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# 9 The Environmental Range of Serial Rapists

## Abstract

A model of individual sexual offenders' spatial activity was developed based upon 45 British male sexual assaulters who had committed at least two assaults. For each offender a separate map was produced indicating the spatial locations of his offences and residence. A *Marauder* model and a *Commuter* model of offenders' spatial behaviour was proposed. As an elaboration of the Marauder model, the *Circle* and *Range* hypotheses were tested against the sample of offenders. Results of the study support the Marauder model showing that most of the sample (87%) move out from their home base in a region around that base to carry out their attacks. The antithetical Commuter model was not supported within the sample. The Circle and Range Hypotheses were supported demonstrating that offenders operate within a distinct offence region (in 91% of cases) and that the distance they travel to offend correlates directly with distances between offences ( $r = 0.93$ ,  $p < 0.001$ ). The findings clearly indicate that there is a basis for model of offence venue choice by individuals within the sample. The present study supports the value of a theory of *domocentricity* within offenders' lives and offers potential applicability to the solving of crimes.

## Introduction

Many studies have shown that offenders usually do not travel very far from home to commit crimes (White, 1932; Pyle, 1974; Repetto, 1974; Curtis 1974; Kind, 1987). Shaw and McKay illustrated this general trend as long ago as 1942 in their Chicago studies. They established that there is a limited area of zones in which offenders will offend and that these zones were geographically close to the zones in which the offenders lived. However the majority of the research undertaken to date has involved case studies of, for example, classic crime series like 'the Yorkshire Ripper' (Kind, 1987). Alternatively they have considered the aggregate pattern of the spatial activity of a sample of criminals (e.g. Pyle, 1974). Results from such work has provided useful case and population characteristics. In contrast to previous studies of offender movement that have emphasised the aggregate geographical behaviour of offenders, the present study explores directly the

psychological question of the extent to which a general model can be developed that is applicable to any individual offender's spatial activity.

Developing a model of the sequential spatial behaviour of offenders requires tests of the validity of various conceptualisations of the psychological processes which determine where an offender chooses to commit a crime. A robust model would also be of practical value to criminal investigators because it could indicate the likely area of the offender's residence.

The starting point for any theory of an offender's selection of the venue of his crime is the hypothesis that the choice of crime venues relates to some kind of home or base from which the individual operates. This hypothesis is based on the view that the offenders for whom an environmental psychology model is developed will not be random drifters of no fixed abode, but will be residing at one or more locations from which they travel to commit their crimes.

Although the environmental cognition literature is not explicit on the point, there is an implicit assumption throughout such studies that a significant determinant of the mental representations of places a person develops is the location of a person's home (as for example reviewed by Golledge, 1987). The proposition is therefore that the 'domocentric' locational experiences of law abiding citizens are a reasonable starting point for building models of criminals' movements. The potential validity of such a proposition is supported by Amir's (1971) finding that even individuals who commit the impetuous crime of rape do operate from a fixed point. Amir's account of Philadelphia police file data (1958-1960) draws attention to the value of understanding more about the psychological processes underlying a criminal's spatial behaviour, raising questions about the significance of the 'fixed point' to the offender and the ways in which it might determine the location of his offences.

In contrast to the 'fixed point' having any personal significance to the offender, Shaw and McKay (1942) of the 'Chicago School' proposed that offenders who operate within city centres are reacting to processes beyond their personal experience. They state that behaviour can be explained in terms of the structure of the urban environment. For Shaw and McKay it is the organisational geometry of cities that gives a pattern to criminal activity. They would thus suggest an arbitrary relationship between offences and between offences and residence other than that the offences are enclosed by a socially recognised 'city centre'.

A somewhat different geographical emphasis is given by Rengert and Wasilchick (1985). They emphasise the importance of the journeys a criminal habitually takes around his home ground. They conducted detailed interviews with 31 burglars, and found a strong likelihood of crime being located on and around the pathways and routes that the burglar habitually used in non-criminal activities. Such journeys through familiar territory are thought to provide information around which an offender could plan his next crime, and that it is this process of information gathering that gives shape to the area in which a person chooses to commit his crimes. They go further to suggest a simple model for offenders' behaviour. The offender in this model is more likely to attack on 'his way home'. Thus the offender

will operate within an area which is defined by his home and a base which he frequents, for example his work, local bar or restaurant.

Brantingham and Brantingham (1981) have proposed more affectively based processes for crimes taking place in the area around a criminal's home. They suggest that the security offered by familiarity with the area would outweigh risks of being recognised in the commission of an offence. However, the avoidance of being recognised near a crime scene would lead to the existence of a minimum distance around the home in which the offender would tend not to offend. Brantingham and Brantingham (1981) do provide some aggregate evidence for such a 'safety zone'. Their arguments therefore lend support to the hypothesis that offenders will tend to offend not only within an area around their home but that there will be a maximum and minimum range of distances from home in which they offend.

Capone and Nichols (1975) provide evidence that for robbery, there may indeed be some sort of criminal range. They argue that the offender's goal in crimes of this type are focused on personal gain. Thus the robber will operate within an area which yields the greatest profit and will be looking to identify those areas which have the best opportunities for success. The generality of these findings across different types of crime is an important question. It assumes that an offender in a robbery is maximising his gain for minimum effort and will therefore travel the minimum safe distance that will offer the prospect of a successful crime. Can the same assumption of economic logic be applied to crimes that may have a more overtly emotional nature such as rape, or crimes in which there is a more considered overt risk for larger scale gain, such as armed bank robbery? Capone and Nichols show that there is a significant difference in the lengths of armed and non-armed robbery trips, with armed trips having a greater mean distance. The present study focuses on rape, leaving robbery for future research.

There is some evidence that rapists do have similar geographical patterns to burglars. LeBeau (1987) used centrography (originally developed by Sviatlovsky and Eells, 1937) to defend the idea of a structure to the spatial offence behaviour of the individual rapist. Centrography 'allows one to assess and measure the average location, dispersion, movements and directional change of a phenomenon through time' (LeBeau, 1987). The sample of offenders used was 'all the lone-assistant rapes reported in the San Diego police department in 1971 to 1975'. He suggests that the offender may operate from a clear home or base, presenting evidence for a general geographical pattern of rapes around the home of the rapist.

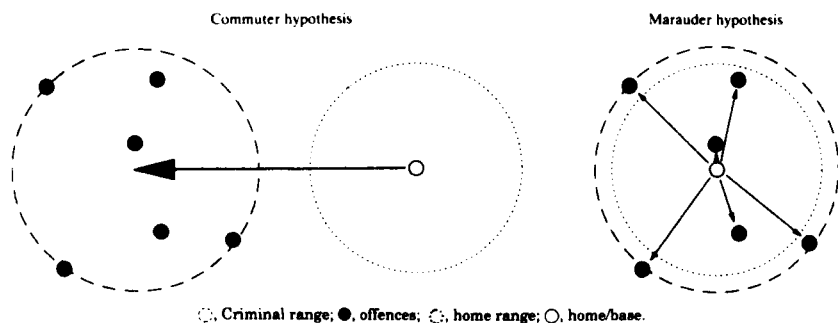
In a further elaboration of these suggestions LeBeau (1987a) points out that although chronic serial rapists in San Diego that he studied do vary considerably in the distance they travel from their homes, they restrict their 'attacks to within one-half of a mile from his previous attacks' (p. 325). LeBeau (1987a) supports this conclusion with year on year aggregate figures so it is difficult to establish exactly how individual offenders fit into this picture. Furthermore, there is the possibility that many offences are localised in areas that provide special types of target and opportunity. LeBeau's results therefore do raise important questions about the

spatial relationships between the residential location of serial rapists and the locations in which they commit their crimes.

### Two models: commuter or marauder

In general, then, it seems to be reasonable to assume the existence of a fixed base for men who carry out a number of rapes as for other offenders who commit a series of crimes. There is also some evidence that there will be an area in which the offences are committed that has some non-arbitrary relationship to that base, what might be termed a *criminal range*. The present study test various models of the relationships there might be between an individual's criminal range and the location of their home base.

Two general models may be proposed to characterise the relationship between base and area of crime, as represented in *Figure 1*. The simplest assumption to make about the geometry of a criminal domain is that it is circular as this only requires the determination of a radius, no other boundary limitations are necessary. In *Figure 1*, therefore, the area around the home (home range) and the area in which the crimes are committed (criminal range) are represented as circles.



*Figure 1* Hypothetical models of serial rapists' spatial behaviour

The first model is based on what we have called the *commuter hypothesis*. In this case the offender travels from his base into an area to carry out his crimes. This may be determined by the general geometry of the city, as would be consistent with Shaw and McKay's (1942) proposal of the use of the city centre, or it may be an area determined by regular routes that the offender takes as Rengert and Wasilchick (1985) suggest. However, whatever the particular determinants of the specific area of crime, central to this hypothesis is that although there will be a domain in which the crimes are committed, and this domain will have some distinct relationship to where the offender lives, there will be no clear relationship between size or location of the criminal domain and the distance it is from any given offender's home.

The commuter hypothesis, then, proposes that there is little or no overlap between these two areas and that the offender moves to a district which is outside

his home range to offend. This is not to suggest that the criminal range is unfamiliar to the offender, but that it is at an appreciable distance from the area in which he habitually operates as a non-offender.

A second model may be developed on what we call the *marauder hypothesis*. In this case the base acts as a focus for each particular crime. The offender is assumed to move out from this base to commit his crimes and then return. This relates most directly to the research of Brantingham and Brantingham (1981) who see the home as a focus for the crime locations. This hypothesis implies a much closer relationship between the location of crimes and of a criminal's home, such that the further the distance between crimes the further, on average, the offender must be travelling from home.

In other words, the marauder hypothesis proposes that there is a large or total overlap of the home range and criminal range areas. The offender operates from a home/base definitely located within the boundaries of his safe area for criminal activity.

If either of these hypotheses is strongly supported it has implications for further elaboration of the related model. For simplicity of presentation the development of these implications will be left until after the first test of the two hypotheses.

### **Sample and procedure**

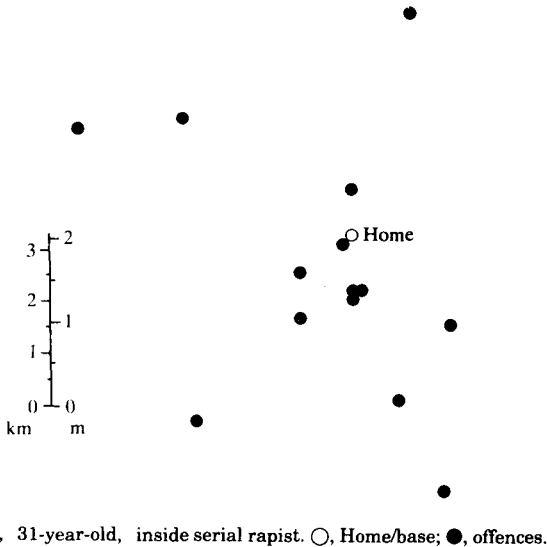
Although the general arguments above are applicable to any offences, the present study focuses on sexual assaults. These types of crime are a particularly strong test of the essentially rational models that have been outlined. Sexual assault overtly has a profound emotional component to it and may be regarded by many as containing some strongly impulsive aspects (Amir, 1971). However, when a rapist does commit a series of assaults on women, with whom he has had no previous contact, some pattern is possible in these offences of which the offender may or may not be aware, just as for burglary or drug abuse. Sexual assaults may therefore be seen as an extreme case that tests the fundamental assumptions that an individual criminal's crime venue has some distinct relationship to his place of residence.

To carry out the study details of 45 sexual assaulters were made available by British police forces. These included criminals who had been convicted of crimes legally regarded as 'rape', in which vaginal penetration had taken place, as well as other forms of sexual violence. All offenders had been convicted of two or more offences on women they had not known prior to the offence. A total of 251 offences had been committed by these 45 offenders. The mean rape series consisted of 5.6 offences (S.D. = 3.6) with a minimum of 2, and a maximum of 14 offences. The offenders had a mean age of 26.6 years (S.D. = 8.7) ranging from 15 to 59 years, 21 offenders being broadly classified by the police as 'white' in ethnicity and the other 24 as 'black'. All the offenders operated within the Greater London area and/or the South East of England during the 1980s.

**Test of hypotheses**

The basic information available to test the hypotheses above is the geographical distribution of the offences in relation to the location of the offender's residence at the time of the offences. For each offender a separate map was produced indicating the locations of offences and his residence. A further summary of this without the underlying base map was produced, as illustrated in *Figure 2*.

The most direct test of the two hypotheses is whether the region covered by the crimes encompasses the location of the residence. In the commuter hypothesis this would not be common, whereas it would be typical of the 'marauder'. A simple test of these possibilities is to examine the area covered by the offences and see whether the residence is within that area.



*Figure 2 Example of rape series*

In order to define the area of the offences, the two offences furthest from each other were identified and the distance between them taken as the diameter of a circle that was drawn. Such a circle is likely to encompass all the offences, except for rather unusual spatial distributions. There are therefore more precise geometrical hypotheses that can be derived from the marauder model, *circle hypotheses*. These hypotheses have two aspects:

- a) the offences of a single offender will be encompassed within a circle that is drawn with its diameter as the two offences that are furthest from each other,
- b) the residence of the offender at the time of the offences will be within the same circle.

Clearly such hypotheses make no allowances for variations in local topography, transport routes and so on. They relate to a generalised mental representation of the broad geographical relationships between locations. As such these hypotheses are similar to those relating to the study of distance estimation in cities (Canter and Tagg, 1975). In those studies 'crow flight', direct line estimates of distances around cities were found to have important relationships to actual direct line distances. This was found to be true even independently of travel time between those points (Canter, 1977). The circle hypotheses therefore reflect an assumption about a criminal's mental representations about the area in which he commits his crimes. This assumption is that it is the schematic representation of the location of the crimes that is primary rather than very particular topographical details of those locations. Such details may play a role in addition to the schematic 'image', but the present research explores models that do not include such details.

### **Results of the tests of the circle hypotheses**

- a) It was found that 41 of the 45 offenders had circles which encompassed all their known offences. That is 91 % of offenders had all their crimes located within the circular region. Of the 30 offences, within the four cases that did not co-accord, 23 were located within the circle hypothesis area (77%).
- b) When the residential location was considered it was found that the large majority of the offenders, 39 (87%), had a base within the circle hypothesis prediction area.

There were six cases of offenders operating from a base outside the circular region. All of the six spatial patterns showed that the offenders commuted to the offence area. Two of the cases involved picking-up victims and assaulting them in a motor vehicle some distance from home. Two other cases involved the offenders targeting a specific street far away from their home area.

The very high proportions of offenders whose crimes are located in accordance with the circle hypotheses provides strong support for the general marauder hypothesis as being the most applicable to these sets of offenders. The commuter hypothesis therefore does not seem tenable for this sample of sexual offenders, although it may have application where very specific types of targeting, for example on prostitutes, was taking place.



## Development of the marauder hypothesis

If offenders are operating within a circular region that also houses their base the question arises as to the relative location of their base within their offence domain. In particular, as the size of their criminal range grows does this change the relative relationship to the domestic focus? One way of understanding and developing this argument is to make the simplifying assumption that the home is at the centre of the offence circle. If this is so then those crimes that are committed far away from each other are more likely to be further from the home than those that are nearer to each other. Such a relationship would hold true for any position that the home had in relation to the crime circle, provided the crimes were distributed around it. This more precise specification of relationships between distances is therefore an arithmetic elaboration of the geometric circle model. It can be summarised as a *Range Hypothesis*: The distance between a criminal's offences will correlate directly to the distance those offences are from his home.

A further development of this hypothesis is that if it is supported, the largest distances between offences will be greater than the largest distance between any offence and the offender's home, otherwise the home would be outside of the circle created from a diameter based on the largest distance between offences. Furthermore if the home was at the centre of the circle then the distance from home to the furthest offence would be half of the maximum distance between offences. In other words, it is hypothesised that regression of maximum distance between offences on maximum distance from home will have a gradient that is less than 1.00 and close to 0.50. A value of less than 0.5 would only be possible if the circle hypothesis was invalid. A gradient greater than 0.5 but less than 1.00 would suggest that the home tended to be eccentrically placed within the crime circle.

The proposition by Brantingham and Brantingham (1981) that there is a safe range around the home in which crimes would not be committed would be supported in the regression equation by a constant value that was positive, but less than the average minimum distance of crimes to home.

## Test of the range hypothesis

The scatterplot showing the relationship between the maximum distance between crimes and the maximum distance each crime is from the offender's home is given in *Figure 3*. The correlation for this plot is 0.93 (highly significant at  $p < 0.001$ ). The regression equation is  $y = 0.84x + 0.61$ . The gradient, at 0.84, does indicate a location within the crime circle, but suggests that it is unlikely to be close to the centre of that circle. This is a finding of some interest which will be discussed later.

The constant is also as predicted. The average minimum distance of crime to home for these offenders was 1.53 miles. The constant of 0.61 miles is well below this. There is, therefore, strong evidence for a minimum distance that the sexual offender is willing to travel from home, in accordance with the hypothesised desire to be at a safe distance away from home.

The criminal's 'safe area' for activity, as defined by this regression equation, is at least 0.61 miles from home but within an area away from all offences which is less than 84% of the maximum distance between offence.

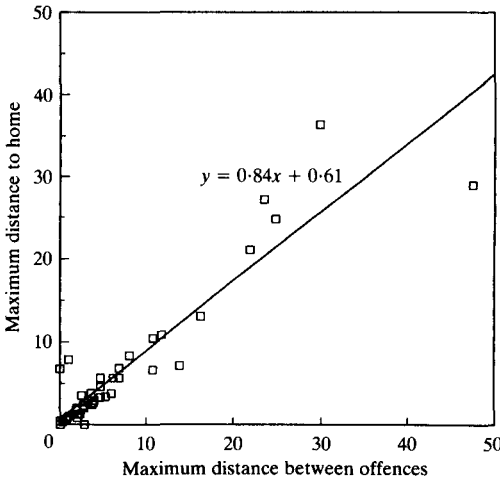


Figure 3 Maximum criminal range: relationship between maximum distance between crimes and maximum distance to home.  $n=45$ ;  $r=0.93$ ;  $p < 0.001$

## Discussion

The clarity of these mathematical results is little short of remarkable for what is regarded as an impetuous, emotional violent crime. They show that, whatever the rapist's experience of committing the crime, there is a basis to his choice of locations that can be modelled from relatively logical environmental psychology principles.

The relationship that a rapist's home has to the location of his crimes has been established for 45 rapists in the South East of Britain who attacked more than one woman; all of the women being unknown to the offenders before the assaults. The indications are that most offenders move out from their home base in a region around that base to carry out their attacks. However the gradient of 0.84 does suggest that there is some bias to commit a number of offences rather closer to home than would be predicted from a simple circular model. In other words, the base is not at the centre of the circle of crimes.

This eccentricity is important because it may reflect a developmental process in which offenders travel further from home at some stages of their offending career than at other stages. The present data set is not large enough to test this possibility thoroughly although there are certainly anecdotal examples of individuals that illustrate it. Such a developmental process could interact with the commuter and

marauder models proposed. For although the marauder model was clearly the strongest candidate for describing the present sample there were a few individuals who illustrated a strong commuter process. It seems feasible that the differences between 'commuting' and 'marauding' rapists would be a function of the stages in their development as criminals. With a larger sample this could be tested by the relationship between regression gradient and criminal experience.

The representation of the ranges as circles is, of course, a simplification. The research of both Rengert and Wasilchick (1985) and Capone and Nichols (1975) indicate the possibility that, for North America at least, the expansion of cities from a central down-town may lead to the generation of more elliptical or even sectoral patterns to the geography of serial offending. The grid-pattern of North American cities may also mean that examination of distances between offences is more appropriately carried using city-block metrics rather than the crow-flight measures that were found fruitful for British data.

There are also arguments against the use of more specific models and concrete metrics for the data examined here. The number of offences per offender was relatively small in the current sample. As a consequence very detailed models of the geographical distribution of the offences is difficult to substantiate. Furthermore it seems very likely that the offences recorded are not all those perpetrated by the offender so models that were very restrictive in the spatial structure could be very misleading.

One further consideration is psychological question of what exactly is being modeled in the study. If the view is taken that the model is an approximation to the internal representation of the environment that forms the basis of the criminal's actions, then there is research evidence to suggest that for large complex cities crow-flight distances do capture important aspects of a person's 'cognitive map' (Canter and Tagg, 1975). Indeed Canter (1977, p. 90) reports that crow-flight distance estimates correlate better with both actual distance and actual time to travel around London than do time estimates, suggesting that crow-flight distances may be psychologically more primary than other forms of direct experience. Clearly this is an important issue which future research, with more data than the present, will need to explore.

The fact that rapists reveal strong domocentric behaviour serves further to strengthen the general power of the location of the home in structuring people's lives. It is clearly a process that is worthy of test in many other areas of activity, such as shopping behaviour, recreational activities search for work, or even search for new homes. In the criminal arena it offers direct prospects for practical application in the solving of crimes.

For although the area in which an offender may be living, covered by the circle in the present model, may be very large, nonetheless where detectives are attempting to assign priorities to a long list of suspects the limitations of the circle may still be of utility. It may be possible to reduce the area of the circle by introducing further refinements into the sub-samples of offenders on which the models are based, for example more impulsive offenders may travel shorter distances, or offenders in rural areas may travel further and so on. Research

exploring these possibilities has already produced some encouraging results. Investigative suggestions derived from specific studies have also been made available to police investigations with considerable success.

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**Note**

1. All the offenders presently being studied are male. The male personal pronoun is therefore intended only to refer to male persons throughout this chapter.

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