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Claudio C. Beato F.

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# DETERMINING FACTORS OF CRIMINALITY IN MINAS GERAIS\*

**Claudio C. Beato F.**

## **Introduction**

The study of spatial distribution of crime has a long tradition in the social sciences, in which Quetelet and Durkheim occupy a conspicuous position. Influential work carried out by Shaw and McKey (1942) showed that there was a gradient in the figures for delinquency, with high numbers in the city centers, that declined in the suburbs. Other authors analyzed, using concepts such as that of “defensive space”, immediate physical and environmental circumstances related to the incidence of criminal misdemeanors (Newman, 1972). More recently, the “geography of crime” has been discussed with increased importance (Brantingham and Brantingham, 1981) while defining police strategies and fighting crime (Evans, 1995; Murray, 1995; Eck, 1997). There are important studies that relate crime rates to socioeconomic structures of nation-states (Messner, 1980), regions (Loftin and Hill, 1974) and metropolitan areas (Blau and Blau, 1982).

In this article, I would like to stress the implications that studies dealing with spatial distribution of crimes have on the sociology of crime.

(a) The drawing up of criminality maps dislocates analyses from criminals to the misdemeanor itself.<sup>1</sup> From a theoretical point of view, this means analyzing the decision-making processes made by criminals in terms of the choice of location and nature of the target made for certain types of crime. Spatial analyses are particularly appropriate when demonstrating the rational elements of criminal activity, as well as serving to countersign models dealing with the theory of crime opportunities (Cohen and Felson, 1979; Wilson and Herrenstein, 1985; Tedeschi and Felson, 1994; Glaeser *et al.*, 1996).

(b) In second place, a very important implication in terms of methodology arises from the fact that spatial analyses don't deal with “crime” in general terms, but deal with the conditions of the incidence of specific types of crime. When we talk about “crime”, we are talking about very distinct phenomena: “steal a comic book, whack a colleague, cheat on income tax, murder a wife, rob a bank, corrupt politicians, hijack planes — these and countless other acts are crimes” (Wilson and

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Herrenstein, 1985, p. 21). The importance of this change of focus is to show how some crimes reveal those decision-making processes whose orientation is strictly instrumental. This doesn't mean that some crimes are qualified as being more "rational" and utilitarian than others; on the contrary, it provides an invitation for us to use what is widely termed the "charity principle" (Golguer, 1995; Davidson, 1974) with a view to evaluating the rational component of crimes which are apparently *non-sensical* (Katz, 1988).

(c) This strategy is very similar to the logic of organizations that deal with the "problem of crime", especially the police. The battle against crime as carried out by police organizations can quite easily ignore a diagnostic of the "causes" of a crime and seek orientation from the idea that crimes do not take place just by chance in time and space. A proactive orientation must detect spatial and temporal patterns in specific types of offense in order to anticipate the occurrence of such events (Rich, 1997).

(d) Finally, the implementation of public crime prevention policies is reliant upon the identification of communities and locations that will be the object of aid and prevention activities (Sherman, 1997). Literature on public policies to fight crime has emphasized with growing frequency the search for "local" and decentralized solutions, which points directly to the identification of problems in the specific contexts in which they occurred.

## Data and methodology

An initial discussion surrounding the sociology of space *stricto sensu* discusses the level of aggregation necessary for this type of analysis (Parker, 1989; Patterson, 1991). Some authors treat ecological studies based on a strict sense of location: "on a stable physical setting that can be seen completely and simultaneously, at least on the surface, by the naked eye" (Sherman *et al.*, 1989, p. 31). In this article I would like to explore some of the implications of spatial studies on the crime rate indices for the State of Minas Gerais based on the characteristics of its municipalities (756 in 1991),

and based on the supposition that many of these implications can be verified in this unit of analysis. The current study is based on violent crime data for 1991 in all of the State's 756 municipalities and their socioeconomic correlates.<sup>2</sup>

*Dependent variables.* The variables that will be explained are the violent crime indices (homicide, attempted homicide, rape, robbery and armed robbery) per one hundred thousand inhabitants. These indices were corrected using Bayes' empirical estimates. The decision to correct the indices is based on the fact that we chose for our research units small geographical regions, many with small risk populations, which would create unstable roughly estimated rates. Let us suppose that a homicide took place in a municipality with a thousand inhabitants; the rate for that community would be 100. But if for some absolutely fortuitous reason there were two homicides, we would have a Colombian rate of 200 per hundred thousand inhabitants. In statistical terms, this rate would be incomparable with the others due to its variance. Empirically, the discrepancy in rates collected in small municipalities may be the result of random fluctuations.<sup>3</sup>

*Independent variables.* Independent variables used here include the collection of ICMS tax by sectors active in each municipality of Minas Gerais, the GDP per municipal inhabitant,<sup>4</sup> the size of the population and the population density per municipality, the level of urbanization, the coefficient of Gini, the Index of Human Development,<sup>5</sup> the percentage of house with proper sewage system and the percentage of families that earn less than one minimum wage.<sup>6</sup>

## Classical hypothesis for the distribution of crime rates

Sociologists are sufficiently familiar with two contrasting theories for the causes of criminality. One of them tells us that criminality and violence are phenomena that originate essentially in factors of an economic nature; scarcity of opportunities, social inequality and marginalization would be decisive stimulants for criminal behavior (Parker and Smith, 1979; Taylor *et al.*, 1980). The other

theory credits the delinquent and criminal acts with representing an aggression to a society's normative and moral consensus; a low level of moral integration produces the crime phenomenon. Consequently, the punishment of a crime is an imperious necessity required for the reestablishment of values central to the normative nucleus (Durkheim, 1978; Sherman and Berk, 1984; Clarke, 1983; Kraut, 1976).

Various quantitative studies (Bayley, 1984; Blau and Blau, 1982; Land *et al.*, 1990; Schuerman and Kobrin, 1986) have tried to explain the variation in violent crime levels for different cities, metropolitan areas or states. To do this, sociologists and criminologists have applied a wide gamut of statistical techniques, drawing on a diverse range of social, demographic and economic variables. Results from these studies have shown that some factors are invariably associated with high crimes levels, while other factors reveal more volatile behavior, which are sometimes statistically significant, and other times not.

In the United States, the following factors are systematically related to crime, in order of decreasing importance (Land *et al.*, 1990): levels of economic inequality (areas with higher inequality present higher crime rates); levels of population structure, encompassing the total population and the population density (larger areas/denser areas have higher crime rates); unemployment rates (surprisingly, producing a negative effect, which has been explained by the theory of criminal opportunity by Cohen and Felson (1979) and by Cook (1986), among others). After taking these factors into consideration, other variables traditionally associated with violent crime, such as age (young people commit more crimes), turn out to be statistically insignificant.

And so, one of the classical hypothesis put forward by these theoretical approaches for the explanation of violent crime rates would be the inequality of socioeconomic conditions of the localities, regions or municipalities. Crime would be the result of two distinct, albeit correlated, mechanisms: relative deprivation (Blau and Blau, 1982; Merton, 1968) and absolute deprivation (Messner, 1980). An approach centered on rela-

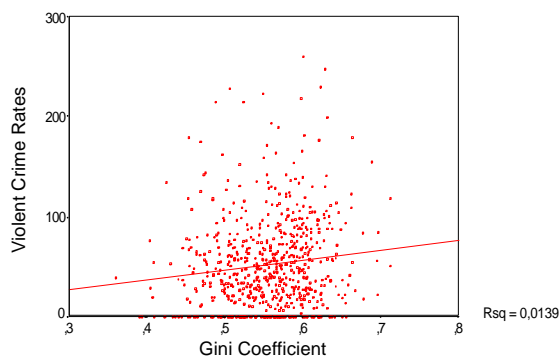
tive deprivation suggests that the mechanism responsible for the larger or smaller criminal rate arises from the individual's perception of economic position relative to society's ideals of success. In this case violence would be the result of a process of frustration generated by individuals deprived, in relative terms, of the realization of legitimate social objectives. The second approach has its roots in classical sociological literature that treats absolute poverty as the source of violence (Engels, 1976). The few options available to those subjected to a state of penury in dealing with difficult economic situations, on the one hand, and the difficulty in dealing with difficult emotional situations, on the other hand, leads to an escalation of violent acts. Some studies suggest the importance of factors like unemployment of the head of the family, and marital instability, in causing non-lethal domestic violence (Straus, 1980, *apud* Parker, 1989).

In reality, these approaches boast a series of elements of continuity, insofar as the structural reality of poverty, relative or absolute, allows for the subculture of violence to flourish (Wolfgang and Ferracuti, 1967). The elements of this subculture of violence would generate violence indirectly through poverty (Parker, 1989). In any case, there remains a strong conviction in many of these studies that there is a tight, though not necessarily causal, interaction between violent criminality and socioeconomic conditions. Hence why many evaluations of successful programs to fight crime enjoy some of their best results in social interventions (Greenwood *et al.*, 1996; Sherman, 1997).

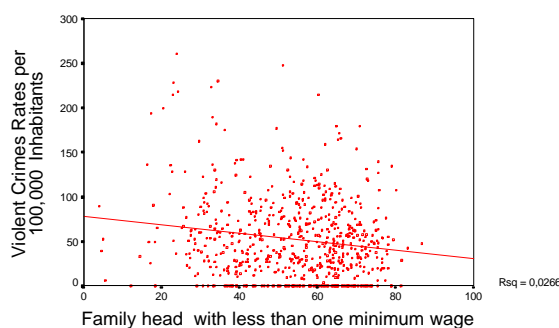
Moreover, when analyzed in light of figures available for the State of Minas Gerais, these hypotheses do not find empirical proof. If we correlate violent crime rates with the Gini coefficient, which is an indicator of relative poverty, and with the percentage of families that live with less than one minimum salary, which is an indicator of absolute poverty, we will obtain the following results, shown in Figures 1 and 2.

As we can see, the variance explained by the hypothesis of relative deprivation and the hypothesis of absolute poverty is of a little more than 1% ( $R^2 = .0139$  and  $.0266$ , respectively). Lit-

tle, almost no variation in the violent crime rates seems to be associated with the measure of inequality adopted.



**Figure 1**  
**Relationship Between**  
**Violent Crime Rates and Gini Coefficient**



**Figure 2**  
**Relationship Between Violent Crime Rates and**  
**Family Head with Less Than One Minimum Wage**

An explanation for this discrepancy in relation to some existent studies can be attributed to the presence of important intervening variables in the US context that are absent in the Brazilian context, especially when it comes to race. In the US case, poverty, violence and subculture are often associated, by means of interaction, with a race variable, especially in the southern states (Blau and Blau, 1982; Huff-Corzine *et al.*, 1991).

As I suggested at the start of this article, I would like to analyze some of the implications of a spatial approach to understanding criminal acts. Two of these are of particular interest to the approach: (a) the criminals' change of focus to

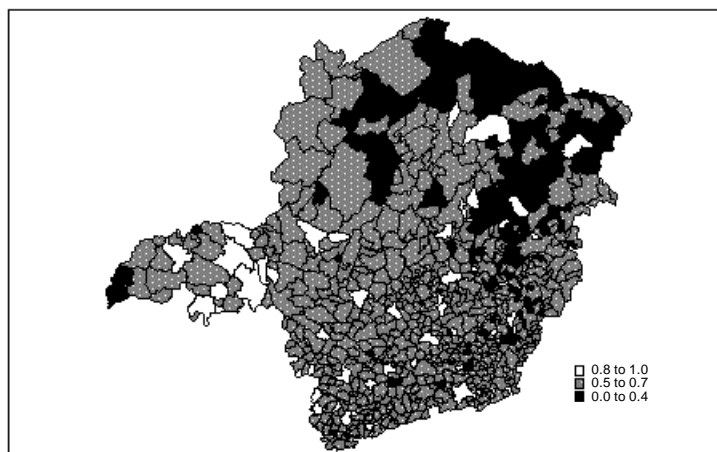
spatial correlates of misdemeanors and (b) a separate treatment of the variables that lead to violent crime. This approach will allow us to deal with the municipalities in terms of their structural characteristics in relation to specific types of crimes. What are the structural characteristics of the municipalities — such as population size and density, the structure of goods and services, the level of development — that supply a favorable context for the occurrence of different types of crime?

### **Patterns of criminality in Minas Gerais**

Levels of social and regional inequality in Minas Gerais still persist at very high levels. In truth, this inequality expresses the state's heterogeneity. Although there exists a mythology about Minas Gerais cultural unity and identity, the truth is that cultural, economical and social disparity between regions is very noticeable. If we take the Index of Human Development (IHD) developed by the UN as our measure we can see that there are regions of Minas with very clear frontiers. The levels of prosperity and human development in the Central regions and the Minas Gerais Triangle (*Triângulo Mineiro*) counter the quasi-African statistics available for the Vale do Jequitinhonha, Mucuri or the Northern Region. Levels of inequality are greater the poorer the region. Most of the population of Northern Minas Gerais, Jequitinhonha, Mucuri, Rio Doce, Vertente do Caparaó and Vale do Piranga, which amounts to half of the State of Minas, is still under the poverty level.

Municipalities such as Uberlândia, Belo Horizonte, Varginha, Itajubá, Juiz de Fora, Pouso Alegre, Poços de Caldas, Guaxupé and Alfenas, among others, stand out for their high levels of health and education. But even in these apparent islands of prosperity there are still strong inequalities.

If inequality and poverty levels are still very high, other social indicators have improved. A comparison between development maps from the 70s and from 1991 shows that there has been a progressive move towards improved positions. The Central Region and the Minas Gerais Triangle (*Triângulo Mineiro*) only reached a high level of human develop-



**Map 1**  
**Spatial Distribution of the**  
**Index of Human Development (IHD) in Minas Gerais**

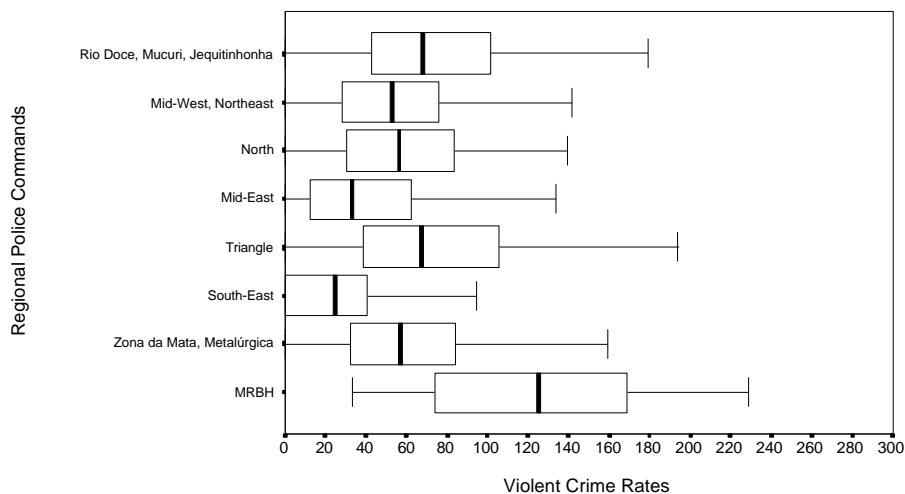
ment in the 80's. The IHD in the intermediary zones of development increased in the 70s and 80s. There are still patches of poverty in the Northern Region and in the Vale do Jequitinhonha.

Minas Gerais's regional diversity seems to reflect the level of development inflicted by neighboring states. Southern Minas and the Minas Triangle suffer the influence of São Paulo; the North and Jequitinhonha, the influence of Bahia, and Mucuri and Rio Doce combined influences of Bahia and Espírito Santo. This is another way for us to think

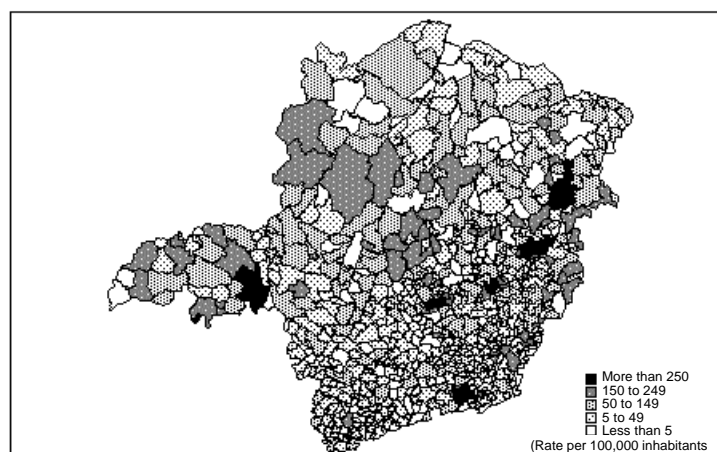
about the question of Minas Gerais identity: using the regional heterogeneity of the socioeconomic base of each region as a point of departure.

When we consider average statistics for violent criminality around the large units adopted by the Military Police — Regional Police Commands (*Comandos Regionais de Policiamento* — CRP) — we obtain the results seen in Figure 3.

As we have seen, the largest concentrations of violent crime are found in the Metropolitan Region of Belo Horizonte (MRBH), followed by the Minas Tri-



**Figure 3**  
**Distribution of the Violent Crime Rates**  
**by Regional Police Commands**



**Map 2**  
**Spatial Distribution of**  
**Violent Crime in Minas Gerais — 1991**

angle and the region that takes in Vale do Rio Doce, Mucuri and Vale do Jequitinhonha. The region with the largest level of variability is MRBH, which includes metropolitan areas like Belo Horizonte, Contagem and Betim, that are densely populated and have diverse economic structures, alongside municipalities and suburbs with low levels of urbanization and simple productive bases. Other regions have very homogenous levels of distribution, although quite distinct in their relative positions. This homogeneity is owed, in part, to the level of aggregation of the Regional Police Commands, that can aggregate areas with over one hundred municipalities. This is the case of CRP South-East with its 172 municipalities, CRP Mid-West with its 133 municipalities, and CRP North with 106 municipalities.

As we have seen in Map 2, the darker areas correspond to the municipalities with the highest violent crime rates. If the development and population maps are superimposed on the criminality maps, we can see that there are important intersections, which we will discuss below.

### Population and criminality

Criminal offences are phenomena that are highly spatially and temporally concentrated. As Table 1 shows, ten cities in the State of Minas Gerais account for 50% of violent crimes.

**Table 1**

<b>Cities with the Highest Levels of Violent Crimes</b>	
Belo Horizonte	5.282
Contagem	1.030
Juiz de Fora	1.009
Uberlândia	721
Governador Valadares	532
Uberaba	463
Betim	383
Teófilo Otoni	350
Sete Lagoas	263
Ribeirão das Neves	254
Total violent crimes in major cities	10.287
<i>Total violent crimes in MG</i>	<i>18.018</i>

Of the ten cities with the largest number of crimes, four are part of MRBH (Belo Horizonte, Contagem, Betim and Ribeirão das Neves), two belong to the Minas Triangle, and the others are important urban centers in their regions. What is the reason for this concentration? In their influential article, Cohen and Felson (1979) finished with a proposition that is disconcerting to traditional criminology:

It's ironic that those very same factors that provide us with the opportunities to make the most of the benefits of life can also provide opportunities for predatory violations [...] In-

stead of taking predatorial crime as an indicator of social collapse, we can conceive of it as being a direct product of our liberty and prosperity, as manifest in the routine activities of our day-to-day. (Cohen and Felson, 1979, pp. 604-605)

Contrary to what is produced in piles of intellectual papers and systematic research, the correlation that must be established to explain crime must not focus on poverty, but on wealth. This is so because prosperity ends up providing an increment to the opportunities for criminal action, insofar as it proffers viable and worthwhile targets, as well as complicating traditional mechanisms of social control and vigilance.

Of course the authors were not referring to delinquents, found in abundance in the less privileged ranks of society, but to misdemeanors. What are the socioeconomic conditions that favor the occurrence of certain types of misdemeanor? The supposition behind this type of approach is that decisions for the selection of targets are rational, because they involve the weighing up of costs and benefits associated with the viability of carrying out certain types of criminal act in specific conditions. Although aggressors do not possess full command of the information necessary for such contemplation, they deliberate rationally in accordance with a pre-defined spatial and temporal context, involving people and objects:

Unlike many criminal investigations, we didn't examine why individuals or groups are inclined towards criminal activity, but, on the contrary, we treated this inclination as a given and examined the ways in which a spatial-temporal organization of social activities leads people to turn their criminal leanings into acts. Criminal violations are treated here as routines that share many attributes and are interdependent on other routine activities. (Cohen and Felson, 1979, p. 589)

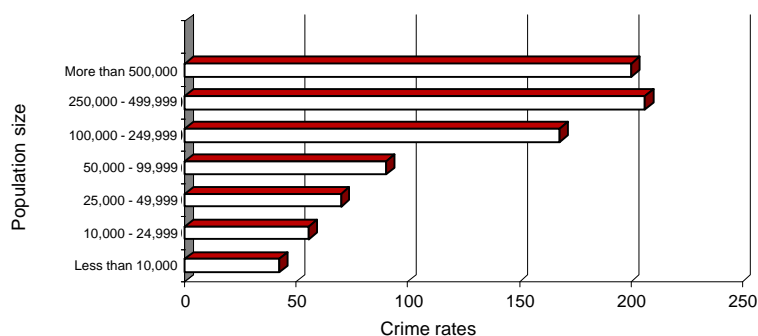
One of the important consequences of the exploration of this model is that each one of these factors should be observed from the point

of view of distinct indicators in accordance with socioeconomic context. In theoretical terms, this means that in specific cases, the socioeconomic constraints of criminal activity will be more central to the definition of the type of delinquent activity than to opportunity costs resulting from resources controlled by perpetrators of these misdemeanors. In other words, to the degree of development in a region, municipality or location there will be a corresponding schedule of misdemeanors in keeping with references of a cultural order that in turn delineate preferential structures for the orientation of criminal activities. This will allow for the hypothesis that the state's underdeveloped regions have high homicide rates because of specific preferences towards values such as traditional codes of honor and emphasis on violent resolution of conflicts between members of a same group, as well as the small likelihood of punishment.

### **Urban structure providing a context for criminal activity**

As is shown in Figure 4, the phenomenon of violent urban crime in Minas Gerais, with the exception of homicide, takes place predominantly in medium and large scale cities. This result is consistent with the observation made by Blau and Blau (1982) for the USA and it confirms the model that misdemeanors are dependent on opportunities for social contact (Glaeser, 1996).

If we look at the different types of misdemeanor that are categorized as violent crime, we will see that their concentration in medium and large scale cities corresponds to distinct patterns of distribution (Table 2). Homicide rates per one hundred thousand inhabitants are equally distributed throughout all types of city, with the exception of the ones that have less than ten thousand inhabitants.<sup>7</sup> Rape and grievous bodily harm are more common in larger cities, but the misdemeanors most often associated with city size are robbery and armed robbery. According to Wilson and Herrenstein (1985), this occurs because urban and better developed regions provide favorable contexts for certain types of misdemeanor.



**Figure 4**  
**Violent Crime Rates per 100,000 inhabitants**

Urban life changes levels of human interaction due to the distances that separate (and possibly protect) people, and it increases criminal opportunities in a given area (if people rob banks it's because that is where the money is; therefore, cities have more bank robberies because there are more banks), as well as changing relations between people due to the spatial organization of streets, buildings and windows. (Wilson and Herrenstein, 1985, p. 306)

Opportunities to commit crimes offered by urban settings in turn increase criminal activities. According to the theorem presented by Cohen *et al.* (1980), the increase in criminal activity corresponds to the decrease in security by primary groups.

If other conditions are maintained, a decrease in population density for areas in which routine primary group activities are carried out (that is,

routines oriented by roles) produces an increase in criminal opportunity and, therefore, an increase in frequency rates of criminal violations of property. (Cohen *et al.*, 1980, p. 99)

Another aspect worth highlighting is the difference between homicide rates and crimes against property. As we have already seen, homicide rates are distributed equally among different size cities, which indicates that population size does not influence rates for this type of violent crime. The explanation for this is that homicides do not depend on the selection of viable targets, seeing as they involve, in most cases, situations between acquaintances, or casual and alcohol-fueled discussions; only a small number of homicides have instrumental motivations. Robbery and armed robbery, on the other hand, require anonymity and availability of targets that only certain sizes of city can guarantee (Wilson and Herrenstein, 1985).

**Table 2**  
**Types of Crimes by City Population Size**

City Population Size	Types of crimes (rate per 100,000 inhabitants)				
	Homicide	Attempted Homicide	Rape	Robbery	Armed Robbery
More than 500.000	11,43	65,79	10,74	6,68	102,76
250.000 - 499.999	9,64	50,53	8,26	65,46	69,25
100.000 - 249.999	12,92	58,48	9,78	39,35	44,65
50.000 - 99.999	10,01	32,54	4,48	21,84	20,05
25.000 - 49.999	11,02	32,84	3,38	12,89	8,18
10.000 - 24.999	12,63	28,55	3,66	5,86	4,24
Less than 10.000	8,50	22,81	4,23	3,79	2,31

### Development and criminality

Another possible analysis for the distribution of crimes can be made not in terms of city size, but in terms of a city's level of development. Using the UN's Index of Human Development, I obtained results that indicate that the level of municipal development is positively associated with certain types of crime, such as robbery and armed robbery, as we have seen in Figures 5 and 6.

Municipalities with higher levels of development have higher crime rates against property. The obvious explanation for this is that these misdemeanors require opportunities of a material nature in order to take place. As many authors have already stated, the increase in criminality is the downside of development, due to increased opportunities it offers for crime (Cohen and Felson, 1979; Wilson and Herrenstein, 1985). More highly developed cities are inhabited by anonymous people, and nuclear families, which reduce traditional forms of social control.

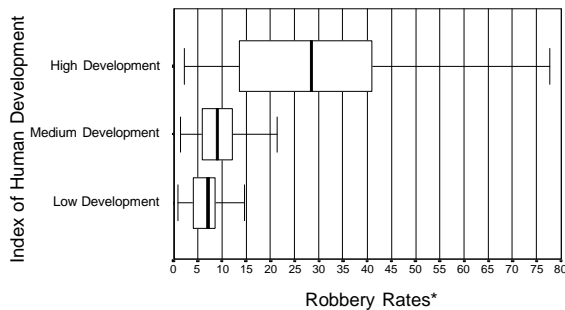
The anonymity of urban life also results in being surrounded by strangers, instead of, as used to happen in traditional rural societies, by familiar faces anxious and willing to impose good manners. If the city is the school of crimes, as some say, the countryside may be the opposite, a school against crime. (Wilson and Herrenstein, 1985, p. 445)

The same cannot be said of homicides, which occur with greater incidence in lesser developed municipalities, as shown in Figure 7. A partial response to this appears in classic criminality theory and refers to the fact that bloody crimes are characteristic of traditional societies, in virtue of prevailing ties of solidarity, in which such values as honor are central, and violent resolution of conflicts is frequent.

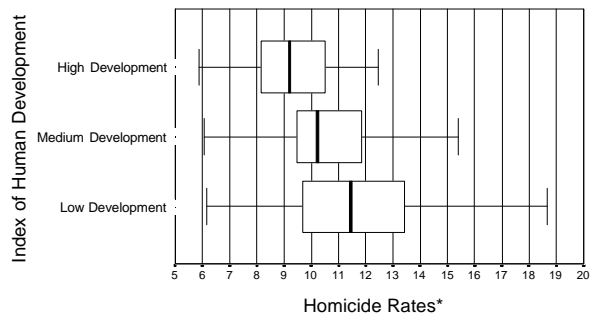
The second problem is methodological, though it has theoretical implications that refer to the motivational component of criminal action. When we accept official definitions of homicidal occurrences, we are induced to believe the false idea that they all have the same structurally defined motivation (Katz, 1988). Meanwhile, some analyses have insisted upon the diverse motivations for crimes like homicide, which could be defined in terms of the relationship between aggressor and victim (Parker and Smith, 1979; Smith and Parker, 1980; Parker, 1989). Four types of homicide were classified from this perspective: (a) second-degree murder resulting from robbery; (b) second-degree murder resulting from other crimes; (c) first-degree murder of non-intimate people such as friends and; (d) first-degree murder of intimate people such as family members. Only first-degree murder, that is, the murder of someone with whom previous relations exist, is related to



**Figure 5**  
**Armed Robbery by Levels of Index Human Development**



**Figure 6**  
**Robbery by Levels of Index Human Development**



**Figure 7**  
**Homicide by Levels of Index Human Development**

\* Rates per 100,000 inhabitants corrected by Bayes' global empirical estimates

socioeconomic indicators of development. Second-degree murder, linked to armed robbery and theft, seems to follow the same pattern as other misdemeanors involved with property.

This data seems to suggest distinct patterns of homicidal organization resulting from the level of underdevelopment of the municipalities analyzed. In some regions of the State of Minas, especially in the more traditional and less developed regions, first-degree murders are more frequent. This hypothesis is quite plausible, owing to the previously referred to regional diversity, in terms of development, of the State of Minas Gerais.

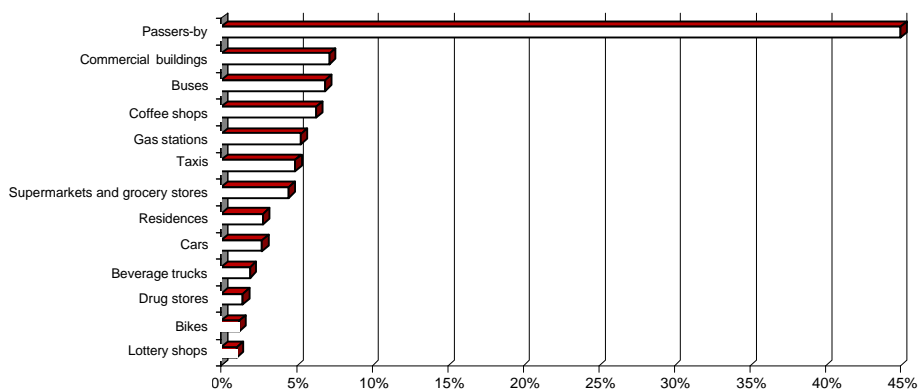
What we could object to is that these types of offence, so much more expressive than instrumental in content, contradict the hypothesis that they are rationally orientated. Moreover, the theory of rational choice does not veto the possibility of any type of preference serving as a cause of individual action (Opp, 1989; Hechter *et al.*, 1990). This occurs as a result of the adoption of the “charity principle”, according to which “majority beliefs must *always* be right” (Davidson, 1974). This does not imply a tautological application of the concept of rationality, but a demonstration of how behavior can be read as “behavior-according-to-rules”, in the Wittgensteinian sense. Rational properties are no longer mere methodological principles used to interpret actions; they become the very empirical material under examination. The “charity principle” suggests a narrative strategy that, in reflex, connects actions, intentions, objects and events,

establishing causal relations between intentions and behavior, based on the assumption that this connection already exists. In this way, such offenses as political violence or crimes of honor are morally justified as preferences instrumentally realized through violent crimes.

### Preferential targets of criminal activity

Central to decision-making processes of criminal activity is the selection of targets in specific contexts. Most of the police force’s advice, as well as the prosperity enjoyed by companies in the security business, results from the fact that delinquents always ponder the difficulties of hitting certain targets. Throughout the 60s, the British national phone service managed to almost completely eliminate vandalism by substituting aluminum coin containers for solid steel ones. During the same decade the German automobile industry significantly reduced car theft by instituting wheellocks on the production line (Clarke, 1983).

Figure 8 shows that favored targets of armed assault in Belo Horizonte, in 1996, were passers-by. The large number of assault on passers-by is due to their limited ability to defend themselves; guns are generally used to reduce the possibility of the victim reacting. Gottfredson (1990), on discussing the results of multiple research on victimization, shows that 70% of robberies take place on the streets. Amounts taken are usually modest (R\$ 50



**Figure 8**  
**Targets of Armed Robbery**

or less). Half the assaults in the survey were carried out with some sort of weapon, and a fifth with firearms. The presence of firearms reduces the probability of harm to the victim.<sup>8</sup> In 60% of the cases there is more than one person involved, generally sharing a similar profile: young people, male and not Caucasian, and often either drunk or on drugs. They tend to choose their victims close to where they live. Half the break-ins occur during the day, when houses are empty. Holiday periods offer the greatest risk. Interviews with burglars show that the greatest deterrents are: dogs, people in the house, visibility to neighbors and difficulty of escape routes (Gottfredson, 1990).

In Table 3 we draw a correlation between different types of violent crime with variables that measure opportunities for criminal activities. The results presented in the table support the hypothesis stated in this article. Although not strongly correlated, violent crime is positively associated to all the indicators of contexts of opportunities for criminal activity. It is always present in larger cities, that have a significantly larger volume of retail businesses and companies. Homicide, on the other hand, is not dependent on these structural attributes for its occurrence. A small index, however, draws attention: the negative correlation between the percentage of houses with proper drainage and sewage systems. It is possible to deduct, based on this correlation, that areas still lacking proper drainage and sewage systems are probably just as far away from police stations and a legal system.

### Conclusion

Spatial analyses also have their limitations. The first of these refers to the level of aggregation of criminality levels. The notion that the community is the most important factor in understanding the phenomenon of violence is classical. And so a question remains: what is a community and what are its limits? As Patterson observed (1991, p. 761):

The notion of community places many operational problems due to the difficulty in defining the limits of a community. Many of the ecological units for which data is available correspond to administrative communities, and may not represent communities in the general spirit of the first works.

For this reason many information sources used in the drawing up of crime rates incorporate many of the problems and shortcomings of using official data. One way of correcting this would be through a more intense production of data, by means of, for example, surveys of victimization.

In any case, the preceding analyses showed the importance and contribution made by an analysis that seeks to make explicit the rational elements of criminal acts. This result was reached through an examination of the incidence of violent crimes in the entire State of Minas Gerais, and not just in the large urban centers. This approach would certainly produce similar results if occurrences for this type of misdemeanor in urban spaces was also examined.

**Table 3**  
**Relationship Between Types of Crimes and Socio-Economic Indicators**  
**(Pierson's Correlation Coefficients)** (%)

<i>Types of Crimes</i>	<i>Retail business**</i>	<i>Number of companies**</i>	<i>ICMS tax**</i>	<i>GDP per inhabitant**</i>	<i>Population size**</i>	<i>Population density**</i>	<i>Urbanization levels</i>	<i>Index of Human Development</i>	<i>Percentage of families with sewage systems</i>	<i>Percentage of families with less than 1 salary</i>
Violent crime*	.44	.42	.36	.13	.48	.26	.26	.10	.05	-
Homicide*	.01	-.02	-.03	-.08	.06	-.08	-.09	-.20	-.24	.10
Attempted homicide*	.05	.02	-.02	.06	.10	-.01	.00	-	-.23	.08
Rape*	.00	.00	.00	.06	.02	.04	.03	-.04	-.04	-.04
Robbery*	.35	.37	.35	.28	.31	.27	.37	.36	.27	.24
Armed robbery*	.21	.23	.25	.24	.21	.38	.28	.27	.24	.25

\* Rates per 100,000 inhabitants corrected by Bayes' global empirical estimates

\*\* Natural Log

## NOTES

- 1 Maps for criminality have been produced with growing regularity in the last two years in Brazil, without really knowing what their use is, or what procedure was used in their making. The simple elaboration of maps ends up providing a curiosity for the general public, or analysis material for a semi professional school of Sociology, making the discipline vulnerable to the criticism that "ecological research is primarily an atheoretical exercise in mapping criminal phenomena" (Bursik, 1986, p. 36).
- 2 I shall be working with figures produced by Minas Gerais Military Police.
- 3 For a detailed discussion of the techniques and how to best use them, see Assunção (1996) and Marshall (1991).
- 4 In both cases I used data available from the Fundação João Pinheiro for 1995, seeing as data was not available for the year 1991.
- 5 The Index of Human Development (IHD) was created by the UN in the beginning of the 90s and is made up of three indices, which are all given equal importance: longevity, education and income. Therefore, IHD = Index of Human Development  
IHD<sub>L</sub> = IHD Longevity  
IHD<sub>E</sub> = IHD Education  
IHD<sub>R</sub> = IHD Income  
IHD varies between 0 and 1, and the greater the index, the greater is human development in the region. Based on the value obtained in the IHD, the UN classifies countries under three levels of human development: countries with low human development (IHD up to 0.5); countries with average human development (IHD between 0.5 and 0.8); and countries with high development (IHD above 0.8). Cf. Fundação João Pinheiro (1996).
- 6 All these numbers were produced by Fundação João Pinheiro, with the exception of those for homes, families and Gini, which were produced by IBGE, 1991 Census.
- 7 This measure of distribution of homicide rates contrasts with numbers for US cities, where the rates increase in accordance with population increases (Dobrin *et al.*, 1996).
- 8 It is interesting to note that, according to these studies, the probability of a victim suffering a serious physical grievance is inversely proportional to the lethality of the weapon used.

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