as opposed to income inequality should not radically affect our results.

are available for employment but who are out of jobs and are currently seeking employment. For two reasons, we break from previous work that relied heavily on female's participation in the labor force as an indicator of guardianship. First, routine activities scholars have used female labor force participation as an indicator of lack of guardianship, reasoning that increased female employment means less protection of the household's goods and less control of its occupants (e.g., juveniles or potential offenders). Indirectly, then, the routine activities approach, since its inception, has used nonemployment (albeit of females only) as an indicator of guardianship. In addition, scholars such as Cantor and Land (1985), Cohen and Land (1987), Land, McCall, and Cohen (1990), and Miethe et al. (1991) have argued that unemployment tends to keep people at home and thereby to exert a negative effect on burglary, robbery, and similar predatory crime rates. Therefore we expect an inverse relationship between theft rates and unemployment.

Second, Miethe et al. (1991) found conceptual ambiguity in operationalizing the guardianship concept with female labor force participation. Routine activities scholars who have used female labor force participation to measure lack of guardianship overlook its potential as an indicator of exposure to suitable crime targets, another one of the approach's three concepts. It is conceptually difficult to determine the degree to which female labor force participation measures guardianship or exposure to suitable targets. Thus we agree with Miethe et al. (1991) that the use of this indicator in this analysis would create conceptual ambiguity in our model and would confound our findings. As a result, we did not use it here.¹²

STATISTICAL ESTIMATION

The use of a pooled cross-sectional time-series design requires special estimation procedures (see Hannan and Young 1977; Qstrom 1978; Stimson 1985). Because the sample units or observations are not independent over time and because each observation does not provide completely new information, the data may contain serial dependence of the errors and thus may violate the assumptions of ordinary least squares (OLS) regression. In addition, nation-specific effects, not taken into account in the conceptual model,

¹² In addition to this conceptual ambiguity, two fairly recent analyses (Miethe et al. 1991; Steffensmeier et al. 1989) revealed no significant relationship between female labor force participation and crime when female labor force participation was conceptualized as an independent variable of "exposure to" or "opportunity for" crime.

may introduce bias. In the first case, these conditions lead to unbiased but inefficient estimates with underestimated standard errors; in the second case, biased and inefficient estimates are the result.

Several econometric estimation models have been created to address these problems (Johnston 1984; Maddala 1977). The fixed-effect or LSDV models assume that the errors include nation-specific and time-specific components as well as random-error terms. These models can be estimated with a set of nation-and-time dummy variables that allow the intercepts but not the slopes to vary (Judge et al. 1980). Preliminary analyses showed that only nation effects were significant in the sample. Therefore we created a fixed-effect model that included 28 nation dummy variables to adjust the intercept to control for nation-specific effects.

Because the offense rates within each nation formed a time series, we attempted to investigate and, if necessary, to correct for autocorrelation. We estimated the model as a time series, once for each nation. Under the assumption of a first-order autoregressive process, the autoregressive parameter was estimated for each nation over the 20-year span. To correct for the possible presence of a first-order autoregressive process, we reestimated the pooled model by the feasible generalized least squares method. The resulting estimates and their estimated standard errors were virtually identical to those of OLS estimates. Relying on the parsimony principle,

is Random coefficients are an alternative regression model suitable for analyzing pooled cross-sectional time-series data on property crime. Random coefficient models can be specified not only to permit the estimated intercept parameter to vary cross-sectionally and over time, but also to allow all the estimated slope coefficients to vary in similar fashion. This type of model will be more powerful if estimated successfully.

Unfortunately a random-coefficients model requires a special set of assumptions which, if not met, will result in biased estimation (Judge et al. 1980) The dummy variable model used here, however, is relevant no matter what assumptions are made about α_i ; and α_{it} . Because we hesitate to specify the relationships a priori, we employ the more conservative but less information-rich fixed-effects model.

In the notation of the fixed-effects dummy-variable model, the relationship between property crime rates, and selected

independent variables.

where

C = theft arrest rate;

$i = 1, 2, \dots, 29$, referring to each of 29 nations;

$t = 1, 2, \dots, 20$, referring to each of 20 years;

$k = 2, 3, \dots, k$, the number of independent variables in the model;

B_{it} is the i th nation's intercept at time t ;

α_i is the difference between i th nation's intercept, B_{it} , and a common factor B_i , which is due to cross-sectional influences such as culture, religion, or criminal justice system efforts;

α_{it} is the difference between the i th nation's intercept, B_{it} and the common factor B_i , which is attributable to a time-series influence such as a global event at a time that may affect theft. An example of such a global event might be the world energy crisis of the mid-1970s.

we used only the OLS estimates; they are reported here.¹⁴ Finally, potential multicollinearity between independent variables of the model (such as ATTRACTIVE AND ACCESSIBLE TARGETS, MOTIVATION, or PROXIMITY) did not materialize¹⁵

Most regression analyses reported in criminology, including routine activities research, estimate a linear relationship between dependent and independent variable¹⁶. Because recent cross-national research has demonstrated that similar relationships are nonlinear (Bennett 1991a; Bennett and Basiotis 1991), and because the independent variable used in this analysis exhibited a wide range of values, investigating only fixed-proportion relationships did not seem justified. Therefore we estimated both linear and quadratic terms in the regression equation.

FINDINGS

Yearly Trends In Theft Arrest Rates

We begin with a time-series descriptive analysis of changes in men's and women's theft arrest rates in developed and less developed nations (which the subsequent time-series regression analysis seeks to explain). The descriptive data are presented in Table 1 and Figure 2. Figure 2 shows that men have the higher theft arrest rate at both levels of development: in 1984 this rate was more than three times that of women in developed nations and about and about nine times that of women in less developed nations. The rate of change over time, however, is higher for women in developed nations: a 175.8 percent increase as opposed to a mere 65.7 percent increase for men, and, in less developed nations, a 60.8 percent increase for women as opposed to a 20.4 percent increase for men. For both men and women in less developed nations, the trend is not

¹⁴ Estimates of the autocorrelation coefficient are unbiased in large samples. Because the analysis of data spanned only 20 time periods for each nation, our estimates could have been biased. As we pointed out in the text, however, the estimated coefficients and their standard errors based on these (possible biased) autocorrelated estimates were virtually identical to estimates that did not weight estimated autocorrelation coefficients. Other research in the area finds a similar lack of autocorrelation effects in their time-series for crimes similar to those employed here (see Bennett 1991b; Cantor and Land 1985).

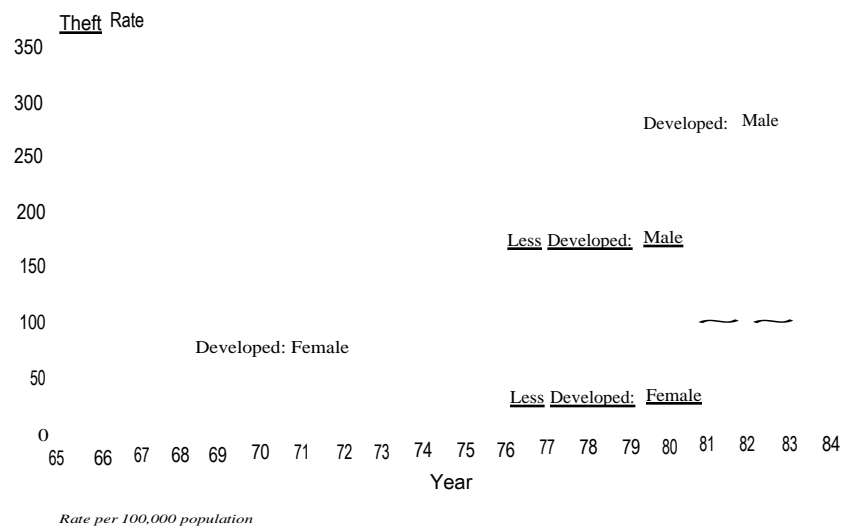
¹⁵ The absence of troublesome collinearity (collinearity being a problem of a small sample) was confirmed by analyses of tolerance for the variables included in the model. The lowest tolerance value observed was 0.412, for MOTIVATION for females' arrest rates in developed nations.

¹⁶ This is not to say that the issue of possible curvilinearity has not been addressed. Cohen and Felson (1979) estimate the equations in one of their analyses, employing a natural log of the relevant variables. We believe, however, that the issue of possible curvilinearity and its effects on the findings should be explored directly, and not merely corrected for in the analyses.

Table 1. Mean Minor Theft Arrest Rates Per 100,000 by Gender and Level of Development

Year	Developed		Less Developed	
	<u>Men's Arrest Rate</u>	<u>Women's Arrest Rate</u>	<u>Men's Arrest Rate</u>	<u>Women's Arrest Rate</u>
1965	181.8	34.7	94.3	7.9
1966	190.2	40.5	96.4	9.3
1967	198.9	40.2	106.8	9.6
1968	212.1	43.8	107.5	9.2
1969	214.7	46.4	101.5	9.1
1970	223.3	53.1	113.0	9.2
1971	221.7	57.1	117.5	9.1
1972	200.5	59.1	123.8	9.9
1973	196.9	61.0	137.4	10.2
1974	202.4	65.2	154.2	10.7
1975	218.7	70.0	172.7	10.1
1976	225.4	70.8	150.7	9.6
1977	231.9	72.3	132.0	10.6
1978	254.6	77.1	114.5	9.7
1979	275.3	80.0	99.7	8.2
1980	295.5	84.7	99.8	8.4
1981	308.7	86.7	94.8	7.4
1982	318.1	92.5	89.0	7.7
1983	318.5	96.0	97.2	7.9
1984	301.3	95.7	113.5	12.7
N	18	18	11	11

Figure 2. Mean Minor Theft Rate, by Gender and Level of Development



increasing linearly, as observed in developed nations. A partial explanation of this change might be found in the effects of the worldwide recession, which damaged the economies of less developed nations more severely than those of the developed world.

Variations by Gender And Development

The findings of the pooled cross-sectional time-series regression analyses are presented in Tables 2 and 3. These analyses investigate the hypotheses that the routine activities approach 1) explains theft arrest rates more accurately developed in less developed nations, 2) explains theft arrests more accurately for men than for women, and 3) fails to explain theft arrest rates of women in less developed nations. Table 2 presents, by level of development and gender, regression coefficients for the independent variables in both linear and quadratic form, descriptive data, t-statistics, and regression coefficients for the dummy variables for each nation. The accompanying significance levels demonstrate the importance of including the dummy nation variables in the model: these findings make it evident that national characteristics not directly included in the model but captured in the dummy variables play a significant role in accounting for arrest rates.

Table 2. Descriptive Statistics and Estimated Regression Coefficients for Fixed Effects: Nonlinear Model Relating Gender-Specific Arrest Rates for Minor Theft to Selected Variables, by Level of Development

Variables	Developed		Less Developed	
Men's Arrest Rates for Minor Theft				
Attractive and accessible targets (GDP per capita)				
Mean	5,646.6		1,168.8	
Range	517.8	15,334.6	64.8	11,804.0
Linear effect	-9.7E-3		6.6E-4	
t-statistic	-1.34		.058	
Nonlinear effect	4.3E-7		-5.8E-7	
t-statistic	.973		-.658	
Proximity (percent urban)				
Mean	72.5		34.7	
Range	25.4	92.6	15.4	64.0
Linear effect	21.3		-2.93	
t-statistic	3.29**		-.604	
Nonlinear effect	-.178		.019	
t-statistic	-3.40***		.331	
Motivation (status inequality)				
Mean	.415		.659	
Range	.227	.693	.384	.924

Table 2 (continued)

Variables	Developed		Less Developed	
Linear effect	-4,884.8		764.3	
t-statistic	-7.89***		1.68	
Nonlinear effect	4,654.8		-738.4	
t-statistic	6.60***		-2.16*	
Guardianship (unemployment rate)				
Mean	1.63		223.4	
Range	.109	7.03	.20	1,232.0
Linear effect	52.19		.029	
t-statistic	3.23**		.238	
Nonlinear effect	-5.25		1.2E-5	
t-statistic	-2.13*		.143	
Intercept'	622.4*		108.4	
Canada	269.7***		—	
England/Wales	360.5***		—	
Netherlands	73.7*		—	
Luxembourg	238.9***		—	
France	158.7***		—	
Portugal	122.9		—	
W. Germany	425.3***		—	
Austria	147.7**		—	
Cyprus	—		-123.7***	
Finland	259.6***		—	
Sweden	91.7**		—	
Norway	46.2		—	
Denmark	15.4***		—	
Ivory Coast	—		-150.0***	
Zambia	—		-21.8	
Libya	—		-51.9	
Israel	428.5***		—	
Hong Kong	203.2***		—	
Korea	—		-69.1*	
Japan	57.0		—	
Myanmar (Burma)	—		-14.1	
Sri Lanka	—		-117.3**	
Malaysia	—		-191.2***	
Philippines	—		-229.3***	
Australia	329.4***		—	
New Zealand	636.8***		—	
Fiji	—		59.5*	

Women's Arrest Rates for Minor Theft

Attractive and accessible targets (GDP per capita)

Mean	5,646.6		1,168.8	
Range	517.8	15,334.6	64.8	11,804.0
Linear effect	4.8E-3		1.2E-3	
t-statistic	2.39		1.00	
Nonlinear effect	-2.8E-7		-1.3E-7	
t-statistic	-2.36		-1.27	

Table 2 (continued)

Variables	Developed	Less Developed
Proximity (percent urban)		
Mean	72.5	34.7
Range	25.4 92.6	15.4 64.0
Linear effect	-6.15	-.414
t-statistic	-3.42***	-.841
Nonlinear effect	.047	7.5E-3
t-statistic	3.25**	1.28
Motivation (status inequality)		
Mean	.415	.659
Range	.227 .693	.384 .924
Linear effect	-1,293.4	151.1
t-statistic	-7.54***	3.28***
Nonlinear effect	1,216.7	-100.0
t-statistic	6.23***	-2.89***
Guardianship (unemployment rate)		
Mean	1.63	223.4
Range	.109 7.03	.20 1,232.0
Linear effect	6.37	.032
t-statistic	1.42	2.64**
Nonlinear effect	-.509	-1.6E-5
t-statistic	-.747	-1.93
Intercept\$	547.0***	-21.2
Canada	64.0	—
England/Wales	21.4	—
Netherlands	-23.8**	—
Luxembourg	13.5	—
France	11.9	—
Portugal	-81.7***	—
W. Germany	111.1***	—
Austria	15.3	—
Cyprus	—	-20.4***
Finland	-14.9	—
Sweden	-43.9***	—
Norway	-49.0***	—
Denmark	-67.7***	—
Ivory Coast	—	-28.6***
Zambia	—	-27.3***
Libya	—	-29.9***
Israel	-15.5	—
Hong Kong	-49.1**	—
Korea	—	-24.7***
Japan	-7.5	—
Myanmar (Burma)	—	-17.3***
Sri Lanka	—	-31.9***
Malaysia	—	-30.6***
Philippines	—	-41.0***
Australia	33.7**	—
New Zealand	148.8***	—
Fiji	—	-17.8***

Table 2 (continued)

DEPENDENT VARIABLES

Men's Arrest Rates for Minor Theft

Developed

Mean = 239.5
 Range = 24.12 - 935.75
 N = 360

Less Developed

Mean = 117.2
 Range = 14.6 - 552.0
 N = 220

Women's Arrest Rates for Minor Theft

Developed

Mean = 66.35
 Range = 1.25 - 323.1
 N = 360

Less Developed

Mean = 9.3
 Range = .44 - 68.3
 N = 220

STATISTICS OF FIT

Men's Arrest Rates for Minor Theft

Developed

$R^2 = .805$
 F-statistic = 57.2
 P < .0001

Less Developed

$R^2 = .706$
 F-statistic = 28.2
 p < .0001

Women's Arrest Rates for Minor Theft

Developed

$R^2_{adj} = .869$
 F-statistic = 91.6
 P < .0001

Less Developed

$R^2 = .832$
 F-statistic = 57.1
 p < .0001

'Intercept includes United States for developed nations and Jamaica for less developed nations.

*p<.05; **=p<.01; ***=p<.001.

The data presented in Table 2 show that the relationship between theft and the indicators of the routine activities approach is complex and does not always conform to prediction. The variables contained in the models are associated with theft arrest rates across gender and development that differ in sign and significance. For men in developed nations, three of the four indicators are significant; only two are significant for women. In addition, for one of the two significant predictors common to both genders (PROXIMITY), the direction of the relationship is different. In less developed nations, the findings suggest that the routine activities model is not very useful in explaining outcomes: none of the predictors are significant for men's arrests for minor theft. Only one indicator (MOTIVATION) is significant in both linear and quadratic effects for women in less developed nations. GUARDIANSHIP evidences a linear effect for women in less developed nations, and is the only variable to show a linear effect. The effect is not in the hypothesized direction, however: as guardianship increases, theft increases.

In short, it appears that routine activities variables account for men's and women's minor theft arrest rates in developed nations

but do not account adequately for women's rates and especially men's rates in less developed nations. In general, then, the routine activities approach 1) explains minor theft arrest rates more accurately in developed than in less developed nations, (but not always in the direction predicted by the approach); 2) explains men's arrests for minor theft more accurately than women's arrests; and 3) explains men's rates least accurately in less developed nations, counter to our prediction.

Table 3 presents the incremental effects, the threshold points, and the elasticity concerning the effects of the variables.¹⁷ These relationships are intricate and not in concert with our predictions of the routine activities approach. For instance, the findings concerning our PROXIMITY indicator in developed nations are complex and differ by gender. For men, the incremental effect is negative until the threshold point below the mean (72.5) is reached; then the effect changes sign and becomes positive, thus supporting the routine activities approach. Therefore the predictions of the routine activities model apply only in nations exhibiting levels of PROXIMITY above the mean. In other words, it appears that the routine activities principle concerning PROXIMITY is supported in urban nations (i.e., nations that contain urban populations greater than the mean) but not in nonurban nations. The reverse is true for women: for values slightly below the mean, PROXIMITY shows the predicted effect, but the effect becomes negative as the value crosses the threshold point of 65.4. PROXIMITY for men evidences an elasticity of 13.7 and is the second strongest effect in the men's model, whereas for women it evidences the smallest effect ($E = 7.3$). This reversing of effect by gender calls for further analyses and explanation.

In less developed nations, PROXIMITY plays no role in explaining the variation in theft arrest rates for either men or women. The findings do not support our prediction about development: that PROXIMITY would explain theft arrest rates more accurately for less developed than for developed nations.

Our indicator of MOTIVATION generates the greatest effect for women in developed nations, with an elasticity of 18.0. The indicator also yields the highest elasticity for men (17.7). Although the incremental effects are negative for both men and women and thus run counter to prediction, they evidence a positive relationship for values above the mean (.415). Thus, for MOTIVATION levels below the mean, the effect is negative on arrests for theft; in the higher

¹⁷ Table 3 displays only those variables in which both the linear and the quadratic effect attained significance. GUARDIANSHIP for females in less developed nations is included even though it did not show significance for both effects.

Table 3. Estimated Incremental Effects, Threshold Effects, and Point Elasticities of Selected Variables on Gender-Specific Arrest Rates for Minor Theft, by Level of Development

Independent Variable	Mean	Range	Incremental Effect ^a	Threshold Point ^b	E ^c
	Low	High			
Developed Nations					
Attractive and accessible targets (GDP per capita)					
Men's rates			NS	—	—
Women's rates	5,646.6	517.8 - 15,334.6	NS	—	—
Proximity (percent urban)					
Men's rates			-4.51	(-)59.8(+)	-13.7
Women's rates	72.5	25.4-92.6	.665	(+)65.4(-)	7.3
Motivation (status inequality)					
Men's rates			-1,021.3	(-).525(+)	-17.7
Women's rates	.415	.227-693	-286.9	(-).533 (+)	-18.0
Guardianship (unemployment rate)					
Men's rates			35.08	(+)4.97(-)	2.4
Women's rates	1.63	.109-7.03	NS	—	—
Less Developed Nations					
Attractive and accessible targets (GDP per capita)					
Men's rates			NS	—	—
Women's rates	1,168.8	64.8 - 11,804.0	NS	—	—
Proximity (percent urban)					
Men's rates			NS	—	—
Women's rates	34.7	15.4-64.0	NS	—	—
Motivation (status inequality)					
Men's rates			NS	—	—
Women's rates	.659	.384-.924	19.3	W.775(-)	13.7
Guardianship (unemployment rate)					
Men's rates			NS	—	—
Women's rates	284.5	.20 - 1,232.0	Linear only		

^a Based on the formula $MinTHR = \frac{-(b_k + 2 \times C_k \times X_{i,k})}{2 \times C_k}$, where b_k is the estimated coefficient for the linear term and C_k is the estimated coefficient for the quadratic term. b (+) or (-) on either side of the threshold point indicates direction of change of incremental effect of X on MINOR THEFT ARREST RATES as X crosses the threshold point while increasing.

^c Estimated point elasticity at the mean (10 percent), where: incremental effect $\times (X_i / \mu_i)$

ranges of the indicator, however, the effects are positive and strong. Unlike the PROXIMITY indicator, the MOTIVATION indicator reveals a similar relationship with men's and women's theft arrest rates in developed nations. MOTIVATION is the only indicator that reaches significance for women in less-developed nations. The incremental effect is positive until it reaches the threshold point

above the mean of .659; at that point it takes on a negative value. This finding is in contrast to Steffensmeier et al.'s (1989) finding of no significant relationship between educational attainment and females' arrest rates.

Finally, our GUARDIANSHIP indicator yields a significant relationship with theft arrests for men, but not for women, in developed nations. For men in developed nations, the effect is small although statistically significant. In fact, it has the smallest effect on theft arrests ($E = 2.4$). For low values, the effect is positive; for high values, when it passes the threshold point (4.97, close to the top of the range), it becomes negative and conforms to prediction. These findings suggest that GUARDIANSHIP requires a practical threshold before it affects arrest rates. That is, only those nations with high unemployment rates show the predicted effect on theft arrests.

Contrary to our predictions about the effect of development on GUARDIANSHIP (that the greatest effect would be evidenced in less developed nations), our indicator evidences no relationship between men's theft arrest rates and shows only a linear effect for women ($b = .032$, $t = 2.64$). This contradiction might be explained in part by cultural aspects of family life in less developed nations, which might cause unemployment to increase minor crime and arrest rates. Unemployment hits families especially hard in less developed nations. Because women in such nations are primarily responsible for the family, they might engage increasingly in minor theft to provide for their households (Danner 1993).

In summary, the routine activities approach yields complex and contradictory findings by gender and development. First, as predicted, the approach provides a more powerful explanation in developed than in less developed nations; that is, more of the indicators of the approach were found to be significant for developed nations. Yet we predicted that ATTRACTIVE AND ACCESSIBLE TARGETS would operate more strongly in developed nations, but we found no effect. Second, in developed nations, our indicators account more accurately for men's theft arrest rates than for women's. This finding calls into question the structural choice assumptions of the approach, which predict a similar causal structure for men and for women. Third, we did not find that the indicators of PROXIMITY and MOTIVATION affected arrest rates more strongly in less developed than in developed nations.

We observed an anomaly concerning the effect of GUARDIANSHIP. We predicted that it would have a greater effect in less developed than in developed nations, but we found it significant only

for women's arrest rates. Also, the direction of this one relationship does not conform to our predictions.

Finally, the findings suggest that no strong interaction exists between development and gender. These findings suggest that the routine activities approach needs better specification in regard to scope and that the scope conditions of gender and development should be incorporated into future theoretical models.

SUMMARY AND DISCUSSION

The purpose of this research was to expand the knowledge of the explanatory power of a very popular approach to explaining crime. On the basis of observed variances in arrest rates for theft across gender and levels of development, we sought to determine whether the routine activities approach could help explain these differences.

Our analyses revealed that gender, development, and their interaction affect the predictive power of this approach. It explains theft arrest rates more accurately in developed nations, especially for men. The approach provides some explanation for arrest rates of women in developed nations, but the variables do not always act in the predicted fashion; nor do they collectively explain the variation in women's theft arrest rates as accurately as in the men's model. Specifically, for developed nations, the routine activities approach explains men's rates best, but not always as predicted or as simply as predicted by the literature.

First, the relationship predicted by the approach holds only for certain values of the indicators. For MOTIVATION, for example, the predictions hold only for very high values of the variable. Second, although Lynch (1987) predicted that the proximity of the pool of motivated offenders would explain the greatest amount of variation, neither he nor others account for the spread of the variation between the findings for men and for women, or the differences in the direction of their statistical relationships. Finally, we observed a slight interaction effect of gender and development, but the findings do not conform to our original prediction. In less developed nations the approach does a very poor job of explaining women's theft arrest rates and fails completely to explain men's theft arrest rates. In summary, the causal structures of men's and women's theft arrest rates differ by levels of national development.¹⁸

¹⁸ A word of warning is in order. Steffensmeier et al. (1989) suggest that cross-national changes in the formalization of social control (e.g., police activity) may maximize females' offense rates in developed nations and minimize them in less developed nations regardless of any real behavioral change. Furthermore, these authors

The routine activities approach provides important insights into variations in crime rates and into policy initiatives appropriate for curtailing them. Our finding that the perspective works best in explaining men's theft arrest rates in developed nations is significant for a world that is witnessing the development of a global economy. Research has shown that market transformations and economic growth not only influence crime rates but also alter men's and women's lives. As market transformation and changes in gender role definitions and behaviors take place in less developed nations, making them more like developed nations, this approach will be increasingly valuable in explaining why minor theft occurs.

The routine activities approach and its supporters, however, should not wait until the world becomes more highly developed; they should help policy makers by investigating the limits of the approach across cultures, across formal and informal economic systems, and across subpopulations and minority groups. At the same time, such theorizing and model building would help to move this useful approach from the status of a perspective to that of a mid-range theory.

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argue that the routine activities approach may not be a viable explanation of females' offense rates in less developed nations because of prevailing social norms regarding females' lives. We believe, however, that we have controlled for this threat to the validity of the findings by employing nation dummy variables. This procedure should control for differences in social norms and social control activity within nations across these analyses. For clarification of the effect of nation dummy variables, see note 9.

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