

Spatial Patterns of Crime Among Indian Cities

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Abstract: An analysis of inter-city patterns of crime in India was undertaken. Using data for fourteen different types of crime and for 99 cities, standard correlation techniques were used to analyze the inter-relationships between different types of crime and the spatial distribution of these types. Factor analysis was applied to regionalize crime groups. An attempt is made to explain the crime patterns which emerge from the analysis, and the concentration of crime in the north-central region of India.

Introduction

Spatial studies relating to crime in Indian cities are few in number and mainly focus on the intra-city distribution of crimes (DUTTA, 1976; SRIVASTAVA, 1963, DUTT *et al.*, 1977). The present study is the first attempt to analyze comparative inter-city patterns of crime in India. The purpose is (1) to ascertain whether the Indian cities reflect the regional crime patterns identified by DUTT *et al.* (1979); (ii) to evaluate the relative association between types of city crime; and (iii) to understand the difference between city and non-city crime. The recently published city crime data are worth examining because Indian cities represent different cultural settings, economic development, subracial groups, education levels, demographic structures and historical backgrounds.

Data Sources

For the analysis of crime in India, data were collected from *Crime in India* (MINISTRY OF HOME AFFAIRS, 1971), which recorded the number of cognizable crimes in districts and cities with a popu-

lation of 100,000 or more. Crime data for cities are classified into fourteen types (Table 1). Though dacoity and robbery relate to almost the same kind of criminal activity, the Hindi word 'Dakoiti', incorporated in the English language as 'dacoity' in the early 19th century, has been defined as "robbery with violence committed by a gang" in the *Shorter Oxford English Dictionary*. Although the 1971 Indian census recorded 153 cities (i.e. urban centers with a population of 100,000 and over), crime data were published for only 99 cities. Two border states, West Bengal, and Jammu and Kashmir, were completely left out. The population data for the cities were obtained from the *CENSUS OF INDIA* (1971). Since the crime data are for the city population as a whole, they have been standardized (per 10,000 people) for comparability.

Methodology

Correlation clearly brings out the existing inter-relationship between the crime variables. Significant correlations are observed between many crime types, and the matrix is presented in Table 2. However, it is difficult to gain an overall understanding of the spatial distribution of different types of crimes from this table. In order to reduce the number of variables and group them into similar crime types an orthogonal varimax rotated factor analysis was performed. This procedure maximizes the com-

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Table 1. Crime types in India

1. Murder
2. Culpable homicide not accounting to murder
3. Rape
4. Kidnapping and abduction
5. Dacoity (gang robbery committed by five or more persons)
6. Robbery
7. Burglary (house-breaking)
8. Thefts
9. Riots
10. Criminal breach of trust
11. Cheating
12. Counterfeiting
13. Total cognizable crimes
14. Other

mon variance and aids in clearer group identification. All factors with an eigenvalue of one or more were taken into consideration, resulting in three distinctly identifiable crime groups. They are:

Factor 1 contains rape, murder, kidnapping and robbery as the major components, with burglary, dacoity and homicide as secondary contributors (Table 3). These are all violent and are the least sophisticated crimes. These crimes are possibly features of an area with a long-standing history of violence. Hence the tag of 'subculture crimes' is given to factor 1.

Factor 2 contains cheating, criminal breach of trust and theft as its major contributors. These are generally committed by individuals taking advantage of the ignorance and or the need of the people. Secondary contributors are robbery and kidnapping. Hence this factor can be called 'economic crimes'.

Factor 3 contains primarily riots, burglary, dacoity and counterfeiting. Thefts and murders are secondary. Most of these crimes are committed by a 'gang'. Ignoring thefts, this can be called a 'group crime' factor.

All three factors are significant, with eigenvalues of 3.36, 2.8 and 2.2, and 28.0, 23.4 and 18.3 of the variance respectively. These factors as a group account for about 70% of the common variance. To understand the spatial distribution of these three groups of crimes the factor scores have been mapped and a logical explanation for such a distribution is provided.

Cities and the Subculture of Violence

Generally a city is expected to represent its regional characteristics. An earlier study has confirmed the existence of a subculture of violence in the north-central part of India (Figure 1) (Dutt *et al.*, 1979). The cities in this part of India not only have a concentration of violent crimes (rape, murder, kidnapping and robbery), but are also the main foci of the 'economic' and 'group' crimes.

Violent crimes as mapped in Figure 2 have two distinct concentrations, one in western Uttar Pradesh, extending into adjacent Rajasthan and Madhya Pradesh, and another in Bihar, probably extending into West Bengal. (It has already been stated that city crime data for West Bengal was not available.) Though reasons for two separate concentrations are hard to explain, the existence of such a subculture of violence in the north-central region may be explained by the following factors:

- (i) historical frontierism of the region, e.g. lacking long-continued and intrinsically ingrained civic institutions;
- (ii) existence of a traditional center of dacoity in the region, at least since the 11th century (KATARE, 1972);
- (iii) the region being the main operating area of 'thugs', the well-organized groups of highway and river bandits, until the 19th century (BRUCE, 1968);
- (iv) because of 500 years of Moslem rule in the Indo-Gangetic plains, which wiped out or rendered impotent the Hindu elites, the

Table 2. Pearson correlation coefficients

Crime variables	Murder	Homicide	Rape	Kidnap	Dacoity	Robbery	Burglary	Thefts	Riots	Criminal breach of trust	Cheating	Counterfeiting
Murder	1.000											
Homicide	0.322	1.000										
Rape	0.811	0.422	1.000									
Kidnapping	0.603	0.367	0.641	1.000								
Dacoity	0.602	0.301	0.433	0.615	1.000							
Robbery	0.546	0.438	0.562	0.790	0.531	1.000						
Burglary	0.775	0.432	0.647	0.747	0.755	0.652	1.000					
Thefts	0.712	0.292	0.611	0.742	0.616	0.713	0.855	1.000				
Riots	0.712	0.340	0.508	0.587	0.725	0.443	0.910	0.705	1.000			
Criminal breach of trust	0.457	0.310	0.455	0.697	0.477	0.741	0.638	0.763	0.431	1.000		
Cheating	0.236	0.142	0.243	0.557	0.244	0.489	0.465	0.687	0.270	0.788	1.000	
Counterfeiting	0.265	-0.056	0.057	0.55	0.143	0.102	0.272	0.281	0.364	0.111	0.104	1.000

Table 3. Varimax rotated factor matrix

Crime type	Subculture crimes (factor 1)	Economic crimes (factor 2)	Group crimes (factor 3)
Murder	0.73304	0.13826	0.45881
Homicide	0.44711	0.14166	0.10325
Rape	0.84044	0.16185	0.14261
Kidnap	0.63996	0.55701	0.21920
Dacoity	0.48436	0.24232	0.50941
Robbery	0.61381	0.57104	0.11558
Burglary	0.59471	0.38599	0.67441
Thefts	0.47218	0.63856	0.49460
Riots	0.44004	0.15298	0.86871
Criminal breach of trust	0.35717	0.83767	0.16281
Cheating	0.05272	0.87660	0.13228
Counterfeiting	0.00267	0.05198	0.40194
Sum of the squared loadings on the factor (eigenvalue)	3.36	2.81	2.2
% variance	28.0	23.4	18.34

region experienced a vacuum of cultural and religious leadership;

- (v) complete alienation of reinstalled elites in north India from the masses leaving the common people to rustic leaders with questionable moral values during the British period (SUBRAMANIAM, 1979);
- (vi) lack of a 'well-agreed comprehensive linear sequence of castes', centralized religious organization of a temple and a single village deity in the Ganges Valley villages and thus multiplying the 'opportunities for inconsistent stratified interaction' in the region (MARRIOTT, 1965).

The highest rated 'subculture' crimes are clustered in seven relatively small cities (all less than 350,000 population), only one of them (Ranchi) being associated with recent large-scale industrialization (Table 4). The remaining six (Bareilly, Darbhanga, Gaya, Monghyr, Moradabad and Shahjahanpur) are mainly associated with district administrative activities, college education, retail-wholesale business, transport node functions and a limited amount of industry. All seven cities are 'subculture region' representatives and thus reflect the regional crime behaviour. Ranchi's population grew from 124,697 in 1951 to 147,796 in 1961 and to 265,011 in 1971. Such an increase reveals a great influx of recent migrants from many other 'subculture' districts of Bihar and Uttar Pradesh, turning the city into a cockpit of their native crimes. A parallel can be

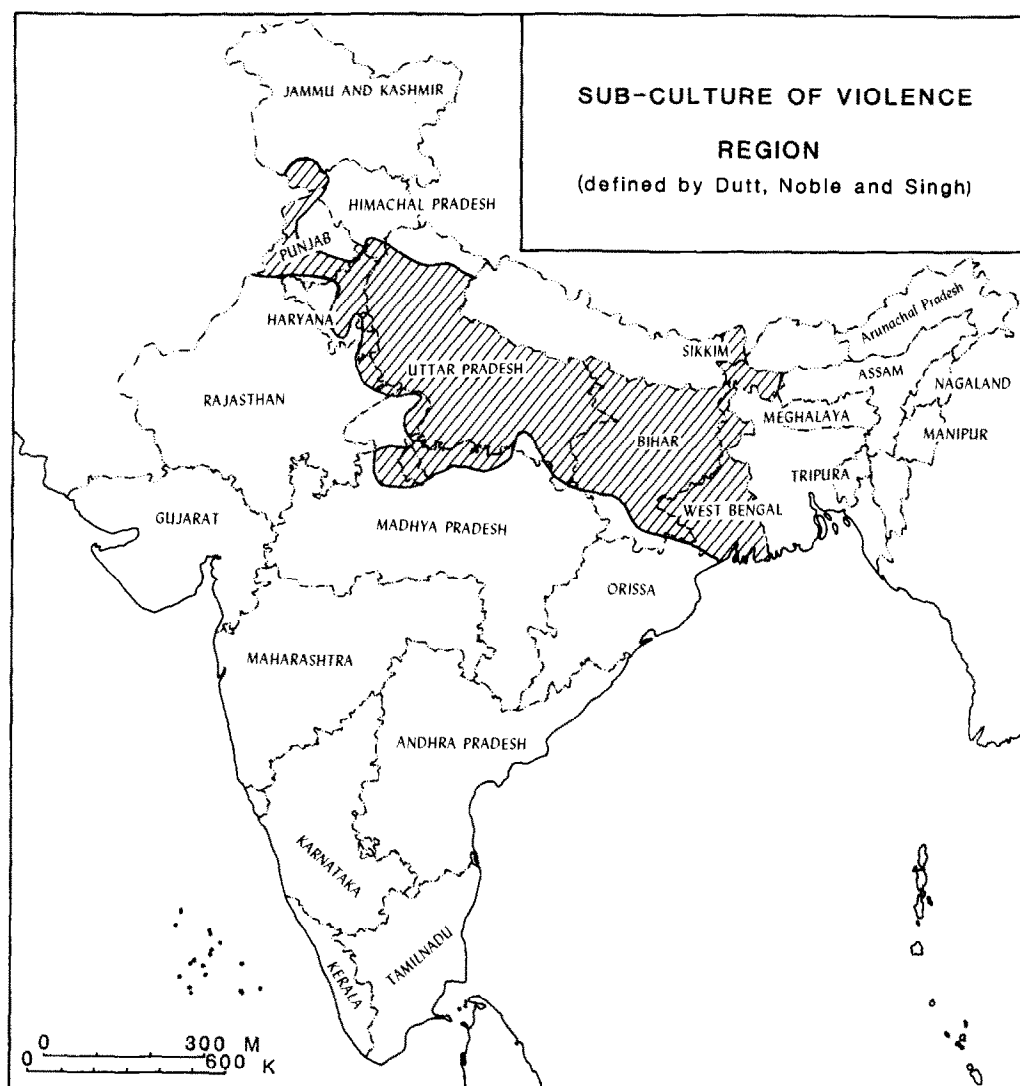


Figure 1. Subculture of violence region in north-central India. The slanted lines indicating the limits of the region are based on district data. *Source:* DUTT *et al.* (1979).

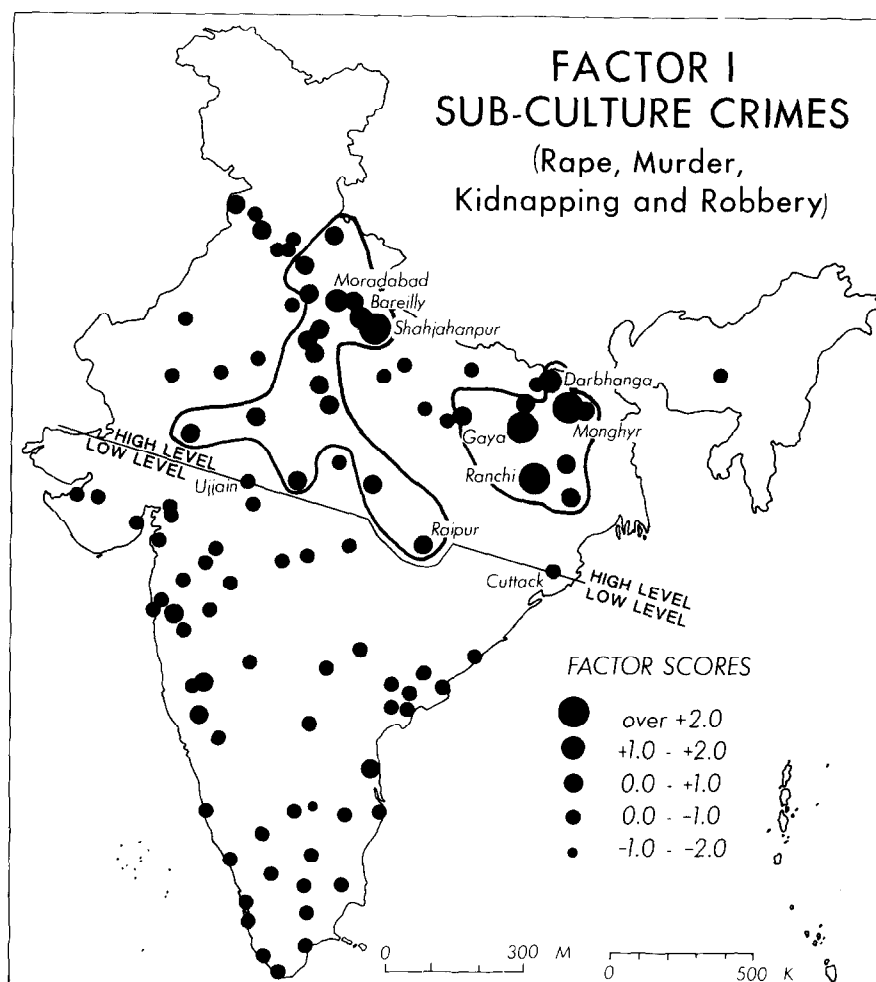


Figure 2. The subculture crime region is generally situated north of the Ujjain–Cuttack line and has two main focal areas, shown by thick lines. Based on factor 1 scores.

Table 4. High subculture crime (factor 1) factor scores for selected cities

Cities	Crimes per 10,000 population				Population 1971	Factor scores
	Murder	Rape	Kidnap	Robbery		
Bareilly	0.61	0.21	1.9	6.8	326,127	1.5621
Darbhanga	3.70	0.61	2.27	3.18	132,129	1.6212
Gaya	6.34	0.45	1.56	4.17	179,826	2.2906
Monghyr	3.90	0.59	3.32	4.69	102,462	3.8307
Moradabad	1.14	0.40	1.32	3.56	272,355	1.7229
Shahjahanpur	0.69	0.42	1.21	2.99	144,058	2.1316
Ranchi	6.21	1.45	1.76	3.40	256,011	5.8404
Average for the cities	0.37	0.09	0.49	0.76		
Average for all India	0.29	IN*	IN*	0.34		

Source: MINISTRY OF HOME AFFAIRS (1971), *CENSUS OF INDIA* (1971) and from factor analysis.

*IN = insignificant.

drawn with the United States, where the southern rural and Latin American subculture of violence has been transplanted into the ghettos of northern and western cities in recent times. In the slums or the city ghettos the transported subculture has been further intensified by the "prolonged isolation of those reared there . . ." (GLASER, 1970, pp. 202-203).

If a straight line is drawn joining Cuttack and Ujjain and by-passing Raipur, the cities of southern India are relatively free from violent crimes. DUTT *et al.* (1979) also found a similar pattern in the south while analyzing district data. NAYER (1975), in his state-based analysis, pointed out that the four southern states have the least incidence of violent crimes. Fewer occurrences of subculture crimes in south Indian cities is the reflection of the low level of regional crime behaviour.

The economic crimes (factor 2), primarily theft, are also concentrated in the 'subculture region', affecting all city sizes (Figure 3). However, two of the cities (Kolar and Gauhati) most intensely affected by economic crimes lie outside the 'subculture' region (Table 5) and, moreover, there is a secondary belt extending from Amravati to Greater Bombay through Poona which is also affected by large scale economic crimes.

The 'group crimes' (factor 3) are primarily concentrated in the north-eastern periphery of the 'subculture region' (Figure 4). Out of the four cities with the highest level of group crime factor scores, only one, Patna, is medium sized, while the remaining

are all small (Table 6). One of the 'group crimes', dacoity is also a 'subculture' crime of the north-central region of India [according to DUTT *et al.* (1979)]. Essentially, dacoity is a rural crime, and the four cities in particular receive a 'fall-out' effect of this crime from the surrounding rural areas.

Association between City Crimes

Generally, the occurrence of one type of crime is either associated with or provides inspiration for other types of crimes; violence begets violence, and crime breeds crime. Therefore it is logical that different crimes are associated with each other. Table 2 shows that all crimes except homicide and counterfeiting are related to each other positively to some degree. We have already shown that the north-central 'subculture' region is not only the main focus of violent crimes, but that a concentration of other crimes are also present there. Such a condition leads to a regional association of different crimes in north-central India. Nothing is more revealing than mapping city diversity of crime using a modified Lorenz curve (Figure 5). It reveals a greater diversification of crimes in north-central India, virtually coinciding with the violence in the subculture region. It appears likely that once a group of cities in a subculture region becomes a center of violent crimes, other types of both economic and group crimes will be nurtured there, thus causing diversification. Moreover, when a criminal atmosphere exists and a great deal of violent crimes are committed in a particular region other crimes also become widespread.

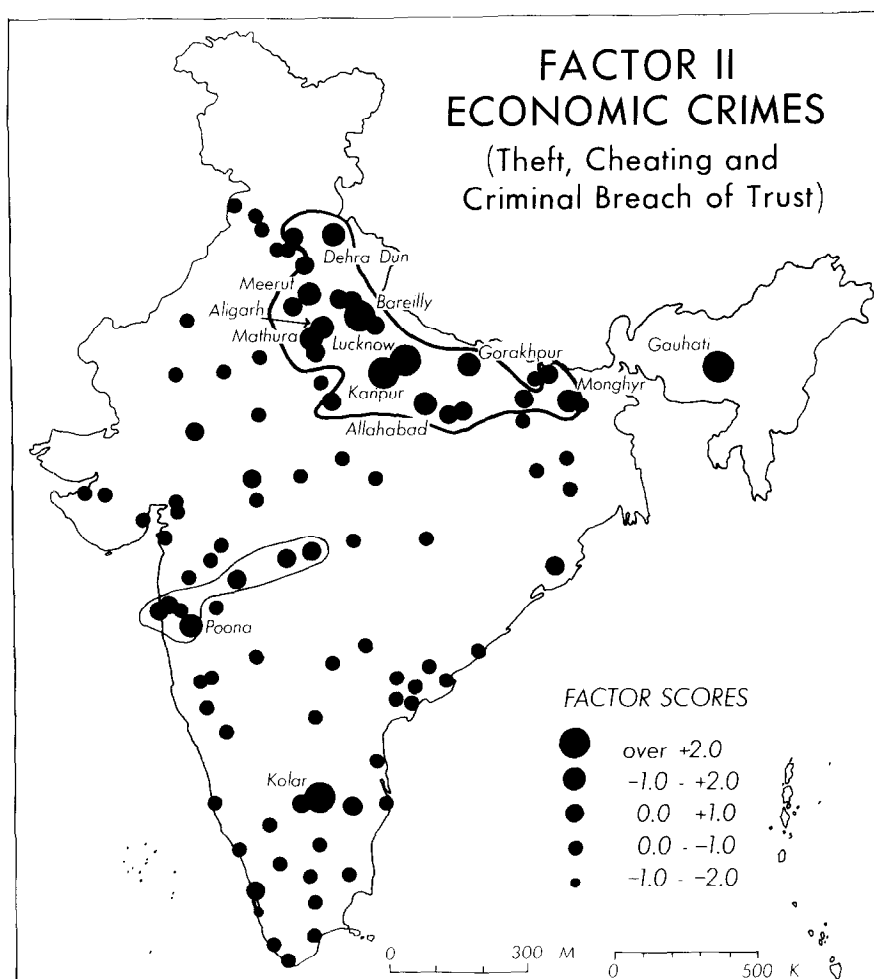


Figure 3. Economic crimes are also mainly concentrated in the north-central subculture region, which is shown by a thick line. Based on factor 2 scores.

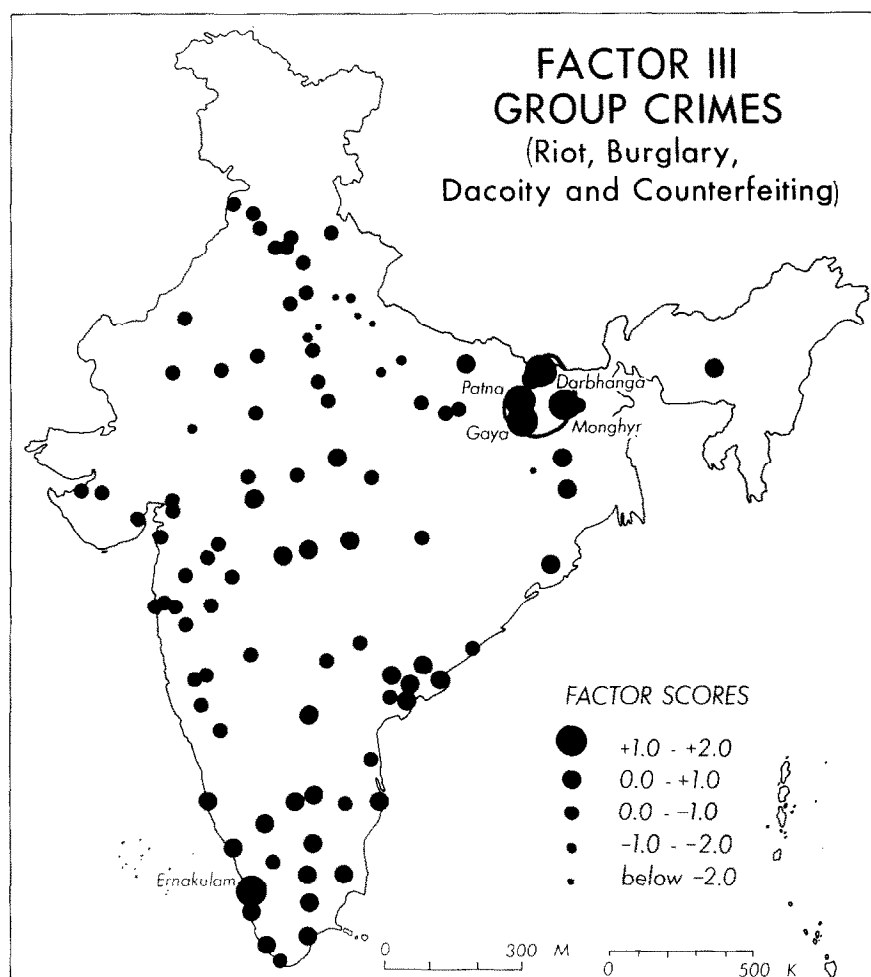


Figure 4. Group crimes are concentrated in north Bihar, one of the focal areas of subculture crimes. Based on factor 3 scores.

Table 5. High economic crime (factor 2) factor scores for selected cities

Cities	Crimes per 10,000 population			Population, 1971	Factor scores
	Theft	Criminal breach of trust	Cheating		
Monghyr	76.51	3.61	2.25	102,462	1.0856
Gorakpur	40.66	4.61	1.91	230,701	1.5297
Allahabad	37.00	3.68	3.42	513,997	1.9089
Mathura	25.84	3.77	3.06	140,468	1.4515
Aligarh	36.30	4.21	1.54	254,008	1.4405
Meerut	40.56	4.92	2.31	367,821	1.9482
Dehra Dun	61.07	3.11	2.06	199,443	1.6526
Lucknow	52.85	5.36	3.67	826,246	2.4022
Kanpur	35.18	6.14	2.31	1,273,016	3.0122
Bareilly	45.01	5.43	1.99	326,827	2.1633
Gauhati	50.90	4.55	4.64	122,981	2.7741
Kolar Gold Fields	50.29	6.92	4.15	43,345	3.2095
Average for cities	23.31	1.58	1.16		
Average for all-India	6.10	0.37	0.21		

Source: MINISTRY OF HOME AFFAIRS (1971), *CENSUS OF INDIA* (1971) and from factor analysis.

Table 6. High group crime (factor 3) factor scores for selected cities

Cities	Crimes per 10,000 population				Population, 1971	Factor scores
	Burglary	Dacoity	Riots	Counterfeiting		
Gaya	75.93	6.04	42.81	0.11	174,826	3.3972
Patna	28.31	1.78	23.41	1.10	490,265	2.0181
Darbhanga	100.00	9.23	90.44	0.30	132,129	7.6925
Monghyr	75.93	6.44	39.43	0.10	102,462	1.5972
Ernakulam	22.6	IN*	11.20	0.60	100,000	0.8943
Average for cities	7.68	0.28	2.03	0.07		
Average for all-India	3.02	0.20	1.17	0.01		

Source: MINISTRY OF HOME AFFAIRS (1971), *CENSUS OF INDIA* 1971 and from factor analysis.

*IN = insignificant.

City and Non-city Crime Differentials

Studies in India and in Western countries have confirmed that crime rates are significantly higher in cities than in rural areas. As human interaction is maximized in the cities crime behaviour is also accentuated, in contrast to rural areas where both human interaction and crime occur at a minimal level. DHANAGARE (1969) explains the causes of city crime behaviour as:

"The impersonalized and segmentalized human rela-

tionships in the city weaken moral sanity and heighten the sense of instability and insecurity. Conditions of city life tend to break down rigid social structure and render informal control on individual behavior almost ineffective" (p. 1239).

CHRISTIANSEN (1970) postulates that as social control is much relaxed in urban areas, urban citizens yield more easily to illegal temptations than their rural counterparts. He has also constructed a cause-effect-continuum: industrialisation-urbanization-temptations-crime.

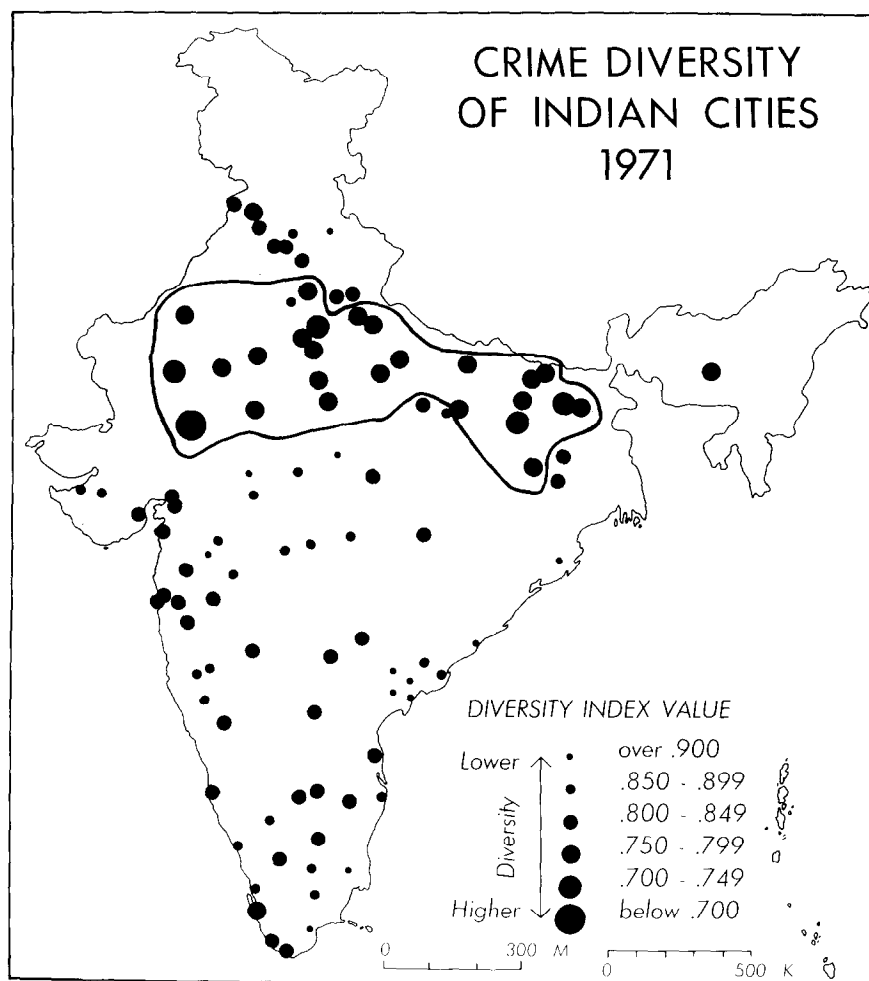


Figure 5. Diversity of city crimes is based on a modification of the Lorenz curve. The formula applied has been explained in Note 1. It is in the subculture of violence region that crime types are most diversified.

Although no separate crime incidence data are available for rural and urban areas in India, we can draw some conclusions from city and all-India data in relation to the rural-urban differential. City crime statistics relate only to the urban units with a population of 100,000 and over, whereas the all-India data include city, medium and small towns and rural areas (cities over 100,000 account for over 50% of the country's urban population). Therefore the city data may be considered entirely urban while the all-India data is a mixture of both urban and rural. Table 7 reveals that all crimes have a much greater per capita incidence in the cities than in the country as a whole. City crime in relation to that in all-India stands at a ratio of 3 : 1. This particular ratio does not agree with the findings of Bayley's 1965 survey of Indian crimes, which showed that 1 out of 10 urban males had been victims of a crime,

although only 1 in 100 rural males had fallen prey to crime (quoted in CLINARD and ABBOTT, 1973, p. 17). Thus the rural urban crime ratio, according to Bayley, should stand at an unbelievable 1 : 10. It is understandable how Bayley arrived at such a conclusion since his city sample data came from Bangalore and Kanpur and rural samples from Karnataka. In terms of crime occurrences according to the data sources Kanpur ranks quite high among the Indian cities, whereas Karnataka is one of the lowest among the states. Bayley's findings based on biased sample design are therefore not valid as a generalized statement for the country as a whole.

All types of crime incidences are higher in cities than the rural areas (Table 7). It appears that as crime from rural areas has permeated into urban areas, regional rural crimes have entered into city-

life. There are, however, specific crimes that breed well in rural areas. Murder and dacoity are more rural than other crimes. DHANAGARE (1969) also found that the cities have a considerably lower rate of dacoity than have rural areas. It is nevertheless true that urban places are congenial breeding grounds for crime in general and, therefore, many city crime-forms permeate into rural life. Some crime types, such as counterfeiting, cheating, criminal breach of trust and thefts, have incidence rates in the cities which are four times or more greater than those in the country as a whole, if we consider per capita incidence. This result confirms DHANAGARE'S (1969) conclusions from his study of selected state and city data for 1964–1965. It is found in this study that murder and dacoity are more equitably distributed in rural and urban areas than other crimes.

Conclusions

Spatial patterns of crime in Indian cities conform to the general regional occurrences of crime. Cities located in north-central 'subculture' regions have the main concentration of violent, economic and group crimes. South Indian cities, with the exception of two (Kolar Gold Field and Ernakulam), show a relatively less frequent incidence of all crime types. Except for homicide and counterfeiting, most crimes are positively inter-related. Although burglary is mainly a small city crime, thefts, riots and kidnapping are concentrated in large cities. Cities have registered about three times more crime per capita than the country as a whole. Murder and dacoity are more rural, but counterfeiting, cheating, criminal breach of trust and theft have very high per capita occurrences in cities.

Notes

1. The diversity index has been calculated for each city based on the following formula:

$$I = \frac{D-E}{M-E}$$

where I = index of concentration (or diversity if lower index value are considered as more diversified), D = cumulative percentage total according to the

rank of each crime in a city, E = cumulative percentage total assuming even percentage distribution of each crime and M = maximum cumulative percentage total assuming 100% of the frequencies in rank 1 (i.e. in this case 1200). This method of calculation is taken from HAMMOND and McCULLAGH (1974).

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