

Strategies Property Offenders Use in Spatial Decision Making

Thesis Submitted in Accordance with the
Requirements of the University of Liverpool
for the Degree of Doctor in Philosophy

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November 2004

ACKNOWLEDGEMENTS

First, I would like to thank Professor David Canter, for giving me the opportunity to follow my dream and for helping a confused student in organising her thoughts.

I would also like to thank the staff at the ARCH and Independence initiatives; the governors of Alt Course and Kirkham prisons and Wirral Probation Centre for giving me the opportunity to enter an unfamiliar world despite the time constraints and lack of manpower they face. I would especially like to thank Adrian McGrath for all his help and guidance and for making my visits to Alt Course prison an adventure. I would also like to thank all those who have given me their time and participated in the studies.

On a personal note, I would like to thank my mother for her encouragement. Louise, Brenda, and Natalia, thanks for all the brainstorming sessions and for those coffee breaks. I couldn't have asked for better office mates. Andie, thanks for all the support at a time of madness, and for the English. Galit and Amir, Galit, and Omer, thanks for following me all these years, for encouraging me to explore my vision and for being there when times were tough. Gaby, thanks for making me better and for being who you are. I couldn't have asked for better friends than you. Laura, thank you for the love, the support and the humour. You made a big difference.

Finally, this thesis is dedicated to Arie, who encouraged me to ask questions and to search for answers and to Eliezer Klingbeil, my grandfather, who made this journey possible. I hope you are both watching. Toda.

ABSTRACT

This thesis examines strategies property offenders use in their spatial decision making. A revised model of Golledge and Stimson's (1997) spatial decision making model offers the conceptual framework. This includes five stages of the decision making process i.e., goals, information search, cognitive maps, evaluating alternatives and spatial behaviour. It is hypothesised that by exploring offenders' cognitive maps, their background information and criminal activity, processes and factors which influence their spatial decision making will be revealed.

The hypothesis was tested by interviewing 28 property offenders. Sketch maps are used to extract a representation of series of crimes, and to facilitate in understanding psychological factors influencing offenders' spatial decision making. Two data sources available for analysis. Firstly, the offender's sketch maps provide a visual source of information. This includes 28 maps from the main study and in order to support the results 16 maps from an earlier pilot study are included in the analysis. Secondly, interviews with the offenders provide an additional source of information. The sketch maps are analysed using a revised classification system.

Information search is the first stage to be examined. The first aim is to establish the factors determining offenders' external information search. The second aim is to identify information gathering strategies. The results show that offenders use a variety of sources of information to acquire knowledge about possible locations and products. These include direct inspection, co-offenders and potential clients. Three search strategies are identified. These findings are compared to studies of consumer behaviour.

The second stage identifies the relationship between offenders' perceptions and spatial behaviour. This is tested by examining offenders' cognitive mapping skills in relation to their extent of search and mobility levels. Four mobility levels are identified. Contrary to existing models in criminology asserting offenders have a fixed base from which they travel, the results show offenders tend to live in several bases at a time or frequently travel from one home to the next. This is discussed in relation to their awareness space and cognitive mapping skills.

It is hypothesised that the more offenders travel the better their skill of cognitive representation of it will be. This will be exhibited in more detailed and complex sketch maps. The results show that occasional travellers draw more complex maps and focus on sequential elements. Offenders who invest in extensive and mixed search strategies draw primitive maps focusing on sequential elements.

The third stage of the model focuses on factors influencing offenders' choice between the alternative, which they become aware of through internal and external search. The discussion deviates from the traditional Rational Choice Theory and focuses on the concepts of constraints and preferences. Four choice strategies are identified and the discussion uses Bounded Rationality Theory, Prospect Theory and Cognitive-Experiential-Self-Theory (CEST) as a framework to explain offenders' choice strategies.

Finally, offenders' spatial behaviour is examined by testing the 'Circle Theory'. The aim is to identify strategies of spatial behaviour using offenders sketch maps of crimes they have committed. The circle hypothesis is expanded and two new strategies are identified. These strategies are discussed in relation to the offenders' extent of search and mobility levels.

The implications of these findings for understanding offenders' spatial decision making are discussed. There is no similar in-depth study of offenders' spatial decision making. Future research can build on the strategies identified in the various stages of the decision making process. This can provide a conceptual framework for considering the processes and factors influencing offenders' spatial decisions in other types of crime. The understanding of property offenders' decision making process can also improve geographical modelling of offenders' spatial behaviour and enhance policing.

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Chapter 1

Modelling Spatial Decision making

1.1. Introduction

Many attempts have been made to document the manner in which an offender uses his environment for criminal gain. As well as descriptive studies, attempts to explain variations between offenders in terms of their spatial behaviour have typically concentrated on the distances offenders travel from the home to the crime locations (Capone and Nichols, 1975; Rhodes and Conly, 1981), and the directions around the home in which they travel (Brantingham and Brantingham, 1981; Canter and Larkin, 1993; Canter and Gregory, 1994; Rossmo, 1995). These studies are of most importance to police investigations, especially ones involving serial offenders (Canter and Larkin, 1993).

Such research focuses on ways in which offenders use their environment. The emphasis is on the choice itself in the form of patterns of crime in urban areas or various strategies offenders' use in selecting crime site locations. This approach to offenders' spatial behaviour has two shortcomings. First, it deduces from the offenders' behaviours as to their perception of the environment and its effect on them. Second, it ignores the vital input the offenders can reveal, regarding their spatial behaviour and the processes involved in their spatial decision making.

This thesis follows Canter and Larkin's (1993) view, that each and every location used by an offender is of psychological and investigative importance. Hence, the interest of the present project is not in modelling the objective distances but in understanding the subjective aspects of spatial decision making, such as information search and cognitive maps. The main benefit of understanding offenders' spatial decision making is the insight it offers to the psychological significance of the relationship between locations.

Although attempts to explore the process of offenders' spatial decision making are scarce (Canter and Larkin, 1993; Carter and Hill, 1979; Rengert and Waselchick, 1985; Canter and Hodge, 2000), they do recognise the existence of a decision making process and the importance of understanding the subjective view the offenders have of the environment in which they operate. However, they lack a thorough explanation of the decision making process itself, the factors influencing it and the manner in which it affects offenders' subsequent spatial choices and actions.

There are many possible explanations why the literature is limited. First, the lack of research may be due to the fact that researchers of the geography of crime have only recently begun to consider the processes involved in spatial decision making. Second, the quality of data available in criminal contexts may be a constraint. Third, the lack of research may be due to an implicit assumption in psychology that the same principles and processes that are drawn upon to understand non-criminal behaviour cannot increase our understanding of criminal behaviour.

The aim of this thesis is to fill this gap in the literature. It aims to conceptually develop ideas proposed by consumer literature, where similar issues have been examined, and apply them to property crime. It follows Tibbetts and Gibson (2002), Carter and Hill (1979) and Baker's (2000) conclusion that criminals are comparable to non-criminals in the processes by which they interact with the immediate environment and in the motives that direct their reactions to that environment. However, Brantingham and Brantingham (1981) rightfully argue that when it comes to their offending activity, the offenders' goals make them notice the environment differently, due to the risks involved with getting caught and incarcerated.

Serial offences provide a wealth of information that is directly open to empirical test. Using property crime to explore the conceptual issues under study can be particularly helpful. Property crimes are common offences. They account for 78% of all crimes recorded by the British Crime Survey and for 82% of the total recorded crimes in 2001/2002 (Home Office, 2002). Furthermore, property offences are very definably located in space and hence, the environmental factors that predispose that site to be a target can be identified relatively easily.

In an attempt to examine the spatial decision making of serial property offenders and in order to provide a framework for explaining their mobility patterns, this thesis brings together elements of psychology, criminology, geography and economy. In order to explain offenders' mobility patterns this thesis examines offenders' interaction with the environment. An important distinction is being made throughout the thesis between objective and subjective space. The objective view assumes that space exists as a fixed quantity and people are located in this fixed space. On the other hand, subjective space is the space that is perceived by individuals (in Hodge, 1998).

The study of human interaction with the environment focuses on three specific areas of research (Garling and Evans, 1991):

- Environmental Cognition encompasses the cognitive processes involved in the acquisition and representation of predominantly spatial information in real world settings (e.g., structure of cognitive maps, formation and accuracy of cognitive maps, and how physical elements effect the acquisition and storage of information).
- Environmental Assessment focuses on people's evaluation and descriptions of the quality of the ambient environment (pleasure, arousal, and potency).
- Action focuses on the formation of preference and choice between alternatives.

Since these processes are inter-related and dynamic, this thesis focuses on the links between the three elements. Environmental perception includes both an assessment of what is in a scene, and an evaluation of the good and bad elements. The perceptual process involves actions by us. We bring expectations, experiences, values, and goals to the environment; it provides us with information. Our activity consists of three parts. First, an exploration how to orient ourselves in the environment. Second, to find strategies for using the environment to meet needs and goals. Third, establishing confidence and feeling of security within the environment (Bell et al., 1996).

Brantingham and Brantingham (1984) comment on this dynamic process in relation to offenders' decision making, suggesting that criminal behaviour can be viewed as a complex form of subjective spatial behaviour in which movement patterns depend on underlying mobility biases, knowledge, and experience.

This subjective space determines the potential areas within which an offence is committed. Similar to an individual's perceptual environment, subjective space is shaped by the individual characteristics, knowledge and experience of the offender. It is, therefore, argued that an examination of the subjective space will reveal differences that relate to the objective space. It is expected that uncovering the spatial conceptualisations and constraints upon the offenders will facilitate explaining the spatial patterns of their offences.

1.2. Models of Spatial Decision making

Decision making and choice behaviour represents two of the most significant behavioural processes in human geography. Unfortunately, these terms are often confused. Decision making is defined as a set of strategies that guide decision making behaviours as they appear to cover many possible scenarios (Golledge and Stimson, 1997). It is conceived of a process, which consists of a series of linked stages of activity, not simply a discrete action (McGrew and Wilson, 1982). The choice act is the outcome of the decision making process and is an end result or spatial manifestation of what has gone on during the decision making process (Golledge and Stimson, 1997). Some type of overt act normally reveals the choice.

In relation to offending behaviour, travel in large-scale environment entails decisions about which locations to visit, which routes to follow, which transportation mode to use and in which order to visit various locations. The outcome of this decision making process is called a travel plan and it links internal processes to actual travel behaviour (Saisa and Garling, 1987).

Existing models of decision making recognise that behind a decision there is a process. The decision maker identifies the problem, clarifies particular goals which are desired, examines the various possibilities of achieving the determined goal, and

completes or terminates the process by a choice of action (McGrew and Wilson, 1982). These sub-processes interact and their interaction is of great importance in the organisation and co-ordination of decision making (Einhorn, 1982).

Brantingham and Brantingham (1981) recognise that offenders experience a decision making process which leads to a choice of a crime site location. They explain that for a crime to take place offenders need to be motivated to offend and to be aware of opportunities around them. They go further to say that offenders search for information regarding the availability of such opportunities and will use cues to locate a variety of targets. However, their model remains general and does not test how these processes relate to spatial behaviour.

From that time on, writers who have discussed offenders' spatial behaviour have accepted the existence of such a process but only rarely examined its influence on the location choice itself. Hence, the criminological literature lacks a detailed discussion of the different stages of decision making and the strategies which offenders use that lead to a crime site location choice. This thesis aims to add to the understanding of offenders' spatial behaviour by examining these processes.

Models of spatial decision making have been developed over the past four decades, mainly in relation to consumer behaviour and residential behaviour. Carr (1967), for example, identifies phases in environmental interaction, which include,

- ***Directive Phase:*** When people's needs and purposes become sufficiently predominant to change their course of action.

- ***An Intelligence Phase:*** In which people search for new and relevant information from the environment and organise it to be retained, normally, in the form of memory representations. It contains significantly more information at any given moment than our cognitive capacity can deal with. In order to make something meaningful of it we have to condense it and relate it to the rest of our experience, past, present and future. Thus, we are by nature selective.

- ***A Planning Phase:*** The appropriate information is retrieved from such representations and transformed to be used in the generation, evaluation, and selection of possible actions. To make a plan is to transform information in such a way as to generate a course of action different from that in which the information was originally gained.
- ***An Action Phase:*** In which the plan or sets of plans considered as most appropriate is executed according to a specific environmental context. The form of the environment provides support for certain actions and constrains others. The significance of environmental form for human action is as much a function of how people perceive supports and constraints as it is of the physical form itself.
- ***A Review Phase:*** In which the effectiveness of the particular course of action is assessed in order to correct further action and to assign value and meaning to the experience.

The strength of this model is in the acknowledgement of the dynamic nature of the decision making process which is ever changing, and where each stage influences the next. However, an individual can generate a course of action similar to that in which the information was originally gained and still make a plan of action. Furthermore, the model is too simplified and does not explore each phase in detail or how the environment influences people who interact with it. Finally, it lacks elaboration as to how a choice is actually made.

Amedo and Golledge (1975) offered their own conceptual structure of an individual's decision making process, which was later modified by Golledge and Stimson (1997). As shown below their model divides decision making into two parts, the first and second motivated response.

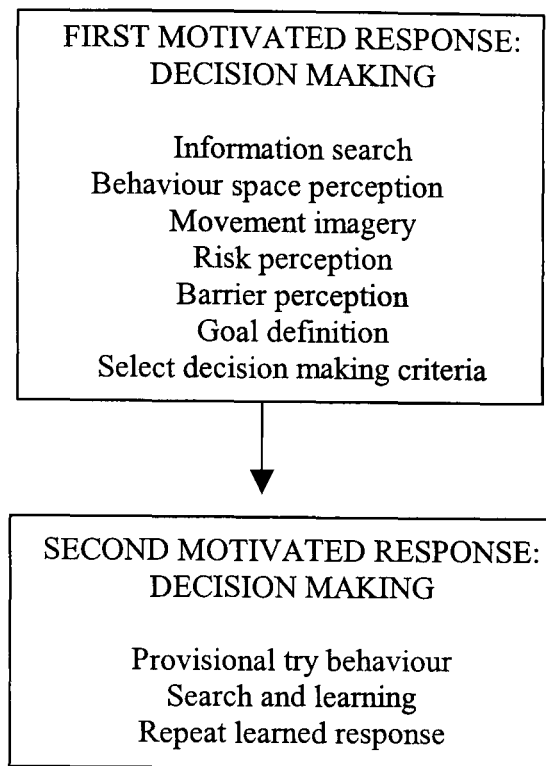


Figure 1.1: Conceptual structure of an individual's decision process (from Golledge and Stimson, 1997, pg 32)

First Motivated Act

Information Search: The search for information involves recalling stored information into a working memory at the individual level and a search for external sources of information, such as the media or interpersonal contact or communication (by phone, fax etc.).

Behaviour-Space Perception: This involves accessing information contained in one's cognitive map. This can occur in either spatial or non-spatial context. In a non-spatial context it can relate to a product attribute (e.g., if searching for food, chewiness and colour are relevant attributes.). In the spatial domain, the behaviour space may consist of a subset of the cognitive map structures in working memory as an image or survey type representation of an environment.

Within the behaviour space, specific paths that could be followed to the ultimate destination are reviewed. Criteria such as minimising distance, minimising time or effort and so on (i.e., rules for path selection of a given destination choice) are accessed. Also at this stage expectations are formalised in terms of constraining

criteria, such as economic or spatial rationality, bounded rationality, satisficing, or minimising regret. These criteria are the ones used to help solve conflict situations among possible alternatives identified in the behaviour space.

Activating the Cognitive Map: The appropriate components of the cognitive map are assembled in working memory and selected decision making criteria are applied to the alternate strategies that could be initiated. For example, alternative paths that could provide access to a goal object may be evaluated in terms of time or distance or even authority constraints on travel.

Movement Imagery: This stage is sometimes referred to as the development of a travel plan (Garling and Golledge, 1989). Barriers to movement may be imaged. These may include distance, cost, time, preference, attitude or desirability. Each of these may be constrained in turn by societal or cultural factors, such as accessibility by a particular ethnic group. The physical process of moving from an origin to a destination must be imaged as well. This involves selecting a mode of travel. The selection of mode of travel depends on availability of modes within the economic and social system in which the decision making unit is located. Conflict resolution becomes a significant part of movement imagery. Barriers that are perceived to occur as a result of physical, societal, or cultural dimensions of the setting in which decisions have to be made must then be reconciled. Once this has been accomplished the behaviour can be implemented.

The Second Motivated Act

The Choice Act: A selection of a specific location represents the choice act. Choices are the results of decision making processes. The decision-maker does not have perfect knowledge, a perfect cognitive map, and perfect awareness of the rules of reasoning and inference that allow the decision making procedure to be integrated and implemented.

The strength of Golledge and Stimson's (1997) model is in the inclusion of the spatial context to decision making process in conjunction with existing models of decision and choice making. Their model emphasises the progressive and accumulative nature

of the decision making. The second motivated response is crucial as it encompasses the dynamic make-up of this process given that individuals constantly learn, evaluate and grow with experience.

However, the stages proposed ought to be approached differently. The starting point should be with the definition of a goal. This is similar to the directive phase Carr (1967) proposed. In Golledge and Stimson's (1997) model information search is very limited. In order to enhance decision making offenders need information that is useful, accurate, easy to understand, affordable, and accessible. The processes through which information levels are built is inextricably linked to the process by which discernible travel patterns emerge over a period of time: the individual gathers information in the course of travelling around the city, while at the same time information levels influence the choice of trip destinations. These two processes interact, each effecting change in the other (Hanson, 1986).

Therefore, the model should consider spatial and non-spatial domains. Offenders are expected to not only search for a specific product but also search an area for opportunities. On the other hand, the discussion about perception and spatial behaviour should focus on the spatial aspect of imagery. Barriers to movement are vital to understand in relation to choice of travel rather than to mode of transportation.

Thus, components of the first motivated response are re-arranged and the discussion regarding offenders' spatial decision making will revolve around five main stages in the decision making process:

Goals	Goal Definition
Information Search	Mode of Travel
Cognitive Maps	Movement Imagery
Evaluating Alternatives	Select Decision Criteria
	Risk Perception
	Barrier Perception
Spatial Choice	Strategies in spatial behaviour

1.3. Goals

The goals that property offenders aim to achieve have been well documented. The most common goals are financial gain, social acceptance, emotional relief, and excitement. (Krsnovsky and Lane, 1998; Schlesinger, 2000; Walsh, 1978). The most obvious goal in the commission of property crime is financial gain. This has often been attributed to drug use. Krsnovsky and Lane (1998) summaries studies describing the hustling careers of many addicts. There is evidence that criminal activity precedes involvement in drugs than that drugs preceded crime. It has also been noted that arrests for property offences decline with decreasing frequency of drug use.

Walsh (1978) claims that excitement may be a goal in itself for many criminals and be seen as a game rather than an offence, as viewed from the offender's viewpoint. The excitement arises from committing an act knowing it is forbidden, together with an uncertain outcome.

Schelsinger (2000) suggests that group pressure and subgroup values are particularly important factors to juvenile crime. Individuals who feel alienated, angry and lack success in socially desirable avenues may aim to promote a sense of power and belonging generated by a group.

1.4. Information Search

As mentioned above, decisions that offenders make about the amount and type of information to acquire when evaluating potential crime site locations are a fundamental aspect of their decision making process. Nevertheless, offenders' access to information has been subject of very little attention in the literature.

There are several reasons for giving attention to information search. First, search is a method by which offenders develop a set of alternatives for consideration and cues or reasons to make a choice among these alternatives (Gigerenzer and Selten, 1999; Miller, 1993). Therefore, understanding the decisions that offenders make about the amount and type of external information they need to acquire is an inherent part of the explaining their decision making process (Maute and Forrester, 1991). Second, police

forces will benefit from understanding search behaviour in terms of distribution of search areas and communication between offenders.

Information search is defined either explicitly or implicitly as “the degree of attention, perception, and effort directed toward obtaining environmental data or information related to the specific purchase under consideration” (Beaty and Smith, 1987). There is a distinction between external and internal search.

Internal information search refers to peoples’ retrieval of memory knowledge from previous search, experience with products, or passively acquired information during normal daily activities.

External information search includes consulting with friends, family, expert consumers, sellers, third party sources, reading books, magazine articles, advertising, and direct inspection (Beales et al. 1981).

1.4.1. Offenders’ Information Search

Rengert and Wasilchick’s (2000) study is the only known attempt to directly explore offenders’ search for information. They interviewed 37 convicted burglars about their search behaviour and target selection. While their study is important in introducing the notion that offenders use existing knowledge and external factors in expanding their awareness space, it lacks empirical analysis and discussion of specific factors and processes involved in information search.

They claim that they “are trying to understand the decisions made by burglars when they evaluate their environment” (pg. 60). However, they only focus on suburban burglars who are convicted of an average of 2 burglaries. It is not clear why they chose to focus only on burglars who operate in the suburbs, rather than interview the general population of burglars in a particular city. Furthermore, the offenders were asked about a very limited number of crimes, which prevents the authors from drawing conclusions about their patterns of behaviour.

Their model assumes that “the criminal is actively engaged in the criminal evaluation and use of space. Because of this, the model will not be useful in evaluating the special cases of opportunistic crimes and criminal opportunities discovered through secondary sources such as fences or friends” (pg. 64). One of the drawbacks of their study is that opportunistic crimes are excluded from it. Offenders’ active search behaviour is likely to lead directly to the discovery of opportunities and therefore will be a key factor in target selection. Finally, there is no clear discussion of offenders’ use of sources of information.

Their conclusions, therefore, lack the backing of a solid empirical framework and they make vague statements, which leave the reader with more questions than answers. For example,

- “Successful, high level burglars often rely heavily on information from inside sources in planning their crimes” (pg 73)- It is not clear what constitute a successful burglar; How do offenders who are not successful behave; Is there evidence that some offenders use third party source and some do not.
- “They (offenders) do not give equal consideration to all the area they are aware of in their criminal evaluation of space” (pg. 82)- It is not clear what supports this statement and how offenders differ, if at all, from people in general.
- “When secondary information sources are used, crime sites are located in all directions and at greater distances from the burglar’s home” (pg. 79)- It is not clear whether the source of information effects the distances offenders travel?

This thesis aims to develop this aspect of decision making further by empirically examining the factors influencing information search and identify strategies offenders’ use as they search for information. Since the study mentioned above is singular, the present study analyses the offenders’ behaviour using concepts which are derived from non-criminal spatial behaviour literature. It relies on studies of consumer behaviour and residential mobility, where the issues of utility, location choice and travel apply as well (Golledge and Stimson, 1997; Garling, 1989).

1.4.2. Determinants of Information Search

In treating information like any other commodity, economic theory suggests that rational consumers will gather information up to the point where marginal cost exceeds the marginal benefit derived from additional information (Stigler, 1961; Moore and Lehmann, 1980; Maute and Forrester, 1991). The majority of search statistics suggest that consumers spend little time searching for information, consult few sources, visit few retail stores and consider only a limited number of alternatives prior to purchase (Newman, 1977; Beaty and Smith, 1987; Guo,2001).

These studies have identified a variety of individual, situational and market environment variables that affect the nature, extent and duration of external information search through their influence on consumer perceptions of search benefits and costs (Newman, 1977). Beaty and Smith (1987) updated the classification scheme of search determinants developed by Newman (1977) and later refined by Bettman (1979), Moore and Lehmann (1980). Beaty and Smith's (1987) collected mail survey data from 351 customers across five product categories (e.g. various televisions, video recorders, and computers) as they examined the relationship between external search effort and a number of motivating avariables.

1. Market environment

- Number of alternatives
- Complexity of alternatives
- Store distribution (distance)
- City size of residence

2. Situational variables

- Time pressure (urgency, immediate need)
- Social pressure
- Financial pressure
- Ease of access to information sources

3. Potential payoff/product importance

- Price

- Perceived risk
- Differences among alternatives
- Number of crucial attributes

4. Knowledge and experience

- Stored knowledge
- Usable prior knowledge
- Previous information and experience
- Satisfaction (with past results)
- Brand loyalty/preference

5. Individual differences

- Ability
- Approach to problem solving (dependence on others)
- Approach to search (positive approach towards search)
- Demographics (education, age)
- Personality

6. Conflict and conflict resolution strategies

7. Cost of search

According to cost-benefit theory any variable increasing benefit of search and/or decreasing search cost will be positively related to search activity, whereas variables increasing cost of search and/or decreasing search benefit will be negatively related to search effort (Guo, 2001). For example,

- Information accessibility, price, enjoyment of search, influence search behaviour by increasing benefit of search, decreasing search cost or increasing benefit and decreasing cost. Some variables, such as complexity of alternatives, product differences, and variation in retail operations increase cost but increase benefit as well. In this case there is a positive relationship between the variables and search behaviour.

- Satisfaction with a product/service in the past attenuates search effort because it lessens potential benefits of extra search. Also age diminishes search effort and brand loyalty abates search benefits and increases cost of search in that the willingness to search for new information about unknown products is reduced. Thus, it is negatively related to search behaviour.
- Some variables such as experience and product knowledge have an inverted U or U relationship with external search. Experience has a varying degree of impact on search cost and benefit along the continuum of amount of experience. The key determinant of search behaviour relies on the net effect of search benefit and cost. When consumers perceive increased net benefits, they search more along experience; when net benefits decrease as the amount of experience exceeds a certain point, search efforts tapers off.

Routine activity theory (Cohen and Felson, 1979), which has been used to explain offenders' spatial behaviour, asserts that offenders choose opportunities for crime through their daily activities. The theory incorporates the cost-benefit approach. Thus, the theory would expect offenders to be similar to consumers in their aim to minimise the costs of search and maximise the benefits. Therefore, factors such as time constraints, perceived risk, perceived price are expected to influence offenders' search behaviour.

1.4.3. Information Search Strategies

An understanding of the process of information search can not be accomplished without studying the manner in which offenders actually acquire information about potential locations. Consumers gain information from different sources (Lee and Hogarth, 1999, 2000). These normally include:

- *Seller Provided*- Direct from seller and advertisement
- *Personal*- Family and friends
- *Third Party*-Ratings, real estate professionals
- *Direct Inspection* –

As Lee and Hogarth (2000) indicate “information search is difficult to quantify”. Newman (1977) identifies five measures of consumers information gathering strategies:

- ***Number of Stores Visited-*** Majority of buyers visited only one store prior to purchase.
- ***Number of Information Sources-*** Majority of buyers used only one source of information.
- ***Number of Types of Information Sought-*** Only 35% of major appliance buyers considered more than one feature in addition to price and brand.
- ***Numbers of Alternatives Considered-*** Many consumers limit their attention to few alternatives.
- ***Purchase Decision Time-*** Many consumers appear to have short purchase decision times. The higher the value of the purchase and the greater its effect on an individual’s life, the more extensive the search is.

Beatty and Smith (1987) identified four search factors as well.

- ***Retailer Factor-*** Number of trips to retailers
- ***Media Factor-*** Number of ads recalled
- ***Interpersonal Factor-*** Number of opinion leaders used
- ***Time Factor-*** Introspection and search time

Studies of consumers search behaviour vary between the use of a single aspect of behaviour or aggregate measures of search. They employ a variety of methodologies such as survey (Beatty and Smith, 1987), field experiment (Moore and Lehmann, 1980), laboratory experiment (Lehmann and Moore, 1980), interview (Newman and Staelin, 1972) and protocol analysis (Bettman and Park, 1980). The most common measure generally includes a variety of self-report procedures.

Guo (2001) criticises these measures since they are based on events, which occurred many months after the completed purchase, and selective retention and forgetting may reduce the validity of these measures. Furthermore, they have often been used as

single measures of search, which precludes the development of reliable, multiple indicators.

These concerns are important to note. However, the methodologies used in consumer behaviour may not apply in studies of offender behaviour. For example, offenders' search behaviour cannot be done in a laboratory or as a field experiment. Therefore, this thesis focuses on interviews with offenders. Interviews will be used to extract information regarding the sources of information the offender use, the type of information they search for and the strategies they use in their search behaviour.

1.5. Cognitive Maps

1.5.1. Imagery and Behaviour

The discussion above focused on external information search. The following section focuses on internal information and the relationship between perception and behaviour. Cognitive maps are cognitive processes that enable people to collect, structure, store and manipulate environmental knowledge (Downs and Stea, 1973; Murray and Spencer, 1979; Saarinan et al. 1988). This information is used in shaping people's attitudes of the world and affects their behaviour patterns, thus making it a vital part of the spatial decision making process.

Trowbridge (1913) was one of the first to comment on the way people perceive their environment. He notes that some people in a city always seem to have a good sense of orientation, while others are more easily lost. Some are able to move around the urban landscape as long as they remain on familiar ground, but in unfamiliar surroundings they quickly become disoriented.

Toleman (1948) first used the term 'cognitive map' to describe how rats, and by analogy, people behave in the environment. Since then numerous studies have been carried out into the concept of what has become known as cognitive mapping. Downs and Stea (1973) define cognitive mapping as:

“a process composed of a series of psychological transformations by which an individual acquires, codes, stores, recalls and decodes information about the relative locations and attributes of phenomena in his everyday spatial environment.” (pg. 9)

Kitchin (1994) states that one of a cognitive map's functions is to rehearse spatial behaviour in the mind so that when people actually travel they can act with a degree of assurance that they would otherwise not have. Thus, an understanding of the processes and resulting images individuals' hold of their environment is essential to an understanding of their spatial behaviour.

One common theme running through research in this area is the idea that people's information about a particular area will vary considerably and the mental images they build up may reflect not only their surroundings but also many other aspects of themselves and their lives. In addition, people's cognitive systems contain information not only about where places are but what they are, what is likely to happen within them and who is likely to be present (Canter, 1977). In the same way, a property offender's cognitive system will contain information about where crime sites are and how likely a successful offence will be at each location (Hodge, 1998).

Few attempts have been made to draw on cognitive maps in order to understand criminals and their choice of crime location (Canter and Larkin, 1993; Carter and Hill, 1979; Rengert and Waselchick, 1985; Canter and Hodge, 2000). Carter and Hill (1979) were the first to propose a conceptual approach which explores how individual criminals perceive their urban environment and how they make criminal spatial choices in response to opportunities. They claim that criminal activity varies in an apparently systematic fashion in urban areas, resulting in regularised patterns of type and intensity of crime. They hypothesise that criminals possess generalised mental images of their urban surrounding (similarly to other residents) which guide their choice of targets and account for the observed crime patterns. Their sample of 83 incarcerated property offenders who were convicted of burglary, robbery and larceny was interviewed about their perceptions of crime levels and risk levels in various areas of the city. These were compared with the geographic distribution of known

crime. The specific attributes of areas as perceived by the criminal (e.g., familiarity or other attributes) were then compared with the actual crime rates.

Carter and Hill (1979) recognise the importance of the symmetry between behaviour and image. Their premise is that environmental images exert considerable influence on human behaviour and respectively behaviour influences one's image of a place or a situation. The manner in which a criminal behaves is relevant to his perceived environment. Through information the offender becomes aware of different opportunities. The individual's level of knowledge of any environment is a function of his experience in that environment.

Carter and Hill (1979) also discuss the process of environmental learning as a multistage process and argue that once the offender chooses a target and commits the crime, both his mental image and his environment are affected. His mental image is affected because the outcome is either as expected, which confirms his feelings and adds to his learning or the outcome was unexpected, which also contributes to his learning about the area. Confirmed expectations increase the probability that he will return to the area in the future, while unconfirmed expectations decrease this probability.

Carter and Hill (1979) explain the dynamic relationship between offenders perception and behaviour. However, they do not examine the content of the knowledge the offenders have gained or how they process such information, which in turn leads to a choice to travel or avoid an area within the city. Furthermore, they only test racial disparity between black and white offenders rather than testing for variation between different types of criminal. Nevertheless, their study brings to the front the significance of the relationship between the subjective and objective environment and its influence on spatial behaviour. It also is the first empirical attempt, in this area of research to appreciate the input provided by the offenders regarding their behaviour and thought process.

In their book 'Suburban Burglary', Rengert and Waslchick (1985) also examine the relationship between spatial perception and the criminal use of space and explain that spatial awareness is the result of a learning process encompassing a variety of

information sources. This learning process may be either active or passive depending upon the information source. Passive learning journeys are characterised by habit. These journeys are travelled regularly through day-to-day activities. In everyday activities such as travelling to work, shopping or a social occasion, people passively assimilate spatial information.

It has been documented in studies of consumer behaviour that people seldom try more than three alternatives before settling on a specific route that becomes routine (Hanson, 1986). Changes to this travel pattern are resisted after this habitual route has been decided. Relatively little additional spatial knowledge is gained after the initial exploration to find the best route. People tend to ignore spatial information around them unless something unusual gets in the way.

On the other hand, the purpose of spatial activity in the active learning process is to obtain information for later use. The environment is actively examined and evaluated for its usefulness. According to Rengert and Waslchick (1985) unfamiliar territory is entered either by extending a known activity path into unfamiliar territory or by travelling in a different direction that leads to new places at shorter distances.

Rengert and Waslchick (1985) discuss two opposite settings of criminal activity in relation to spatial learning and perception. First, they suggest that offenders who learn passively about their environment operate close to home in familiar areas and will commit opportunistic crimes. They state that opportunistic crimes are not actively sought out, and usually no planning is involved. They add that in most cases the crimes are located well within the individual's daily activity space. The second scenario involves the criminal who is actively engaged in the criminal evaluation and use of space. He is expected to plan his offences as he travels to more distant and less familiar locations.

Rengert and Waslchick (1985) predict that crime which is closest to home will be opportunistic, and will take place during the criminal's daily activities. Next are crime situations located through the criminals' evaluation of places he knows about. Finally, the farthest are crime situations located through spatial exploration. Randomly

distributed among and along this continuum are criminal opportunities identified by secondary sources.

This model considers the relationship between spatial learning, level of planning, and distance. However, it is too general and simplistic and does not take account of those offenders who are opportunistic in areas, which are unfamiliar, or for crimes in areas the offenders are familiar with but are not part of their daily activities. Also, they argue that criminal activity will be an extension of habitual paths rather than travel in unfamiliar direction. However it remains unclear whether a cognitive map and familiarity of one's immediate environment can assist in learning new areas and in selecting targets in it. This thesis will test these issues and will discuss them in relation to the other stages in the decision making process.

There are some further methodological points that need to be addressed. First, familiarity was measured by asking the offenders to rate how well they knew a place on the scale from zero to ten. Rengert and Waslchick (1985) claim that burglars were most familiar with areas close to their home. But there is no definition of what comprises a home area. Furthermore, people's perception of familiarity is subjective. What one person may define as familiar another may not. This is a valuable information to the relationship between perception and behaviour which this study leaves unexplained. This thesis will use sketch maps in order to directly gain this information.

Second, they emphasise the journey to work "because of its influence in determining the likely direction of criminal activity from the burglar's residence". They claim that many locations were located just off the familiar path from home to work. This claim is surprising considering offenders are likely to be unemployed. Third, the offenders in the sample were convicted of an average of 2.69 offences. Thus, the discussion does not include 'professional burglars' or an analysis of series of offences.

Rengert and Waslchick (1985) also remain unclear in how passive journeys are relevant to criminal activity. They make a general claim that 'the habitual spatial paths of passive journeys tend to directional orient criminal activity' (pg. 72), but they do not empirically test how offenders perceptions and habits influence their criminal

activity or whether information search influences their perception of the environment and in turn their exploration of it, which the present study will.

Canter and Hodge (2000) build on these earlier studies and contribute to this topic by examining strategies offenders' use in their crime site selection. They refer to studies in the fields of Environmental Psychology and Environmental Criminology. They attempt to develop general principles to characterise the geographical patterns of individual offenders rather than the earlier focus on aggregate patterns of samples or populations of offenders' in particular locations.

They suggest that without knowing how those individuals see the geography of their crime, the maps produced by cartographers can only be seen as a relatively superficial account of the effect of criminals' actions with only indirect hints of their causes. They maintain that limited spatial mobility of offenders can be explained by their limited mental maps that structures their activities. They also point out that the awareness of these psychological structures encouraged researchers to examine how locations of crimes could be modelled in general as schematic systems rather than as particular geographical instances (Brantingham and Brantingham, 1981).

They illustrate the potential of understanding offenders' ways of thinking about their crimes and the locations in which they commit their offences, by asking them to draw maps that indicate where they have committed their offences. This procedure was devised by Kevin Lynch (1960). Lynch (1960) asked people to draw sketch maps of their cities. His early studies of Boston, Jersey City and Los Angeles reveal people's limitation and distortions which are seen as indicators of the cognitive processes that shape people's transactions with their surrounding.

Lynch (1960) describes the processes involved in people's perception of three cities (Los Angeles, Boston, and Jersey). He identifies 5 content categories, which people use to recognise and organise the environment by:

- **Paths**- Paths are channels along which the sketch mapper moves. This may include streets, walkways, railways.

- **Edges-** Edges are the boundaries between two phases, linear breaks in continuity such as shores, walls.
- **Districts-** Districts are the medium to large section of the city which have an identifiable character.
- **Nodes-** Nodes are specific points in the city into which an observer can enter. These can be junctions, places of break in transportation, a crossing or convergence of paths or concentrations of some use such as a street corner for hangout or an enclosed square.
- **Landmarks-** External point reference, such as building, sign, store, or mountain

His study is significant for several reasons. First, it reveals that people describe different environment with varying emphasis on different elements. Second, the features represented on these maps are of symbolic meaning to the individual and therefore provide an insight into the meaning of places to them.

Canter and Hodge (2000) state that an exploration of subjective and internal mental representation is notoriously difficult. They discuss the methodological difficulties of using sketch map yet assert that there is no doubt that important aspects of the respondents conceptual system are indicated by what they choose to draw and how they choose to draw it when asked to draw a map from memory. They present four examples to illustrate the ways in which criminal activity can be more fully understood if the mental representations that criminals have of where they commit their crimes are explored. They also show that by asking offenders to draw maps of where they commit crimes insight into the offenders approach to offending is revealed. They argue that sketch maps alone can be misleading and that background information is required. They conclude that sketch maps should be used as a tool to help focus an interview, which explores criminals' lifestyle and offending career.

The three studies discussed above focus on patterns of crimes in various urban areas or on the strategies offenders used in selecting various crime site locations. The authors recognise the relationship between imagery and behaviour, but they lack an encompassing discussion of the decision making process itself and an examination of the intervening factors influencing it. This thesis expands on these issues and tries to

identify the relationship between offenders' imagery and their spatial behaviour. Therefore, the offenders' cognitive mapping skills will be more thoroughly explored.

1.5.2. The Nature of Cognitive Maps

The majority of non-criminal research of people's imagery concentrates on "designative" aspects (Knowx, 1996) and investigates cognitive organisation of space necessary to orientation within the urban environment. These types of studies try to identify the strategies people use to learn about the environment in deciding whether to go somewhere; why go there; where is that destination; how to get there (Cadwallader, 1976; Garling et al. 1985). They are most similar to previous studies of criminals' spatial behaviour and cognitive maps.

The affective aspects of imagery reflect people's feelings about the environment. This is revealed by the desirability or attractiveness of different neighbourhoods or residential locations. Surprisingly, these aspects received relatively little attention (Wood and Beck, 1976, 1990). In terms of criminal behaviour, these aspects have been addressed by even fewer researchers and have focused on the attractiveness or deterrents of specific targets (Thompson, 2002).

There are several theories as to the nature of cognitive maps. Theories about its structure are divided between (1) non-hierarchical (Kaplan, 1973a,b,c), (2) hierarchical (McNamara, 1986; Stevens and Coupe, 1978) and (3) schema theories (Medyckyj-Scott and Blades, 1992). The hierarchical theory is the most common one:

(1) The hierarchical theory asserts that spatial knowledge is structure as nested levels of detail. Siegel and White (1975) suggested that cognitive maps are hierarchically organised into three different levels: landmark, route and configurational knowledge.

(1.a.) *Declarative (Landmark) Knowledge* is the database of what is in the environment. It consists of lists of objects, persons, things, events and places (Golledge, 1992). Declarative knowledge structures of a given environment differ among different people. The combination of unique individual information sets (e.g.

an individual's home, workplace and favourite recreational locations) makes up personalised knowledge structures of an environment.

(1.b.) *Procedural (Route) Knowledge* consists of rules used to synthesise declarative knowledge into information that can be used to facilitate an action. The term embodies within it the knowledge of specific paths through complex environments, an ability to preview and pre-process information to help in developing a travel plan and heuristics to translate plans into spatial activity. This type of knowledge requires an ability to order or sequence information about location cues, distance segments connecting those cues, ability to determine direction and orientation and an ability to estimate the nature of barriers that might occur along a given route. This implies an ability to modify a travel plan when required.

(1.c.) *Configurational (Survey) Knowledge* is the highest level of knowledge. Both landmarks and routes are organised into clusters with metric properties, which produce survey knowledge. It incorporates information about angles, orientation, and direction and distances between places. This comprehensive spatial knowledge system is the basis for making spatial inferences and propositions (Kitchin and Blades, 2002). Studies have shown that configurational knowledge can be learnt very rapidly through travel, although accuracy and completeness may take longer to develop. While Golledge (1978) emphasises the role of landmarks in the learning process, Garling et al. (1981) argues that routes are learnt before landmarks.

(2) Non-Hierarchical- Non hierarchical theories contend that cognitive map knowledge is structured in a holistic fashion, does not contain nested levels of detail or separate codes for global or local properties, and therefore lacks any hierarchical structure. There are two principle ways of achieving such holistic structures: propositional networks and analog images or the combination of both. Kaplan (1973a) argues that a cognitive map is a network of representations coding both places and the sequential relations among them (Beck and Wood , 1976)

(3) Schema- The schemata provide a framework or outline of essential information about places or events that are derived from past experience and that can aid recognition and learning of new environments. For example, when visiting a new city

for the first time past experiences from visiting other cities can help make assumptions as to the layout of the city.

There is a further disagreement regarding the map form. The first view proposes that information can be in map-like units and preserve Euclidean properties of the world (Kosslyn et al., 1978; Thorndyke, 1981). The analogy is of 'a map in the head' being functionally identical to a graphical map (Kuipers, 1982). Downs and Stea (1973) used the term 'map' to represent a functional analogue. The focus is on a cognitive representation which has the functions of the familiar cartographic map but not the physical properties of such a pictorial graphic model. Pylyshyn (1981) on the other hand, claims that people store information as conceptual propositions and do not use imagery when processing information unless they are asked to do so (Kitchin and Blades, 2002).

McNamara (1992) concludes that when people learn a spatial layout they may construct two representations, metric and non-metric representations. For the most part, the term map as used in cognitive mapping is more of a metaphor than a strict analogy (Downs, 1981). Furthermore, knowledge of a place is based on much more than the information provided in a map. It also includes the unusual and striking components and functional landmarks which serve as sub goals in one's path (Kaplan, 1973b). Our spatial experiences with object in an environment are often determined as much by non-spatial as by spatial properties of the objects (McNamara, 1992). Consequently, cognitive maps are expected to have incomplete knowledge with a distorted representation of real world environments (Golledge and Stimson, 1997; Kitchin, 1994, 1996).

There are many factors influencing the acquisition and development of cognitive maps. *Experience*, for example, assists in translating gained information into metric information and configurational knowledge. This can be affected either by the environmental characteristics (such as city layout, size, barriers to movement, distinctive feature) or by the type of experience in the environment (direct or secondary) (Kitchin and Blades, 2002).

Education

Studies suggest contradicting results that with age and education the knowledge structure develops (Orleans, 1973; Golledge and Spector, 1978). Appleyard (1970) found structuring differences between educational level. This was explained by varying ability to conceptualise. The less educated employed no common method of structuring. They tended to draw either very simple or complex maps, with most of them being simple. The parts were also inaccurately related. These maps conveyed a strong sense of personal experience, describing their own journeys rather than the physical form of the transportation system. The more educated groups were able to draw the city more objectively, fitting their maps together more coherently, inferring more about the city.

Travel Mode

Variations in travel mode have been shown to be responsible for influencing structuring style (Appleyard, 1970; Golledge and Timmermans, 1990). Appleyard (1970) in his study of inhabitants in Ciudad Guayana found that travel mode effects map type. Those mainly using cars to get around the city tended to draw more survey maps and those relying exclusively on buses only rarely produced coherent maps.

Familiarity

Familiarity is a catch all term. Gale et al (1990) suggest four dimensions of familiarity.

- ❑ An ability to identify a place by recognising its name or label
- ❑ An ability to recognise a place when shown an image of it
- ❑ Being familiar with a place by knowing where it is
- ❑ Interaction frequency

The familiarity of a place appears to influence the accuracy of spatial judgement and influence the type and amount of error attached to a place in the cognitive map or internal representation of a layout (Golledge, 1992). With increasing familiarity maps

become more detailed and spatial elements are more common. However, studies have shown that people acquire most of the information within the first few experiences with the new environment and then expand on the initial learning (Garling et al. 1981; Spencer et al., 1989).

Familiarity has normally been linked with experience and length of residence. But these do not necessarily mean more interaction with particular area as an individual may be a passive explorer or never move far from residence (Kitchin and Blades, 2002). Golledge et al (1969) suggest that people with greater familiarity have cognitive maps, which are closer to actual maps than those who are less familiar (in Mackay et al, 1975). Kaplan (1973b) concluded that familiarity with a variety of settings leads to a sense of mastery.

Mobility

Murray and Spencer (1978) found that high geographical mobility may lead an individual to develop their cognitive mapping skills and produce maps, which are more adequately organised and more complex. This is because individuals who have experience of a considerable number of places develop an approach to both novel and familiar areas, which allows for a rapid, structured and efficient imaging of such places. Offenders' mobility and familiarity received great attention in the literature (see section 1.7).

The aim of this thesis is to examine these factors as they are expected to be relevant to offenders. This thesis will also examine the relationship between these factors and other stages of the decision making process. For example, how the first stage of the decision making process (i.e. information search) influences offenders' cognitive mapping skills.

1.6. Evaluating Alternatives

Once offenders have gathered information and perceived areas they are aware of, it remains unclear how they select between the alternatives available to them and choose a location to offend in. The aim of this thesis is to identify these factors and explain them in relation to offenders' crime site selection. As documented above, information often needs to be acquired, and its evaluation takes time, which may be needed, for other tasks. The concept of preference is important because it brings together the internal mental life of a person (i.e, cognitions, motivations, and emotions) and overt behavioural responses within one framework.

Identifying why offenders select travel areas is an important factor in understanding their activities as it is to know what stops them from travelling to certain areas. There is a relatively small number of factors in everyday life that impose upon all individuals and constrain their freedom to occupy certain space and time locations (Golledge and Stimson, 1997). This means that offenders have to adopt 'strategies' for using a limited quantity of information to the best possible effect. It is hypothesised that when these strategies are identified, it will be possible to deduce reasons as to why an offender follows one path rather than another. This has major implications in terms of advancing academic knowledge of offending spatial behaviour but also to police investigations in terms of predicting future behaviour and minimising search areas.

Most researchers suggest that the rational decision making model, as proposed by Cornish and Clarke (1986), is the appropriate method of explaining offenders' travelling choices. As a utility based conception of criminal behaviour, this school of thought focuses on the risks, rewards, opportunity structure, and causal influence of several variables for different types of crimes. The main premise underlying rational choice theory is that crime is a chosen activity because the anticipated benefit it brings to the offender outweighs the perceived cost associated with committing the crime. The benefits are not only in terms of material gain but also emotional satisfaction. The risks or costs of crime are those associated with formal punishment and apprehension.

Rational decision making varies in definitions, yet rationality has a common core of meaning, which can be summarised as

- A distinction between ends/goals on the one hand and means to achieve those goals on the other
- Some rules for evaluating the costs and benefits of each alternative means so as to
- Select the best or optimum solution to the decision problem (McGrew and Wilson, 1982)

Rational choice theory draws from a variety of different theoretical traditions, including concepts from criminology (such as conflict, control, deterrence and incapacitation), economics (expected utility, reasoned action, bounded rationality), and psychology (social learning, risky decision making). Originally, the theory followed the principles of the 'economic man' who evaluated every possible alternative and did not suffer from any real-world constraints. The rational man of economics is a maximiser, who will settle for nothing less than the best option.

Cornish and Clarke (1987) accept the problematic nature of this model and state it is sufficient for the decisions to be based on the evaluation of gains and costs by the offender, even if not consciously. Offenders are likely to be influenced by the characteristics of the crime itself, such as the location of the offence and the possible response from the victim and respond selectively to the characteristics of particular offences (opportunities, costs and benefits) in deciding whether or not to displace their attention elsewhere (Rhodes and Conly, 1981). The behaviour itself does not have to be carefully premeditated in order to be seen as rational.

Despite this deviation from the normative approach, the theory suffers from a number of notable limitations. First, rational choice theory focuses on the objective properties of the immediate criminal situation and pays little attention to the subjective influence of emotions on offender decision making. As mentioned above an offender is not always seeking economic rewards as seen in the rational model. The offender may combine a variety of non-economic needs, for example, excitement, having a good time, increasing peer group status, or a combination of these variables. Secondly, the

theory consists of potential explanations of a criminal's decision making and action processes, but is stated in descriptive terms, which cannot be empirically tested. Thirdly, the theory assumes offenders are knowledgeable. However, often times the offenders are in uncertain situations. It is an inevitable product of social and economic systems where individual, institutional and systems constraints exist. Furthermore, rational choice theorists have largely ignored the role of psychopharmacological agents that may attenuate cognitive ability. A large proportion of offenders are under the influence of at least one substance. Results indicate that alcohol, for example, significantly diminishes certain cognitive abilities, especially those associated with complex motor behaviour, planning and foresight, assessment, organisation of behaviour and memory transfer of information (Assaad and Exum, 2002). Fourthly, offenders are not always so calculating and may choose to ignore their own rules and act on the spur of the moment. (Ainsworth, 2002). Finally, much of the data supporting rational choice theory is based upon interviews with convicted, incarcerated offenders. Ainsworth (2002) argues that if offenders were any good at making rational choices, they would never be arrested and convicted.

1.6.1. Bounded Rationality

Herbert Simon (1957) approached decision making studies by examining the constraints posed on the decision-maker by real life situations. The premise is that a decision-maker's selection and perception of information is limited by his interests and experience, and by the amount of time available to him (Guy, 1980). Simon (1957) introduced the term '*Satisficing*'. The term appreciates the time, money and motivation constraints and assumes people do not possess knowledge of all possible alternatives. According to this theory, a criminal's decision making is less than perfect because

- It reflects imperfect conditions under which it naturally occurs
- Human beings are imperfect processors of information
- Choices to engage in an act are often made very quickly without having all the necessary information regarding cost and benefits

Simon's characterisation of bounded rationality in the mid 1950's provided the starting point for behavioural economics and was the major reason for which he was awarded the Nobel Prize (Schwartz, 2002). His notion of bounded rationality proposes to connect, rather than to oppose, the rational and the psychological (Simon, 1956, Gigerenzer and Selten, 2002). It also asserts that much of human behaviour is not connected to any conscious deliberation.

Simon describes decision making as a search process guided by aspiration levels. An aspiration level is a value of a goal variable that must be reached or surpassed by a satisfactory decision alternative. In the simplest case, the search process goes on until a satisfactory alternative is found that reaches or surpasses the aspiration levels on the goal variable, and then this alternative is taken. During the search for a satisfactory alternative, the individual may realise that he is unable to find any alternative that meets his standards. He then lowers his level of aspiration, thereby lowering the minimum acceptable standard (McGrew and Wilson, 1982). Therefore, the question is not how the search is carried out, but how it is decided when to terminate it- that is, the amount of search. The process of search distinguishes two classes of models of bounded rationality: those that search for alternatives (e.g. satisficing) and those that search for cues (e.g. heuristics) (Gigerenzer and Selten, 2002). In a satisficing model, search terminates when the best offer exceeds an aspirational level that itself adjusts gradually to the value of the offers received so far. Thus, this approach will expect an offender to search for opportunities until he will come across a satisfactory option depending on his goals.

By the late 1990's Simon accepted the role of emotion and affect among the considerations that rationality took into account (Schwartz, 2002). He considers that information may be biased because the quantity of information the decision-maker can handle is small and because the decision-maker may ignore certain items of information of relevance to the problem, and put an incorrect interpretation upon other items (Guy, 1980). Therefore, the most rational way to proceed is not always that of careful calculation, but by the use of heuristics. Simon defines a heuristic as 'any principle or device that contributes to the reduction in the average search to a solution and endorses behavioural heuristics such as representativeness, availability and anchoring and adjustment that the prospect theory suggests (Schwartz, 2002).

1.6.2. Prospect Theory

During the 20th century, analytic thinking was placed on a pedestal and portrayed as the epitome of rationality. Affect and emotions were seen as interfering with reason. Over the last two decades, many reports in the literature have indicated that people often deviate from responses considered as being normative in decision making tasks. Much of the research regarding heuristics stems from the work of Kahneman and Tversky (1972, 1973, 1982) and Kahneman et al. (1982) who describe a number of heuristics that are commonly used in judgement and choices. Tversky and Kahneman (1983) conclude that there is a “natural” mode of processing that operates by different rules from a rational or “extensional” mode. Heuristics are rules of thumb or strategies that reduce complex problems into simpler ones. Their theory has been referred to as a “tool box theory” because they view heuristics as convenient cognitive shortcuts (Epstein et al, 1996).

Thompson (2002) claims that burglars use heuristics to help them make sense of a variety of characteristics of the environment in which they are operating. According to Thompson, offenders use mental scripts, which are cognitive models of how decisions are made. The offenders will categories information based on their experiences and will create templates to make expert decisions.

Salfati and Canter (1999) describe the cognitive scripts of aggressive offenders. They maintain that the scripts are stored in memory and are used as guides for behaviour, suggesting how a person should behave in response to certain events. The offender may have found that a use of aggression ‘works for him’ as the means to an end. They also describe how by elaborate rehearsal of specific scripts the offender develops a set of cognitive structures that promote consistent forms of social behaviour over time and across situations.

Cromwell et al (1991) accept that individual offenders have psychological mental ‘templates’ about elements of the offence of residential burglary. However, they point out that the burglars may not be able to describe the underlying processing strategies or the discriminative cues or cue clusters that guide the decision making such as target selection processes. They also suggest that offenders use heuristics that are developed

and refined by trial and error when looking for cues that act as predictors of success or failure of targets for burglary.

These studies examine the choice of specific targets rather than areas, which is the focus of this thesis. They are significant since they consider the use of strategies and the importance of learning. However, there is no empirical discussion on the influence of affect on decision making, which is offered by the prospect theory.

Prospect theory asserts that people do not always make wise decisions because we fail to appreciate the limitations of these heuristics. People base their judgements of an activity not only on what they think about it but also on what they feel about it. If they like an activity, they are moved towards judging the risks as low and the benefits as high. If they dislike it, they tend to judge the opposite-high risk low benefit. Under this model, affect comes prior to, and directs, judgements of risks and benefit (Slovic et al, 2002).

It is obvious that decision making is action oriented. One has to choose what action to take in order to satisfy one's goals. Therefore, it is important for any organism to learn the degree to which actions will lead to desirable or undesirable outcomes. This means that a great deal of learning from experience must involve the learning of action-outcome linkage. The process by which trial and error learning gives way to the development of strategies or rules is not well known. Some economists have argued that although one does not act 'rationally' at all times, one will learn the optimal rule through interaction with the environment. Therefore, study of how (and how well) offenders learn from experience is important in casting light on the relative merits of psychological and economic theories of choice.

Prospect theory also gives attention to overconfidence in decision making. People's confidence of judgement is higher than they should be, based on the relative frequencies of the correct answers (Gigerenzer et al., 1991). People are confident that two variables are related, when in fact the relationship is weak or non-existent. This may be an important factor in offenders' choice making. Hodge (1998) in her study of 128 US serial killers suggests that as offenders advance in their criminal career there may be a tactical change in their spatial behaviour due to a growing confidence. They

may feel more confident to explore new areas and move further away from home. This behaviour is expected to apply to property offenders as well.

Although the heuristics or simplification strategies are broad and predictable, they are not universal. There are always some people who give normative answers. Situational demands affecting the amount of thought devoted to the problem. Another factor explaining variance in usage of heuristics is individual differences. This includes differences in risk seeking behaviour, cognitive complexity, need for cognition. One of the main faults of existing criminological theories is that they tend to distinguish between types of offenders categorising some offenders as rational and others as irrational. This thesis argues that like any other human behaviour offenders are on a continuum where some are more rational and some more intuitive. This is the premise of Cognitive Experiential Self Theory.

1.6.3. Cognitive-Experiential-Self-Theory (CEST)

The theory that best explains individual differences in heuristic reasoning is Cognitive-Experiential-Self-Theory (CEST). CEST proposes that people process information by two parallel, interactive systems: a rational system and an experiential system. As Epstein et al (1996) explain, the rational mode is deliberative and analytical, primarily verbal, conscious and functions via a person's understanding of the conventional rules of logic. It is slow and demanding, thus, better suited for delayed actions and complex, dispassionate analysis. In contrast, the experiential system is automatic and pre-conscious; it is intuitive, rapid, associative and holistic. It is particularly suited to rapid assessment of information and for decisive action. Heuristic processing represents the natural mode of the experiential system (Denes-Raj and Epstein, 1994).

Although the experiential system is the default option that determines everyday behaviour, people are able to switch to a more analytic, logical mode of thought when they are motivated to do so. Behaviour is usually influenced jointly by the two systems along a continuum reflecting their relative influence (Kirkpatrick and Epstein, 1992; Shilo et al, 2002; Slovic et al, 2002). The systems normally engage in

seamless, integrated interaction, but they sometimes conflict, experienced as a struggle between feelings and thoughts (Epstein et al, 1996).

The degree of relative dominance of either system in particular situations is determined by various parameters. These include individual differences in preference for relying on one system more than the other, the degree to which the situation is associated with a customary way of responding, the degree of emotional involvement, which is directly associated with degree of experiential dominance, and repeated amounts of relevant experience (Epstein et al, 1996).

EXPERIENTIAL SYSTEM	RATIONAL SYSTEM
1. Holistic	1. Analytic
2. Automatic, effortless	2. Intentional, effortful
3. Affective: Pleasure-pain oriented (what feels good)	3. Logical: Reason oriented (what is rational)
4. Associationistic connections	4. Logical connections
5. Behaviour mediated by 'vibes' from past events	5. Behavioural mediated by conscious appraisal of events
6. Encodes reality in concrete images, metaphors and narratives	6. Encodes reality in abstract symbols, words and numbers
7. More rapid processing: oriented towards immediate action	7. Slower processing: oriented toward delayed action
8. Slower and more resistant to change: change with repetitive or intense experience	8. Changes more rapidly and easily: changes with strength of argument and new evidence
9. More crudely differentiated: Broad generalisation gradient: stereotypical thinking	9. More highly differentiated
10. More crudely integrated: Dissociative, emotional, complexes: context specific processing	10. More highly integrated: context general principles
11. Experienced passively and preconsciously: we are seized by our emotion	11. Experienced actively and consciously: We are in control of our thoughts
12. Self- evidently valid: "Experiencing is believing"	12. Requires justification via logic and evidence

Table 1.1: Comparison of the Experiential and Rational Systems (from Epstein et al, 1996)

Although considerable research and theorising has been devoted to explaining the nature of these processes, relatively little effort has been expended on measuring individual differences in the degree to which people characteristically operate in one

mode or the other. There is support in the literature for an independent existence of the experiential and rational systems. This is determined by the nature of the situation and the level of emotional involvement. Certain situations are readily identified as requiring analytical processing, whereas others are more likely to be responded to by experiential systems (Denes-Raj and Epstein, 1994; Epstein et al, 1996; Kirkpatrick and Epstein, 1992).

Another prediction of CEST is concerned with individual differences in the relative degree to which people use the intuitive-experiential relative to analytical-rational systems, and in the effectiveness to which they employ the experiential relative to the rational systems. One of the main characteristics of the experiential system is its affective basis. Affective responses occur rapidly and automatically. All of the images in people's minds are tagged or marked to varying degrees with affect. The affect pool contains all the positive and negative markers associated with the images. Reliance on affect and emotion is a quicker, easier, and more efficient way to navigate in a complex, uncertain, and sometimes dangerous world. This is recognised increasingly by decision researchers. Zajonc (1980) argues that affective reactions to stimuli are often the very first reactions, occurring automatically and subsequently guiding information processing and judgement.

People consult or sense the affect pool in the process of making judgements. Just as imaginability, memorability, and similarity serve as cues for probability judgements, affect may serve as a cue for many important judgements. Using an overall, readily available affective impression can be easier and more efficient than weighing the pros and cons of various reasons or retrieving relevant examples from memory, especially when the required judgement or decision is complex or mental resources are limited.

Alternatively, need for cognition is a relatively stable individual difference in people's motivation to know, research, and enjoy cognitive endeavours. It is the tendency for an individual to engage and enjoy thinking. Individuals high in need for cognition are motivated to expend more effort to cognitive tasks than are low need for cognition individuals. Given differences in this tendency, Verplanken, (1993) claims it be expected that low need for cognition individuals are less motivated to expend effort

on information acquisition and decision making task than are high need for cognition subjects.

The three inter-related approaches presented above explain the process of offenders' location choice. The three theories are part of a descriptive mode of analysis of decision making that examines how people actually make choices. The aim of this thesis is to shift the discussion from a simplistic debate of risks and rewards to that of preferences and constraints and to try and uncover which strategies offenders' use in the selection of areas and how do preference and constraint influence their travelling choice.

While there is some overlap between these theories they complement each other and bring together knowledge gathered in the fields of economy, geography and psychology. Bounded rationality explains choices between alternatives and the constraints imposed on the decision-maker. Prospect theory adds the affective and irrational aspects of decision making and the rules of choice making that assist in overcoming these constraints and in solving the conflict raised by them. It also gives attention to the dynamic nature of choice making and the importance of learning and experience. Finally, Cognitive-Experiential-Self-Theory (CEST) explores the notion of a continuum in the process of decision making and suggests that individuals are not either rational or intuitive, but float between the two, depending not only on their individualistic character but also by the situations posed on them.

1.7. Spatial Behaviour

Offenders' spatial behaviour has been the focus of discussion regarding offenders' crime site location choice. Following is a detailed review of the existing theories and models that describe and explain offenders' choice act. Over the last four decades theories explaining offenders spatial behaviour have evolved from the general sociological to the urban structure to the individual/psychological theories.

1.7.1. Societal Theories

Social Disorganisation Theory, the Routine Activity Theory and the Rational Choice Theory represent a set of related theories offering explanations about the factors responsible for variations in crime rates across neighbourhoods and between individuals.

1.7.1.1. The Ecological Approach

Approaches to the study of spatial criminology originate from the Ecological tradition. This developed in America between 1900 and 1970 and was committed to the social ecology theory of the Chicago School of Sociology. The ecological approach emphasises explanation of crime patterns by relating the location of criminals to various characteristics of their area of residence, and by linking the locations of criminal offence to attributes of the area in which crimes are committed (Costanzo et al, 1986).

Shaw and McKay (1942) conducted the prime research in this area. Their studies of crime patterns in Chicago were concerned with juvenile delinquency. Using crime rates calculated for community areas in Chicago and other American cities, they sought to explain variations in neighbourhood crime rates using three concepts measuring neighbourhood context. These include poverty, residential stability and the level of social control. According to them, criminal areas suffer from physical deterioration, overcrowding, a mobile population and a proximity to the areas of industry and commerce (Morris, 1957; Brantingham and Jeffery, 1991; Martin, 2002).

The school of Chicago produced two major social behaviour models that together form the basis for a social explanation of crime. First, social interaction suggests that individuals learn behaviour patterns and attitudes and motivations from other people. Thus, individuals learn criminal motivation from their association with others. Second, the theory of social control through community organization suggests that the pattern of crime was related to the ability of social institutions to teach and enforce rules of reputable conduct. The social characteristics are primary lack of informal agency of social control whereby the norms accepted by the wider society may be maintained (Brantingham and Jeffery, 1991; Morris, 1957).

The ecological approach is criticisable in several ways. First, its findings are based on patterns of associations between crime and its potential causes at an aggregate level and ignore individualistic data. This attempt to take a relationship that occurs at the aggregation unit level and apply it to individuals within that unit has been termed the 'ecological fallacy' by criminologists critical of the Chicago school. This research is therefore not particularly helpful in illuminating any processes by which criminals acts are generated (Hodge, 1998).

Second, replication studies have shown that their general models holds for most North American cities, yet, its application to cities in the UK and the rest of Europe is debatable. Third, the theory treated urban areas as homogeneous units with respect to the intra-area distribution of crime and social and other variables of interest. Testing for intra-area clustering is critically important for police precincts and city planners (Brantingham and Brantingham, 1991). Forth, delinquency rates are based on court appearances and can not be considered a reliable index of the extent of delinquent behaviour, as it is not clear what is the relationship between the rates of apprehended and unapprehended delinquency (Sophie Robinson, in Morris, 1957). Fifth, Shaw failed to give adequate consideration to the location of crimes as opposed to the location of offenders homes, and the relationship between the two, namely, the 'neighbourhood triangle of delinquency' and the 'mobility triangle of delinquency' (Morris, 1957). Finally, the field of criminology focuses on the differences between offenders and non-offenders, while neglecting to study the differences in behaviour between different groups of offenders.

Despite its faults, their findings on the existence and persistence of delinquency areas formed the core facts around which American criminology was subsequently constructed. Furthermore, the ecological approach drew attention to the potential of studying the spatial distribution of various urban, social and criminal indices (Hodge, 1998).

1.7.1.2. Routine Activity Theory

Building on these earlier studies, Cohen and Felson (1979) suggest that for a crime to be committed there must be a combination of three important elements:

- A motivated offender
- A suitable (and vulnerable) victim
- The absence of a capable guardian

In order for a crime to occur these elements must co-occur. The concept of guardianship refers to those routine activities of people, which affect crime. For example, asking a stranger as to the purpose of his/her presence in a certain place. Such activities can affect a potential criminal's decision to commit a crime. Such activities depend on the residential environment. Cohen and Felson (1979) follow the view that cities are not random but a structured organisation of people. This organisation ultimately affects the amount of crime in different areas by altering the levels of social control.

Felson (1993) offers an understanding of how everyday life assembles these elements and how offenders may be influenced in their decision whether to offend or not. Felson suggests that each offender will be more likely to carry out a crime the more rewarding it appears to be and the least effort it demands, and that the offenders' routines will set the stage for the illegal opportunities, which come their way (Felson, 1987). Crime is often regarded as situational and is determined by the available opportunities at a particular place and time. Opportunities result, in part, from the probabilities of detection, intervention and apprehension. These depend on the types

of activities and other characteristics of different areas (Cohen and Felson, 1979; Jacobs, 1961; Newman 1972).

The concept of opportunity is bound to the day-to-day activities of the offender, and to the notion that people rely on ready information, including sense data. An offender is most familiar with the area near his home or work place, which serves as his base. The assumption is that opportunities of crime (targets) are equally distributed around that base, and that the possibility for carrying out a crime will have some relationship to where that base is (a rural area or an urban environment). However, in order for an offender to utilise these opportunities and offend, he must know they exist and their location. Thus, Felson and Cohen's (1979) model predicts that offenders will not travel far from their home to commit crimes due to the offenders' reliance on their familiarity with and on the opportunities in areas surrounding the home.

The main downfall of this theory is that it is descriptive and relates to offenders as passive actors who offend only when targets are in front of them. It does not explain those offenders who travel great distances to find a potential crime sites or those who plan their crimes carefully. Like other sociological theories it remains general and focuses on motivation of offenders to offend rather than model their behaviour. Nevertheless, the theory served as the basis for theories that followed in the attempt to model offender spatial behaviour and crime site location choice.

1.7.2. City Level

1.7.2.1. Environmental Criminology

Inspired by the sociological theories, Environmental Criminology offers a new perspective on the relationship between offenders' residence and crime site locations. While the sociological approach explains locations of criminals by the elements of the areas where the crime is committed or where the offender lives, Environmental Criminology studies the relationship between these two areas and offers a model of individual journeys to crime.

This school of thought is led by the work of Brantingham and Brantingham (1979, 1981, 1991). They claim that four dimensions of crime have to concur in order for a crime to be committed.

- A law
- An Offender
- A target
- A place

Environmental Criminology focuses on the fourth dimension of crime. It explores two parallel paths. The first focuses on the objective analysis of the spatial and temporal variation in crime pattern order to discover aggregate factors influencing the patterns. The second focuses on the subjective analysis of why criminals choose some locations or some victims in preference to others (Brantingham and Brantingham, 1991).

Earlier studies in this field have tended to indicate that, generally, criminals do not travel very far from home to commit their crimes. The pattern varies by the type of crime. A fairly consistent finding is that offenders travel longer distances to commit crimes against property (Brantingham and Brantingham, 1981). Baldwin and Bottoms (1976) in their study of crime and distance in Sheffield, collected data of 3444 cases of indictable offences from 1966. They found that violent and sex offences appeared more localised while fraud and theft were least localised. With larceny, the greater the value of property stolen, the greater the distance travelled by offenders to offend.

White (1932) found in Indianapolis, that the average distance travelled by violent and property offenders was .85 and 1.72 miles, respectively, while the rapist averaged 1.52 miles. Amir (1971), defined 'vicinity of crime' as an area of five city blocks, found that 68% of the known rape offenders in the sample lived within the vicinity of the victim and the scene of the offence. Finally, Rhodes and Conly (1981) showed that, based upon their Washington, D.C data of 796 burglars, 832 robbers, and 430 rapists' files from 1974, burglars and robbers travelled an average of 1.62 and 2.1 miles, respectively, while rapists travelled an average of 1.15 miles. They also made an important distinction between line distances (e.g., a straight line mileage between

the offender's home and offence location) and wheel distances (e.g. the distances offenders would have travelled by car to his target).

Within specific types of crime, researchers have examined journey to crime distances for age, sex, race and between different types of the same crime. In terms of race, Pettiway (1982) studied robbery patterns in Milwaukee, Wisconsin. He found that black offenders residing in ghettos cross the ghetto boundary more often than white robbers who reside in other areas. Age was found to be an important factor as well. Baldwin and Bottoms (1976) found that older offenders travel further to offend.

Repetto (1974) obtained information relating to 1,988 residential burglaries from police reports in Boston. He also conducted personal interviews with 97 burglars, and found that young (under 18) offenders were more likely to travel shorter distances than the older offenders and that they were also the most likely to travel on foot as they tended to operate within their own neighbourhoods. He also found that the older age groups (18-25 and over 25 years) were willing to travel further afield (25% were willing to travel more than 24 hours) and to use a car.

The journey to crime literature summarised above is mainly descriptive. More contemporary studies examined crimes in discrete level and aimed to find patterns in where, when and how crimes occur. In the early 70's and 80's, a number of studies investigated offenders' motivations for offending and their selection of targets by asking the offenders directly. Burglars, and particularly domestic burglars, are over represented in these studies (Bennet and Wright, 1984), for a number of reasons. Firstly, it is a common offence. Property crimes account for 78% of all crimes recorded by the British Crime Survey and for 82% of the total recorded crimes in 2001/2002 (Home Office, 2002). Another powerful reason is that burglary has crime sites that are very definably located in space and hence, the environmental factors that predispose that site to be a target can be identified relatively easily. These studies used interviews with burglars to identify factors that increased the vulnerability of properties to burglary.

Ui (1982) took details from 6484 burglaries from 3 different areas intended to represent different types of residential burglary. These comprised a small town of

chiefly council housing, a larger town of mixed housing types and a wealthy commuter area of large detached housing. A sample of 40 convicted burglars were interviewed. Ui found that the poorest area had no obvious stable criminal population, the lowest rate of burglary and that much of it was petty theft. The wealthy commuter housing suffered the highest burglary rate and the highest degree of organisation was apparent in the commission of the crimes. Ui's work could be termed a macro scale analysis of the distribution of burglary, from which he was able to make some general comments about burglars' perceptions of their targets.

Bennet and Wright (1984) conducted a similar scale investigation, which aimed to reveal a more detailed picture of burglars' behaviours and motivations. They interviewed 309 convicted burglars and used simulation of potential burglary targets to extract an organised understanding of the decision process that lead burglars to select particular targets. What they found supported the idea that offenders choose to offend, that is, they go through a rational decision making process. They also found that the vast majority of offences involved planning to some degree.

Although the studies above make some interesting findings, they avoid issues such as the relationship between the offence location and the offender's home. What they also fail to analyse is the process by which an area containing potential targets is selected. They concentrate on the decision process that begins once the burglar is in a target area. There is little discussion of the decisions he makes which enable him to be in that target area. Ui does briefly suggest that familiarity with the target area might be one factor in the choice. When asked, the burglars he interviewed said that they felt more comfortable working in areas with which they were familiar (Hodge, 1998).

1.7.2.1.1. Modelling Spatial Behaviour

Brantingham and Brantingham (1979, 1981) proposed a theoretical model for looking at crime as it occurs in urban space and explored the possibility of predicting the geographical area an offender is likely to victimise, based on his/her own experiences of areas and conceptions of his place in it. The model's importance lies in the fact that it uses concepts of opportunity and motivation and ties them together with concepts of mobility and perception. The model looks and the distribution of crime, what is

known about criminal and non-criminal spatial behaviour, and inductive relationships. It uses the analogy of the journey to crime as a journey to shop, and build on the terminology discussed in geographical literature. The model recognises that rather than examining the objective site characteristics of these regions an attempt should be made to study how attractive these regions are to offenders. Thus, the analysis concentrates on an opportunity structure model (Brantingham and Brantingham, 1993; Nelson et al, 1996).

Familiarity seems to summarise the factors in the decision process that result in the choice of target area. It is mentioned as a determinant by other authors in the field and led Brantingham and Brantingham (1975) to propose their 'proximity hypothesis'. They stressed the contribution of the mobility of the offender and his familiarity with an area to the commission of crime. Although there is a general consensus that offenders will travel the least possible distance, this goes largely unexplained in the environmental criminological research. Where an explanation is offered, it tends to follow the routine activity theory and describe offenders operating on the basis of getting the maximum reward for minimum effort.

An exception to this approach is the work of Baker and Donnelly (1986), who come close to explaining criminal mobility in terms of the meaning that distances might have for the offender himself. Instead of actual distance in miles, they suggest that offender behaviour might be better understood in terms of symbolic distance. A short journey of only 2 miles in a city can take a person through several distinct areas, and perhaps into a very different social scene.

Because of this Baker and Donnelly (1986) suggest that distance in miles may not reflect the social and psychological realities of distances travelled by the offender. They propose that crossing obvious boundaries between neighbourhoods might be more psychologically significant than the linear distance might suggest by itself, so that to commit a crime 2 miles away in another neighbourhood would be to travel a greater psychological distance than to travel 2 miles to offend within one's own neighbourhood.

Given this, they hypothesise that in neighbourhoods bounded by obvious physical and social barriers, most of the crime will be committed by the residents. Labelling these neighbourhoods 'defended', they took two areas in Bayton, Ohio that fulfilled their criteria of racial homogeneity, physically demarcated geographical areas, etc. They analysed police statistics for the areas over a three months period and concluded that 70% of all crimes in each neighbourhood were committed by outsiders in the poorer of the two districts. This study is significant because the suggestion is there may be other than economic or physical constraints operating on the offender when he chooses the location of his offence. It points out that the offender's environment has symbolic importance that may well affect where he offends.

Brantingham and Brantingham (1981) claim that most offenders behave as ordinary people most of the time. They develop information about other parts of an urban area through working, travelling to school, work, shopping, or seeking out entertainment or recreation. Criminals will develop an *action space* based on both their criminal and their innocent activities. Their actions help form an *awareness space*, the parts of the city they have some knowledge about. They also recognise the existence of an area directly around the offender's home base where the likelihood of them committing a crime is lower because of the higher chance of being recognised. This area is known as a *buffer zone*. Their model therefore expects offenders to maintain a minimum distance from their home.

They also expect the offenders to maintain a maximum distance in a sense that there is a decrease in crime as distance increases. This reduction of activity as distance increases is referred to as '*distance decay*'. Capone and Nichols (1976) fit robbery to a distance decay function and Smith (1976) fits crime trips in Rochester, New York, to a gravity potential function. They explained such patterns by the effort it takes to overcome the distances. Close locations have inherent advantages over distant locations.

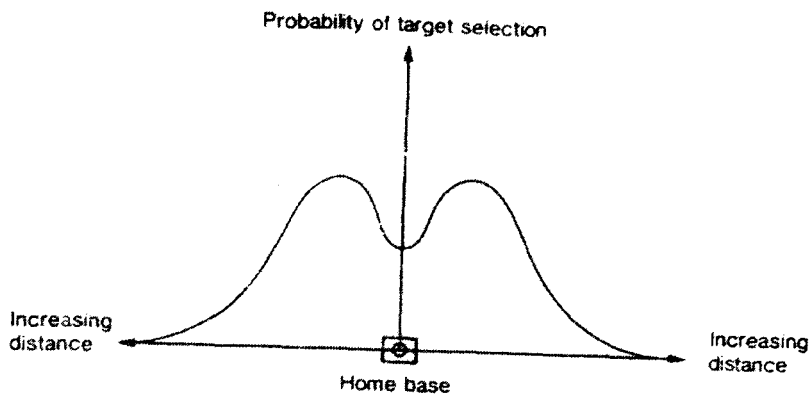


Figure 1.2: Distance Decay Graph for an Individual Offender (taken from Brantingham and Brantingham, 1981)

According to the Brantingham and Brantingham, the offenders' awareness space and action space vary with age just as awareness and action spaces of most urban residents vary with age. It was also found that cognitive maps varied by socio-economic status (Orleans, 1973). Inhabitants of poorer areas of the city had more limited cognitive maps of the larger urban area than people from affluent areas. Criminological findings consistent with these deductions have been illustrated above (Baldwin and Bottoms, 1976; Reppetto, 1974).

Finally, they hypothesise that while information about potential victims and targets is probably spatially biased toward the home base, information is also spatially biased for the other people who live close to the criminal's home base. While criminals know more of the area close to home and are more likely to locate target easily, they are also more likely to be recognised close to home. Therefore, Brantingham and Brantingham expect that there would be an area near the home where the likelihood of offences would be less likely, and will maintain a minimum and maximum range from the offender's home, independent of the direction and other physical or psychological constraints.

1.7.2.1.2. Crime Site Selection Model

Brantingham and Brantingham took these general concepts of the geographical approach to the study of shopping behaviour and from them developed a model for explaining a criminal's search area. The model is built upon several propositions from an earlier model of crime site selection (Brantingham and Brantingham, 1978).

- ❑ Individuals exist who are motivated to commit a crime.
- ❑ The commission of an offence is the result of a multi-staged decision process, which seeks out and identifies, a target or victim positioned in time and space.
- ❑ The environment emits many signals about its physical, spatial, cultural, legal and psychological characteristics.
- ❑ An individual who is motivated to commit an offence uses cues from the environment to locate and identify targets.
- ❑ As experiential knowledge grows, an individual learns which individual cues, clusters of cues and sequences of cues are associated with good victims or targets. These can be considered a template, which is used in victim selection.
- ❑ This template becomes relatively fixed and influences future behaviour.

These propositions did not describe the spatial characteristics of the search and selection patterns. The spatial model attempts to articulate these general propositions spatially.

The model is explained using theoretical cases. The simplest one is the basic search area for an individual offender. There is a uniform distribution of potential targets and the offender is based in a single home location. This model considers the phenomenon of distance decay. It takes effort, time and money to overcome distance. One or more of these factors is always likely to be constrained, which will prejudice an offender to choose a target nearby rather than at any distance. In addition an offender will have more information about locations closer to home, acquired as he moves around the area surrounding his home than he will have about locations at a distance. Most of the literature regarding burglary suggests that offences involve some planning. Information flows should bias search behaviour toward previously known areas.

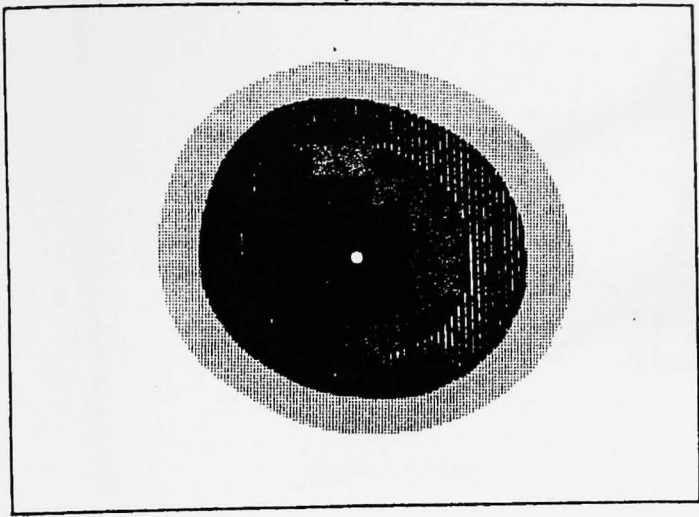


Figure 1.3: Search Area for Individual Offender (from Brantingham and Brantingham, 1991)

Having established a circular offence area as the result of the simplest combination of offender and opportunities, Brantingham and Brantingham (1981) describe a more complex pattern of space use, taking into account the uneven distribution of information an individual is likely to have about his environment. They suggest that given conditions of the offender operating on his own and in an area of uniformly distributed targets, the greater amount of information he will have about the places he uses and the streets he travels down often will be the sort of places he is likely to victimise. They support this by reference to ideas such as awareness space and action space. They propose that criminals, particularly property offenders, often actively search for targets as they move about their business. As well as the normal activity space of a non-criminal individual, there would also be areas around these activity nodes that would also be likely to be victimised. This produces the kind of pattern shown below.

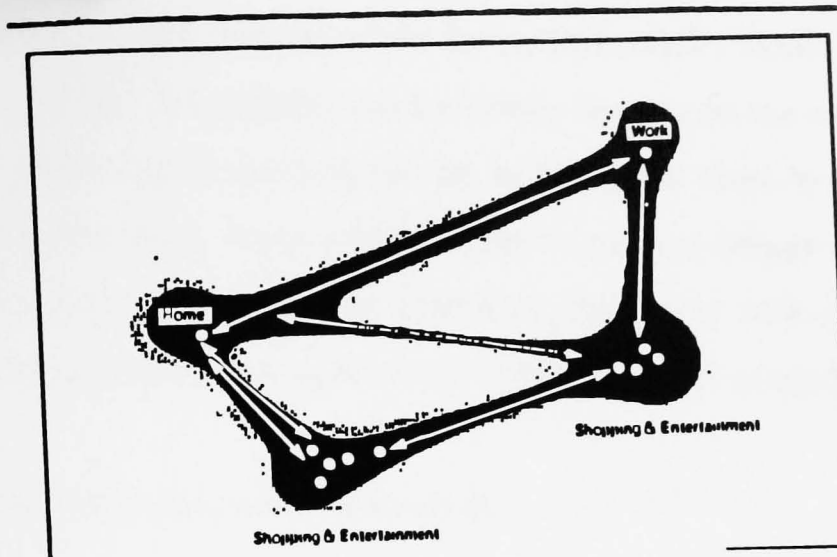


Figure 1.4: Complex Search Area for Individual Offender (from Brantingham and Brantingham, 1991)

There are several problems with Brantingham and Brantingham's model. First, it is descriptive and there is no discussion of the actual distances the offenders may travel. Furthermore, they do not explain why an offender may expand his awareness space rather than remain within the original area. Finally, they do not account for those offenders who move to an area quite distinct from their original awareness space. They merely suggest that any change will be an extension of the original area.

However, one of its strengths of the model is that it is an eclectic approach to exploring crime patterns. The fields of studies surrounding routine activity theory (e.g. Cohen and Felson, 1979; Felson, 1987) and rational choice theory (e.g., Cornish and Clarke, 1986) produce complementary and supportive results (Brantingham and Brantingham, 1991).

1.7.3. Individual Level

1.7.3.1. Rational Choice Theory

As mentioned above Cornish and Clarke (1987) claim it is sufficient for the decisions to be based on the evaluation of gains and costs by the offender, even if not consciously. In this context, similarly to the routine activity theory, the model acknowledges the importance of the home and the benefits of familiarity with an area, and, also that the offender's cognitive map plays a vital role in their decisions about

where to travel. However, while the routine activity theory emphasises the importance of familiarity, the rational choice theory focuses on the concepts of vulnerability and risk monitoring. Travelling too far, or being too close to the home base, elevates the risks of detection. Serial offenders are in growing danger of exposure as they commit more crimes (Hodge, 1998). Therefore, the theory will explain those offenders who will cover larger areas, as means to reduce the risks of apprehension.

1.7.3.2. Environmental Psychology

Following on from Environmental Criminology, a more psychological approach has emerged which contributes to the understanding of criminal spatial behaviour. This is the field of Environmental Psychology. It is suggested that the journey to crime is an expression of a complex interaction between the offender (in terms of his background characteristics), his predisposition, knowledge and perceptions; and the location and type of target (in terms of perceived risks, rewards, opportunities and attractions). For investigative purposes, it may be hypothesised that the actual location selected is indicative of the purpose and experiences of the offender. Canter (1989) suggests that through the geographical patterns of their social transactions, people build up representations of what is possible where. This thesis follows Canter's (1989) assertion that there are patterns of space use typical of different criminals, relating to where they are living at the time of their crimes.

The starting point for an environmental Psychological theory concerned with offenders' selection of their crime sites relates to the recognition of them having some kind of home base from which they operate. Following from the work of Brantingham and Brantingham (1975, 1981, 1991), Barker (1989) studied the spatial offence pattern of burglaries. She mapped the burglary offence and home locations of 31 burglars and analysed this data in an attempt to elicit consistencies in their offence patterns. Her results show that given a uniform distribution of opportunities, the offence area of burglars appears to be within an area defined by a circle around the offenders' home. Explaining her finding, Barker suggests that the home area has significance for offenders over and above the fact that it is familiar, and that because of it, offenders' choices of target are constrained.

1.7.3.3. Home Range

The concept is based upon the idea that there is a geographical area around our homes in which we travel and use more regularly than areas a greater distance from our homes. This area would typically contain the shops, the homes of friends and relatives and the social activities we frequent. Rengert and Wasilchick's (1985) investigations reflect this concept in their suggestion of the importance of the journeys provide criminals information around which they plan their next crime. They emphasise that it is not only the physical dynamics of the area, which are important in structuring criminals' behaviour, but that the information which they gather on the 'way home' is also important. Places frequented by the criminal site travelling home, such as, bars, shops and restaurants are therefore proposed as defining their criminal range, tuning his perceptions as to which areas are 'safe', both geographically and psychologically.

An associated concept to that of the home range is that of the cognitive maps, which, from its earliest conceptions, has been suggested as being strongly related to residential location (Trowbridge, 1913). Cognitive maps are representations of what is possible and where, built up via the geographical patterns of our social transactions. Canter (1985) notes that maps we draw of an area change with time, reflecting how much time we spend in an area and the variability of our purposes of being there. This notion of dynamic cognitive representations of our social and physical transactions with our environment are important to discussions concerned with the spatial dynamics of criminals, since they illustrate the significance of psychological factors in our concepts of familiar areas.

The concept of home range and cognitive mapping seem to explain some of what has been discovered about the distances offenders travel to offend. Home range means the complex of familiar objects and people situated in the space around an individual's home, that he would habitually use. They would be likely to know their way around the area and have their own mental representation of the area he chooses to offend.

1.7.3.4. The Circle Theory

Canter and Larkin's (1993) theory of environmental range studies the spatial activity of 45 British sexual offenders. Drawing on the work of Brantingham and Brantingham (1981, 1991) the basic premise of their *circular model* is that the offenders' crime site location choice bears a relation to the offenders' home base. The model is based on three assumptions. First, that there is sufficient evidence to suggest the existence of a fixed base from which an offender might operate. Second, that there is some defined area known as the 'criminal range', that is deemed to have spatial, and thereby causal, relationship to the geographical co-ordinates of the offender's home. Third, that it is appropriate to use the simplest principles of spatial geometry. This is taken to be circular because a circle requires the determination of only a radius and no other boundary limitation (Baker, 2000).

Under these assumptions the area around the home (home range) and the area in which the crimes are committed (criminal range) are represented as circles, as the two offences furthest from each other create the diameter. This consists of two extreme models of possible spatial behaviour:

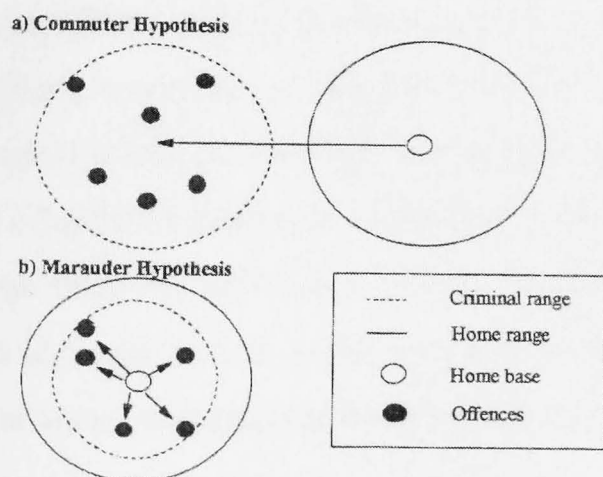


Figure: 1.5: Hypothetical Models of Serial Rapists' Behaviour (taken from Canter and Larkin, 1993)

The Commuter hypothesis proposes that offenders travel away from their home range to commit their crimes, therefore having their criminal range in a distinct area that little or not at all overlaps with their home range. On the other hand, the Marauder hypothesis proposes, similarly to the Brantinghams (1981) model, that the home is the

focus for their crime sites selection. Canter and Larkin (1993) found that 87% of the rapists in their study committed their offences within the home range, therefore supporting the Marauder hypothesis.

Similarly to Brantingham and Brantingham's (1981) model, the "Marauder" hypothesis proposes that the home is the focus of the offender's crime site selection, and that they are likely to travel in all directions around it. On the other hand, similarly to rational choice theory, the "Commuter" hypothesis proposes that offenders will have their criminal range in a distinct area that does not, or hardly ever, overlaps with their home range. Their maximum distance is likely to be greater because they travel to separate areas on each occasion. The offender may be familiar with the area in that criminal range, but "it is at an appreciable distance from the area in which he habitually operates as a non-offender" (Canter and Larkin, 1993). Furthermore, by the nature of their patterning the offenders are likely to travel in a particular direction away from the home. These models are very helpful, since they take into account the role of the home base, and the importance of familiarity with the offenders' surroundings, which effect the mental representation of the geographical locations and the relationships between locations.

Barker (2000) studied the distance and direction travelled to and from by 31 convicted burglars, convicted of burglary offences carried out between 1981-1987 in a number of small towns in the south of England. Her findings support the circle hypothesis as the offenders travelled 3.67 km from home and chose their sites at opposite side of the home from the previous offence. Hodge (1998) also found that the majority of the 126 U.S and 29 U.K serial killers in her sample, disposed of their victim's bodies in local areas, and a high percentage of them were consistent with the marauder model.

However, the circular model suffers from several limitations. First, it rigidly distinguishes between two extreme types of behaviour. Human behaviour, whether criminal or not, seems to be too complex and varied to be divided into only two types. As Hodge (1998) explains, marauders and commuters are not completely independent of each other, because serial offenders can commit a series of crimes in one area, for example a small town, and then move to another area. Therefore, they are commuting to a location but are still marauders.

The second drawback of these models is that they are built on information gathered from police files. They take into account only offences offenders were convicted for. The charges against an offender may not reflect his/her actual behaviour, but rather, that for which the prosecutor feels there is enough evidence or for which may induce defendant to enter a guilty plea. The address contained in an offender's file may not have been his actual residence at the time the offence was committed. Thus, it can not give an exact view on the offenders' development, as the order of the offences may not be accurate. Also, the offenders who have been apprehended may not represent the mobility patterns of those who are less likely to get caught. If offenders who are less mobile and hence, operate on more familiar terrain are less likely to be detected or if, conversely, the highly mobile tend to elude detection better than most offenders, then arrested offenders will provide a skewed sample of the offender population. Previous research provides few clues as to this potential source of sampling bias (Gabor and Gottheil, 1984).

Third, the use of the two furthest crimes as an indicator of the criminal range has three problems. First, it makes a judgement about the behaviours of an offender throughout a crime series by examining the information from only two crimes and then further generalises these behaviours to the entire series. Second, all the remaining crimes are being ignored. This leads to a loss of information regarding the offenders' actual use of space between the furthest two points. This may lead to misrepresentation of the majority of the offender's actual actions. Third, the offender would have to make use of the full circle. Limiting factors on offender behaviour as discussed in the previous chapter, and topographical constraints (Shaw and McKay, 1942) and transport networks (Rengert and Wasilchick, 1985) suggest a circular distribution of a person's activities is highly unlikely. There is too little information leading to over generalisations about the use an offender makes of his environment in his criminal and non criminal activities (Canter et al, 2000).

Canter (2003) himself discusses the methodological problems of assigning the offenders into each of the groups. The direct definition from the geometry of the crimes will force many borderline cases into one camp or the other. Those whose

home sits close to the circumference of the notional circle may be arbitrarily assigned to one group.

The Circle Theory has been studied in relation to different types of offences, such as serial rapist (Canter and Larkin, 1993), serial killers (Hodge, 1998), serial burglars (Kocsis et al. 2002). It has also been the basis of computerised models (Canter et al. 2000; Rossmo, 2000), which have been used to assist police investigations. Therefore, this thesis aims to assess its validity with data obtained directly from offenders regarding crimes they admit to committing rather than those which they have been convicted for.

Hodge (1998) expanded the circular model and suggested four patterns of change or development. These new models are useful since they introduce more behavioural options to the continuum Canter and Larkin (1993) presented. The strength of these patterns is that the role of the home, and the relationships between the different disposal site locations, are taken into consideration.

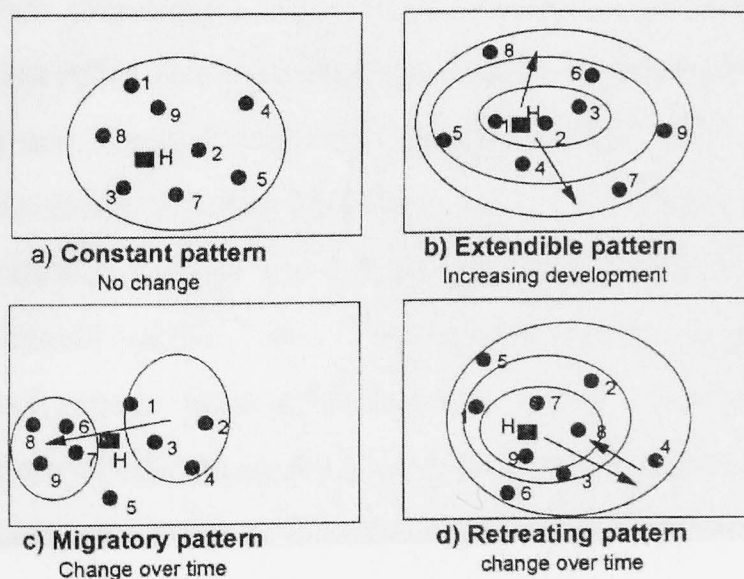


Figure 1.6: Spatial Patterns of Change or Development over Time (taken from Hodge, 1998)

The *Constant pattern* is where no systematic change over time takes place. The crime scenes are randomly spread around the home base, with no systematic development in distance or change in area, as the series progresses.

The *Extendible pattern* represents a systematic spatial development over time. The initial offences are closest to the home base. As the series progresses the offender moves further from the home, covering a wider area. The last offences are the furthest from the home base.

The *Migratory pattern* shows a rather different type of development over time. The offender stays within one area during the early disposals and then moves to another area as his criminal career develops. This results in distinct clusters of disposal sites, each containing chronologically related locations.

The *Retreating pattern* is similar to the extendible pattern. However, initially the offences are further from the home base. The offender is then 'extending' the area as more bodies are disposed. Yet the offender reaches some outer limit and then begins to 'retreat' back, to select locations within the initial pattern of disposal sites which are closest to his home base.

In order to test these models, Hodge (1998) divided the sample of 126 U.S serial killers into three sub-groups, according to the mean distance the offenders travelled (those offenders who travelled a mean distance of 10 km or less, between 10 and 30 km and finally those who travelled further than 30 km). The findings suggest that each group exhibits different patterns of change over time and that the offenders locational choices are not random but can be explained by the spatial processes discussed above. The least mobile group displays an "extendible" pattern of development; those offenders who travel a medium distances exhibit a "retreating" pattern of change; and the most mobile group displays a "migratory" pattern of spatial behaviour. Hodge (1998) concludes, "the home became less influential as the mobility of the offenders increased".

Hodge (1998) explained that an offender may feel the necessity to move away from a particular area after exhausting all locations in his areas of familiarity. He then has to move further afield in order to keep a *perceived* 'safe' distance, not only from the home, but also between the different crime site locations. Furthermore, after an offender commits several offences his confidence is likely to grow, and he will be more willing to travel further from home to crime sites, and, to explore new areas.

The main drawback of these models is that they are built on information gathered from police files. They take into account only offences offenders were convicted for, and can not give an exact view on the offenders' development, as the order of the offences is not accurate. The model assumes an even distribution of opportunities around the offender's home, and takes no account of the topography of an area, or the offender's specific knowledge and use of the area (Barker, 2000).

The psychological ideas of a mental map as a combination of stored knowledge and affective responses has been described earlier to show how that may structure offenders activity. This encourages to examine how locations of crime could be modelled as schematic systems rather than as particular geographical instances. There has been a growing body of research that attempts to develop general principles that will characterise the geographical patterns of individual offenders in particular locations (Canter and Larkin, 1993).

These principles have been found to have practical significance in helping to solve crime (Canter, 1994), as well as the broader theoretical issues to which they contribute. It is the distortions in such 'maps' that helps us to understand how people conceptualise their surroundings and the activities that take place there. Therefore, the aim of this thesis is to examine whether the offenders' perception of their own activity will be similar to the behavioural patterns suggested by the circle hypothesis and whether strategies the offenders use as part of their spatial decision making process can be revealed.

1.8. Research Objectives

This thesis follows Canter and Larkin's (1993) view that each and every location used by an offender is of psychological and investigative importance. Hence, the interest of this thesis is not in modelling the objective distances but in understanding the subjective aspects of spatial decision making. The main benefit of understanding offenders' spatial decision making is the insight it offers to the psychological significance of the relationship between locations.

The criminological literature which have discussed offenders' spatial behaviour have accepted the existence of a decision making process but only rarely examined its influence on the offenders' choice of location. Hence, it lacks a thorough explanation of the decision making process itself, the factors influencing it and the manner in which it affects offenders' subsequent spatial choices and actions. This thesis aims to add to the understanding of offenders' spatial behaviour by examining these processes.

The revised model of spatial decision making presented above considers offenders mobility as a manifestation of a psychological process, which is composed of several stages. The strength of the model is in the inclusion of the spatial context to a decision making process in conjunction with existing models of decision and choice making. The model emphasises the progressive and accumulative nature of the decision making process. It encompasses the dynamic make-up of this process given that individuals constantly learn, evaluate and grow with experience.

The aim of this thesis is to advance research in this area in two ways. First it will provide an opportunity to understand offenders' spatial behaviour by examining their decision making process and factors affecting it. Second, it will provide a conceptual system to explain all types of offender. Therefore, the research objectives are

1. To identify the strategies offenders use in their spatial decision making
2. To examine the relationship between the ways offenders perceive their environment and their subsequent criminal location choice.

1.9. Research Questions

The conceptual framework for this thesis is based on Golledge and Stimson's (1997) revised spatial decision making model. Thus, the discussion follows four stages:

1. Information Search

Decisions that offenders make about the amount and type of information to acquire when evaluating potential crime site locations are a fundamental aspect of their decision making process. Nevertheless, offenders' access to information has been subject of very little attention in the literature. Although the process has been mentioned, there is no available empirical analysis of this topic or a discussion of specific factors and psychological processes involved in offenders' information search.

The this thesis aims to develop this aspect of decision making further by using concepts which are derived from non-criminal spatial behaviour literature. It relies on studies of consumer behaviour and residential mobility, where the issues of utility, location choice and travel apply as well (Golledge and Stimson, 1997; Garling, 1989). Thus, the aim is to uncover,

1. Which factors determine offenders search behaviour?
2. Which strategies do offenders use in their information gathering behaviour?

2. Cognitive Maps

The second stage of the decision making process focuses on internal information and the relationship between perception and behaviour. The information people build up may reflect not only their surroundings but also many other aspects of themselves and their lives. In the same way, a property offender's cognitive system will contain information about where crime sites are and how likely a successful offence will be at each location (Hodge, 1998).

Studies that approach this topic recognise the relationship between imagery and behaviour and the significance of the relationship between the subjective and objective environment and its influence on spatial behaviour. They focus on patterns of crimes in various urban areas or on the strategies offenders used in selecting various crime site locations. However, they lack an encompassing discussion of the decision making process itself and an examination of the intervening factors influencing it. They do not examine the content of the knowledge the offenders have gained or how they process such information. Finally, they do not empirically test how offenders' perceptions and habits influence their criminal activity. This thesis will develop these topics by examining the following questions,

1. What is the relationship between offenders' perception and behaviour?
2. Which strategies do they use?

3. Evaluating Alternatives

Once offenders have gathered information and perceived areas they are aware of, it remains unclear how they select between the alternatives available to them and choose a location to offend in. There are a relatively small number of factors in everyday life that impose upon all individuals and constrain their freedom to occupy certain space and time locations (Golledge and Stimson, 1997). This means that offenders have to adopt 'strategies' for using a limited quantity of information to the best possible effect.

The discussion will shift from a simplistic debate of risks and rewards to that of preferences and constraints by using three inter-related approaches. The aim is to try and uncover which strategies offenders' use in the selection of areas and how do preference and constraint influence their travelling choice. This will assist to deduce reasons as to why an offender follows one path rather than another. Therefore, the research questions are,

1. Which factors influence the offenders' selection process?
2. Which strategies offenders' use in their selection of alternative?

4. Spatial Behaviour

Attempts to explain variations between offenders in terms of their spatial behaviour have typically focused on ways in which offenders use their environment. Studies have concentrated on the distances offenders travel from the home to the crime locations and the directions around the home in which they travel. The emphasis is on the choice itself in the form of patterns of crime in urban areas or various strategies offenders' use in selecting crime site locations. This approach to offenders' spatial behaviour has two shortcomings. First, it deduces from the offenders' behaviours as to their perception of the environment and its effect on them. Second, it ignores the vital input the offenders can reveal, regarding their spatial behaviour and the processes involved in their spatial decision making.

This thesis follows Canter and Larkin's (1993) view, that each and every location used by an offender is of psychological and investigative importance. Hence, the interest of this thesis is not in modelling the objective distances but in understanding the subjective aspects of spatial decision making and the psychological significance of the relationship between locations.

Therefore, it will examine whether the offenders' perception of their own activity will be similar to the behavioural patterns suggested by the Circle Theory. The Circle Theory has been the basis of computerised models (Canter et al. 2000; Rossmo, 2000), which have been used to assist police investigations. Therefore, it is vital to assess its validity with data obtained directly from offenders regarding crimes they admit to committing rather than those which they have been convicted for. This type of information will also help determine which strategies the offenders use in their spatial behaviour and how these relate to the other stages of the decision making process. Therefore, the research questions are

1. Which strategies do offenders use in their spatial behaviour?
2. What is the relationship between these strategies, the extent of search and mobility levels?

Chapter 2

The Pilot Study

The present chapter focuses on an exploratory pilot study, which served as the foundation for the main study, which will be presented in the following chapters. The present chapter has four aims. First, it will describe the theoretical concepts that led to the commission of the pilot study. Second, it will describe the research design of the pilot study and the process of data collection. Third, it will discuss how the findings contributed to the development of the main study. Finally, it will review the changes made to the interview design of the main study as a result.

2.1. Background

Previous attempts to document the manner in which an offender uses his environment for criminal gain have focused on patterns of crime in urban areas or on various strategies offenders use in selecting crime site locations. This approach to offenders' spatial behaviour has two shortcomings. First, it deduces from the offenders' behaviours as to their perception of the environment and its effect on them. Second, it ignores the vital input the offenders can reveal, regarding their spatial behaviour.

The pilot study aims to explore this gap in the literature and examine the relationship between perception and offenders' spatial behaviour. This was inspired by Carter and Hill's (1979) study that investigated "how individual criminals perceive their urban environment and how they make criminal behavior choices in response to those perceptions" (pg.1). They compared between offenders and non-offenders and between white and black offenders. The present study aims to find patterns in property offenders' perceptions and behaviour.

The pilot study also follows Canter and Larkin's (1993) view, that each and every location used by an offender is of psychological and investigative importance. In order to explore in full these issues it was decided to interview offenders and learn directly from them. The advantage is the insight it offers to the psychological significance of

the relationship between locations and to further our understanding of the subjective view the offenders have of the environment in which they operate.

The conceptual basis of this study includes established factors which have been shown to influence offenders' behaviour such as the home of the offenders and familiarity with the area the offenders live and offend in (Brantingham and Brantingham, 1981; Canter and Larkin, 1993). Past research, which has modelled offenders' spatial behaviour, has established that offenders do not tend to travel far in order to commit crimes (Baldwin and Bottoms, 1976; Repetto, 1974; Rhodes and Conly, 1981; White, 1932). This is often explained by two theories, the 'Routine Activity Theory' (Cohen and Felson, 1979; Felson, 1993) and the 'Rational Choice Theory' (Cornish and Clarke, 1987), which serve as the conceptual basis of this study.

2.2. Data Collection

The aim of the pilot was to explore the subject matter described above. However, the pilot study also served as a study of the measures to extract that information. Thus, the following sections will detail the methodology used in the study and the ways in which they were derived from the theoretical discussion.

2.2.1 Interview Design

As an exploratory study the appropriate data collection method was a semi-structured interview. The semi-structured interview was most appropriate since a specific set of questions could be asked while it was still possible to have an open discussion or a conversation where the offenders could add relevant information as they saw fit. Thus, the offenders could make the interviewer aware of important issues, which were further investigated.

The interview consisted of four main parts each contributing to the understanding of the background, behaviour and perception of the offenders (see Appendix 1 figure 1). The first part included a short background questionnaire and consisted of very basic demographic questions and information regarding the participants' criminal record

and area of residence. This was derived from previous studies which included interviews with offenders (Carter and Hill, 1979; Thompson, 2002).

The second part consisted of instructions to draw a sketch map of the area where the criminal activity took place. This provided information about the offenders' perception and use of the environment. The drawing instructions were adapted from Lynch's seminal (1960) study of people's perceptions of Los Angeles, Boston and Jersey City. The basic part of Lynch's (1960) interview consisted of a request for a sketch map of a city, for a detailed description of a number of trips through that city and for listing and brief description of the parts felt to be most distinctive or vivid in the subject's mind. These instructions were adapted for the purposes of this study. Thus, instead of asking the participants about a number of trips through the city they were asked about crime site locations. The participants were also asked to indicate significant locations in these areas, such as places they would often visit or that they considered as important.

Lynch also instructed his participants to "give explicit directions for the trip that you normally take going from home to where you work" (pg 141). Since the role of the home has been noted in the literature as central to the offenders' travelling patterns (Brantingham and Brantingham, 1981; Canter and Larkin, 1993) the offenders were asked to draw a second sketch map which indicated a route to and from a crime site.

The third part included 13 open-ended, close-ended and leading questions. These questions were aimed to further explore the relationship between the offenders' perception of their environment and their spatial behaviour. The questions were derived from established concepts, which are often discussed in relation to offenders' spatial behaviour such as the offenders' career development, and the role of the home (Brantingham and Brantingham, 1981; Canter and Larking, 1993, Carter and Hill, 1979). These will now be presented and explained.

There is some overlap between the aims of some of the question as they encompass several concepts. For example, questions 1,2,8, and 10 were aimed to understand the role of the home and questions 1,2,6,11 and 12 were aimed to learn about the offenders' background and career development. As mentioned above, two theories are

often used to explain offenders' spatial behaviour. First, the 'Routine Activity Theory' explains offenders tendency to offend in areas they are familiar with via work or their daily routines. Thus, the theory predicts offenders will travel short distances in order to commit crimes (Cohen and Felson, 1979; Felson, 1993). Since familiarity is considered to be a key factor in offenders travelling behaviour questions 5,8,9 and 10 relate to this topic and explore the range of distances offenders cover when committing their offences.

Second, the 'Rational Choice Theory' advocates the offenders' choice of crime location is a result of an evaluation of costs and benefits. Carter and Hill (1979) also stipulate that offenders' spatial behaviour is relevant not only to the objective environment but also to the perceived one and that the evaluation of the offenders' environment is intrinsic to his goals. Thus, questions 3,4,6,7, and 10 focus on the goals of the offences and the offenders' considerations in selecting a crime location.

Finally, Carter and Hill (1979) compared between offenders and non-offenders' perceptions and behaviours. Question 13 is aimed to acquire knowledge whether similar comparison could be made in the future by setting interviews with non-offenders who live in the same area as the offenders in this sample.

The forth part was a questionnaire adapted from one used by Carter and Hill (1979). Carter and Hill's (1979) study is the only known attempt to measure images of areas and consequent criminal behaviour. They adapted a Semantic Differential, an attitude-reaction measurement tool. This method allows the assessment of participants' reactions to a set of concepts or objects in terms of a number of evaluative dimensions. The tool measures people's reactions to stimulus words and concepts in terms of rating on bi-polar scales.

	Very	Slightly	Neutral	Slightly	Very	
Good	-----	-----	-----	-----	-----	Bad

A scale like this measures directionality of a reaction (e.g., good versus bad) and intensity (slight versus extreme). The original questionnaire was aimed to test offenders' evaluation of 15 geographic areas in Oklahoma City and included 15

adjective pairs (e.g., good/bad; risky/safe; cheap/expensive). The selection of the pairs was guided by the preceding conceptual and methodological discussion of variables of likely concern to Carter and Hill's (1979) analysis. The polarity of the scales was mixed to prevent individuals making all their responses on one side of the page or the other.

Carter and Hill (1979) tested how criminals think about different areas of the city by comparing white offenders with non-white offenders and offenders with non-offenders. The present study differs from Carter and Hill's (1979) in two ways. First, it aims to identify patterns in property offenders' perception and behaviour. Second, the offenders were expected to come from various areas across Merseyside. Since the aim of the study was to gather information directly from the offenders, it was decided to focus on the offenders subjective definitions of their home and criminal areas, rather than official divisions of Merseyside, such as divisions by police forces or post codes.

Thus, the modified questionnaire consists of 9 questions on a scale from 1 to 5 (as shown above), which require the offenders to evaluate and grade aspects of their lives at the time of the offences, and their perceptions of the area they live and offend in. The questionnaire serves as another tool to validate information already given by the offenders at previous parts of the interview and to expand on the theoretical concepts of familiarity, and evaluation of possible costs or benefits of carrying out crime in particular areas. Finally, it is used as another source of information regarding the relationship between perception and behaviour. For example, it is expected that offenders who will perceive an area as poor and risky will be less likely to offend in it versus offenders who perceived an area as wealthy and calm.

2.2.2. The Procedure

16 interviews were conducted at two counselling facilities around Merseyside, which are part of a drug rehabilitation partnership.

- ARCH Initiative (in Birkenhead)
- Independence Initiative (in Bootle)

The centres were contacted by phone. A request was made to conduct interviews with prolific property offenders attending the centres. The centres recommended that a staff member would suggest volunteering to specific individuals, they thought might be willing to participate in the study. In order not to bias the sample, it was agreed that a poster will also be placed on the centre's notice board and anyone interested would be able to receive further information about the interview from staff members in reception (see Appendix 1 figure 2). If a volunteer came forwards his/her names were then passed on to the researcher and the staff member proceeded to schedule the meeting.

2.2.3. Pre-Interview

The participants were guaranteed anonymity and confidentiality and they were told in advance the interviews would be taped. The offenders were also informed that they would not be paid for the interview and their participation was on pure voluntary basis and non participation would not be considered against them.

2.2.4. The Interviews

The 16 interviews were conducted over a three-month period (between April and July 2000). Each participant was asked to draw at least one sketch map. The participants were first asked to draw a sketch map of crime locations, their home and other locations that they visited frequently. These were then analysed and are shown in Appendix 2. 13 of the offenders also drew a map of a route to and from a crime scene. Overall, 29 maps were collected.

2.2.5. Raw Data

Each of the 16 interviews was transcribed for analytical purposes. Personal details of the offenders and of people they mentioned in the transcripts have been changed in order to ensure their anonymity.

2.3. Offenders' Background

The following section will briefly describe the sample's background.

- Most offenders were between 31 and 35 years old, with an average age of 32 (see Appendix 1 table 1).
- The majority of the offenders in this sample were male. However, 4 women were also interviewed. The female offenders were aged between 25 and 36.
- Almost half of the offenders in the sample finished school or had further education. The mean number of years of education was nearly 10, ranging from 4 to 17 (see Appendix 1 table 2).
- The offenders admitted to committing more than 7500 offences, with average of 474 (101-500) offences, ranging from 7 to 2056. The prolific nature of the offenders' activities became clear as over 87% of the offenders committed more than 50 offences (see Appendix 1 table 3). The most common type of offence was shoplifting(see Appendix 1 table 4). The offenders who admitted to committing this type of crime also admitted to doing so on a daily basis over a number of years.
- The average age for committing the first offence was 14.5 ranging from 6 to 24. Most of the offenders (63%) offended with co-offender/s.
- Considering that the offenders were approached in counselling centres for drug abuse, it was not surprising that all of the offenders mentioned drug use. The most common type of drug mentioned was Heroin. Other types of drug mentioned were Alcohol and Ecstasy.

2.4. Methodology

The pilot study was an exploratory investigation of the relationship between offenders' perception of their environment and their spatial behaviour. As mentioned above, the literature predicts that a typical property offender will not travel far from his/her home to commit crimes and will focus on areas he/she are familiar with. The offenders interviewed in the pilot study agreed that they would rather offend in areas they were familiar with. For example,

“‘cos if you get to a shop and you do get caught, and you have to go out you don't know where you are, you don't know where to go. You can just start going down in the wrong street or the wrong whatever and get caught that way. If you know where you are you can get around it.” (Pilot Interview 7, pg. 2)

However, as early as the second interview and across the entire sample it became clear that there was a more complex and dynamic process influencing the offenders' spatial behaviour than the criminological literature gave attention to. While the offenders preferred to offend in familiar area offender number two explained a reality that was more varied.

“Well...with drugs...you wake up in the morning and you feel pretty terrible, and you think “I need some money and quick”. So you not gonna get somewhere far to make the first 10 pounds to come back and get your drugs. You want someplace that's close. That what it was like every single morning. Come back get the drugs, and then go somewhere far.” (Pilot Interview 2, pg. 1,2)

The variations in the offenders spatial behaviour and explanations of various factors influencing it, such as mentioned in the quote above led to two key conceptual changes in the focus of the main study. First, the focus of the main study was modified to examine strategies offenders' use rather than focus simply on identifying typologies of offenders. Second, It became clear that beyond the simplified

explanations of the routine activity theory and rational choice theory there was a dynamic process of decision making which needed to be explored.

The offenders generally referred to their activities using business like terminology such as ‘buyers’ and ‘sellers’, ‘going to work’, etc. As this female offender described her ‘market’ she said:

“I’ve had got lot really of contacts in XXXX. All my buyers are in XXXX. 3 in YYYY, 1 who used to buy loads of bikes.” (Pilot Interview 9, pg. 2)

Therefore, it was decided that the main study would follow established models of consumer behaviour that have identified a decision making model and examine whether it would be appropriate to explain offenders’ behaviour as well. The conceptual framework which was adapted is explained in detail in chapter 1 section 1.2.

Beyond these theoretical implications, the experience gained from these 16 interviews and the initial findings they provided, led to significant amendments in the interview design of the main study. These are considered in relation to the results from the pilot study.

2.4.1. Demographic Questions

The first part of the interview included a few demographic questions was modified for the following reasons:

The offenders were asked about the number of years of their education. In order to receive more reliable information this was changed and the offenders were asked about specific qualifications they have achieved. This was expected to help in separating between technical qualifications and academic. It also gave room for several qualifications to be mentioned, which was not possible in the pilot, and gave a better overview of their background.

The offenders were asked to assess the number of crimes they had committed. The answers varied as the interviews progressed. This was due to the offenders feeling more at ease with the setting of the interview or feeling more confidence in the interviewer. A second and more significant reason was that once specific areas were mentioned the offenders gave clearer answers. Two key amendments resulted. First, a time line was devised (see Appendix 3 figure 1). Second, the number of offences the offenders admitted to committing needed validation. This was to be achieved in two ways. First, validation within the interview, by asking the offenders to look again at the information they have given and agree on a final number of estimated number of crimes. Another way would be to compare the numbers given by the offenders with official records. Thus, it was decided that the interviews in the main study would be conducted in prisons.

Existing models of offenders' spatial behaviour assume offenders have a fixed base from which they operate (see chapter 1 section 1.7). Therefore, the offenders were asked whether they lived in the same address when committing all of their offences or whether there were multiple addresses. Surprisingly, 14 offenders (88%) indicated that they lived in several addresses while committing their offences. On average, the offenders lived in 7 different addresses throughout their criminal career, ranging from 1 to 20. 3 offenders indicated they were living in multiple addresses but did not indicate an exact number. For example, offender number 2 explained he "didn't have one permanent address. Just all around here...in housing estates here" (Pilot Interview 2, pg. 1).

These findings indicated the offenders were much more transient than expected. This led to believe there was a gap in the literature which needed to be explored further. This was fundamental to changes in the interview design as the questions in the pilot study generally assumed there was one home area. This also had a knock on effect on the analysis of the pilot's results. Consequently, the timeline was designed to clarify this issue by examining the number of areas the offenders lived in and to explore the relationship between the offenders' mobility patterns and their criminal behaviour.

Since the interviews were conducted in drug rehabilitation counselling centres, all of the participants had an addiction to some form of drug. However, the extent of the

addiction and its effect on their lives became clear only once the interviews were completed. In response to question 6, the offenders explained how they were in constant pursue to make money. For example,

“Well, with the drugs, I mean, with them being so expensive and that, you need to make a lot of money quickly.” (Pilot Interview 5, pg. 4)

Hence, more information about the type of drug the offenders were using and how frequently they were using it had to be retrieved. The advantage of including these questions as part of the demographic survey is that it offers an immediate insight to the relationship between drug use and the offenders’ life style and criminal behaviour.

2.4.2. Sketch Maps Drawing Instructions

The sketch maps were found to be a useful interviewing tool. They were a visual aid in understanding the distribution of crime site location in relation of the offenders’ home. It also assisted in retrieving information about the offenders’ life style and non-offending behaviour as they included locations which were important to them, such as a parent’s house or the pub. Therefore, sketch maps would be included in the main study. However, since the instructions were adapted from Lynch’s (1960) study where he examined non-offenders, there was no issue of risk of detection. As the offenders were asked to draw a second map, it became clear they were unwilling to detail specific information in fear of detection. Therefore, the instruction to draw a route to and from a crime site would refer to a crime the offenders were convicted for.

The finding that the offenders did not have a fixed base proved to effect the drawing instructions as it was not always clear what was the relationship between the various homes and the offenders’ spatial behaviour. It also became clear that valuable information regarding the offenders’ career development was not retrieved. Therefore, the timeline would be used to first learn about the spatial behaviour and then relate the offenders’ perception about a defined area, where most of the offences took place.

In the pilot study, the drawing instructions came immediately after the short background questionnaire. Thus, the offenders did not have enough time to settle into

the interview and build rapport with the interviewer. As a result, the benefits of using the sketch map as an interviewing tool were not maximised. The main advantage of the sketch map is the insight it gives to the distribution of the offences in relation to the offender's home and the processes involved in the crime site location (see Chapter 5 for more details on this technique). Hence, in the main study, more time would be spent on part 1 and the drawing instructions would come later in the interview session.

2.4.3. General Questions

As mentioned above, the results of the pilot study led to changes in the aims of the main study. The fact that the offenders did not always have a fixed base and the variations in their spatial behaviour were revealed in the third part of the interview and the design of the main study had to be changed as a result.

Carter and Hill (1979) claim that offenders' spatial behaviour is a result of their goals. The offenders explained that their main aim was to make money to feed their drug habit. Few also mentioned there was some thrill involved in committing crime. The offenders expanded on this topic when asked how drugs influenced their choice and revealed that most of their time was spent in pursuit of opportunities to make enough money. Two of the women in the sample also said they shoplifted in order to feed or dress their children. For example,

“The kids were never left behind. I never left them. They didn't starve and stuff. The only thing you did get was new cloths all the time, but if I pinched anything that was nice for the kids to keep it.” (Pilot Interview 7, pg. 3)

One of the main advantages of the pilot study was that it allowed for a dialogue with the offenders and an opportunity to learn directly from them. When the offenders were asked about their considerations of where they chose to offend, some explained they preferred to offend in wealthy areas, in areas where they considered it easy or in areas they were familiar with. Some offenders also explained that they preferred to avoid areas where they were too known and feared detection. These were clearly

important factors which influenced the offenders' spatial behaviour. Thus, it was felt that the main study needed to explore this aspect of choice further.

As mentioned above, the offenders often agreed that familiarity was an important factor in selecting a crime site location. However, it also became apparent that many offenders were travelling more often and further than expected. When asked about the range of the distanced they travelled, they revealed that the shortest distance was within their home (stealing from their family members) or next door (from a neighbour they did not like). More surprisingly at the other end of the scale, their travels also included areas which were miles away from their home. These areas included places they have never been to before. This range of behaviours challenges the literature which regards offenders as those who remain local or those who travel far. Thus, this issue needed to be explored in more detail in the main study and the offenders would be asked more directly about their spatial behaviour patterns in the timeline and in probing questions. Conceptually, it also raised the awareness that the discussion should deviate away from attempting to identify types of offenders and consider a discussion of strategies of offending behaviours instead.

2.4.4. Questionnaire

Given that the literature claims offenders operate from a fixed base, the questions in the questionnaire assumed the offenders' answers would refer to one area of residence. The fact that most offenders lived in several addresses during their criminal career meant the answers were too general and unreliable and no analysis could be carried out. For example, in question 7 the offenders were asked how they would describe the area where the offences took place in terms of the area being hostile or friendly. As they explained, it depended on the area. This exposed the fact that in the pilot's questionnaire there is no indication to which area the offenders should refer. Thus, it was not possible to make a comparison across the sample or between areas each offender lived and offended in. Therefore, the main study would use the timeline to first require information about various areas and part 2 of the interview would focus on the area where most of the offences took place.

Questions that did not necessarily relate to a specific area often needed clarification regarding their meaning. The offenders claimed that there was no clear answer, and that the answers depended on the situation and/or different circumstances in their lives. For example, in question 5 the offenders were asked to describe themselves in terms of calm or violent at the time of the offences. As some of them explained they committed offences over 15 years and their behaviour was subjected to many influences. These included situational factors such as marriage or divorce or whether the offenders were using drugs at the time or not. This made the answer impossible with the current design. Thus, the questionnaire was replaced by specific questions in parts 3 and 4 of the interviews in the main study.

7.5 Conclusions

The present chapter had four aims. First it described the theoretical concepts that led to the pilot study. Second, it described the methodology used in the study, the process of data collection and presented the sample and some initial findings regarding the offenders' background. Third, it discussed how the findings served as the foundation to the conceptual framework of the main study, which led to the adaptation of a decision making model. Finally it discussed the changes that were made to the interview design as a result.

The pilot study was vital to the development of the main study, which will be described in the following chapters. The most notable contribution of the pilot study was the insight, given by the offenders' own account, to the existence of a decision making process and different factors influencing a crime location choice.

The second contribution was the finding that an offender's spatial behaviour was varied and that the offenders were more transient than expected. Thus, the discussion in the main study would have to consider the identification of different strategies, which the offenders used rather than assume to identify types of offenders.

Third, the practical experience of conducting a set of interviews was highly valuable. As a result of these interviews and the experience gained, the phrasing of some of the

questions were changed and more time was spent with the participants before and during the early stages of the interviews in order to build better rapport.

Chapter 3

Data Collection

The previous chapter described the pilot study. It detailed the research design, described initial findings and discussed the affect the pilot had on the aim and structure of the main study. It also explained the reasoning for following the conceptual framework for understanding the psychological processes involved in offenders' spatial decision making. The present chapter introduces the sample of the main study, its recruitment and methodological issues regarding the research design. The methodological issues relating to the method used to extract spatial information from them are reviewed in chapter 4. A model for analysing sketch maps is tested and revised in chapter 5. The background of the participants is reported in chapter 6.

3.1. Interview Design

The appropriate data collection method for this research was a semi-structured interview. As mentioned in the previous chapter, the pilot study, which consisted of 16 interviews in counselling facilities around Merseyside, served as the foundation for the interview design. Due to the experience gained a revision was made to the initial procedure (see chapter 2 for more details). Thus, the interview in the main study consisted of four main parts each contributing to an understanding of the background, behaviour and perception of the offenders (see Appendix 3 figure 1).

- The first part included a background questionnaire and consisted of demographic questions and information regarding the participants' criminal record.
- The second part was a time line, where the participants detailed areas where they have lived throughout their lives and whether their criminal activity was in the same or different areas. The advantage of a time line is that it provides a general overview of the progression of one's criminal career, in terms of type and number of crimes committed. It also puts the offenders' criminal

behaviour in context of their lives as ordinary people. Finally, it assisted the interviewer in giving informed instructions and questions in the following parts of the interview.

- The third part included instructions to draw cognitive maps of the area where the majority of the criminal activity took place. This provided information about the offenders' perception and use of the environment.
- The fourth part included a combination of open-ended, close-ended and leading questions regarding the offenders career development, role of the home, risk assessment, co-offending, and travelling behaviour. These questions were aimed to further our understanding of the decision processes involved in selecting a crime location.

3.2. The Procedure

The interviews were conducted at

- Altcourse Prison- a Group 4, category 'A' prison.
- Kirkham Prison- a category 'D' training prison.
- Wirral Probation Centre (Birkenhead)

Initially, the Probation Office and Drug Rehabilitation Centres in Liverpool were contacted in a search for volunteers. After several weeks with no progress it was decided to approach the Prison Services.

Every prison in the Northwest was contacted by phone followed by a formal letter requesting to conduct interviews with offenders in these establishments. Most prisons responded negatively. Their reasoning was lack of time, lack of interest or lack of manpower.

Two Prisons were initially welcoming. However, they wished for the interviews to be conducted in the presence of a prison psychologist and for information about offences

the offenders were not convicted for, to be reported back to them. Since the offenders were guaranteed confidentiality this arrangement was not possible.

Interviews were first set up in HMP Alt-Course. Due to time limitations and a wish to reach as many participants as possible HMP Kirkham was contacted as well. The overall number of interviews was not as high as expected and more avenues were sought.

Five Probation services in Merseyside were contacted separately, except for two offices in the Wirral Probation Centre, which work together. Each senior probation officer was independent to decide on his or her willingness to help.

- ❑ Kirkdale was understaffed and could not afford the manpower.
- ❑ East Liverpool Probation Centre was disinterested.
- ❑ The third Probation Centre was willing to help. Unfortunately no one contacted reception and there were no further attempts to organise interviews, due to lack of manpower.

Therefore, out of the five Probation offices interviews were set up only in the Wirral Probation centre.

Each establishment had its own restrictions and agenda. Thus, there were some variations in the manner by which the data was collected.

3.2.1 HMP Alt-Course

The Prison's Senior Psychologist was asked to provide a list of the burglars, robbers and thieves serving a sentence in the prison. The prison's policy is to view the list of prisoners onsite. The printout with the prisoners' details included the prisoner's number, surname, type of crime convicted for, and location within the prison.

The prisoners' population at the time was 299 prisoners. This consisted of mostly burglars, then thieves and robbers (see Appendix 3 table 1). In order to maintain a random sample, every fifth burglar's prison number was put into the prisons' computer system in order to check if they were sentenced, and their expected day of release. If they were present and available to be interviewed within the following weeks, their name was marked and the next fifth person was checked. If they were not, then the next person on the list was checked. If that person was available then the next fifth person was checked, etc.

The reasons why offenders were unavailable to be interviewed were:

- Offender was convicted for less than 3 times
- Offender was on remand
- Offender was not sentenced
- Offender was in court
- Offender was released
- Offender was about to be released within a week
- Offender did not wish to participate in the study

3.2.2. *HMP Kirkham*

A list of the prisoners serving their sentence at the prison was sent to the researcher by post. The list included the offender's number, surname, time of sentence, type of crime convicted for. The prisoners' population at the time was 96 prisoners. This consisted of mostly burglars, then thieves and robbers (see Appendix 3 table 2).

Every fifth burglar, every robber and every other thief were checked for availability. The prison allowed for the interviews to be conducted during one week. A list of names of offenders, which could be interviewed, was drawn on a daily basis. A prisoner who was put in charge of this procedure by the governor then approached the offenders. The prisoner constructed a final list of those wishing to take part in the study. Reasons for not participating in the study were the same as in HMP Altcourse.

2.2.3. *Wirral Probation Centre*

Wirral Probation Centre sent a name list of 29 offenders who were candidates, and were under the supervision of 8 different probation officers, which were contacted independently. After initial conversation with the probation officers, the offenders who were still under their supervision and those offenders the probation officers thought would be willing to participate were contacted. Three interviews were consequently set up. However one offender did not turn up to the meeting. Due to timetable limitations no further contact was made.

3.3. Pre-Interview

All eligible prisoners were given a pre interview letter (Kirkham), approached by the Prison's Senior Psychologist (Altcourse) or their Probation Officer (Wirral) a day prior to the interviews taking place, in which they were informed of the nature of the interview and how it would be carried out, i.e. that they would be asked to provide information about past criminal activities and to draw maps of crime site locations (see Appendix 3 figure 2).

The rationale for this was for the following reasons:

Ethical Reasons

It was felt that due to the sensitive nature of the interview explaining the purpose of the interview and its procedure may reduce stress levels. It was also important to provide sufficient information so that the participant will be able to make an informed decision to consent to participating in the research. The participants were asked to sign a consent form only after they have met the researcher in the interviewing room and were verbally informed of the nature and procedure of the interview.

Self Reflection

The task required of the subject was expected to be intimidating and the participants were given time to think about their willingness to provide information on tape.

Volunteers

The participants were assigned on a strictly volunteer basis. They were not forced to give an account of their criminal behaviour. Thus, at the time of the interview were willing to provide personal information.

Confidentiality

One problematic area is disclosing information about undetected crimes that the offenders committed. The offenders were told that they should not disclose any information regarding serious crimes against a person (i.e., sex offences, homicide etc.) or reveal intention or details about future crimes they intend to commit- as the researcher was obliged to pass such information to the relevant authorities. The offenders were presented with a consent form which they were asked to sign (see Appendix 3 figure 3).

3.4. The Interviews

The interviews were collected over a five-month period in 3 establishments (see Appendix 3 tables 3 and 4). Each participant was asked to draw at least one sketch map. In the first map, the participants were asked to draw a sketch map of crime locations, their home and other locations that they visited frequently. The second map was a description of a route to and from a crime scene they were convicted for (a summary of the number of maps collected is shown in Appendix 3 table 5). Interviewee 27 drew a third map without being asked to do so, as part of his attempt to explain an area he was referring to in the interview.

Reasons why some offenders only produced only 1 map:

- ❑ Offenders refused to draw a second map.
- ❑ Offenders already detailed a route in the first map.
- ❑ There were time limitations and the interview had to be resumed. It was decided to focus on the details in map 1 rather than to stop the participant in the middle of drawing and possibly miss valuable information.

All maps were collected and analysed (see Appendix 4).

3.5. The Sample

The initial sample consisted of 37 interviews. Of the 37 interviews, 28 were selected for study, 9 were rejected (see Appendix 3, table 6). The present study aims to learn about serial offenders' spatial decision making. Thus the thesis follows the definition of a serial offender being an offender who committed three or more offences (Canter and Larkin, 1993; Hodge, 1998). On one occasion an offender who only had one previous conviction admitted to committing more than a dozen property offences. The definition of a serial offender is typically based on previous convictions. Thus, the definition had to be revised. For the purpose of this study offenders who admitted to committing three or more property offences were considered serial offenders.

Unlike HMP Alt-Course, HMP Kirkham did not provide the details of the offenders' previous convictions. In many occasions the offenders were convicted for other offences than robbery, burglary or theft. A problem arose once it became clear that seven offenders did not commit the minimum three property offences but had more than three convictions (i.e. driving without a license). It was decided to include only those offenders who committed three or more property offences.

In two cases other reasons led to the exclusion of the participants from the final sample. Participant number 15 was British-Arab and had visible scars on his hands and knuckles due to fist fighting. He spoke quietly. The procedure of the interview was explained and his verbal approval to be taped was given. He signed the consent form and the interview began. Approximately 30 minutes into the interview, as he was answering questions regarding his criminal activities and areas of residence his demeanour changed and he paused. He gazed at the Dictaphone, which was on the table in front of him and said that he was not informed that the interview would be recorded. Immediately an apology for the misunderstanding was given, while stressing that the interviewer was not a member of the police, prison or probation and that there was no intention to get him involved in future legal hearings.

However, the participant got more and more agitated and aggressive, until he grabbed the Dictaphone, stopped it, pulled the tape out and broke it in half, while mumbling that he was not informed properly. Again an apology was given and he was asked if he wished to resume the interview. He replied positively and the Prison's Senior Psychologist was then approached by the researcher.

This incident led to a reassessment of the procedure of the interview and several changes were made in the following interviews:

- The consent form made clear that the interviews would be recorded, and the exact limitations of the confidentiality agreement were modified.
- At the beginning and end of each interview the interviewees were repeatedly reassured that the information they provided would remain confidential and that their identity would remain anonymous.

Interview number **35** was the last interview in Kirkham Prison. The interview was not set in advance and the interviewee was approached by another prisoner and was asked to volunteer as two scheduled interviews were cancelled at the last minute. Due to time restrictions it was not possible to check the prisoner's pre-conviction file. Prior to the interview, the interviewee and interviewer met the day before while sitting in a communal area during a lunch break. The interviewer explained that the purpose of her visit to the prison was to interview offenders as part of a study about environmental perception and crime. The prisoner informed the interviewer that he studied psychology and that he was thinking about finishing his course once he got out of prison.

On the day of the interview, the interviewee informed the prisoner in charge that he was convicted for armed robbery. However, he was absent from the prisoners list. It was thought the list was not updated or that there was some error. Before the interview began the interviewer asked the participant if in fact he was convicted for armed robbery. He replied positively and claimed a mistake in the list was the cause of confusion.

Thus the interview commenced. The participant answered all questions willingly, and volunteered information, including very specific details of the crimes he claimed he has committed and drew a map of the area where the armed robbery, supposedly, took place. The interview took about an hour and once resumed, the interviewer checked the pre-conviction file, which revealed that the participant was convicted for kidnap. Therefore, the interview was rejected from the sample.

3.6. Pre-conviction Files

The demographic background and information regarding the criminal history of the offenders was collected from two sources. From the offenders themselves and from their personal files. Access to information differed from one establishment to the other.

3.6.1 HMP Altcourse

The prison allowed for the offenders' pre-conviction files to be read and for notes to be taken. However, it was not allowed to photocopy any of the files content. The pre-conviction report consisted of the background of the prisoner, the probation office report and a progress report evaluating the prisoner within the prison. There was also a summary of the offenders' prior conviction files. The files detailing the offenders' background differed in quantity and quality.

The probation officer's evaluation normally included information about the background of the offender, place of birth, level of education, personal history which led to the specific offence the offender was convicted for and the offender's risk assessment.

The summary of prior convictions varied quite dramatically. In some cases several pages were misplaced and in others complete sections were missing. In most cases there was a printout of each of the convictions, type of crime committed and type of sentence received (ie., whether prison, probation, etc.) and length of sentence. This proved very helpful and valuable information. However, due to time limitations it was necessary to focus mainly on the overall count of conviction that only included

general categories such as “crime against a person” or “theft and kindred offences”. There was also information about the offenders’ first offence and home address. Whenever possible it was preferred to copy the more general information thus have time to copy some of the background information as well.

The files were read before or after the interviews were conducted depending on the time limitations of the supervising psychologist. The advantage of reading the files prior to conducting the interviews was the possibility of finding whether the participants were hiding information or even lying during the interview and to be able to confront the issue or ask in great detail to test the reliability of the offenders’ answers. It also helped in avoiding direct questions regarding delicate issues of past experiences that might stress the participants. For example, if there was information in the file that the participant had been abused in a children’s home, questions regarding life in care or reasons for moving would be rephrased or allow the researcher to be better prepared to handle the emotions that the question might trigger.

On the other hand, the advantage of reading the files once the interview had been concluded is that there was no predisposition in information asked or given. It was also possible to learn what type of information the offenders were more likely to conceal and which they felt comfortable sharing.

3.6.2. *HMP Kirkham*

The prison did not allow the interviewer to inspect the offenders’ pre-convictions files and the only information the prison allowed to record was the number of prior convictions and pre-custodials (i.e. how many times the offenders’ have been in prison). The offenders past records were viewed before the interview, except for the first three and last interviews, where the files were checked after the interviews were completed. The files were used to determine if the participants were serial offenders.

3.6.3. Wirral Probation Centre

There was willingness to view the offenders' pre-conviction files. The first interview was done before the file was viewed and the second interview was done after the files were read. The files included the same material as was available in HMP Alt-Course.

3.7 Raw Data

Each of the 29 interviews was transcribed or summarised for analytical purposes. The first 13 interviews were transcribed in full where as the remaining 16 interviews were summarised, since there is no need for such detailed account. The summary includes the location of statements on the tape and allows for review of the exact account provided by the offenders.

Personal details of the offenders and of people they mentioned in the transcripts have been changed in order to ensure their anonymity.

Chapter 4

Methodology to Extract Spatial Information

The aim of the present chapter is to justify why the sketch mapping technique was chosen and why despite its faults it is such a useful tool for examining offenders' cognitive representation of their environment. A cognitive map is the cognitive process that enables people to collect, structure, store and manipulate environmental knowledge (Downs and Stea, 1973; Murray and Spencer, 1979; Saarinan et al. 1988). This information is used in shaping our attitudes of the world and hence affects our behaviour patterns, and thus is a vital part of spatial decision making.

A sketch map is a graphic representation of environmental information, which can unlock the processes by which places have their impact (Canter, 1977). It is a useful interviewing tool and has been used in this thesis to extract a representation of series of crimes, to facilitate in understanding psychological factors influencing offenders' locational choice as it is drawn from their direct experience with the environment.

Methods to extract environmental information are varied and include estimating distances (Canter, 1975; Montello 1991) or direction between a series of locations (Garling et al. 1981; Kirasic et al. 1984), way finding along a route or indoors (Garling 1989) and multidimensional tasks (Magana et. al. 1981) (for an review of these techniques see Kitchin 1996). These methods can be classified according to three terms (Golledge, 1976):

- Whether they are based on naturalistic vs. experimenter- controlled behaviour.
- Whether inferences are made by direct observations or are based on past experiences.
- Whether the responses are elicited directly from the respondents.

Due to the nature of the study the appropriate method for extracting the cognitive and affective information had to be naturalistic and based on past experiences. In order to fully understand offenders' thought process and spatial decision making the information had to be elicited directly from them. Self-report methods include verbal and written reports, sketches, free flowing conversations and map and model making. These methods require individuals to state their knowledge of particular places or to reconstruct representation of that knowledge.

Kitchin (1995) identifies 5 types of sketch maps:

- ❑ *The Basic Sketch Map*- It is designed to obtain from the sketch mapper a freely drawn and solicited sketch map that has been minimally defined by the researcher. The participant is given a blank piece of paper and asked to map a given environment.
- ❑ *The Normal Sketch Map*- The researcher words instructions in order to retrieve certain data.
- ❑ *Cued Sketch Map*- The respondent is given a portion of the map and asked to complete specific features.
- ❑ *The Longitudinal Sketch Map*- Allows the researcher to study how the sketch map evolves.
- ❑ *Sketch Map Language*- Respondents are taught the language and their map is not hindered by their drawing ability.

Since the present study explores recalled information of the environment offenders lived and offended in, the basic sketch map technique was used.

4.1. The Advantages of the Sketch Mapping Technique

Canter (1977) suggests that sketch maps usefulness lies in the fact that maps can be used as a metaphor for mental processes, which give insight to a variety of different types of information which may be registered and then reproduced in a sketch. As a consequence, a sketch map may be examined to reveal where a sketch maker's interests lie. If a person chooses from a range of possible information, which does he decide to represent. Unlike a geographer's map, which represents what he has systematically recorded, a sketch map may be used to represent what a person remembers. In other words, a psychologically significant aspect of maps is that they provide an overview of potential action sequences, which enable us to appreciate the internalised spatial structure upon which a person is operating. Because of the efficiency, variety and summarising qualities of sketch maps they present a valuable method of exploring conceptual systems.

The second advantage of this technique is that it is a convenient form of data collection of environmental knowledge. This is because it uses the mental image peoples have acquired of a given location or area and transforms the 3 dimensional input into a 2 dimension output. The selected images for this thesis represent a key area of criminal activity of each offender and his home location. The advantage of this approach is that the sketch map includes a representation of series of crimes, thus revealing patterns of offending behaviour in a certain area.

Third, the method allows the offenders to freely construct an image, where the interviewer's influence on the drawing of the specific map remains minimal, as she was not familiar with the specific locations the offenders drew. Participants were all given the same drawing instructions and there was no prompting of a specific manner of drawing. The offenders were encouraged to draw the way they wished.

The need to understand the constructs elicited from the offenders is helped by the use of simple instructions, in ordinary language. It therefore does not make much demand from the language fluency or vocabulary of the participant. This simplified linguistic process also helps to reduce the possibility of social desirability bias during the

interview as the researcher is not required to demonstrate any expert knowledge (Thompson, 2002).

Forth, the practical advantage is the 'think aloud' method, which is used to extract cognitive map knowledge (Kitchin, 1995). Perkins (1981) proposes that this approach allows the participants to express their thoughts while engaging in an activity. This leads for the affective impressionistic description as well as factual one (Spencer and Dixon, 1983).

Finally, this method is reliable. Blades (1990) examines the test re-test reliability of sketch maps by asking 109 psychology students to draw the same map on two occasions and concludes that it was a reliable method of data collection. He also notes that this method is more ecologically valid than other methods, because most people are familiar with this technique.

4.2. Problems with the Sketch Map Technique

The main limitation of this method is that subjects are sensitive to the instructions given by the interviewer. The instructions determine which aspects of the information is elicited or emphasised, and offenders may suppress information they consider irrelevant to the task, as they understand it (Appleyard, 1969; Canter, 1977; Murray and Spencer, 1979; Pocock 1976). Pocock (1976) goes on to claim that a request to draw a subjective map, a real map or as it appears to a visitor would elicit three different types of responses.

Kitchin (1996) asked 279 respondents to complete four different tests, which were varied in spatial cueing (the amount of information supplied) and location cueing (amount of information requested). He concludes that the tests produced different results due to the task demands. He also recommends that several tests should be used. Therefore, the offenders in the present study were given the same drawing instructions. In some instances the offenders expressed lack of confidence in their ability to draw or in their understanding of the instructions, and a more elaborate explanation was given.

The drawing instructions can also influence the participants in another way. According to Haney and Knowles (1978) and Spencer and Dixon (1983) people tend to bias their selection to factual rather than affective maps. These researchers recognise the importance of strengthening this method by combining sketch mapping with a verbal interview, which allows the inclusion of affective elements, and that sketch maps serve as an interviewing tool or as “the starting point for interviews” (Spencer and Dixon, 1983, pg. 375).

Another common criticism of differences in sketch maps is that they are sensitive to graphic skills of the drawer. However, as Murray and Spencer (1978) found, performance could account for 10 to 25 % of the variance. They concluded that “its importance should not be overstated”.

Third, shortage of time to conduct meaningful interviews is one of the major methodological limitations on the researcher in this field. There are major time constraints on interviews with people within the criminal justice system (Thompson, 2002). In this present study 35 offenders were interviewed in prison. Prisoners are being counted before their lunch break. Therefore interviews could not be conducted during that time and the schedule had to be adjusted or in few cases there was a break in the interview.

Forth, sketch maps are difficult to interpret and quantify, because features not included on the map may reflect either the lack of knowledge or deliberate selectivity on the part of the subject (Bryant, 1984). This is especially true in this study due to the sensitivity of the information the offenders were asked to include in their maps. Some of the offenders were reluctant to write street names on the map or identify landmarks in an attempt to conceal their identity. It was expected to affect the number of details shown on the maps compared with non-offenders. Therefore, this thesis does not aim to test offenders’ accuracy of knowledge, but focuses on their subjective perception and decision making.

Fifth, map distortions may be due to the actual production of the sketch map, which often places constraints on the resultant map: the size of the paper, the subject’s starting point when drawing, the assumed scale, etc (Pocock, 1972).

Sixth, the layout of the city or its 'legibility' can bias the use of different elements. Most cognitive maps studies compare people's perception in one defined area. However, the offenders in the present sample operated and lived in many areas across the North West of England. Therefore, it was not possible to compare the number of elements used but to compare the styles of the maps.

Finally, a methodological problem specific to this study was the definition of 'an area'. The offenders were asked to draw a map of an area they committed most crimes at and to indicate where their home was in relation to those crime sites. Downs (1970) referred to this problem as he studied consumers' behaviour in relation to shopping areas. He commented, "there was not a generalised image of an area" (pg. 23). However, his study compares people's perceptions of one area, while the offenders in this study offended and lived in different areas across the North West, and each "area" was different from one offender to the next.

During earlier stages of the interview the offenders completed a time line where they indicated the progression of their criminal career in terms of the specific number of crimes they committed in each 'area' as they defined it. Once completing that section they were asked to draw a sketch map. In cases where the offenders claimed the 'area' was too large to draw, it was narrowed down to neighbourhoods where their criminal activity was most prolific.

Despite these notable methodological problems sketch-mapping remains the best method for extracting environmental knowledge under the conditions discussed above and was used in conjunction with other methods in order to extract valuable information from property offenders regarding their spatial decision making and crime site locational choice.

Chapter 5

Classification of Sketch Maps

5.1 Background

A sketch map is a graphic representation of environmental information, which can unlock the processes by which places have their impact (Canter, 1977). It is a useful interviewing tool and has been used in this thesis to extract a representation of series of crimes. It was also used in order to facilitate an understanding psychological factors influencing offenders' location choice as it is drawn from their direct experience with the environment. There are two data sources available for analysis and hypothesis testing. First, the offenders' sketch maps provide a visual source of information. Second, interviews with the offenders provide an additional source of information.

In order to analyse the detail contained in the sketch maps it is necessary to examine and evaluate past attempts at the classification of sketch maps according to their content and style. Surprisingly, only a handful of researchers attempted to develop a classification scheme for the sketch mapping technique. Before we can begin to say what any consistent map style implies for the respondent's cognitive system, we must obtain a better idea of what it is that sketch maps most readily represent, and the variation possible within that (Canter, 1977).

Lynch (1960) describes the processes involved in people's perception of three cities (Los Angeles, Boston, and Jersey). He identifies five content categories, which people use to recognise and organise the environment by:

- *Paths*- Paths are channels along which the sketch mapper moves. This may include streets, walkways, and railways.
- *Edges*- Edges are the boundaries between two phases, linear breaks in continuity such as shores and walls.

- *Districts*- Districts are the medium to large section of the city which have an identifiable character.
- *Nodes*- Nodes are specific points in the city into which an observer can enter. These can be junctions, places of break in transportation, a crossing or convergence of paths or concentrations of some use such as a street corner for hangout or an enclosed square.
- *Landmarks*- External point reference, such as building, sign, store, or mountain.

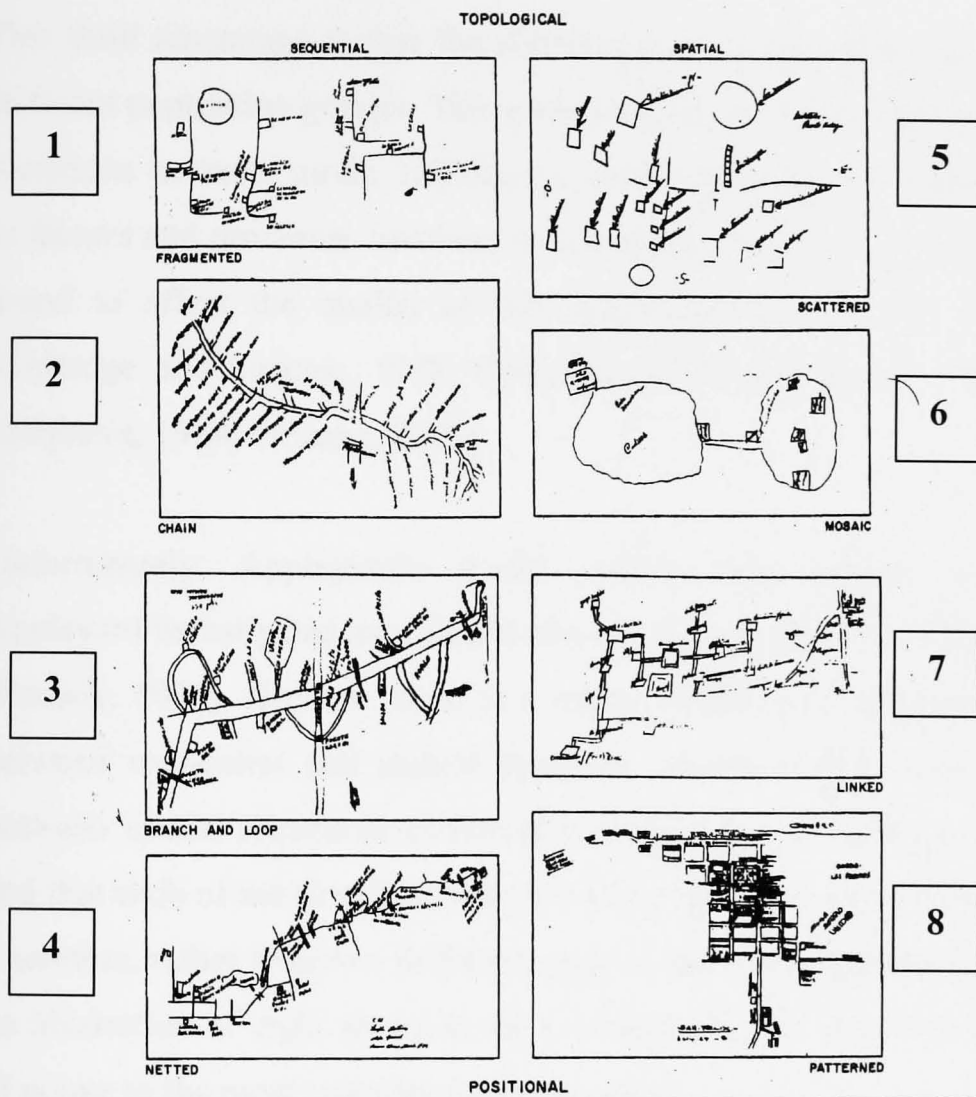
The significance of his study is in the recognition that people describe different environments with varying emphasis on different elements, and that the features represented on these maps are of symbolic meaning to the individual and therefore provide an insight into the meaning of places to them.

Lynch's quantitative analysis of sketch maps shows that people tend to emphasise the path and route elements of cities rather than landmarks. Conversely, Hart and Moore (1973) and Siegal and White (1975) argue as to the sequences of environmental cognition. One school of thought claims that landmark learning develops prior to paths, whereas for the other an opposite sequence has been postulated.

Due to the emphasis on connections between places in sketch maps, many of the systems for classifying maps are essentially ways of describing networks. Ladd (1970), for example, asked children between the ages of 12-17, from low socio-economic backgrounds to draw a map of their neighbourhood. She classifies the drawings into four categories: pictorial, schematic, resembling a map and a map with identifiable landmarks. This illustrates the progress from a pictorial form to a map like form. The shortcoming of her study was lack of clear definition of spatial arrangement, since sketch mapping is one of a whole range of representational mode (Canter, 1977).

Extending on Lynch (1960) and Ladd's (1970) work, Appleyard (1969, 1970) recognises both quantitative and qualitative differences in map styles (see figure 5.1). He identifies eight types of maps people used when describing Ciudad Guayana. This model has become one of the most widely used classification schemes of sketch maps

and has three main advantages. First, the maps are analysed not only according to one domain (like content or style) but also by their structure and accuracy.



a. Reprinted from *Planning Urban Growth and Regional Development* (1969), by Lloyd Rodwin and Associates pp. 438-9. By permission of MIT Press.

Figure 5.1: Appleyard's (1970) Sketch Map Classification Scheme

Appleyard divides sketch maps by two dimensions. Following Lynch's (1960) findings the first dimension examines the type of elements emphasised. This is either sequentially by means of links (routes), or spatially by indicating the relative locations of places (landmarks) without noting the links between them. The second dimension focuses on the level of accuracy. The maps are measured to find to what extent they resemble a cartographic map.

The second advantage of this taxonomy is that it can be seen as a sequence, illustrating the development of sketch maps. Each of the two major types, sequential or spatial, may be divided into four degrees of complexity. Complexity means the number of

parts, which makes up the sketch (Goodchild, 1974). It also raises the question of whether the complexity of a sketch is informative of the conceptual systems within the person and relating to some aspects of development over time (Canter, 1977).

This third advantage is that the differences in styles allow for comparisons between different population groups. This element lacks in Ladd's taxonomy. Variables such as variations in travel mode, familiarity, social class, age and education can be explored as factors and processes involved in acquiring environmental information. These were found to affect the quality of the 'maps' and the quantity of information stored (Golledge and Spector, 1978; Golledge and Timmermans, 1990; Goodchild, 1974; Matthews, 1984; Orleans, 1973).

Unfortunately, Appleyard's model suffers from several notable faults. First, Appleyard investigated an unusual city and the applicability of his result is questioned (Pocock, 1976). Second, there is a major difficulty in disentangling the distinction between sequential and spatial elements. Canter (1977) notes that the distinction between spatial/sequential elements is simply due to different levels of complexity and that each of the sketches (1-4) is a less complex version of that on the right (5-8). Therefore, rather than two different types of spatial knowledge, Canter suggests this is an illustration of eight stages in the development of a sketch from the simplest series of points to the most complex map like sketch.

Pocock (1976) in his study of residents and visitors to Durham questions the maps' applicability due to differences in culture, scale, instructions and legibility. He suggests a refined model, which identifies five levels of complexity among sequential map types and six degrees among spatial map styles. Unfortunately, Pocock fails to empirically test Appleyard's styles and to discuss its problematic nature or explain the advantages of his own classification scheme. He also overemphasises the physical aspects of the maps on their symbolic meaning, which environmental psychologists like Canter (1977), Moore (1979), and Evans (1980) warn against (Spencer and Dixon, 1983).

Furthermore, researchers who try to apply Pocock's model find it problematic as well. Murray and Spencer (1979) and Kitchin (1995) find it has unacceptable low levels of

inter-rater reliability. Murray and Spencer also comment that while the spatial/sequential dichotomy is reliable the sub categories are less so. They offer their own classification system dividing the maps by two dimensions of spatial/sequential and degree of organisation.

Matthews (1984) suggests these typologies assume that the maps can be easily distinguished according to these properties and that there is no ambiguity in how people represent space. He recommends that an alternative classification should reveal the richness and diversity of the participants' responses and would accommodate the hybrid nature of their mapping styles. His recognition of line, point and area signs provides means for distinguishing map styles.

His typology is very useful in that it recognises that maps seldom consist of one sort of element and so the combination of point, line and area features are distinguished with the principal characteristic noted first. Matthews used a double-blind procedure and found that over 90% of the maps were allocated to the same categories thus making it a reliable method. Yet, despite the recognition of the problematic nature of these proposed styles, no attempt has been made to empirically examine the relationship between the sub categories of Appleyard's original classification system, which all other models are based on. Therefore, the aim of this study is threefold:

1. To test the reliability of Appleyard's classification scheme
2. To identify the relationships between Appleyard's eight styles
3. To suggest an improved classification scheme of sketch maps

5.2. Method of Analysis

The first stage of the analysis was to test the reliability of the map styles proposed by Appleyard (1970). Two groups of 10 people were asked to judge sketch maps. The first group consisted of members of the Centre for Investigative Psychology. This group judged the 28 maps from the main study. In order to strengthen the results, a second group of people were asked to judge the 16 maps from the pilot study. This group consisted of individuals with varying backgrounds and level of education. Each of the judges was given an extract of the 8 styles and a brief definition of each style

(see Appendix 5 figure 1). The judges were then asked to familiarise themselves with each style and to determine which style described each of the maps best (see Appendix 5 tables 1, 2). The judges were not given a time limit.

In order to determine the relationships between the 8 styles a Small Space Analysis procedure was used. The values in each cell indicate the frequency each style was scored for each map. The data was analysed using the similarities of associations. In other words, the higher the value, the closer the distances are in space. Therefore, the pattern of points provides a clear structure of the relationships between the variables considered.

Due to the complexity of the mapping problem, and since in empirical data some “noise” is actually to be expected, the computer programs do not find a perfect mapping. For a given, pre-specified dimensionality (2), the SSA programs searches for the distribution of item-points in a space of that dimensionality that best represents the given interitem similarities. How good that “best representation” is, is assessed by the coefficient of alienation. The coefficient of alienation ranges from 0 (perfect fit between ranking similarity and, in this case, average distances in the SSA space) to 1.00 (worst fit). An acceptable coefficient is normally less than 0.24 (Shye et al., 1994).

5.3. Refined Map Styles

The overall agreement between the judges was on average 53%. More specifically, there was a difference in agreement levels between the two groups (see Appendix 5 tables 1, 2). Group 1 agreed on 57% while group 2 only agreed on 48%. Both scores were very low. These findings called for a refinement of Appleyard’s styles. Since Kitchin (1995) already ascertained that Pocock’s (1976) styles were difficult to follow, a new classification scheme was proposed and tested. The rationale for the new classification was that it maintained the distinction between route dominant and landmark dominant styles. Second, it took into consideration Matthews (1984) claim that maps are not easily identified due to the hybrid nature of the maps. The aim was to create distinct styles, which would enable the judges to identify more easily the

dominant style within the maps. Third, it took into account the development in map complexity. That is, the more elements included in the map the more complex it is.

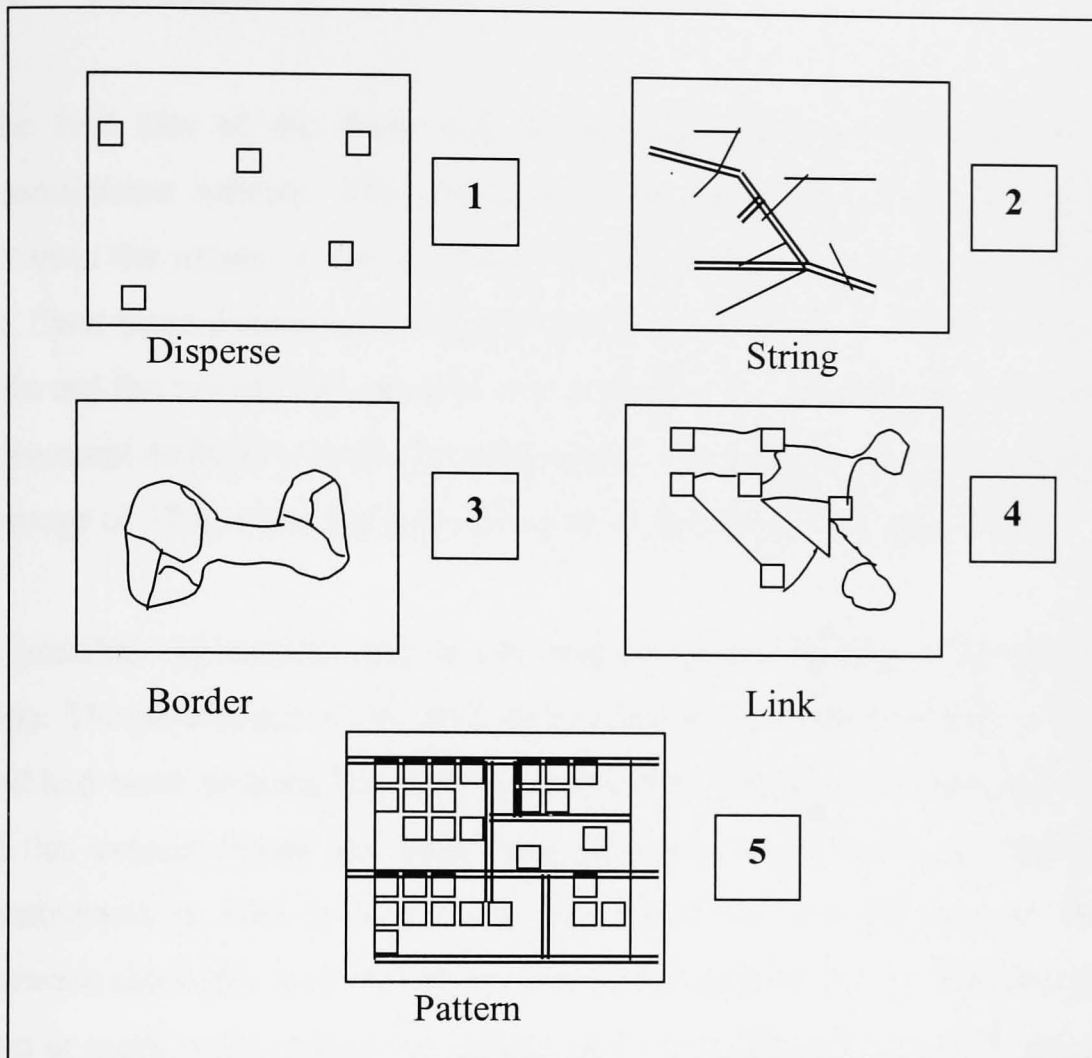


Figure 5.2: Revised Sketch Map Styles

The map styles were defined as follows:

1. *Disperse*- The most primitive map style. It contains fragments of sequences or elements unconnected to each other and out of serial order.
2. *String*- A schematic type of maps, which contains curves and bends.
3. *Border*- The map distinctly contains districts and borders.
4. *Link*- Places or districts are clearly connected by a road system.
5. *Pattern*- The most complete type of map, which resembles a cartographic map.

The same course of action was taken with this classification scheme as before (see Appendix 5 figure 2). The same two groups of 10 judges were asked to assess the

sketch maps again (see Appendix 5 tables 3, 4), and Smallest Space Analysis was carried out.

5.4. Discussion

The first aim of the study was to test the inter-rater reliability of Appleyard's classification scheme. The results indicate there was an overall 53% agreement between the judges on the 44 maps, which is a very low score (see Appendix 5 table 5). Even more disturbing is the finding that in 25 of the 44 maps the agreement level between the judges was equal to or less than 50%. As mentioned above the level of agreement differed between the two groups. The judges in the first group agreed on an average of 57%, while the judges in group 2 agreement was only 48%.

A possible explanation may be the subjects' understanding of the topic prior to the tests. The participants in the first group were aware of the concepts of cognitive maps and had basic training in it. Participants in the second group had no prior knowledge of this subject matter and their judgement was solely based on Appleyard's styles. Participants in both groups stated they found the task difficult, as the differences between the styles were not clear. This was supported by the fact that in seven cases two or more styles shared the highest score of a map of 30 or 40% agreement. These findings suggest that there was some overlap between the map styles.

It is astonishing that Appleyard's classification scheme has been so popular without a thorough examination of its reliability. In order to explore the classification scheme further an SSA was carried out to determine the relationship between the 8 styles.

5.4.1. Appleyard's (1970) 8 Sketch Map Styles

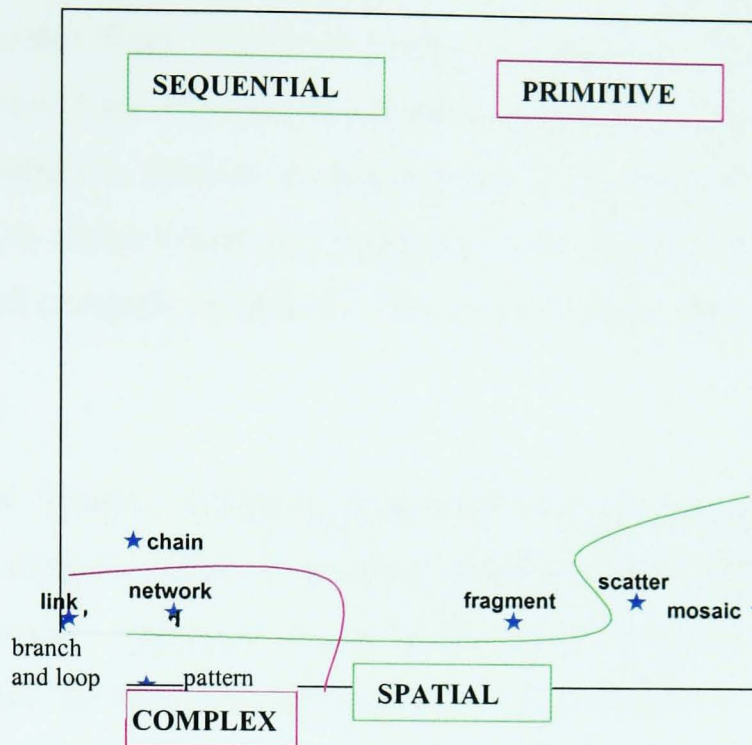


Figure 5.3: SSA of Appleyard's 8 Styles

1 by 2 projection

n=44

Coefficient of Alienation= 0.18

The second aim of the study was to evaluate the relationship between the sketch map styles. Figure 5.3 represents the SSA plot for Appleyard's 8 styles. It was expected there would be a clear distinction between the two dimensions of map elements and map complexity. Had the judges agreed with each other in the categories there would be no correlation between them and the map types would all collapse into one point or be distributed randomly.

However, the SSA plot shows that there was an overlap between some map styles. In fact, the judges found the distinction between spatial and sequential elements very confusing. For example, the SSA plot shows how close 'Branch and Loop' and 'Link' are to each other suggesting there is an intrinsic relationship between them. This means the judges found the two variables too similar to differentiate, which helps explain the low levels of reliability.

On the other hand, the judges found the second dimension of complexity relatively easier to recognise. As mentioned above, Appleyard's styles suggest an evolution of the styles from a sporadic map to the most detailed and organised map. Had there been a distinct order from 1 to 8 or from 1-4 ('Fragment' to 'Netted') and 5-8 ('Scatter' to 'Pattern') the SSA plot would be in an inverted U shape. The judges did not find the distinction as clear. However, there is an obvious distinction between the more primitive styles which are 'Fragment' and 'Scatter' and 'Mosaic' and the more detailed and complex styles (i.e., 'Branch and Loop' and 'Linked'; 'Net' and 'Pattern').

The exception is 'Chain', which is considered a primitive style but is in close proximity to the complex styles. A possible explanation may be that 'Fragment' and 'Scatter' and 'Mosaic' represent routes, landmarks or areas without links between them. As the maps develop more links appear until a more complete map is drawn. Since 'Chain' includes links between routes the judges considered it more complex. This suggests this dimension remains ambiguous to some degree. It also supports Canter's (1977) assertion that the sub groups of the sequential and spatial elements are simply different levels of complexity rather than a different type of map. In other words, these are two types of map with varying degree of detail. This also supports Matthews (1984) view of the hybrid nature of these maps and that there is ambiguity in how people represent space.

5.4.2. Refined 5 Sketch Map Styles

The low inter-rater reliability scores and the confusion the judges expressed in identifying a dominant style for each map while using Appleyard's styles led to a refinement of his classification scheme. Testing the new classification revealed the agreement between the judges was 61%, which is slightly higher than Appleyard's, but is still disturbingly low.

In 8 cases two variables received equal score. In 6 of these cases, 'Link' and 'Pattern', shared the votes. In order to assess the influence of that on the reliability level the scores of the two variables were united and counted as one variable. This time the agreement level across the sample of 44 cases was 68%, which is still fairly low.

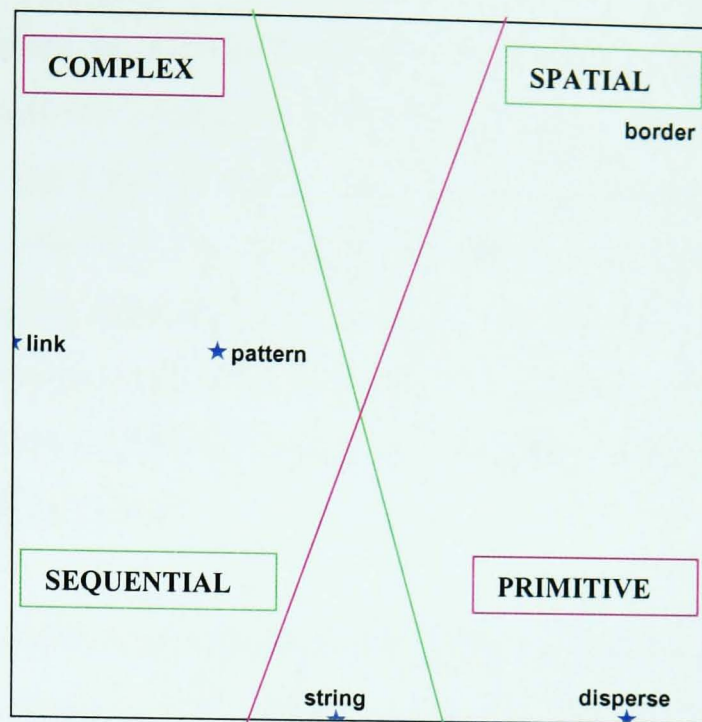


Figure 5.4: SSA of 5 Refined Styles

1 by 2 projection

n=44

Coefficient of Alienation= 0.16

The results shown in figure 5.4 indicate that the main distinction between the styles is on map complexity and there is a clearer distinction between sequential and spatial elements. This fits the idea that we start with sequences and build them up to produce more complete spatial representations. So it is a developmental process as well as levels of cognitive complexity. 'Border' is a primitive style of spatial features and is somewhat distinct to the other primitive styles. It is the most visually distinctive style as it marked by the inclusion of clear borders. 'String' and 'Disperse' are the most sensitive to a city's layout. In areas that are more visually governed by roads, landmarks will be less relevant whereas in areas where landmarks are unique they might influence the map structure more. So, a detailed account of road system will be still considered primitive although, rightfully 'String' is closer to the more complex features. Overall, the plot represents a process of moving from the simple to the complex and from sequential to spatial.

This is not to say that the more primitive maps are a product of lack of familiarity with an area. The 44 offenders were asked to draw a map of areas they committed most of their offences in and include their home area in relation to that. The instruction guaranteed the offenders drew areas they were familiar with. The differences in styles can be due to the fact that people have more primitive knowledge of larger scales environments. For example, an offender may know how to get from Liverpool to Manchester but does not know about the details of what is in between. The distinction in complexity levels may also be indicative of factors influencing spatial cognition across different groups of offenders, such as age, education, familiarity and mode of travel.

The variance in the judges' answers may also be due to individual differences in the focus on different elements. The judges themselves may give priority to certain elements over others. The present study is a unique opportunity to test the variation between people assessing maps as twenty opinions were gathered. In order to test whether or not the variation was due to the judges rather than the quality of styles' classification, the sum of scores for each judge in both groups and for both tests (Appleyard's and the Refined classification schemes) was measured. The two highest and two lowest scores were compared across the tests (see Appendix 6 tables 1 to 4). Surprisingly, in both groups 3 of the 4 judges consistently scored either low or high across both tests. This proves the subjective tendency to evaluate dominant features in the maps. For example, some of the judges consistently chose 'Link' or 'Pattern' over the other.

Finally, differences in quality of maps were expected to be a factor, with some maps being more difficult to assess than others. Out of the 44 maps, 12 maps scored 50% or less in both tests. This may add to the judges' confusion, as most maps are not as clear as the map style definitions and may combine several elements to varying degrees. As the judges themselves explained, the definition of the refined styles were easier to understand but they found it difficult to decide which element is most dominant in a given map, which explains the variability in their answers.

5.5. Conclusions

Sketch mapping is a useful technique that can give insight to people's acquisition and organisation of spatial information. Several researchers have offered classification schemes, the most popular one being Appleyard's (1970). The study presented above was the most elaborate test of inter-rater reliability conducted with sketch maps classification schemes. The reliability of Appleyard's sketch maps classification scheme was found to be unacceptably low.

The study also presented and tested a refined model. By using the refined styles it was possible to consider the two dimensions researchers consider in their analysis of sketch maps. This included the dimension of map complexity and a better distinction between spatial/sequential elements. The revised model scored higher on the inter-rater reliability test, although the scores remained fairly low.

The variances in the judges' scores were not a result of poor definition of the refined styles but due to the hybrid nature of real life sketches. Thus, the judges felt it was easier to decide on a sketch map style, but varied in their assessment of the dominant elements. It was also explained by individual differences in spatial cognition and assessment, which should be further tested.

In conclusion, the sketch map classification schemes are very subjective. A possible solution may be to train judges in assessment of sketch maps classification prior to their evaluations. It is recommended that any future analysis using this technique will assess map styles using the average score of several judges. It is also recommended that this classification should not be a sole basis for evaluating sketch maps and that an interview process should be included.

Chapter 6

The Participants

The previous chapters explained the process of data collection and methodological aspects concerning the use of sketch maps as an interviewing tool. They also clarified the reasoning for following the conceptual framework for understanding the psychological processes involved in offenders' spatial decision making. The present chapter describes the personal history of the 28 property offenders who were interviewed for this project, in order to establish whether they are representative of property offenders in the UK. The information was gathered by using a questionnaire as part of a wider research into offenders' demographic background, criminal histories, their attitudes and the choices they made before committing their crimes. The issues involved in obtaining a representative sample population and the reliability of the data are addressed as well. Finally, the results are discussed in conjunction with the initial results presented in the pilot study (see chapter 2)

6.1. Offenders' Backgrounds

All the participants in this study were male and white UK/Irish and lived in areas around the North West of England or in North Wales at the time of their arrest.

6.1.1. Age

Although there was a 20 years difference between the oldest and youngest offender in this sample, most of them were between 26 to 30 years old (see Appendix 6 table 1). The average age was 29. The median was 27.5. Compared with the offenders in the pilot, this is a relatively younger group of offenders.

6.1.2. Family Background

Only 10 out of the 28 offenders were raised by both parents (see Appendix 6 table 2). They were likely to be raised by their mother with or without a stepfather or in a children's home. Although the offenders spent some time in those establishments, although only 3 considered it their main residence.

6.1.3. Marital Status

17 out of the 28 offenders were single at the time of their arrest for the crime/s they were serving their sentence for (see Appendix 6 table 3). Almost a third of the offenders either had a partner or was living with one at the time of their arrest. Only two of the offenders were married and only one offender was divorced. However, 19 offenders had at least one child.

6.1.4. Education

Half of the 28 offenders only finished comprehensive school (see Appendix 6 table 4). However, almost a third of the offenders in the sample reached higher level of education or completed some technical training program. This is fairly similar to the results from the pilot study.

6.1.5. Employment

Employment was not a common experience for the offenders in this sample. Out of the 28 offenders 10 offenders admitted to never having been employed. Those who had some work experience were mainly labourers and chefs.

6.1.6. Areas of Residence

Existing models of offenders' spatial behaviour assume offenders have a fixed base from which they operate (see chapter 1 section 1.7). The results from the pilot study suggested this was not necessarily true. The majority of offenders lived in multiple addresses. Some offenders explained they moved around the same area but resided in

several addresses. In order to clarify this issue, the offenders in the main study were asked in how many areas they have lived in and to indicate whether they committed offences while residing there. The results support the finding from the pilot study as 24 offenders indicated that they lived in various areas while committing their offences. On average, the offenders lived in 6 different areas throughout their criminal career, ranging from 1 to 14.

6.2. Criminal Activity

6.2.1. Serving Sentence for:

Table 5 in Appendix 6 shows the distribution of the 28 offenders by the type of crime for which they were convicted. 16 offenders were convicted for burglary, 5 for robbery, and 3 for theft. The 'Combined' category represents those offenders who were convicted for more than one offence at the court case, which lead to their latest prison sentence. The average sentence the offenders were serving was 2 years and 9 months, ranging from 5 months to 8 years. The median is 2.5 years.

6.2.2. Offenders' Estimations of Their Convictions Rates

It is generally accepted that official crime statistics underestimate the extent of crime committed. Self reported information was chosen as the appropriate method for this research since it can help in filling the gap between the official records and the offenders' criminal activities. The use of this method in forensic psychology in order to establish the characteristic of participants is well documented, and is often used as a verification technique. (Hollin, 1989; Thompson, 2002). Hollin (1989) states that studies using this method found high degrees of agreement between the two measures of offending. Thompson (2002) ascertains that during interviews, people with numerous convictions and long criminal histories tend to be imprecise and confused about the specific details of their official records. This was found to be true in this study as well, especially when the offenders were asked about the chronology of their crimes, previous convictions, and specific details of the offences.

Due to constraints posed by one of the prisons where the offenders were interviewed, it was only possible to view half of the offenders' pre-conviction files. In the questionnaire the offenders were given, they were asked to estimate the number of prior convictions. The results suggest there was some disparity between the official files and the offenders' account. The official files of 13 offenders indicate that each of the offenders was convicted on average 42 times. There was a great diversity in the results, ranging between 6 to 82 convictions. On the other hand, the same 13 offenders estimated they were convicted on average 34 times, ranging from 3 to 84. The 28 offenders estimated an average of 30 convictions, ranging from 3 to 111 convictions, which is an even lower average and a larger range.

The 13 offenders underestimated their conviction rate by nearly 20%. It is possible that the disparity is due to the considerable number of convictions and that the offenders found it difficult to remember the exact figure. Furthermore, since the offenders were asked to disclose information regarding their criminal activity, this might be an indication of the offenders' tendency to under-represent their criminal behaviour and portray themselves as less 'productive' than they actually were.

6.2.3. Number of Crimes Committed

It is a well established fact that most of the property offences offenders commit goes either unreported or unsolved (Hollin, 1989; Thompson, 2002). Therefore, the offenders were also asked to estimate the number of crimes they have committed, including offences they have never been caught for or charged with. This information was recorded in a table, which referred to various types of crime, the number of crimes the offenders committed and the number of convictions they estimated they had received (see Appendix 3 figure 1). Studies on the offending histories of criminals (Klein, 1984) have concluded that offenders generally do not specialise in one type of crime. Canter (2000) recognises the versatility of criminal action and decision making for prolific offenders as an area for concern in psychological research about offenders (Thompson, 2002).

The participants were asked about a variety of offences including offences against a person. Since this project focuses on the spatial decision of property offenders, in the

final analysis only property offences were considered. It should be noted that none of the offenders disclosed information about serious crimes against a person, which they were not convicted for. The list of offences includes theft, theft from or of cars, shoplifting, domestic burglary, commercial burglary, robbery, damage to property, and fraud. Robbery was included because it is a crime which aims to obtain monetary benefit by stealing goods, rather than to cause bodily harm to the victim/s.

The initial request for an estimate was phrased as a general, open ended question, such as 'how many (type of crime) do you think you have committed?'. Offenders who committed dozens or more offences were unable to give a precise and accurate number of the crimes. Hence, the following question was leading but still phrased generally, similar to the categories presented in Appendix 6 table 6. For example, 'would you say you committed 5, 50 or 2000 (type of crime)?' Once the numbers were categorised the offenders were asked again to give an estimate which would best summarise their activities.

By the third stage of the interview, the offenders were asked to reconstruct their criminal activity by the number of areas they have lived in. A large proportion of the offenders elaborated more freely about their criminal activity at this stage of the interview than they did in the previous one. As they were filling out the time line they were able to review the numbers of crimes they committed by different periods in their lives. Many of them commented on how this technique made the process of estimation easier. This is not surprising as many studies in cognitive psychology show that recall is improved when people focus on specific events or targets rather than on general trends (Baddeley, 2001; Matlin, 1998). The two sets of data were then compared. In cases where there was disparity the offenders were asked to return to the original table and review the figures, or they commented verbally on the number of crimes they had committed.

The justification for these sets of instructions is that the purpose of this study is achieved even with relative numbers rather than with absolute ones. Although the offenders did give specific figures, the discussion will revolve around the categorised data for two reasons. First, it will be more reliable to consider the offenders' activity in more general terms. Second, it is the pattern of behaviour and its implications on

the offender's life style and choices, which is important to uncover. In other words, it is less significant for the purpose of this study, if an offender committed 51 or 76 offences. The importance of these figures is in their implications about the offenders' lifestyle, which evolved around crime. This would be contrary to an offender who committed only a few offences and led a completely different lifestyle and perhaps was more likely to make different choices as a result.

Overall, the offenders admitted to committing more than 21,000 offences, with average of 750 (501-1000) offences, ranging from 3 to nearly 3000 (see Appendix 6 table 6). These results clearly show the prolific nature of the offenders' activities. Considering the results from the pilot, this finding is not surprising. Despite the fact that the offenders in the pilot committed on average fewer offences, more offenders admitted to committing more than 50 offences. This proves similarity in the intensity of criminal activity both groups were involved in and supports the findings of the main study.

6.2.4. Criminal Activity and Conviction Rate

Calculating the relationship between the number of crimes the offenders admitted to versus the number of conviction suggests that only about 5% of the offences led to a conviction (see Appendix 6 table 7). Detection rates for offences against property have been notoriously low. The Home Office 'Criminal Statistics for England and Wales', published in 2002, reports that only 23% of reported crimes are detected and that 14 % of offenders are charged. This figure includes all offences. The Home Office figure suggests that only 15% of reported property crimes have been detected, versus 50% detection rate for crimes against a person. These findings are very important as they support the above discussion about the reliability of self-report methods versus official files.

6.2.5. Age of First Offence

The average age of the offenders' first offence was 13. This ranges from 7 to 17, which is quite varied. The median is 13. NACRO's official records support this

finding as they suggest that the average age for first offence is 14. This was also found to be true to the offenders in the pilot.

6.2.6. Co-Offenders

Since in the pilot study most offenders claimed they offended with a co-offender, the offenders were asked whether, at their latest sentence, they were convicted with a co-offender. Surprisingly, 19 of the 28 offenders did not. However, during the fourth stage of the interview they were asked whether they normally offended on their own or whether they preferred to commit crimes with someone else.

The results (shown in Appendix 6 table 8) suggest that 16 offenders tended to offend with others. This is an interesting finding, considering that the majority of offenders were convicted alone. Reasons given by the offenders for offending with others were that it was safer having someone to watch out for danger; it was 'too scary' to do one their own; others knew about new places or had cars; it was a peer group activity; 'as a group of lads'. On the other hand, those offenders who preferred to offend on their own repeatedly claimed that their main reason was lack of trust in others. As offender number 9 explained,

"I've done a lot of things on my own. If you get caught there's no one but yourself, you. If you have a partner chances of him telling and that. You have to look after yourself." (Interview 9, pg. 11-12)

6.2.7. Drug Use

The literature regarding the relationship between drug use and crime focuses on how different types of drugs relate to different types of crimes. Studies have linked Heroin use and property crime while alcohol is normally linked with more violent offences (Hammersley et al, 2003; Parker and Newcombe, 1987; White et al, 2002). There is a division of offenders who use drugs to two groups. Those who have used Heroin before they began offending, and those who have offended before they began using Heroin (Dobinson and Ward, 1986; Kokkevi et al, 1993). The offenders in the latter

group typically spiral down into a life of crime. This is due to an economic necessity to sustain the habit (Brochu et al, 1994; Resignato, 2000; White et al, 2002). While these studies are important, there has been very little discussion about ways in which drug use influences the way in which offenders actually commit crimes. Resignato (2000) reviews this limited literature and discusses the mental and emotional effects of drugs on violent behaviour. He also notes that given an alternative most offenders will choose a non-violent form of finance.

As shown in table 9 in Appendix 6, most offenders in this sample were addicted to one drug or more. Similarly to the results from the pilot study, the most common addiction was to Heroin (18 out of 28) and alcohol (14 out of 28). 19 offenders admitted to smoking marijuana (cannabis) as well. The offenders normally spent between £50 to £100 a day on drugs. This figure gives some indication to the amount of money they needed in order to support their drug habit.

6.3. Conclusions

The present chapter described the personal history of the 28 property offenders who were interviewed for this thesis. Where possible, the results were discussed in conjunction with initial results from the pilot study. The findings suggest the offenders in this sample were likely to be in their mid twenties, have had some education, committed their first offence in their mid-teens and were likely to offend with a co-offender. Most of them used Heroin and/or alcohol. This finding was particularly significant as most of the offenders expressed the effect drug use had on their criminal behaviour. This finding will be addressed in more detail in the following chapters.

Concerns involved with obtaining a representative sample population and the reliability of the data were addressed as well. The reasoning for including information about crimes the offenders were not convicted for was explained. The results illustrate the prolific nature of the offenders and the significant difference between their account and official records.

Another significant discovery was that offenders were residing in multiple addresses/areas throughout their criminal career. This is contrary to existing literature that assumes offenders operate from a fixed base. This was first discussed in the pilot study which the sample in the main study corroborated.

The findings presented in this chapter generally support the results of the pilot study. Thus, it is reasonable to conclude the offenders in this sample are likely to be representative of property offenders in the UK. This strengthens the argument of validity of the sample and the findings regarding offenders' decision making which will be investigated in the following chapters.

Chapter 7

Information Search

The majority of research which identifies patterns in offenders spatial behaviour typically concentrates on the distances offenders travel from the home to the crime locations, and the directions around the home in which they travel (Brantingham and Brantingham, 1981; Rossmo, 2000). This type of research focuses on ways in which offenders use their environment. However, there is a gap in the literature as to the psychological processes involved in offenders' spatial decision making and the factors influencing their location choice. Following the decision making model presented in chapter 1, the present chapter focuses on the first stage of the decision making process, which is information search. The aim of this chapter is twofold. First, to learn what determines offenders' information search and second, to explore the manner in which they gather that information.

There are several reasons for giving attention to this subject. First, search is a method by which offenders develop a set of alternatives for consideration and cues or reasons to make a choice among these alternatives (Gigerenzer and Selten, 1999; Miller, 1993). Therefore, understanding the decisions that offenders make about the amount and type of external information they need to acquire is an inherent part of explaining their decision making process (Maute and Forrester, 1991). Second, similarly to marketers, police forces need to understand search behaviour in terms of distribution of search areas and communication between offenders, in order to adopt measures to prevent offenders from acquiring information on which they base their decisions.

Information search is defined either explicitly or implicitly as "the degree of attention, perception, and effort directed toward obtaining environmental data or information related to the specific purchase under consideration" (Beatty and Smith, 1987). It is often distinguished between external and internal (Beales et al. 1981). Internal information search refers to peoples' retrieval of memory-knowledge from previous searches, experience with products, or passively acquired information during normal daily activities. External information search behaviour, which is the centre of this

study, includes consulting with friends, family, expert consumers, sellers, third party sources, reading books, magazine articles, advertising, and direct inspection.

The only known attempt to directly explore offenders' information search behaviour is that of Rengert and Wasilchick's (2000). Furthermore, their model assumes that the criminal is actively engaged in the criminal evaluation and use of space. Because of this, their model does not consider "the special cases of opportunistic crimes and criminal opportunities discovered through secondary sources such as fences or friends" (pg. 64). The main drawback of this study is that opportunistic crimes are excluded from it. Offenders' active search behaviour is likely to lead directly to the discovery of opportunities and therefore will play a vital role in crime site selection.

It is also not clear why Rengert and Wasilchick's (2000) focus only on burglars who operate in the suburbs, rather than interview the general population of burglars in a particular city. In addition, the offenders were asked about a very limited number of crimes, which prevents the authors from concluding about their patterns of behaviour. Finally, there is no in-depth discussion of offenders' use of sources of information. Hence, their conclusions lack the backing of a solid empirical framework and their discussion relies on generalised statements.

While their study is important in introducing the notion of offenders' use of existing knowledge and the influence of external factors in expanding their awareness space, it lacks empirical analysis and discussion of specific features involved in information search. Despite its methodological faults, this is a unique effort. Since this attempt is singular, the present study applies some of the findings in non-criminal spatial behaviour literature. It relies on studies of consumer behaviour and residential mobility, where the issues of utility, location choice and travel apply as well (Garling, 1989; Golledge and Stimson, 1997).

7.1. Determinants of Information Search

Beatty and Smith (1987) updated a classification scheme of search determinants developed by Bettman (1979), Moore and Lehmann (1980) and Newman (1977). It includes factors such as the number of alternatives, situational variable (time, social and financial pressures), potential payoff, knowledge and experience, individual differences and the cost of search. It is easy to see why these factors should apply to offenders' behaviour as well. This study follows the view which assumes "that criminals are 'normal' in that they are comparable to non-criminals in the processes by which they interact with the immediate environment and in the motives that direct their reactions to the environment" (Tibbetts and Gibson, 2002, pg. 6). Time constraints, perceived risk, perceived price, experience etc. are therefore expected to be relevant to offenders as well as to consumers.

Beatty and Smith (1987) have also identified the relationship between the antecedent and search as positive (+), negative (-), or no relationship (0) and have listed the nature of the product category studied. As Newman (1977) commented about earlier studies (Katona and Mueller, 1955; Newman and Staelin, 1972), this type of research only tests one factor of the total search. However, these studies are important as they assess the relationships between these factors and search behaviour.

Guo (2001), in his thorough review of the literature, discusses the findings in line with the cost-benefit school of thought, which concurs with other studies in the field. According to the cost-benefit theory any variable increasing benefit of search and/or decreasing search cost will be positively related to search activity, whereas variables increasing cost of search and/or decreasing search benefit will be negatively related to search effort.

Hence, information accessibility, price, and enjoyment of search influence search behaviour by increasing the benefit of search while decreasing search cost or increasing benefit and decreasing cost. Some variables, such as complexity of alternatives, product differences, and variation in retail operations increase cost but increase benefit as well. In this case there is a positive relationship between the variables and search behaviour.

On the other hand, satisfaction with a product/service in the past attenuates search effort because it lessens potential benefits of extra search. Age also diminishes search effort and brand loyalty abates search benefits and increases cost of search in that the willingness to search for new information about unknown products is reduced. Thus, it is negatively related to search behaviour.

The notion of cost-benefit has been applied to offenders' behaviour in the past. Rational choice theory, led by Cornish and Clarke (1987), argues that offenders seek to benefit by their criminal behaviour, and that this involves the making of decisions and choices. These decisions are, essentially, a trade off between increased opportunity and reward, and the costs of time, effort and risk. The rewards are not only in terms of material gain but also emotional satisfaction. The risks or costs of crime are those associated with formal punishment and apprehension (Hodge, 1998).

The problem with existing research of offenders' spatial behaviour is that it focuses on the distribution of targets and the offenders' familiarity with different areas around their base (Brantingham and Brantingham, 1981; Rossmo, 2000), rather than the psychological factors influencing their search of potential crime site locations. It acknowledges, however, that in order for an offender to utilise opportunities and offend, he must know they exist and their location.

Moreover, the shortcoming of the cost-benefit approach is that it presumes optimal behaviour. People, whether consumers or offenders, are expected to be rational decision-makers who persistently evaluate the advantages and disadvantages of their actions. This philosophy has long been criticised in the literature, due to real life constraints and human limitations. Decision makers can not obtain all of the information that is relevant to the problem by the time a decision has to be made, given that reliable estimates of cost and benefits demand large degrees of knowledge and great processing efforts of that information (Gigerenzer and Selten, 1999; Schwartz, 2002).

Bounded rationality theory (Gigerenzer and Selten, 1999; Simon, 1957) takes into account the limitations of decision makers and suggests that individuals will conduct a

limited search until a favourable alternative is found. It also incorporates people's use of heuristics as they reduce the complexity of assessing probabilities and predicting values to simpler judgmental operations (Kahneman et al., 1982). Finally, individual differences must also be taken into account.

7.2. Strategies of Information Search

An understanding of the process of information search can not be accomplished without studying the manner in which offenders actually acquire information about potential locations. Consumers gain information from different sources (Lee and Hogarth, 2000). These normally include seller-provided (direct from seller and advertisement), personal (family and friends), third party (ratings, real estate professionals) and direct inspection

As Lee and Hogarth (2000) indicate "information search is difficult to quantify". Newman (1977) identifies five measures of consumers information gathering strategies: number of stores visited, number of information sources, number of types of information sought, number of alternatives considered, and purchase decision time. Beaty and Smith (1987) add to this four search factors: retailer factor (number of trips to retailers); media factor (number of ads recalled); interpersonal factor (number of opinion leaders used); time factor (introspection and search time).

These factors and measures are similar to one another and are expected to be a good indicator of offenders' information sources. However, some adjustment needs to be made as some differences between consumers and offenders are expected due to the risks involved with the offenders' activities. It seems likely that an offender will learn about an opportunity from an acquaintance or a co-offender. It is less clear what role other sources of information may play in offenders search of information. Media advertisement, for example, may be a factor in a burglar's choice of a possible location, as they learn about the locality of a shopping centre, which they can then exploit.

Therefore, the research questions are

1. What sources of information do offenders use?
2. What terms and features do offenders search for?
3. What search strategies do offenders use?

7.3. Method

Studies of consumers search behaviour vary in their use of a single aspect of behaviour or aggregate measures of search. They employ a variety of methodologies such as survey (Beatty and Smith, 1987), field experiment (Moore and Lehmann, 1980), laboratory experiment (Lehmann and Moore, 1980), interview (Newman and Staelin, 1972) and protocol and analysis (Bettman and Park, 1980). The most common measure generally includes a variety of self-report measures.

Guo (2001) criticised these measures since they are based on events, which occurred many months after the completed purchase, and selective retention and forgetting may reduce the validity of these measures. Furthermore, they have often been used as single measures of search, which precludes the development of reliable, multiple indicators (Guo, 2001). However, due to the nature of this study, it was not possible to conduct a field experiment and an interview was selected as the best method instead.

7.3.1. Sample

The interview design of the main study is based on experience gained from the pilot study (see chapter 2). The results from the pilot study suggest that offenders rely on information from other sources, such as buyers and co-offenders. Thus, changes were made to the interview design of the main study. This led to more specific questions to be asked in order to clarify what sources of information offenders use. Determinants of search and strategies of search were concepts which became part of the main study only after the completion of the pilot study. In preparation for the main study models of decision making were examined and clarified the significance of these concepts to the understanding of information search in relation to the complete process of

decision making. The methodology for this study was adapted from previous studies of consumers behaviours as shown below.

Thus, 28 incarcerated burglars, robbers and shoplifters were interviewed. The interview included a demographic questionnaire, drawings of sketch maps and a semi-structure interview regarding the offenders' choice of crime site location. As part of the interview, the offenders were asked about their information search behaviour while looking for a crime site location.

7.3.2. Measures

In order not to distort their responses the offenders were initially asked a general open-ended question (e.g., "how do you choose where to go?", or "how do you know where things are"?). Once the offenders described in their own language the processes involved, more specific, probing questions followed. However, due to the sensitivity of the information discussed, the offenders were generally reluctant to disclose identifiable sources of information, and a more general approach had to be adopted.

Following Beaty and Smith (1987) and Hogarth and Lee (2000) studies data collected was coded according to the following themes:

Source of Information- reflects where the respondent obtained the information. Respondent were asked what sources of information they used when looking for a crime site. A set of binary variables was created to indicate whether each of the following sources of information was used (direct inspection, co-offender, family member, a buyer, an acquaintance) (1= Yes; 2= No).

Number of Sources Used- The number of different sources a respondent contacted before looking for a crime site was then constructed by summing the number of the above sources used.

Type of Information- In the original study Hogarth and Lee (2000) asked their respondents about the terms and features they compared (e.g. interest rates, application fees, etc.). For the purpose of this study, the offenders were asked about

the type of information they searched for in terms of specific products and location awareness:

Product information

- Potential Price
- Money
- Jewellery
- Clothes
- Food
- Electrical Equipment

Location information

- Awareness of Police Location
- Awareness of an Escape Route

A set of binary set was created to indicate whether each of the above of the particular terms and features was search for (1=Yes; 2=No)

Extent of search

The participants found it difficult to quantify the extent of their search. It was therefore decided to ask for a descriptive account of the search they have conducted. The sample was divided into 3 groups of search strategies. Those were based on the offenders' description of the length of time they invested in the search or the distances they covered:

Limited Search Strategy: Cases were included in this category if there was clear indication of prior knowledge of either product or location. This includes cases of a specific order by a potential buyer or if the participant indicated that he stayed local because he was aware of shops or houses in the area. For example, "...but with knowing the estate fairly well, I know where I have to go anyway." (Interview 8)

Extensive Search Strategy: Refers to cases where the offender indicated that he spent a considerable amount of time and effort searching for information. For example, "If we're in the car, when we get to places we look around, check all the little lanes here and there and between them." (Interview 4)

Mixed Search Strategy: Refers to cases where the offenders used both strategies at different times. For example, "I could be going to church, and just happen to come across something." Referring to another offence he said: "I will spend 2-3 days learning a place." (Interview 1)

7.4. Results

7.4.1 Sources of Information

The average offender obtained information from three sources (see table 1 in Appendix 7). All 28 offenders mentioned using direct inspection making it their main source of information. 19 offenders also mentioned they heard about a location from a co-offender. 13 offenders mentioned an acquaintance. The main sources of information for product knowledge were direct inspection and a potential buyer. There was only one case in the main study of a family member being a source of information. The offender's girlfriend was shoplifting herself and he joined her on that occasion. Two of the female offenders in the pilot study also mentioned a partner as a source of information.

It is important to note that the figures refer to offenders, who mentioned during the interview, that they relied on a particular information source. Otherwise, it was coded as unknown. Therefore, it is reasonable to assume that the figures for all categories are in fact higher.

It is not surprising that offenders tend to inspect the area directly in search for goods. The manner in which they do so required some clarification. Offenders were further asked about their transportation mode to and from the crime site location (see table 2 Appendix 7). 19 offenders gained information about their surrounding and potential crime site locations by walking. 14 offenders drove around either by themselves or by

others (12 offenders). A minority of the offenders indicated they would use a bus or a train as their mode of transport. In the pilot study, a few offenders mentioned they used a taxi to on their way back from a shopping centre where they committed shoplifting. It was also found that 2 offenders used maps and 3 offenders followed road signs in order to find a potential crime site location.

7.4.2 Type of information

A great proportion of offenders reported searching for a wide range of items (see Appendix 7 table 1). Out of the 28 offenders, 18 preferred cash and 12 offenders preferred jewellery. 11 offenders also admitted they were interested in electrical equipment. Other items searched for were cars and antics. In terms of location information, 16 offenders said it was important to them to know where the police was located and 15 were aware of an escape route they might take.

7.4.3 Search Strategies

Only 4 offenders admitted to conducting limited amount of search (see table 3 in Appendix 7). Out of the 28 offenders 9 offenders invested in extensive search of the area of their crime site location. 8 offenders used a mixed search strategy, where offenders would be either opportunistic or at other times spend a significant amount of time searching for information about potential crime site locations.

7.5 Discussion

7.5.1 Sources of Information

Offenders are typically in constant pursuit of information about new locations and opportunities. They either search on their own or rely on others for information. While the results cannot be statistically generalised due to the small size of the sample, the analysis of the interviews reveals key factors and processes influencing offenders' search behaviour.

This study assumed there would be some similarities between the offenders' behaviour and consumers. This was found true as early as the pilot study. A female offender, who was interviewed in the pilot study, committed thousands of shoplifting in a particular shopping area. She describes her 'market'.

"I knew that the Taxi drivers or the girls in the Cafe' or...and I have a woman in a kebab shop who used to buy everything off me, or kids clothes, you know? 'cos they get them next to nothing. I've had got lot really of contacts in XXXX. All my buyers are in XXXX. 3 in YYYY... You haven't got a hell of a lot of money. It used to be half then it went down to third, you know?" (Pilot Interview 9, pg. 3)

Similarly to consumers, the sources of information are often interdependent. For example, an offender would receive information about a target by a secondary source and then inspected it himself. The extent of this process was surprising. The offenders repeatedly described how they received a phone call from a potential buyer or were asked by someone they were acquainted with to search for a specific product. For example,

"Sometimes I used to get up and go and look for certain things. Someone would call and say 'can you look for this?' and stuff like that. So I would go and look for that certain thing. Find it, get it, then take it to them. Get rid of it." (Interview 3 pg. 4)

Learning about possible locations from buyers or co-offenders was found to be central in acquiring information. Offenders continuously used networking to learn about opportunities. If they moved areas they fairly quickly set up a new network. If their circumstances allowed it they also kept contacts in previous areas they have lived in. The network was also valuable in relation to selling the stolen goods. A burglar or shoplifter does not only need to know what to steal but who to sell it to. Offenders quickly learn the state of their "market". As this offender explained,

“So people know who the grafters are, people know who the drug dealers are, people know who’s going to buy stuff, just things like that really so you get to know people. Like I had one buyer who’d buy everything off me no matter what, one phone call, boom, then you’d get other buyers because you might get a better price and then you get odd people who know you’re a grafter coming up and going can you get me this can you get me that, just word of mouth.” (Interview 8, pg. 3)

Consumer studies assume consumers rely on secondary source of information. Consumers are often encouraged to search and compare information with different sources of information in order to make an informed decision about a product or an area (as in the case of residential mobility). Offenders are similar. The advantage of using several sources of information is that it allows the offenders to benefit from a pool of knowledge and expand their awareness space. Consequently, they have more opportunities to steal a variety of products and become aware of locations they otherwise may not be aware of.

7.5.2. Type of Information

The offenders were also asked what they were searching for. The majority referred to the search of a product and explained they were mainly interested in things that were easy to carry, such as cash or jewellery. For example,

“Sometimes you could come across something you’re not expecting, a safe straight on or just money for instance, so you go for the safe and get the money, and probably leave the telly and all of that. Then you’ve got your money you don’t want to be bothered messing about with stuff like a telly. A lot of thieves like straight cash, a lot of them are probably like me, but they don’t like messing about with drugs really. I just like straight cash meself. Say I break into a shop and I’ve got all the money out of the safe, and there’s video camera’s and all that. What do you

think I'll do? I'm not greedy. That's how you get caught being greedy." (Interview 2 pg. 10)

In terms of environmental knowledge, the offenders varied in their interest of a search for escape routes or awareness of police stations. Some indicated that they did not actively search for this type of information. Some relied on internal information and some indicated that they would spend some time learning the area before offending. For example,

"I've known the area that well, I'd just run. If I run one way I know the way I'm gonna go, if there was a route quicker, as an alley. As a kid I used to walk around all these areas, playing with the kids from school, like alleys behind shops, you know the streets behind shops. Things like that." (Interview 11 pg 8)

Several of the interviewees found it difficult to explain what precisely they were searching for. They often made statements such as this,

"If you're in for the crime for a while you just know. You can't, you can't really say, you know what I mean? If I could see you I can drive straight, pull the car over, go to the house and break in. There are little things you look out for, that you get so used to seeing. It's hard to explain. You can tell." (Interview 9 pg. 12)

7.5.3. Search Strategies

Central to the understanding of offenders' information search is the issue of the extent of their search, or the time spent in looking for opportunities. The pilot study indicated the discussion should focus on identifying strategies of search rather than try to divide offenders into types (see chapter 2 for more details). Since the offenders described their behaviour in terms of 'a market', the premise of this study was that offenders were similar to consumers and would behave in parallel fashion. The determinants of external information search suggested by Beatty and Smith (1987) proved relevant to offenders' behaviour.

7.5.3.1. Limited Search

The first and most common factor was availability of information. In Beatty and Smith's (1987) terminology this means the number of alternatives available to the offenders. The offenders frequently described how they accidentally came across an opportunity and acted on it. Rengert and Wasilchick's (2000) statement that opportunistic crimes are a special case is not been supported. Instead, opportunistic crimes were found to be an integral part of the offenders' access to goods.

"Sometimes I would go looking for a certain thing but stumble on something else and take that. Then when I'm doing something, if I see something while looking for something else, sometimes I'll go back to that something." (Interview 3 pg. 4)

Availability also resulted from the information being given to an offender by a third party. Thus, they did not need to invest much time searching. 3 of the 4 females in the pilot study committed shoplifting on a regular basis in order to support their drug habits. As Jane explained,

"Well most of the time it will be someone telling you "if you go, can you get a bed spread or a pillow case or get us a pair of Jeans or something", so you basically knew what you were going for, you know, you just get what people ask for, or whatever you think you can sell, and then you just sell it for whatever, or just swap it for a bag." (Pilot Interview 7, pg. 3)

Some prolific offenders repeatedly returned to places they already stole from, benefiting from a familiar place. Jane also explained how she returned to the same shop several times.

"I'd gone into the shop, that was on the hill, and...this one here (point to the shop at the top left of the map), and I was off my head, and I went in and done it, and that was easy, you know? That was the first time I did it. So I went in back about half an

hour later with a shopping trolley and just filled it up and walked out with it. Me and my mate. Because I got away with the shopping trolley the first time, I went back and done it another two times.” (Pilot Interview 7, pg. 2)

This was not only true to female offenders. The advantage was that the offenders spend less time searching for information and used their internal information instead.

Second, time pressure was posed on the offenders by their drug use. They repeatedly described how they required drugs in the morning and therefore went to places they were familiar with, near their homes, and conducted a limited search for goods in order to buy drugs fairly quickly. The cost benefit approach predicts this type of behaviour. However, it assumes some cognitive deliberation on the part of the offender. As the next quote shows, some offenders refute this assumption.

“You wake up, first thing on your mind is to go out and get the stuff, you know. You just go out and shoplift... Goes to the nearest place (supermarket) and do a runner.” (Interview 18, 242)

And

“So I’d get up in the morning feeling rough, turkeying, so I go out. I walk along this, not this, you know I walk along an area, find a nice home or see someone’s out or see a shed door or garage door open, see a set of golf clubs or a mountain bike or see a video through the window, no-one in, I’d break in and rob it. Go sell it and buy some Heroin.” (Interview 6, pg. 5)

Also relating to their drug addiction is their lack of motivation to spend time searching. For example,

“When you go on Heroin you just can’t be bothered with doing anything. I couldn’t be bothered going to work, you know, so I

just done shoplifting, cause you need to go and score...you didn't really care about anything. All you care about is getting your money together so you can get stronger.” (Interview 19, 208, 284)

The fourth determinant the offenders mentioned was financial pressure. Several offenders explained that they couldn't extend their search to distant locations due to lack of money to travel.

“Most people are just going to do it on their doorstep because they haven't got a car or they haven't got no money to buy petrol, so they do it on their doorstep. (...) so they can get a quick 50 quid or whatever sort themselves out and carry on.” (Interview 6, pg. 4)

Finally, experience occasionally influenced the extent of the offenders' choice in terms of their confidence. It led to their belief that they could get away with little search.

“Because you get lazy. I used to be good at it and then I got lazy. You get confident. It's laziness I suppose. A lot of the time its close and you get to a point when you think you can do someone, and when you get to a point when you think you can do someone you start making mistakes and that's what happened with me. You get close and get away with it. It get to the point you think you're invincible. You think I'm never gonna get caught. You start getting really confident.” (Interview 2, pg. 10)

7.5.3.2. Extensive Search

Consumer literature has long acknowledged that people tend to spend little time searching for information (Newman, 1977; Beatty and Smith, 1987; Guo, 2001). Extensive search requires time and effort. This was expected to be true to offenders as well. It was surprising to find that so many offenders in this sample were willing to invest this amount of time in search for information, especially since the criminological literature follows the belief that offenders will try to minimise their efforts.

The reasons for this behavioural strategy were made clearer during the interviews. First, an extensive search related to the practical issue of needing to know what was required to be done in order to obtain the money.

“Just mainly drive around. You try, you try to get into the industrial unit and out, but, you know, you don’t go achieving everything. You might be able to get a source from someone, but you don’t go out there until you know where you are, because if you don’t know what tools you need to get in it, till you’ve been there.” (Interview 9 pg. 4)

A second factor was what Beatty and Smith (1987) called financial payoff. For a potentially higher value of stolen property the offenders were willing to spend time learning the area and the opportunities available to them. This was especially true in cases of commercial burglary where the value of the stolen property could reach thousands of pounds. These offences were typically planned and involved travelling to an unfamiliar territory and actively studying the layout of the area.

“We needed to know the place as such. Vaguely look at town maps and things like that. We didn’t need to know the place inside out... We’d drive to town, leave the car and take the bus to the industrial estates. Taking precautions. Walk on foot and just have a look around. Just around the town for miles. We used

to come from miles, park up and take the bus. Walk back to town and come back.” (Interview 25, 167, 283)

On the other hand, prolific offenders, such as shoplifters and domestic burglars, who stole low values of goods, in order to support their drug habit, spent hours everyday walking between stores or houses searching for something to steal.

“These offences are what has been my life for the past 15 years, and I don’t count what I do everyday.” (Interview 15, 39)

Some offenders’ search focused on safety. They explained they searched for information regarding industrial estate’s security design and possible escape routes:

“If we’re in the car, when we get to places we look around for somewhere to hide afterwards, we’ll go round check all the different routes, all the little lanes here and there, between them. Then we drive to the place, do it and then drive straight back to where we’re going to hide. It’s organised.” (Interview 4, pg. 5)

Finally, as Guo (2001) suggests brand loyalty increases the extent of search. Some offenders steal only specific products and brands, such as golf clubs, antics, flags etc. They constantly travel around various areas searching for that particular product.

“The flags we used to travel, sometimes we’d travel too about a mile about 2 miles ‘cos we’d taken a lot from this area and then maybe one day just driving we spotted some outside and so we’d just travel there in the night and come back.” (Interview 27, pg 12)

Throughout the interviews some offenders emphasised they habitually search for opportunities. This may be due to perceptual individual differences as some offenders may be simply more alert to opportunities in the environment. For example,

“When I walk I take everything in, so I’m aware of things.”
(Interview 16, 351)

And

“You’re always up to something.” (Interview 26, 179)

7.5.3.3. Mixed Search

Models of spatial behaviour generally differentiate between types of offenders. However, as described in chapter 2, the offenders revealed more diverse behavioural patterns, where many of them mixed strategies. For example,

“Sometimes, like I’d be walking down the street and see something, so I’d take it. But sometimes I’d go to somewhere else to do something, if you know what I mean. But sometimes it would be spur of the moment and sometimes it’d be planned, so, I don’t know.” (Interview 3 pg. 3)

In most cases the offenders were relatively local and searched for opportunities in their familiar grounds. However, given the opportunity they were willing to travel to areas they were unfamiliar to them and relied on information from a third party.

“I wouldn’t go more than a couple of miles, you know? 4 miles is the most I’ve gone shoplifting... that’s just on occasion, you know, with other people. It’d be their idea, sometimes.” (Pilot Interview 11, pg. 3)

Drug addiction was an important factor influencing the offenders’ mixed strategy. The first indication for this was in the pilot study. As mentioned in chapter 2, the offenders would spend little time searching for locations first thing in the morning due to their immediate need for a fix. Once their habit was satisfied, some travelled further and spent the day searching for opportunities that could ‘earn’ them more money.

Finally, offenders would also mix search strategies because they had to mix areas. In that sense they differ from consumers, whose freedom is not at risk if they repeatedly visit a store they like.

“You just go and see which is the easiest. They do get to know you. That’s why we went to different places.” (Interview 18, 248)

7.6. Conclusions

Existing literature of offenders’ spatial behaviour does not consider the psychological processes involved in offenders’ spatial decision making and the factors influencing their location choice. Following the decision making model presented in chapter 1, the present chapter focused on the first stage of the decision making process, which is information search. The aim of this chapter was twofold. First, to learn what determines offenders’ information search and second, to explore the manner in which they gather that information.

The premise of this study was that existing models of consumer behaviour would be able to explain offenders’ behaviour. This was supported to some extent. The offenders were similar to consumers in that they used several sources of information to acquire knowledge about possible locations and products. These included direct inspection, co-offenders and potential buyers. The offenders indicated they tried to find information about what was there to steal and its location. Furthermore, in support to Tibbetts and Gibson (2002), variables such as time constraints, price, and experience were found to be relevant to offenders as well as to consumers.

On the other hand, offenders differed from consumers as they tended to spend more time searching for opportunities than consumers do. This may be due to the risks involved in their behaviour. Another possible explanation is the prolific nature of their offences. Most of the offenders needed to support their drug habit and constantly had to search for opportunities to make money.

The study had the advantage of drawing information directly from the offenders’ as they explained their behaviour. Their explanation for using an extensive search

strategy related to the value of the stolen goods, safety issues such as security design and escape routes and speciality of stolen product. Mixed search strategy was subjected to situational factors, opportunities, and risks involved with offending behaviour.

The offenders' also clarified the central role networking plays in their search for products and locations. Offenders benefit from having a 'market' where they not only can sell their stolen goods but they also benefit from receiving specific products. This helps them to minimise the amount of time they need to spend searching for opportunities.

The findings seem to support the rational choice theory. The offenders seem to try to maximize their benefits and minimised the cost. However, as mentioned above, one of the theory's main faults is that it is an optimal theory of behaviour. The results support the criticisms, as real life limitations on the offenders such as time limitation, lack of motivation, financial pressure were found to influence their choices. This will be discussed in more detail in chapter 9.

The study suffers from several methodological limitations. First, the small sample size prevented a quantitative analysis of the results. As a support to the results, the discussion incorporated information gained from the pilot study. Second, the results referred mainly to male offenders. Third, as this was an exploratory study of the subject, the offenders were asked open-ended questions.

The study advances the theoretical understanding of the process of offenders' information search as part of a decision making process. It clarified the manner in which offenders search for information, what they search for and the sources of information they used in order to learn about potential crime site locations. Police forces will also benefit from learning more about this process and in particular offenders' networking efforts. Finally, future studies should try and obtain a larger data set and reduce the number of unanswered questions by asking specific questions about various sources of information and strategies of information search.

Chapter 8

Cognitive Maps

8.1. Background

Learning about offenders' cognitive maps can give insight to stored information about offenders' interaction with the environment and about the relationship between various locations in it. The previous chapter examined the process of information search and discussed the determinants and strategies of offenders' external search. The present chapter focuses on internal information and its processing as part of an offender's spatial decision making process.

The assumption is that there are patterns of spatial decision making typical of offenders, which relate to where they live and offend. Therefore, the aim of this chapter is to identify a relationship between offenders' perceptions (i.e., cognitive maps) and behaviour. Such a relationship is expected to be modified by the extent of search the offenders' conduct, and by their mobility levels. Spatial products such as sketch maps (people are asked to draw their view of the city) are used in order to extract the psychological factors influencing offenders' perception of the environment.

The decision maker typically bases his choices in the environment on his subjective perception of it. This process is called a cognitive map. It is an integration of knowledge and attributes that give insight to the relationship between people's perception of the environment and their spatial behaviour (Kitchin, 1994; Golledge, 1992). Research which identifies patterns in offenders' spatial behaviour has typically concentrated on the distances offenders travel from the home to crime locations (Capone and Nichols, 1975; Rhodes and Conly, 1981), and the directions around the home in which they travel (Brantingham and Brantingham, 1981; Canter and Gregory, 1994; Canter and Larkin, 1993; Rossmo, 1995).

This type of research is of most importance to police investigations, especially those involving serial offenders (Canter and Larkin, 1993). However, it focuses only on ways in which offenders use their environment. This approach to offenders' spatial behaviour has two shortcomings. First, it makes inferences from the offenders' behaviours to their perception of the environment and its effect on them. Second, it ignores the vital input the offenders themselves have to offer, regarding their spatial behaviour and the processes involved in their decision making.

Few attempts have been made to draw on cognitive maps in order to understand criminals and their location choice (Carter and Hill, 1979; Canter and Hodge, 2000; Canter and Larkin, 1993; Hodge, 1994; Rengert and Waselchick, 1985). These studies focus on the behaviour choice itself. They focus on identifying patterns of crimes in various urban areas or of the strategies offenders use in selecting various crime site locations. The studies do recognise the existence of the decision making process and the importance of understanding the offenders' subjective perception of the environment they operate in. However, they lack a thorough discussion of the decision making process itself, the factors influencing it and how it affects their spatial choices and actions.

There are many possible explanations to the limited literature. First, the lack of research may be a consequence of the fact that research of the geography of crime has only recently begun to consider the psychological processes involved in spatial decision making. Second, part of the reason for the lack of research is due to the quality of data available in criminal contexts (see discussion in chapter 6). Third, the lack of research may be due to an implicit assumption in psychology that the same principles and processes that are drawn upon to understand non-criminal behaviour cannot increase our understanding for criminal behaviour.

This thesis follows Carter and Hill (1979) and Baker's (2000) conclusion that criminal spatial behaviour is a special case of general spatial behaviour. It is reasonable to assume that certain aspects of imagery are held in common over quite large groups of people, due to similarities in their socialisation, past experience and present urban environment. These processes have been addressed in a variety of contexts such as consumer behaviour (Coshall, 1985; Timmermans, 1979; for overview see

Timmermans and Golledge, 1990), migration and a mobility context (Briggs, 1973), as well as movement associated with recreational and leisure choice (Pigram, 1993).

The majority of non-criminal research concentrates on the “designative” aspects of people’s imagery (Knowx, 1996) and investigates cognitive organisation of space necessary for orientation within the urban environment. This includes people’s knowledge of routes, distances and directions (Canter, 1975; Garling et al. 1981, 1989; Kirasic et al. 1984; Kitchin and Blades, 2002; Magana et. al. 1981; Montello, 1991). These types of studies try to identify the strategies people use to learn about the environment in deciding whether to go somewhere; why go there; where is that destination; how to get there (Cadwallader, 1976; Garling et al. 1985). These studies are most similar to previous studies of criminals’ spatial behaviour and cognitive maps.

On the other hand, the affective aspects of imagery reflect people’s feelings about the environment. This is revealed by the desirability or attractiveness of different neighbourhoods or residential locations. Surprisingly, these aspects have received relatively little attention (Wood and Beck, 1976, 1990). In relation to criminal behaviour, these aspects have been addressed by even fewer researchers and the focus was on the attractiveness or deterrents of specific targets rather than areas (Thompson, 2002). The influence of these aspects on offenders’ spatial decision making will be discussed in detail in the following chapter.

There are several theories as to the nature of cognitive maps. Theories about its structure are divided between non-hierarchical (Kaplan, 1973), hierarchical (McNamara, 1986, Stevens and Coupe, 1978) and schema theories (Medyckyj-Scott and Blades, 1992), of which hierarchical are the most popular and assert that spatial knowledge is structured as nested levels of detail. Siegel and White (1975) suggest that cognitive maps are hierarchically organised into three different levels: landmark, route and configurational. According to them, landmark recognition is the first stage of acquisition of landmark knowledge. Paths or routes then develop between the landmarks with route knowledge progressing from topological to metric. In the final stages, both landmarks and routes are organised into clusters with metric properties, which produce survey knowledge. While Golledge (1978) emphasises the role of

landmarks in the learning process, Garling et al. (1981) argues that routes are learnt before landmarks.

There is a further disagreement regarding the map form. Kosslyn et al. (1978) suggest that information can be in image-like units. Pylyshyn (1981) on the other hand, claims that people store information as conceptual proposition and do not use imagery when processing information unless they are asked to do so (Kitchin and Blades, 2002). Thus, it is not assumed that a cognitive map is equivalent to a cartographic map. Cognitive maps are expected to be incomplete, distorted, mixed-metric representation of real world environments (Golledge and Stimson, 1997).

There are many factors influencing the acquisition and development of cognitive maps. Experience, for example, assists in translating gained information into metric information and configurational knowledge. This can be affected either by the environmental characteristics (such as city layout, size, barriers to movement, distinctive feature) or by the type of experience in the environment (direct or secondary). Studies suggest contradicting results regarding the influence of age and education on how knowledge structure develops (Orleans, 1973; Golledge and Spector, 1978). Variations in travel mode have been shown to be responsible for influencing mental map structuring style. (Appleyard, 1970; Golledge and Timmermans, 1990).

Furthermore, with increasing familiarity maps become more detailed and spatial elements are more common. However, people acquire most of the information within the first few experiences with the new environment and then expand on the initial learning (Garling et al. 1991; Spencer et al., 1989). Familiarity has normally been linked with experience and length of residence. But these do not necessarily mean more interaction with particular areas as an individual may be a passive explorer or never move far from his/her residence (Kitchin and Blades, 2002).

The importance of familiarity in offenders' spatial behaviour has been noted repeatedly in the criminological literature. It is widely accepted that offenders, generally, do not travel far to commit crimes and prefer to offend in areas they are familiar with and that are near their home or work place (Brantingham and

Brantingham, 1981, Repetto, 1974). The offenders' awareness space is thought to be a major influence in offenders' preference of crime site locations. This has been explained by the sense of security provided by familiarity and can be represented by a more complex, detailed map, as it is a sign of organised information.

Another factor of great importance to criminologists is offenders' mobility. Murray and Spencer (1979) show that high geographical mobility enables people to produce more organised and complex maps. Individuals differ in the extent to which their lives have required them to develop cognitive mapping skills. Thus, those who explore different places are expected to develop an approach to travel and for new areas, which allows for a rapid and structured imaging of such places. This relates to the acquisition of spatial knowledge. The basic elements are learnt quickly and can compensate for the lack of familiarity with an area (Garling et al. 1991). This conflict between familiarity and mobility level leads to the first research question of whether offenders who are more mobile will produce more detailed and complex maps than those offenders who only offend locally.

The second research question relates to the previous stage of the decision making process. The findings in the previous chapter suggest that offenders tend to spend a considerable amount of time searching for potential locations. The extent of environmental search should therefore be another factor, which would help offenders to develop more complex and detailed cognitive maps. It is therefore reasonable to expect that offenders who spend a considerable amount of their time searching the environment for opportunities will develop better skills in learning new environments and to have more detailed cognitive maps than offenders who spend little time looking for opportunities.

It is therefore hypothesised that

1. The cognitive maps of offenders will become more detailed as offenders are more mobile.
2. The cognitive maps of offenders will become more detailed as the extent of their search behaviour grows.

8.2. Method

Methods to extract environmental information are varied and include estimating distances (Canter, 1975; Montello 1991) or direction between a series of locations (Kirasic et al. 1984; Garling et al. 1981), wayfinding along a route or indoors (Garling 1989) and multidimensional tasks (Magana et al, 1981) (for a review of these techniques see Kitchin 1996). In order to fully understand offenders' thought processes environmental information was elicited directly from them. Self-report methods include verbal and written reports, sketches, free flowing conversations and map and model making.

Canter (1977) suggests that the sketch maps' usefulness lies in the fact that maps can be used as a metaphor for mental processes, which give insight to a variety of different types of information which may be registered and then reproduced in a sketch. As a consequence a sketch map may be examined to reveal where a sketch maker's interests lie. If a person chooses from a range of possible information, which does he decide to represent? Unlike a geographer's map, which represents what he has systematically recorded, a sketch map may be used to represent what a person remembers. In other words, a psychologically significant aspect of maps is that they provide an overview of potential action sequences, which enable us to appreciate the internalised spatial structure upon which a person is operating. Because of the efficiency, variety and summarising qualities of sketch maps they present a valuable means of exploring conceptual systems.

The sketch mapping technique is a reliable method (Blades, 1990). It allows participants, in this case, offenders, to freely construct an image, where the

interviewer's influence on the drawing of the specific map is minimal. Furthermore, it allows for a comparison between different population groups, and helps in unravelling the processes involved in acquiring spatial information and factors, which affect the quality of the 'maps' and the quantity of information stored. However, the method suffers from notable limitations (for a full discussion of the strengths and limitations of this technique see chapter 4). The main drawback is its sensitivity to the instruction given by the interviewer and to the graphic skills of the drawer. As shown in the chapter 5, sketch maps are difficult to interpret and quantify. Therefore, their main use in this thesis was as an interviewing tool.

The interview design is based on experience gained from the pilot study (see chapter 2). The results of the pilot study suggest that offenders mobility patterns and the role of the home had to be investigated in more detail as offenders were found to have several addresses and to have a more transient lifestyle than expected. Thus, changes were made to the interview design of the main study. This led to the inclusion of a timeline and for more specific questions to be asked in order to clarify this stage of the decision making process.

28 burglars, robbers and shoplifters were included in the final sample of the main study. The interviews consisted of four main parts each contributing to an understanding of the background, behaviour and conceptualisations of the offenders (see Appendix 3 figure 1). In order to test the extent of search the offenders conducted, the sample was divided into three groups of search strategies defined by the length of time the offenders invested in looking for a crime site locations (for full discussion see chapter 7). Since the participants found it difficult to quantify the extent of their search, it was decided to ask for a descriptive account of the search they have conducted. A set of binary variables was created to indicate which of the strategies was used (1= Yes; 2= No):

1. Limited Search Strategy: Cases were included in this category if there was clear indication of prior knowledge of either product or location, such as in cases of 'a specific order' or if the participant indicated that he stayed local because he was aware of shops or houses in the area.

2. Extensive Search Strategy: Refers to cases where the offender indicated that he spent a considerable amount of time and effort searching for information.
3. Mixed Search Strategy: Refers to cases where the offenders used both strategies at different times.

In 7 cases there was no available information regarding the extent of search the offenders invested in searching for crime site locations.

The sample was also divided by the distances offenders travelled to crime site locations. As the offenders were asked about a series of crimes, sometimes encompassing dozens or even hundreds of offences, they were asked during the second stage of the interview about their travelling strategies. It has been identified that the sample consisted of four qualitative groups. The literature refers to the travelling habits of offenders in relation to their home base. Canter and Larkin (1993) offered the initial distinction between a 'Commuter' and a 'Marauder'. This is an extension of that model which is too general as it points to two extremes. The assumption in the literature (Brantingham and Brantingham, 1981; Canter and larkin, 1993) is that the base is stable. It became clear, as early as the pilot study, that this was not necessarily true. Many offenders expressed their mobility in terms of a frequent change of base. This pattern became clearer as the analysis of the timeline was carried out.

1. Local Offenders: This refers to offenders who committed crimes only in areas near their home area.
2. Occasional Traveller: Refers to offenders who mostly remained local but occasionally travelled to other areas as well.
3. Travellers with Fixed Base: Refers to offenders who mostly travelled to areas other than their home area, but returned to a fixed home base once the crime has been committed.
4. Travellers with No Fixed Base: This refers to offenders who did not have a fixed base and offended as they travelled around the UK. This group includes offenders who were homeless for a significant amount of time or those offenders who moves to different cities every few weeks.

The maps were analysed using the refined classification scheme (for diagram see figure 5.2). The map styles were defined as follows:

1. *Disperse*: The most primitive map style. It contains fragments of sequences or elements unconnected to each other and out of serial order.
2. *String*: A schematic type of maps, which contains curves and bends.
3. *Border*: The map distinctly contains districts and borders.
4. *Link*: Places or districts are clearly connected by a road system.
5. *Pattern*: The most complete type of map, which bears a resemblance to a cartographic map.

The new classification scheme was proposed and tested for inter-rater reliability (see chapter 5). It builds on Appleyard's (1970) division of sketch maps by two dimensions. Following Lynch's (1960) findings the first dimension examines the type of elements emphasised. This is either sequentially by means of links (routes), or spatially by indicating the relative locations of places (landmarks) without noting the links between them. The second dimension focuses on the level of complexity. The sketch maps were measured to find to what extent they resembled a cartographic map. This was tested by counting the number of elements and their accuracy. The main advantage of this taxonomy is that it can be seen as a sequence moving from the most primitive to the most detailed map, illustrating the development of sketch maps within or between people.

This new scheme was tested for inter-rater reliability by asking 2 groups of 10 judges to evaluate sketch maps by choosing the style, which identifies it best. Group 1 judged the 28 maps from the main study whereas Group 2 judged 16 maps from the pilot (see chapter 5). There was on average 61% agreement between the judges. Although the inter-rater reliability results are low, the results suggested there was a reasonable distinction between the two dimensions, which justifies their use for the purpose of this study. Due to the variation in the judge's assessment the most common style/s assigned to each map was chosen as the defining one. In cases where the judges were equally divided between two styles both styles were counted.

8.3. Results

8.3.1. Offenders Mobility and Map Styles

The analysis applied the two dimensions presented by the map style classification scheme. The first dimension is of map complexity. This refers to the number of details in the maps and the links between route and landmark features. It was hypothesised that offenders who are more mobile will exhibit more detailed, complex maps than offenders who remained local.

Due to the small sample of offenders it was not possible to test for significant results. The results presented in Appendix 8 tables 1, 2 show that out of the 16 offenders who used the primitive map styles 7 offenders had a fixed base. On the other hand, out of the 12 offenders who used more complex styles 7 offenders preferred to be local but occasionally travelled further to commit their crimes.

The second dimension of the classification scheme refers to the type of element dominant in the maps. The results presented in Appendix 8 table 3 show that 18 of the 28 offenders used sequential elements and that 15 of those travelled either occasionally or regularly but returned to a base. These results only partially confirm the hypothesis.

8.3.2 Extent of Search and Map Styles

It was hypothesised that the extent of search offenders invest in will be a predictor of the quality of their sketch maps, and that the more time they spend searching and learning the environment the more sophisticated their cognitive maps will be. This was again only partly confirmed by the result in this study. As shown in Appendix 8 table 4, out of the 4 offenders who conducted limited search 3 offenders tended to draw primitive sketch maps. Surprisingly, and similarly to travellers with a fixed base, out of the 10 offenders who carried an extensive search 6 offenders drew simple maps. On the other hand, out of the 7 offenders who used the mixed search strategy 5 tended to draw more complex maps.

The results shown in Appendix 8 table 5 are similar to the ones regarding offenders' mobility and type of element. Out of the 17 offenders who spent a considerable amount of time in search for potential targets at least occasionally 13 included sequential elements as the dominant features of their maps.

8.4. Discussion

8.4.1 Offenders Mobility and Map Styles

8.4.1.1 Offenders Mobility and Map complexity

As mentioned above the results are to some extent surprising. Offenders who remained local or who had a fixed base tended to draw simple sketch maps while the occasional travellers tended to draw more complex maps. One possible explanation of these results lies in the nature of the offenders travelling patterns. Local offenders were expected to draw simple maps because they did not need to develop the cognitive skills of generating a more elaborate and complex cognitive map.

Mike is an example of a local offender drawing a primitive map. Mike was a 30-year-old man convicted for robbery. Previous convictions included theft and fraud. He admitted to committing a variety of offences such as robbery, domestic burglary, fraud, drug dealing and assaults. He also had a history of alcohol and cocaine misuse. When asked if he ever offended in other areas rather than his local environment he said:

“...So I'll just stay. If someone said to me, you fancy coming to such and such, I never wanted to go, to XXXX and that. That wouldn't be me. To me, I would always go around in my car.” (Interview 7, pg. 6)

Mike drew a sketch map of an area where he lived and committed most of his offences (figure 8.1).

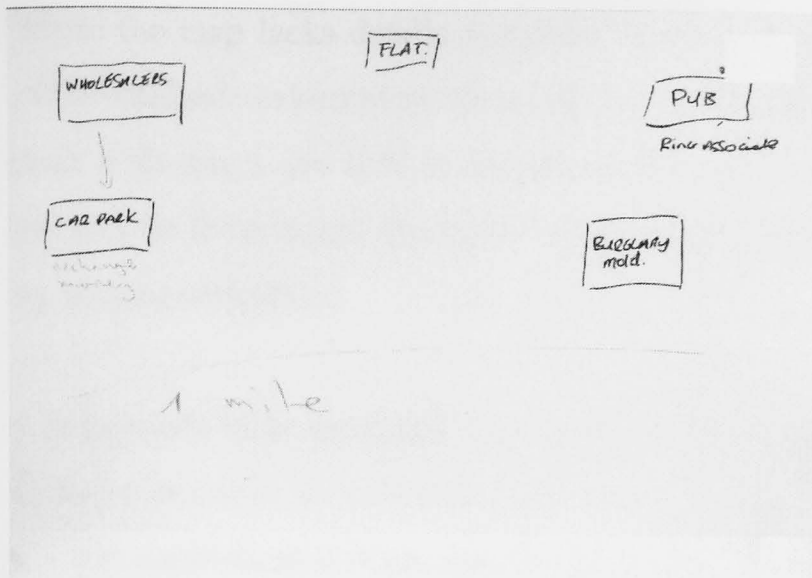


Figure 8.1: A Local Offender Drawing a Primitive Sketch Map

The map Mike drew is primitive and fits the ‘disperse’ style. There are no links or routes between the few landmarks Mike mentioned. Yet, the locations Mike did include are of most significant to him and reflect his subjective environment. Home, work, and shopping areas tend to serve as the initial primary nodes and are among the major anchor points from which the rest of the spatial knowledge develops (Golledge and Stimson, 1997).

Mike exemplifies the advantage of using the sketch map as an interviewing tool. This technique assists in eliciting information about the offender’s criminal activity and interaction with his environment. As Mike was drawing the map shown in figure 8.1 he described his daily routine and criminal activity and the significance of the locations drawn in the map:

“That’s where we used to live. Flat face the pub there. I used to do a lot of dealing when I was in. Another area where I used to, the flat there. I’d go up the road and see my associates, collect whatever it is I have to collect and then pick up the children. I spent a lot of the time in the pub, and I used to do maybe a bit of dealing in the, ah, I spent most of my life in the pub, yeah? So that’s what will be my map of XXXX.” (Interview 7, pg. 6)

While the map lacks details and links between the landmarks, Mike's verbal account offers valuable information about his home, the pub and other areas around where he dealt with drugs and sold stolen goods. His account sheds light on his experiences of the area he lives in and interaction with the environment as an offender, as a father and an alcohol consumer.

It is possible Mike excluded any identifying details from the map on purpose in order to avoid possible identification of himself and his actions. As Ladd (1970) suggests the less sophisticated maps may be due to the offenders' level of understanding of the task, their inexperience with maps, and/or their individual abilities to conceptualise and represent space and spatial arrangements.

It was also expected that as occasional travellers will be mainly localised and rarely travel to other areas they would resemble the local offenders rather than those offenders who travel regularly. However, the results show that offenders who occasionally travel tend to draw more complex maps. These offenders were willing to venture to new areas on occasion. This may have possibly improved their cognitive mapping skill. Since the offenders had to absorb new environments quickly, they possibly became more aware of spatial elements and the links between various locations. Thus, they were able to communicate common elements in the environment more readily.

Adrian is an example of an occasional traveller. He was a 22-year-old and was one of the few offenders in the sample without a drug abuse problem. Although he was convicted for an armed robbery his main criminal activity was shoplifting, thefts either of or from cars, commercial burglary and damage to property. He described himself as "wasn't much into crime, me. I was but I wasn't like a really bad offender that keeps on robbing and robbing" (Interview 31, 268).

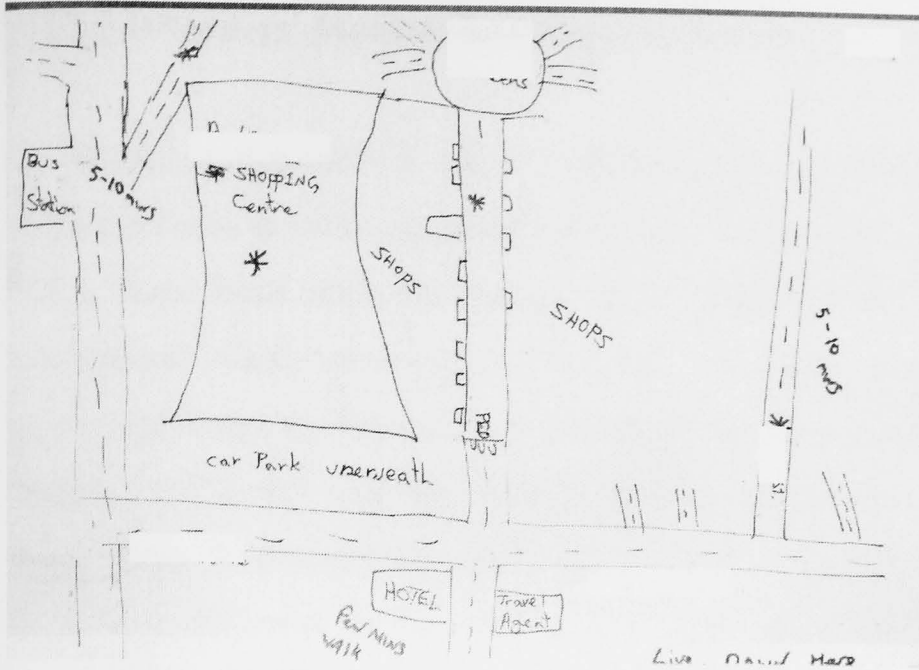


Figure 8.2: An Occasional Traveller Drawing a Complex Map

His sketch map (figure 8.2) is clearly much more detailed than Mike's and resembles a cartographic map. His house is at the bottom right of the maps and was 'a ten minute walk' away from the shopping centre. He would go to the shopping centre and shoplift. On occasion he would steal cars from the shopping centre's car park, and sometimes he would burgle a shop in the street nearby.

Adrian represents a large proportion of the offenders (including offenders interviewed for the pilot study), who prefer to offend in areas near his home, but when another location is suggested to him he would join other offenders. According to the offenders most of these crimes often remain undetected. The use of a pool of knowledge helps expand offenders' awareness space and in expanding offenders cognitive maps. This point is missed in the literature and should be emphasised.

Another surprising finding is that offenders who often travel but return to a fixed base tend to draw simple maps. This may be explained by the classification system itself as shown in relation to the type of element used in the maps.

“From my estate to town centre there are many many roads, so I wouldn’t be able to say. Town centre is in cross roads like that. From my house to town centre it’s like 20 miles. You pass through many roads and many villages. There’s XXXX park. There’s a big shopping centre near my house.” (Interview 25, 283)

These findings support the hypothesis that offenders who travel more to crime site locations develop their cognitive mapping skill which is represented in more detailed complex sketch maps and emphasises route knowledge.

8.4.2 Extent of search and Map Styles

8.4.2.1 Extent of Search and Map Complexity

The findings in this section are mixed as well. The hypothesis, that the more time offenders spend in search behaviour the more complex their maps would be, has only been partially confirmed. As expected, offenders who invest little time in search for opportunities tend to draw primitive maps whereas those who use a mixed strategy tend to draw more complex maps. A surprising finding is that those offenders who invest extensive effort in search draw more primitive maps. The explanation for this finding is similar to the explanation for offenders’ mobility and maps complexity.

8.4.2.2 Extent of Search and Type of Element

The findings again support Garling et al’s (1981) explanation to development of spatial knowledge. Offenders who carry extensive or mixed search include more sequential elements in their maps and the discussion deviates from that of the complexity of the maps to the type of element the offenders emphasise in their maps.

An example of an offender who mixed strategies in searching for opportunities is Jeffery. He was a 28 year old who was convicted of burglary. He committed a variety of property crimes including thefts, shoplifting, handling stolen goods, a robbery, domestic and commercial burglaries, stealing cars and fraud. He suffered from an

addiction to Heroin and admitted to using barbiturates, speed and ecstasy quite often. His map (figure 8.4) represents a wide area of criminal activity, with each colour representing a different type of crime.

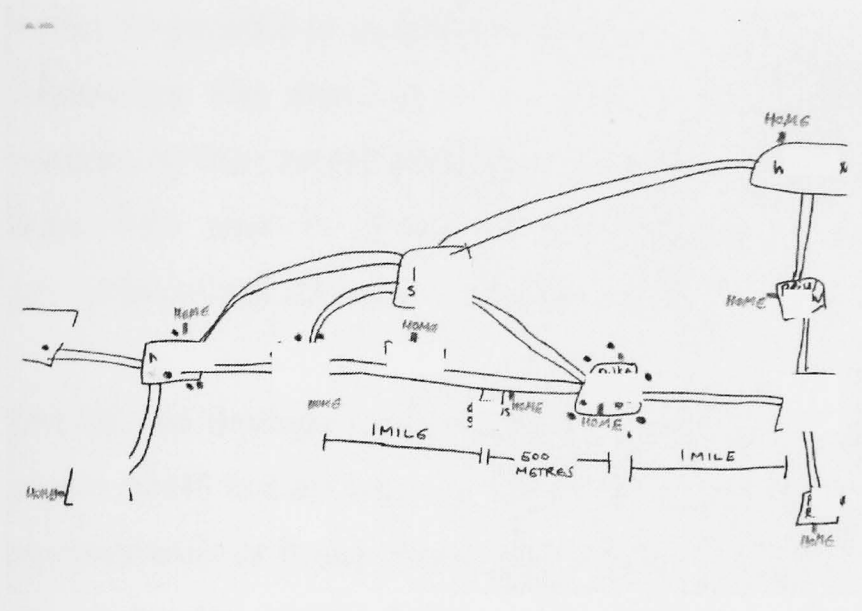


Figure 8.4: A Complex Sketch Map Drawn by Offender Who Conducted Extensive Search

Jeffrey's extent of search depended on the type of crime he committed. For example, when he committed a burglary he was using tablets and left a street party and walked off to a house from which he stole a stereo, cash and jewellery. Conversely, when he stole flags (pavement stones) he and his partner would drive around for sometimes over an hour looking for opportunities.

"I've never really gone out of my distance to commit a crime they've always be opportunist things or spur of the moment thing, the burglaries especially, spur of the moment but the thefts mostly spur of the moment, the flags we used to travel. Sometimes we'd travel too about a mile about 2 miles cos we'd taken a lot from this area. And then maybe one day just driving, we spotted some outside and so we'd just travel there in the night and come back." (Interview 27, pg. 12)

8.5. Conclusions

Cognitive maps are the subjective representation of one's environment. The assumption was that by examining factors influencing offenders' cognitive maps it would be possible to understand the process leading to their spatial behaviour. That relationship was expected to be modified by the extent of search the offenders' conduct, by their mobility and the various geographical areas they operated in. Sketch maps were used to extract the psychological factors influencing the offenders' perception of and interaction with the environment.

Overall, the findings support Murray and Spencer's (1981) conclusion that the more people travel and are exposed to new environments the better their skill of cognitive representation of it and the more detail and complex their sketch maps are. However, the results also suggest that the effect of offenders mobility and extent of search are better reflected in the analysis of type of elements used rather than the maps complexity. Those offenders who interact more actively with the environment exhibit route knowledge whereas offenders who remain local rely more on landmark knowledge.

This study also points to findings that have gone unnoticed in the literature. Offenders do not necessarily have a fixed based from which they operate. This finding is supported by results from the pilot study. Furthermore, offenders who typically remain local tend to travel further from their home occasionally. This has major implications in research of offenders' consistency, as it is generally believed that offenders exhibit more geographical consistency than behavioural consistency. This has implications on models of offenders' spatial behaviour as well as they are based on these premises. The variety in offenders' behaviour should therefore be examined further and the discussion should consider strategies of behaviour rather than rigid typologies.

Chapter 9

Evaluating Alternatives

9.1. Background

Identifying why offenders travel to a certain area is an important factor in understanding their activities as it is to know what stops them from travelling to another. The results from the previous chapters suggest that offenders spend time and effort searching for information regarding potential crime site locations. This type of search is both external and internal. It allows offenders to become aware of possibilities in the environment they are searching in. The first aim of the present chapter is to uncover factors influencing offenders in selecting between the alternatives which have become available to them and make a location choice. The second aim is to identify strategies offenders use in choosing a locale to travel to.

Several studies which examine offenders' spatial behaviour, describe factors that influence offenders' travel choice. These include familiarity with ones surroundings, time, money, risk and the city's layout (Brantingham and Brantingham, 1995; Felson, 1998). Although these researchers accept that 'any significant mental or physical barriers must also be considered in the spatial analysis of crime patterns' (Rossmo, 2000, pg. 88) they do not make an in depth examination of the affective factors influencing travel choice.

Bennet and Wright's (1984) study is a unique examination of the influence of moods, feelings, immediate motives and intentions and moral judgements on limited decision making ability of burglars. They claim that laziness, alcohol or drug use, the effect of others and the offenders' willingness to take risks influenced offenders on *whether* or not to offend. However, it remains unclear whether these factors are relevant to *where* offenders offend, which is the focus of this chapter.

Most researchers follow the rational decision making model as proposed by Cornish and Clarke (1986) as the appropriate method for explaining offenders' travelling

choices. As a utility based concept of criminal behaviour, this school of thought focuses on the risks, rewards, opportunity structure, and causal influence of several variables for different types of crimes. The main premise underlying rational choice theory is that crime is a chosen activity because the anticipated benefit it brings to the offender outweighs the perceived cost associated with committing the crime. The benefits are not only in terms of material gain but also emotional satisfaction. The risks or costs of crime are those associated with formal punishment and apprehension.

As mentioned in earlier chapters, the theory suffers from a number of notable limitations. First, the rational choice theory focuses on the objective properties of the immediate criminal situation and pays little attention to the subjective influence of emotions on offender decision making. An offender is not always seeking economic rewards as seen in the rational model. The offender may combine a variety of non-economic needs, for example, excitement, expressions of rage or anger, having a good time, dominating others, increasing peer group status, or a combination of these variables (Thompson, 2002). Secondly, the theory consists of potential explanations of a criminal's decision making and action processes, but is not stated in terms such that it can be empirically tested. Thirdly, the theory assumes offenders are knowledgeable. However, often the offenders are in uncertain situations. Fourthly, rational choice theorists have largely ignored the role of psychopharmacological agents, such as alcohol that may attenuate cognitive ability. As shown in chapter 6, a large proportion of offenders is under the influence of at least one substance. Results from previous studies indicate that alcohol, for example, significantly diminishes certain cognitive abilities, especially those associated with complex motor behaviour, planning and foresight, assessment, organisation of behaviour and memory transfer of information (Assaad and Exum, 2002). Fifthly, offenders are not always so calculating and may choose to ignore their own rules and act on the spur of the moment. (Ainsworth, 2002). Finally, much of the data supporting rational choice theory is based upon interviews with convicted, incarcerated offenders. Ainsworth (2002) argues that if offenders were any good at making rational choices, they would never be arrested and convicted.

In 1993, Cornish stated that a rational choice may also mean quick, easy and unskilled thinking. A crime may also be spontaneous or only partly planned and even rarely

thought out. This addition to the original theory was in response to the criticisms noted above. However, this claim is self-contradictory. It allows for all spatial choices to be considered rational. It also continues to ignore the affective factors influencing offenders' choices. As Benner and Wright (1984) conclude, "offenders behave rationally as they perceive it" (pg 152).

Therefore, the aim is to shift the discussion from a simplistic debate of risks and rewards to that of preferences and constraints. The concepts of preference and constraints are important because they bring together the internal mental life of a person (i.e, cognitions, motivations, and emotions) and overt behavioural responses within one framework. There is a relatively small number of factors in everyday life that impose upon all individuals and constrain their freedom to occupy certain space and time locations (Golledge and Stimson, 1997). This means that the offenders have to adopt 'strategies' for using a limited quantity of information to the best possible effect. This has major implications in terms of advancing academic knowledge of offending spatial behaviour but also in assisting police investigations in terms of predicting future behaviour and minimising search areas.

The shortcomings of the rational choice theory leave a gap in the literature. Thus, three inter-related approaches are used to explain this process. These theories are part of a descriptive mode of analysis of decision making that examines how people make choices. There is some overlap between these theories as they complement each other and bring together knowledge gathered in the fields of economy, geography and psychology.

Bounded rationality grew out of the rational choice theory and was led by Herbert Simon (1957). Simon approached consumers' decision making by examining the constraints posed on the decision-maker by real life situations. The premise is that a decision-maker's selection and perception of information is limited by his interests and experience, and by the amount of time available to him (Guy, 1980). Simon (1957) coined the term '*Satisficing*'. It appreciates the time, money and motivation constraints and assumes people do not possess knowledge of all possible alternatives.

This approach asserts that the search process is guided by aspiration levels. In the simplest case, the search process goes on until a satisfactory alternative is found that reaches or surpasses the aspiration levels on the goal variable, and then this alternative is taken. During the search for a satisfactory alternative, the individual may realise that he is unable to find any alternative that meets his standards. He then lowers his level of aspiration, thereby lowering the minimum acceptable standard (McGrew and Wilson, 1982). Therefore, the question is not how the search is carried out, but how it is decided when to terminate it. According to this approach, an offender is expected to search for opportunities until he will come across a satisfactory option depending on his goals.

One of the main strengths of this approach is that Simon appreciates that the information gathered may be biased. The quantity of information a decision maker can handle is small. Thus, the decision-maker may ignore certain items of information of relevance to the problem, and put an incorrect interpretation upon other items (Guy, 1980). For example, Bennet and Wright (1984) found that the majority of burglars they interviewed either chose not to think about the chance of getting caught or to believe that they would not get caught. They conclude that the most rational way to proceed is not necessarily that of careful calculation, but by the use of heuristics.

By the late 1990's Simon accepted the role of emotion and affect among the considerations that rationality calculating economics took into account (Schwartz, 2002), and incorporated the research regarding heuristics (Kahnmentan and Tversky, 1972, 1973, 1982) into bounded rationality framework. Heuristics are rules of thumb or strategies that reduce complex problems into simpler ones. 'Prospect Theory' emphasises an intuitive approach to choice making. The focus of their discussion is on three elements: affective responses, biases and learning. All of which are imperative to the understanding of offending behaviour, especially one relating to serial offenders. Tversky and Kahneman (1983) conclude that there is a 'natural' mode of processing that operates by different rules from a rational or 'extensional' mode. Their theory has been referred to as a 'tool box theory' because they view heuristics as convenient cognitive shortcuts (Epstein et al, 1996).

Thompson (2002) refers to these three elements in his study of burglars' target selection. According to Thompson, offenders will categorise information based on their experiences and will create templates to make expert decisions. The expert decision-maker uses categorisation schemes to discriminate between alternatives in a more effective way than non-experts. These cognitive models are based on our prior knowledge acquired through social learning or past experience. Thus, the experience of being involved in the commission of offences will enhance the cognitive models that offenders construct.

Prospect theory asserts that people do not always make wise decisions because they fail to appreciate the limitations of these heuristics and because people base their judgements of an activity not only on what they think about it but also on what they feel about it. If they like an activity, they are moved towards judging the risks as low and the benefits as high. If they dislike it, they tend to judge the opposite-high risk low benefit. Under this model, affect comes prior to, and directs, judgements of risks and benefit (Slovic et al, 2002).

Cromwell et al (1991) accept that individual offenders have psychological mental 'templates' about elements involved in the commission of domestic burglary, which they describe as a 'card file'. Offenders build up a mental memory of potential targets, which may be unsuitable at the time but will be selected in another instance. Cromwell et al (1991) also suggest that offenders use heuristics that are developed and refined by trial and error when looking for cues that act as predictors of success or failure of targets for burglary. However, they claim that burglars may not be able to articulately describe the underlying processing strategies or the discriminative cues or cue clusters that guide the decision making such as selection processes. Thus, the actual process of selection between available alternatives remains unclear.

Cognitive-Experiential-Self-Theory (CEST) proposes that people process information by two parallel, interactive systems: a rational system and an experiential system. As Epstein et al (1996) explain, the rational mode is deliberative and analytical, primarily verbal, conscious and functions via a person's understanding of the conventional rules of logic. It is slow and demanding, thus, better suited for delayed actions and complex, dispassionate analysis.

In contrast, the experiential system is automatic and pre-conscious; it is intuitive, automatic, rapid, associative and holistic. It is particularly suited to rapid assessment of information and for decisive action. Heuristic processing represents the natural mode of the experiential system (Denes-Raj and Epstein, 1994). Although the experiential system is the default option that determines everyday behaviour, people are able to switch to a more analytic, logical mode of thought when they are motivated to do so. Behaviour is usually influenced jointly by the two systems along a continuum reflecting their relative influence (Kirkpatrick and Epstein, 1992; Shilo et al, 2002; Slovic et al, 2002).

The degree of relative dominance of either system in particular situations is determined by various parameters. First, individual differences in preference for relying on one system more than the other. Zajonc (1980) argues that affective reactions to stimuli are often the very first reactions, occurring automatically and subsequently guiding information processing and judgement. Alternatively, need for cognition is a relatively stable individual difference in peoples' motivation to know, research, and enjoy cognitive endeavours. It is the tendency for an individual to engage and enjoy thinking. Given differences in this tendency, Verplanken, (1993) claims it is to be expected that low-need-for-cognition individuals are less motivated to expend effort to an information acquisition and decision making task than are high-need-for-cognition subjects. Second, the nature of the situation and the level of emotional involvement support the argument for an independent existence of these systems. Certain situations are readily identified as requiring analytical processing, whereas others are more likely to be responded by experiential system (Denes-Raj and Epstein, 1994; Epstein et al, 1996; Kirkpatrick and Epstein, 1992).

Therefore, the research questions are:

1. Which factors influence offenders' choice of travel?
2. Which strategies do offenders use in selecting between alternatives available to them?

9.2. Method

The interview design is based on experience gained from a pilot study (see chapter 2). The offenders revealed several factors which led them to prefer certain areas in which they chose to offend. These include wealthy areas, areas where they considered it easy to commit crimes or areas they were familiar with. They also explained they would avoid areas where they felt they were too known and the risk of detection was too high. Since the pilot study was an exploratory study, the element of choice needed to be investigated in more detail. Thus, changes were made to the interview design of the main study. This led to the inclusion of more specific questions aimed to clarify this stage of the decision making process.

28 incarcerated burglars, robbers and shoplifters were interviewed for the main study. The interview included a demographic questionnaire, drawings of sketch maps and a semi-structured interview regarding the offenders' choice of crime site location (see Appendix 3 figure 1). This line of questioning allowed for an examination of the strategies the offenders use in selecting between the alternatives available to them, i.e. are they more intuitive or more rational in their choices? As part of the interview, the offenders were asked about their travel choices. The offenders were initially asked a general open-ended question (e.g., "how do you choose where to go?"). Once the offenders described in their own language the process involved, more specific, probing questions followed.

The first step of the analysis was to identify factors which the offenders considered as constraining or served as preference. As shown in chapter 6 most of the offenders were using at least one drug. Therefore, they were asked whether drug use influenced their travel choice. The offenders were also asked to identify factors which attracted them to, or deterred them from, travelling to certain areas. The questions included specific time of day or whether weather conditions were possible factors. Furthermore, they were asked whether they thought about the chances of getting caught/hurt; whether they considered the presence of other offenders risky; and if so would that influence them to avoid the area.

The second stage of the study was to identify strategies the offenders used. Due to the small sample size the interviews were considered as a series of case studies and the discussion will use extracts from the interviews to illustrate strategies the offenders identified in relation to the literature presented above. The case study method is based on the need to understand a real life phenomenon by obtaining in-depth understanding, explanations and interpretations about previously unknown practitioners rich experiences, which may stem from creative discovery as much as research design. Thus, it is helpful in theory construction (Riege, 2003).

9.3. Results

The first aim of this study was to identify factors which might constrain offenders from travelling to certain areas in order to offend. The offenders were asked about factors that attract them to, or deter them from, possible areas. 12 offenders did not consider weather conditions as a factor which influenced their travel choices (see Appendix 9 table 1). Out of the 28 offenders in the sample, only 7 expressed a preference. 5 offenders admitted they would rather commit crimes in winter, especially when it rained.

The topological layout of areas was considered as a possible influence as well. Unfortunately, a large proportion of the offenders did not answer or did not find this factor significant (see Appendix 9 table 2). However, 7 offenders preferred to offend on flat ground than on a crime site on a hill.

The presence of other offenders was expected to act as a deterrent. This was confirmed by the results shown in Appendix 9 table 3. 14 offenders said they would prefer to avoid an area where they knew other offenders were operating in.

The offenders also identified the following factors as influential in selecting a crime site location:

- Violent areas
- Lack of familiarity
- Police presence

- Time
- Ethnic areas
- Money
- Distance
- Values

The second aim of the study was to identify strategies offenders used to select between the alternatives available to them. In order to test the rational choice theory's assumption of calculation of risk and benefit, the offenders were asked whether they thought about the chances of getting caught. The results suggest that only 7 of the offenders did.

Four selection strategies have been identified:

- Specific Targeting
- Card File
- Process of Elimination
- Opportunistic

A detailed discussion of these results follows below.

9.4. Discussion

9.4.1. Factors Influencing Choice

The aim of this study was twofold. First, to identify factors which influence offenders selection of a location to offend in. The results support findings from previous studies (Bennett and Wright, 1984; Brantingham and Brantingham, 1995; Felson, 1998) and offer new, more affective, factors. The offenders were first asked about environmental factors. As mentioned above, out of those offenders who preferred certain weather conditions, rainy conditions were favoured. The offenders explained that the noise of wind and rain was a distraction to the noise they were making and that there were not many people about. Furthermore, according to the offenders, police was less present, "the police don't like to walk around" (Interview 15, 311). The topological aspect

revealed that 7 of the offenders preferred to commit crime on flat ground, explaining that it was easier to be noticed on a hill.

The offenders also gave their own explanations to their preferences and constraints when facing a choice between alternatives of where to travel:

Violent areas were pointed out as areas offenders would prefer to avoid. The offenders described how in some areas they were facing violence from other offenders. These also included areas where drug use was common. When, the offenders owed money they were under threat if they did not return it. There was also a threat of violence from local people in the area. For example, Greg was a 24 year old who had dozens of convictions for theft, but was serving time for burglary. When asked if there was an area he would avoid he said there was a specific area, which he would not travel to because

“Its been hammered. Probably every house now has been burgled at least twice. Its just too risky. Probably vigilantes around there now cos they’re sick of it. They’d probably give you a beating with baseball bats.” (Interview 2, pg. 8)

Most of the offenders preferred to offend in areas they were familiar with, as this quote suggests

“You have to know where you’re going otherwise you will get caught.” (Interview 20, 203)

Familiarity has frequently been considered in the literature as a constraint on offenders’ spatial behaviour. It assumes offenders’ knowledge results from their daily activities. While this may be true in some cases, it is not a given. The previous chapters suggest that the offenders rely on various degrees of familiarity with an area. This was also supported by results from the pilot study. The offenders in this sample did not express familiarity was a necessity but a preference. As shown in chapter 8, when given the opportunity most of the offenders were willing to explore new territories even if they were not familiar with it. As discussed in chapter 7, in these

cases the offenders either spent time to search for potential targets, or relied on co-offenders as sources of information. Thus, they relied on the familiarity of someone they trusted with a potential location.

Not surprisingly, police presence was important. The offenders identified police patrol, CCTV, and security guards as a threat. Interestingly, some of the offenders were also sensitive to police response time. This led to a preference of small areas over larger cities where the police response time was considered faster. For example,

“I prefer to go to XXXX because it’s a quiet little village, d’you know what I mean, yeah. Obviously the response time for the old doormat is a lot slower there. XXXX itself is easy to get out of really, if you are on top...I think the police are a lot more global when they’re in a city. Like in the small towns they’re not all that. Think they are all clued up to what the area is and then in the cities they are gullible, but when it does come on top you can’t leave. You just can’t commit the same level of crime that you can do in the small places.” (Interview 9, pg. 4, 11)

The offenders were asked whether the presence of other offenders in an area would deter or attract them. As shown above, most offenders suggested that if they knew other offenders were committing crime in an area, they would prefer to avoid it. This finding was not surprising, however, the explanations given by the offenders gave some insight to their thought process and their lifestyle.

The first reason was that an area with high crime rates leads to more police presence.

“Because if people are committing offences in an area so the police are going to be wise to it. I’ll go far from that. To area where they’re not committing lots of offences. There are more chances of getting away with that.” (Interview 3, pg. 4)

Another reason why this factor would act as constraint was that the offenders did not want to be blamed for a crime they did not commit.

“You don’t want a lot of people around. You don’t want to do it there. You can get blamed for other people, you know? It’s not worth it.”
(Interview 12, pg. 4)

Also, they suggested that if there are many offenders committing crime in the area there would be less to steal. Finally, the threat of posed by other offenders was made clear by the following statement.

“You make sure that nobody sees you, and that the wrong kind of people don’t know you’re going, cause they’ll tell the police what you’re doing. If you owe people money and can’t pay it back, they’re gonna tell.” (Interview 14, 258)

Offenders who said they would not consider this factor as a constraint explained they were not worried about the risks of getting caught, and for some the fact that many offenders commit crime in an area makes it more attractive since it means there is something to steal.

“If everybody keeps going and committing an offence and getting away with it then you’re going over there aren’t you, because you’re going to end up getting away with it.” (Interview 27, pg. 10)

Time was a factor relevant mainly to offenders who committed burglary. There were clear individual differences between the offenders. While some offenders preferred to commit burglaries during the day, when people were likely to be out of the house, others preferred night time, where people were likely to be asleep and the lights acted as a signal to occupants presence.

There were also situational differences. Most of the offenders mixed the type of crimes they are involved in. Burglars were also often involved in theft and/or shoplifting. Thus, some offenders would commit some type of crime during the day and another during the evening or night. Typically shoplifting or theft was done

during the day when the shops were open and burglary was done in the later hours of the day.

As mentioned in chapter 7, money served as a constraint on occasions where the offenders could not afford travelling to other areas. This was true in cases where the offenders relied on public transport. In terms of preferences, the offenders favoured areas where money was visually present. However, several of the offenders also commented that they would steal from council estates. This was due drug to withdrawal symptoms, which meant they needed to obtain money quickly.

Distance was not generally seen as a constraint. As shown in chapter 8, the majority of offenders claimed they would travel if the opportunity presented itself. Some offenders even preferred travelling great distances to commit a crime. This finding will be discussed in more detail in the following chapter.

Two offenders commented they were afraid to travel to areas of a predominant ethnic minority. There was animosity from these ethnic groups towards the offenders and they felt they stood out. This supports Carter and Hill (1979) study where African-American offenders stayed in their own areas and white offenders in theirs.

Supporting the argument that the choices offenders make are not always rational or based on evaluations of costs and benefits, the offenders mentioned values as a constraint. The offenders offered affective reasons for avoiding certain areas. The most common reason was they preferred not to commit crimes near places where their family members lived in. For example,

“I never did anything near me Dad’s house.”
(Interview 2, pg 5)

Some of the offenders would not commit crimes against the elderly and women. For example,

“I never used to thief off the old people, that’s something I’ve never done.” (Interview 2, pg. 5)

The results support the assumption that offenders attempt to avoid areas where there are higher risks of detection. However, most of the offenders denied consciously thinking about the chances of getting caught. They gave several reasons for this:

First, the offenders' main goal was to financially gain from their crimes. As this offender said: "The only thing that enters my mind is a note dangling in my eyes. Kerching! kerching!" (Interview 10, pg. 5). This has often been attributed to the offenders drug use. As mentioned above, one of the main drawbacks of the rational choice theory is that it ignores the influence of drugs on offenders' decision making. Most of the offenders admitted that drugs influenced their cognitive ability. For example,

"If you was out the town on drugs and you'd seen an opportunity you'd still do it because it takes away the fear of the consequences. You don't think about the consequences, or you're not afraid of them at the time, that's one thing that heroin takes away, the fear of the consequence." (Interview 27, pg. 11)

Also

"It doesn't really cross your mind. All that's on your mind is that you have to feed your drug habit...You've got no morals." (Interview 18, 267)

Another criticism of the rational choice theory referred to the lack of attention it gives to the affective factors. Some of the offenders suggested that they think about the chances of getting caught only after the crime when are at home or even a day later. One of the affective explanations they gave to their avoidance of the issue of the chances of getting caught is that it is too frightening. As one of the offenders said, "if you do think about it you wouldn't do it, would you?" (Interview 17, 274)

9.4.2. Strategies of choice

The second aim of the study was to identify strategies offenders used in choosing between the alternatives available to them. Four strategies have been identified. While there were some individual differences in preference of a specific strategy, most of the offenders varied their use of strategies depending on the situation they faced or type of crime they committed.

9.4.2.1. Specific Targeting

This group includes offenders who were involved in more sophisticated crime which was aimed at specific targets. The offenders chose a location due to the presence of a specific target and spent time searching and learning the layout of the area. This normally involved commercial burglary or fraud and the financial gain was measured in thousands of pounds. The targets were mainly situated in industrial estates, such as company buildings where the offenders were targeting safes, computing equipment etc. for example, Lawrence (also see figure 8.3). A soft spoken man, who was convicted for burglary. He and his co-offenders were made aware, by a third party, of a location in an industrial estate, located in a different town to where he was residing at the time. As a result, the group visited the location and later returned to the area, staying there searching for a specific target within the estate and learning the routes to and from it. As Lawrence describes,

“I just go there to see what it was like. 2,3 of us would go. Come back to XXXX and then go again... We needed to know the place as such. Vaguely look at town maps and things like that. We didn't need to know the place inside out. Stay 2,3 weeks there look at different places. Get sums of cash. You know places, when you do this kind of thing. We might not be 100% sure there will be money there, but 99% of the time there will be a safe.” (Interview 25, 159-176)

Lawrence claimed that when he was younger he used to commit shoplifting and domestic burglaries. But at the stage he was at he would ‘only go for safes’ in specific locations where the amount of money he and his co-offenders (whom he had known

for years) could reach up to £50,000. This allowed him to live a crime free life for several years and maintain a lifestyle he enjoyed.

9.4.2.2. Card file

This strategy has been identified by Cromwell et al (1991). Similarly, the offenders in this group indicated they were involved in active search for opportunities. They would remember a target in a location and would come back to it when that suited their goals.

“People putting it at the window, so when you’re strolling about you spot it and put it in your thought. You remember where that house is, you know what I mean? So I’ll go again and rob it.” (Interview 8, pg. 4)

And

“If saw a place would keep it in mind and come back to it later.” (Interview 15, 335)

Cromwell et al (1991) failed to explain why the offenders chose a location from the card file. The offenders in this group gave two explanations. First they chose to return to a location because a potential buyer made an order for a specific product, which the offenders remembered from passing that location. Second, the conditions may not have been appropriate at the time the offender first became aware of the target. For example, an offender was aware he would need certain tools in order to break in or needed assistance from a co-offender.

9.4.2.3. Process of Elimination

This strategy confirms the satisficing model. The search for a location ended when the offender found a potential crime site, which would allow him to make enough money. This typically related to the offenders drug addiction.

“If you can get something that is enough to find enough money to get you through the night then you’ll stay to that area... I wouldn’t go out and commit crime and look for big money its just really petty stuff, just to keep your habit going and you just end up living that way of life, you know just the next day the next day, certainly I did anyway cos I were conscious of committing bigger crimes and the trouble I could get into so I just committed little ones to get me through the day but that’s the way heroin takes you. You don’t become a great thinking and you don’t become a master criminal you just live from day to day.” (Interview 27, pg. 11)

Nicholas, a 34-year-old man, convicted for commercial burglary explained the actual process of choice.

“Wakes up, walk around and looks for something to do. Go around XXXX. Want to shoplift, but everybody know me, right? Trying to see if there’s anything I can steal. There’s nothing. Comes 7 o’clock you just walk around looking what’s locked, which shutters are down, you know. It’s a process of elimination really. You don’t go on purpose to steal this place, it’s not like I’m an organised criminal.” (Interview 28, 295)

9.4.2.4. Opportunistic

This is somewhat similar to the first strategy, which is target specific. However, in this instance the choice is whether or not to commit the crime, and the search is passive. As most of the offenders explain, they will often wander around and an opportunity will present itself. For example,

“I could be going to pick up me little girl from school, I could be going into the town centre of XXXX, I could be going to church, and just happen to come across something... Sometimes when I’m walking I just see something I like, I go for it.” (Interview 1, pg 7,8)

and

“I didn’t think about the areas as such. If I passed and there was money, and it looked alright then I’d do it. I wasn’t a case of being safe it was just doing it. It’s not about a street. I wouldn’t think any area was on top. If I thought I could do it, then I would.” (Interview 15, 140)

9.5. Conclusions

Existing literature regarding offenders’ choice of crime locations does not consider affective factors influencing their choices of where to travel. The first aim of this study was to uncover these factors, by using the offenders own account. Nine factors have been identified as possible constraints or preferences of offenders travel choice, which supports existing studies and expands on them. The second aim of the study was to identify strategies offenders used in choosing a locale to travel to. Four strategies have been discussed. These include target specific, card file, process of elimination and opportunistic.

An argument was made against the use of rational choice theory as a singular explanation of offenders’ choice. Three inter-related theories which are used in consumer literature were presented. The results substantiate the use of these theories in explaining offenders’ strategies of choice. Offenders were found to be similar to consumers in that they are subjected to real life limitations and can not evaluate all the opportunities they have become aware of. Thus, they choose to ‘satisfice’ by using a process of elimination. Furthermore, there was also support to the argument that offenders do not always make rational choices due to the use of drugs and affective factors, such as values, which acted as constraints.

Situational and individual differences were also discussed supporting CEST theory. Similarly to results in previous chapters offenders were found to be mixing strategies rather than act as distinct types. This was possibly due to the fact that most offenders commit different types of crime and had to adjust their behaviour accordingly.

The study advances theoretical knowledge of offenders' behaviour by offering a new approach in explaining offending behaviour. However, it suffers from some limitations. The exploratory nature of the study prevented from analysing the frequency of use of the strategies. A detailed list of factors should be used in future studies as a questionnaire in order to understand the use of the strategies better.

Chapter 10

Spatial Behaviour

10.1. Background

The decision making model presented in chapter 1 proposes several stages which shape the decision making process. This includes information search, cognitive mapping, and choice making. These stages all come together in the place the crime occurs (Canter, 2003). The present chapter aims are twofold. First, to test existing spatial behaviour model with information obtained directly from the offenders. Second, to identify strategies offenders use in their spatial behaviour in relation to strategies they used in previous stages of the decision making process.

Modelling offenders' spatial behaviour has received substantial attention over the past two decades. This type of research has typically concentrated on the distances offenders travel from the home to the crime locations (Capone and Nichols, 1975; Rhodes and Conly, 1981), and the directions around the home in which they travel (Brantingham and Brantingham, 1981; Canter and Larkin, 1993; Canter and Gregory, 1994; Rossmo, 2000). The process whereby the probable spatial behaviour of the offender is derived from the information and context of the locations of the crime sites is termed geographic profiling. The development of these predictive models has advanced from simple spatial typologies such as Marauder/Commuter (Canter and Larkin, 1993) to more complex computerised systems (Rossmo, 2000; Snook, 2000). These studies are of most importance to police investigations, especially one involving serial offenders (Canter and Larkin, 1993).

However, these studies deduce from the offenders' behaviours as to their perception of the environment and its effect on them. They ignore the vital input the offenders themselves have to offer, in understanding their spatial behaviour and the processes involved in their decision making. As Canter (2003) suggests,

“Spatial geometry deals with dots on a map that ignores major routes and land use patterns ...The secret of geographical profiling is to go beyond the dots on the map to understand the significance of the places the offender is choosing, and the meaning to him of the journey he is making. This opens the door to the criminal’s mind.” (pg. 129-130)

Brantingham and Brantingham (1981) introduce several key concepts which these geographical models adopt. Brantingham and Brantingham (1991) suggest that the process of criminal target selection is a dynamic one. Crime occurs in those locations where suitable targets are overlapped by the offenders’ awareness space. Earlier studies in Environmental Criminology have tended to indicate that, generally, criminals do not travel very far from home to commit their crimes. The pattern varies by the type of crime. A fairly consistent finding is that offenders travel longer distances to commit crimes against property (Brantingham and Brantingham, 1981). Within specific types of crime, researchers have examined journey to crime distances for age (Baldwin and Bottoms, 1976, Repetto, 1974), race (Pettitway, 1982) and between different types of crime (Amir, 1971; Baldwin and Bottoms, 1976; Fritzon, 2001; Rhodes and Conly, 1981; White, 1932).

According to Brantingham and Brantingham (1991) criminals will develop an *action space* based on both their criminal and their innocent activities. Their actions help form an *awareness space*, the parts of the city they have some knowledge about. They also recognise the existence of an area directly around the offenders’ home base where the likelihood of them committing a crime is lower because of the higher chance of being recognised. This area is known as a *buffer zone*. Their model therefore expects offenders to maintain a minimum distance from their home. They also expect the offenders to maintain a maximum distance in a sense that there is a decrease in crime as distance increases. This reduction of activity as distance increases is referred to as *‘distance decay’*.

Brantingham and Brantingham’s (1981) model is explained using theoretical cases. There are several problems with their model. First, it is descriptive and there is no discussion of the actual distances the offenders may travel. Furthermore, they do not

explain why an offender may expand his awareness space rather than remain within the original area. Finally, they do not account for those offenders who travel to an area distinct from their original awareness space. They merely suggest that any change will be an extension of the original area.

Routine Activity Theory provides a framework for understanding the relationship between crime and place. Felson (1993) suggests that each offender will be more likely to carry out a crime the more rewarding it appears to be and the least effort it demands, and that the offenders' routines will set the stage for the illegal opportunities, which come their way (Felson, 1987). Crime is often regarded as situational and is determined by the available opportunities at a particular place and time. Opportunities result, in part, from the probabilities of detection, intervention and apprehension. These depend on the types of activities and other characteristics of different areas (Cohen and Felson, 1979).

The concept of opportunity is bound to the day-to-day activities of the offender, and to the notion that people rely on ready information, including sense data. An offender is most familiar with the area near his home or work place, which serves as his base. The assumption is that opportunities of crime (targets) are equally distributed around that base, and that the possibility for carrying out a crime will have some relationship to where that base is (a rural area or an urban environment). However, in order for an offender to utilise these opportunities and offend, he must know they exist and their location. Thus, Felson and Cohen's (1979) model predicts that offenders will not travel far from their home to commit crimes due to the offenders' reliance on their familiarity with the opportunities in areas surrounding the home.

The main downfall of this theory is that it is descriptive and relates to offenders as passive actors who offend only when targets are in front of them. It does not explain offenders, such as ones mentioned in earlier chapters, who may travel great distances to find a potential crime sites or those who plan their crimes. Like other sociological theories this approach remains general and focuses on motivation of offenders to offend rather than model their behaviour.

Canter (1989) suggests that through the geographical patterns of their social transactions, people build up representations of what is possible where. It can therefore be hypothesised that there may be patterns of space use typical of different criminals, relating to where they are living at the time of their crimes. The concept of home range and cognitive mapping seem to explain earlier findings. Home range means the complex of familiar objects and people situated in the space around an individual's home that he would habitually use. The offender would be likely to know his way around the area and have his own mental representation of the area he chooses to offend.

Drawing on these concepts the basic premise of Canter and Larkin's (1993) 'Circular Theory' is that the offenders' crime site location choice bears a relation to the offenders' home base. The model is based on three assumptions. First, that there is sufficient evidence to suggest the existence of a fixed base from which offenders might operate. Second, that there is some defined area known as the 'criminal range' that has spatial, and thereby causal, relationship to the geographical co-ordinates of the offenders' home. Third, that it is appropriate to use the simplest principles of spatial geometry. This is taken to be circular because a circle requires the determination of only a radius and no other boundary limitation (Baker, 2000).

Similarly to Brantingham and Brantingham's (1981) model, the "Marauder" hypothesis proposes that the home is the focus of the offender's crime site selection, and that they are likely to travel in all directions around it. On the other hand, the "Commuter" hypothesis proposes that offenders will have their criminal range in a distinct area that does not, or hardly ever, overlaps with their home range. Their maximum distance is likely to be greater because they travel to separate areas on each occasion. The offenders may be familiar with the area in that criminal range, but it is at an appreciable distance from the area in which they habitually operate as non-offenders (Canter and Larkin, 1993). Furthermore, by the nature of their patterning the offenders are likely to travel in a particular direction away from the home. These models are very helpful, since they take into account the role of the home base, and the importance of familiarity with the offenders' surroundings, which effect the mental representation of the geographical locations and the relationships between locations.

However, the 'Circular Theory' suffers from several limitations. First, it rigidly distinguishes between two extreme types of behaviour. Human behaviour, whether criminal or not, seems to be too complex and varied to be divided into only two types. As Hodge (1998) explains, marauders and commuters are not completely independent of each other, because serial offenders can commit a series of crimes in one area, for example a small town, and then move to another area. Therefore, they are commuting to a location but are still marauders. Hodge (1998) expands the circular model and suggests four patterns of change or development. The strength of these patterns is that the role of the home, and the relationships between the different disposal site locations, are taken into consideration.

The second drawback of these models is that they are built on information gathered from police files. They take into account only offences offenders were convicted for. The charges against an offender may not reflect his actual behaviour, but rather, that for which the prosecutor feels there is enough evidence or for which may induce defendant to enter a guilty plea. Furthermore, the address contained in an offender's file may not have been his/her actual residence at the time the offence was committed. Thus, it cannot give an exact view on the offender's development, as the order of the offences may not be accurate. Also, offenders who have been apprehended may not represent the mobility patterns of those who are less likely to get caught. If offenders who are less mobile and hence, operate on more familiar terrain are less likely to be detected or if, conversely, the highly mobile tend to elude detection better than most offenders, then arrested offenders will provide a skewed sample of the offender population. Previous research provides few clues as to this potential source of sampling bias (Gabor and Gottheil, 1984).

Third, the use of the two furthest crimes as an indicator of the criminal range has three problems. First, it makes a judgement about the behaviours of an offender throughout a crime series by examining the information from only two crimes and then further generalises these behaviours to the entire series. Second, all the remaining crimes are being ignored. This leads to a loss of information regarding the offenders' actual use of space between the furthest two points. This may lead to misrepresentation of the majority of the offenders' actual actions. Third, the offenders would have to make use

of the full circle. Limiting factors on offenders behaviour as discussed in the previous chapter, and topographic constraints (Barker, 2000) and transport networks (Rengert and Wasilchick, 1985) suggest a circular distribution of a person's activities is highly unlikely. Canter et al. (2000) claim that there is too little information leading to over generalisations about the use offenders makes of their environment in their criminal and non-criminal activities.

Canter (2003) also discusses the methodological problems of assigning offenders into each of the groups. The direct definition from the geometry of the crimes will force many borderline cases into one camp or the other. Those whose home sits close to the circumference of the notional circle may be arbitrarily assigned to one group.

The results in previous chapters reveal that offenders prefer to offend in familiar areas, but if given the opportunity they will rely on the familiarity of others and travel away from their home area. Furthermore, the assumption in the literature that offenders always operate from a fixed base has not been supported by these results. Some offenders constantly travel without having a fixed base, while others frequently move from one area to the next, which contradicts Canter and Larkin's (1993) premise.

The 'Circle Theory' has been studied in relation to different types of offences, such as serial rapist (Canter and Larkin, 1993), serial killers (Hodge, 1998), serial burglars (Kocsis et al. 2002). It has also been the basis of computerised models (Canter et al. 2000; Rossmo, 2000), which have been used to assist police investigations. Therefore, it is vital to assess its validity with data obtained directly from offenders regarding crimes they admit to committing rather than those which they have been convicted for.

The psychological ideas of a mental map as a combination of stored knowledge and affective responses have been used in earlier chapters to show how that structures offenders' activity. The time spent searching the environment for potential locations (see chapter 7) and the distances the offenders were willing to travel (see chapter 8) has been shown to increase the awareness of the possibilities of such psychological structures. Information search leads to an awareness of potential areas. A cognitive

map is a tool that encompasses previous information and combines it with on going experiences.

This encourages examining how locations of crime could be modelled as schematic systems rather than as particular geographical instances. There has been a growing body of research that attempts to develop general principles that will characterise the geographical patterns of individual offenders in particular locations (Canter and Larkin, 1993). These principles have been found to have practical significance in helping to solve crime (Canter, 1994), as well as the broader theoretical issues to which they contribute. It is the distortions in such 'maps' that help us to understand how people conceptualise their surroundings and the activities that take place there. The present chapter uses sketch maps to examine whether the offenders perception of their own activity will be similar to the behavioural patterns suggested by the 'Circle Theory' and whether strategies offenders use as part of their spatial decision making process can be revealed.

Therefore, the research questions are

1. What strategies do offenders use for spatial behaviour?
2. Are these patterns influenced by information search strategies?
3. Are these patterns influenced by the distances they travel?

10.2. Method

Canter (1977) suggests that sketch maps usefulness lies in the fact that maps can be used as a metaphor for mental processes, which give insight to a variety of different types of information which may be registered and then reproduced in a sketch. As a consequence a sketch map may be examined to reveal where a sketch maker's interests lie. If a person chooses from a range of possible information, which does he decide to represent? Unlike a geographer's map, which represents what he has systematically recorded, a sketch map may be used to represent what a person remembers. In other words a psychologically significant aspect of maps is that they provide an overview of potential action sequences, which enable us to appreciate the internalised spatial structure upon which a person is operating. Because of the

efficiency, variety and summarising qualities of sketch maps they present a valuable means of exploring conceptual systems.

The sketch mapping technique is a reliable method (Blades, 1990). It allows participants, in this case, offenders, to freely construct an image, where the interviewer's influence on the drawing of the specific map is minimal. Furthermore, it allows for a comparison between different population groups, and helps in unravelling the processes involved in acquiring spatial information and factors, which affect the quality of the 'maps' and the quantity of information stored. However, the method suffers from notable limitations (for a full discussion of the strengths and limitations of this technique see chapter 4). The main drawback is its sensitivity to the instruction given by the interviewer and to the graphic skills of the drawer. As shown in chapter 5, sketch maps are difficult to interpret and quantify. Therefore, their main use in this thesis was as an interviewing tool.

The interview design is based on experience gained from a pilot study (see chapter 2). In order to clarify issues that arose in the initial study regarding offenders' mobility patterns, changes were made to the interview design. This resulted in the inclusion of the timeline and more specific questions regarding mobility patterns and the extent of search.

28 burglars, robbers and shoplifters were included in the sample. The interview consisted of four main parts each contributing to an understanding of the background, behaviour and conceptualisations of the offenders (see Appendix 3 figure 1). The first two parts consisted of a background questionnaire and a time line, where the participants detailed areas where they have lived throughout their lives and whether their criminal activity was in the same or different areas. The third part included instructions to draw a cognitive map of the area where the majority of the criminal activity took place. This provided information about the offenders' perception and use of the environment and made sure all of the offenders drew sketch maps of areas they were familiar with. The fourth part included a combination of open-ended, close-ended and leading questions, which allowed the offenders and the interviewer to expand on issues brought up by the offenders during previous parts of the interview.

Since the participants found it difficult to quantify the extent of their search, it was decided to ask for a descriptive account of the search they have conducted. A set of binary variables was created to indicate which of the strategies was used (1= Yes; 2= No):

- Limited Search Strategy: Cases were included in this category if there was clear indication of prior knowledge of either product or location, such as in cases of ‘a specific order’ or if the participant indicated that he stayed local because he was aware of shops or houses in the area.
- Extensive Search Strategy: Refers to cases where the offender indicated that he spent a considerable amount of time and effort searching for information.
- Mixed Search Strategy: Refers to cases where the offenders used both strategies at different times.

Four groups of mobility levels have been identified (for full discussion see chapter 8).

- Local Offenders: This refers to offenders who committed crimes only in areas near their home area.
- Occasional Traveller: Refers to offenders who mostly remained local but occasionally travelled to other areas as well.
- Travellers with Fixed Base: Refers to offenders who mostly travelled to areas other than their home area, but returned to a fixed home base once the crime has been committed.
- Travellers with No Fixed Base: This refers to offenders who did not have a fixed base and offended as they travelled around the UK. This group includes offenders who were homeless for a significant amount of time or those offenders who moves to different cities every few weeks.

10.3. Results

The results showed in Appendix 10 table 3 combine 16 maps from the pilot study and 28 from the main study. The results show that out of the 44 maps 17 offenders were ‘Marauders’. 12 offenders were ‘Fringers’ and 8 ‘Commuters’. As can be seen from the table there was some differences between the two groups. More offenders in the

pilot study used the cluster strategy and fewer offenders were ‘Marauders’ compared with the main study. However, overall, the order of strategy use remained the same. This supports the results of the main study

10.3.1. Spatial Behaviour Strategies and Mobility Levels

‘Marauders’ were expected to be local. This was only partially confirmed (see Appendix 10 table 4). 7 of the 12 ‘Marauders’ travelled from home on occasion. 2 of the ‘Marauders’ did not have a permanent base. ‘Fringers’, show a tendency to travel more regularly than ‘Marauders’. Although, 4 of the ‘Fringers’ had a fixed base from which they operated. ‘Commuters’ were expected to travel most often. However, the results shown in Appendix 10 table 4 do not reveal a distinct pattern.

10.3.2. Spatial Behaviour Strategies and Extent of Search

The results shown in Appendix 10 table 5 suggest that the ‘Marauders’ use the search strategies equally and do not exhibit a strategy preference. 5 of the 8 ‘Fringers’, on the other hand, invested in extensive search. 2 of the 6 ‘Commuters’ preferred to use a mixed search strategy.

10.4. Discussion

10.4.1. Spatial Behaviour Strategies and Mobility Levels

It was expected that ‘Marauders’ would remain local. Canter and Larkin (1993) suggested that the ‘Marauder’ is likely to travel shorter distances and remain within the home range. However, supporting the results in previous chapters, the ‘Marauders’ tended to travel outside the home range and further afield on occasion. This finding is crucial because the literature simply assumes that offenders remain local and do not go beyond the boundaries of their daily activities, unless they are a distinct type of offender. This is an important factor for police investigators to keep in mind and to not assume offenders operate only in areas near their home base.

In addition, some offenders' mobility exhibits itself by a frequent change of a base. Thus, they move, or in Hodge's (1998) terminology, "migrate", to a new area and explore its opportunities. Plotting their crimes on a map reveal a relatively local behaviour, although in reality they cover large areas. An interesting example is Gary. He lived in over 40 areas all over the country, while staying in each area for several months. This was because he 'sometimes had to move' and sometimes because he preferred to. He was mainly involved with shoplifting although on occasion he also committed burglaries. When asked to draw a map, he simply drew the circles, explaining that the first circle was his home area and he would not offend in an area of 20-minute walk from it. The "secondary area" was open to opportunity and he would "do anything there". This was true to all areas he lived in.

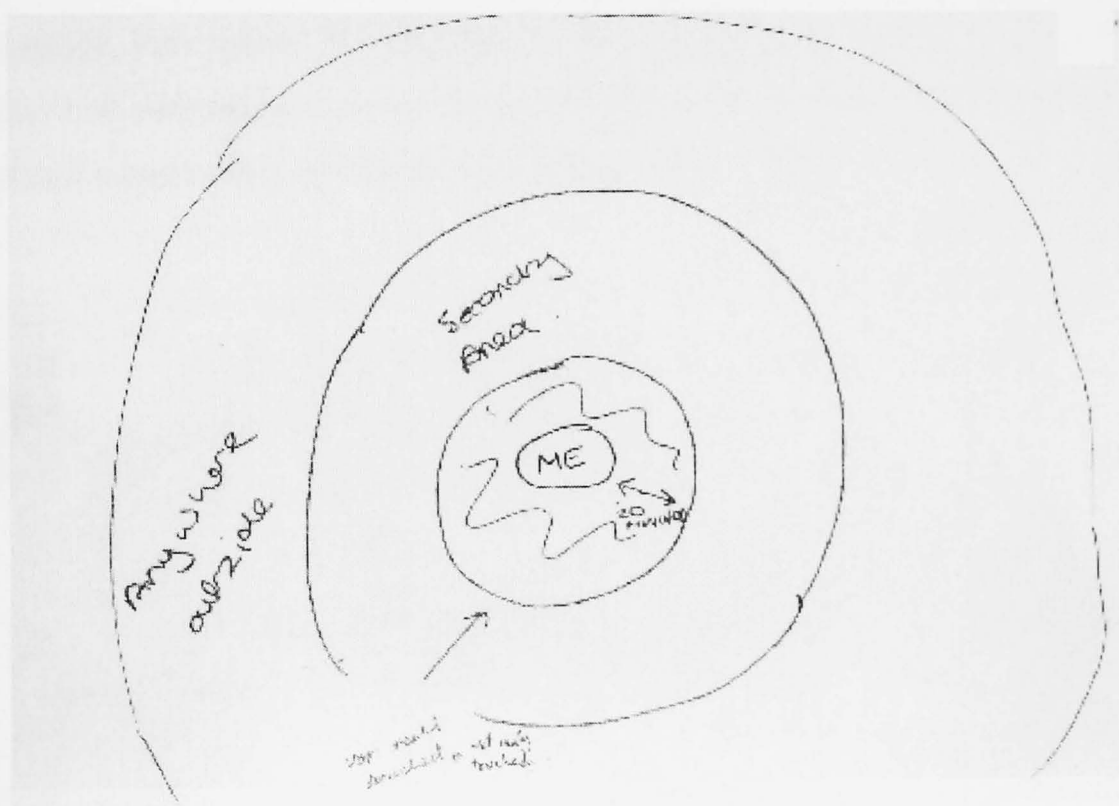


Figure 10.1: A Sketch Map Drawn by a 'Marauder' with No Fixed Base

Gary's map exemplifies the prototypical 'Marauder'. However, when asked about the 'buffer zone' and whether he ever offended in the area close to him he said he did steal from the next-door neighbour explaining it was personal because he "pissed me off". Gary maximised the potential of opportunities in the area he lived in. However, this was true to 40 different areas.

considered affluent. Thus, Paul would travel to both estates and return home via back roads and the canal, which served as a short cut. Initially Paul claimed he would never 'rob his own'. However, when he returned from a crime scene he would normally go to a friend's house. He would never bring the stolen goods to his house. Therefore, dealing with stolen goods and his occasional drug use, did take place in his estate. Thus, although Paul did not travel far he still distanced himself from his home.

The use of sketch maps offers the possibility of exploring further topological and affective constraints (see chapter 9), which can lead to a directional bias. This became clear in the early stages of this thesis. James was interviewed for the pilot study. He was a 29-year-old man who committed hundreds of thefts and was also involved in fraud, assaults and dealt with drugs. Although he admitted to committing offences in various areas around the city he lived in, he chose to draw a map of an area which included crimes earlier crimes in his career. His sketch map is shown in figure 10.3. James's home is at the bottom left of the map and is marked by an 'X'. The canal and the fields served as topological barriers and created a directional bias.

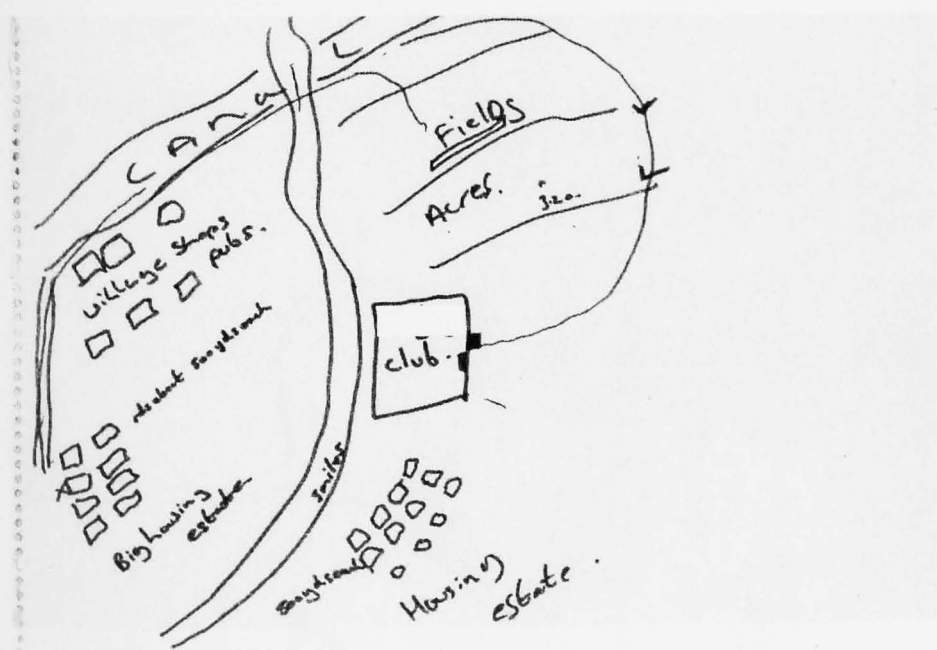


Figure 10.3: Topological Barriers as Drawn in A Sketch Map

The 'Clusters' strategy was used in two ways. First, by offenders who changed address regularly and offended in several areas. The difference between them and the offenders in the 'Marauder' group is that the offenders here kept returning to areas they have previously lived in and used their contacts and familiarity.

For example, Jeffery (see Figure 7.4) was a 28 year old who was convicted for burglary. He committed a variety of property crimes including thefts, shoplifting, handling stolen goods, a robbery, domestic and commercial burglaries, stealing cars and fraud. He suffered from an addiction to Heroin and admitted to using barbiturates, speed and ecstasy quite often. His map represents a wide area of criminal activity, with each colour representing a different type of crime.

The advantage of this strategy is that the offender benefits from relative anonymity in new areas and can enjoy sufficient levels of familiarity. Interestingly more offenders described this pattern of behaviour verbally than they did in the maps they drew. This may possibly be due to the drawing instructions.

The second option was when the offender did not have a fixed base. Steve, for example, constantly moved between areas and offended in all of them (see figure 10.4). He committed hundreds of shoplifting offences. He said, "I'm a bit of a traveller. I can't settle down in one place". He admitted he did not like moving but had to move more than he wished to.

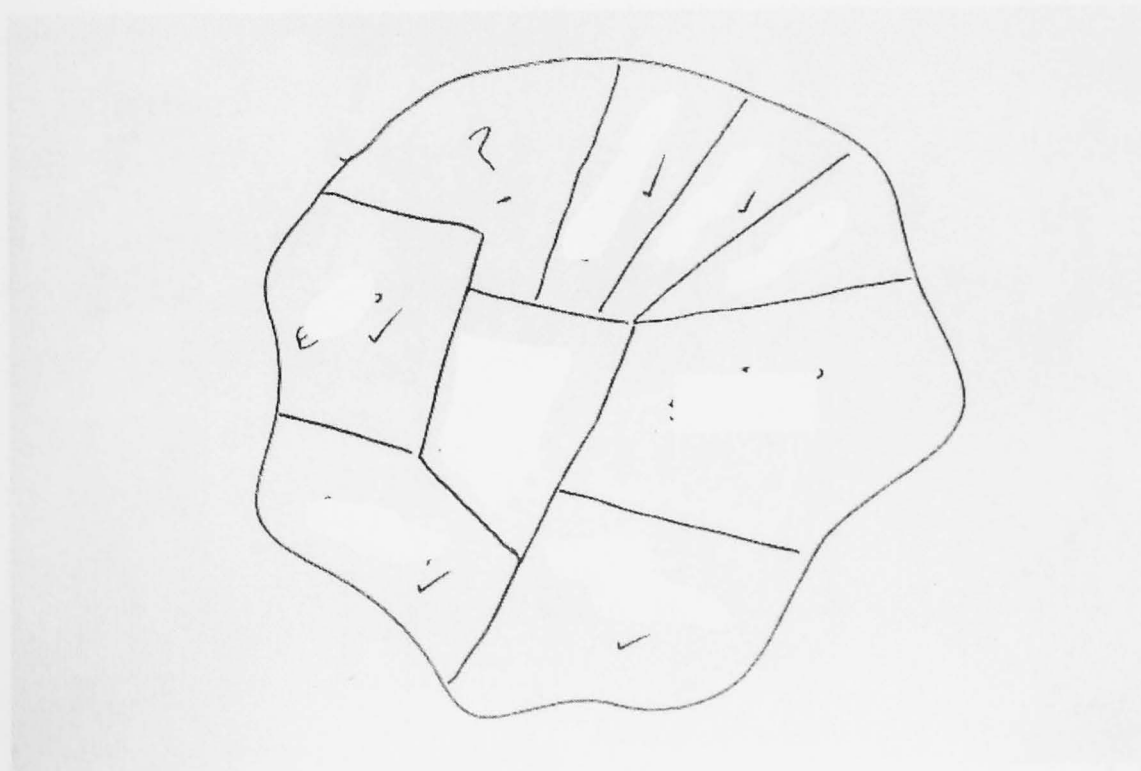


Figure 10.4: A Sketch Map Drawn by a 'Cluster'

It might be argued that this is an extended 'Marauder'. However, as shown in the map, the offender himself created divisions between the areas, suggesting to him they were distinct.

'Commuters' were expected to belong more clearly to the travelling groups (e.g., with fixed or no fixed based). However, the results may be due to a larger buffer zone, which on a sketch map may create a distortion leading to a 'Commuter' pattern. This may be due to the scales of the maps. For example, an offender drew only few main streets and then realised he ran out of place to draw his own home. Another offender who would have used a different scale may have been classified differently.

A typical commuter is Max (see figure 10.5). He was a 27-year-old who had dozens of convictions mainly for theft offences. His Heroin use meant he travelled daily to commit crimes. Max's main route was via the A41. As shown on the map his travels were along that route stealing from different towns and villages on the way. His modes of transportation were cars or trains or both. On the map, Max wrote: "Anywhere along here what takes fancy".

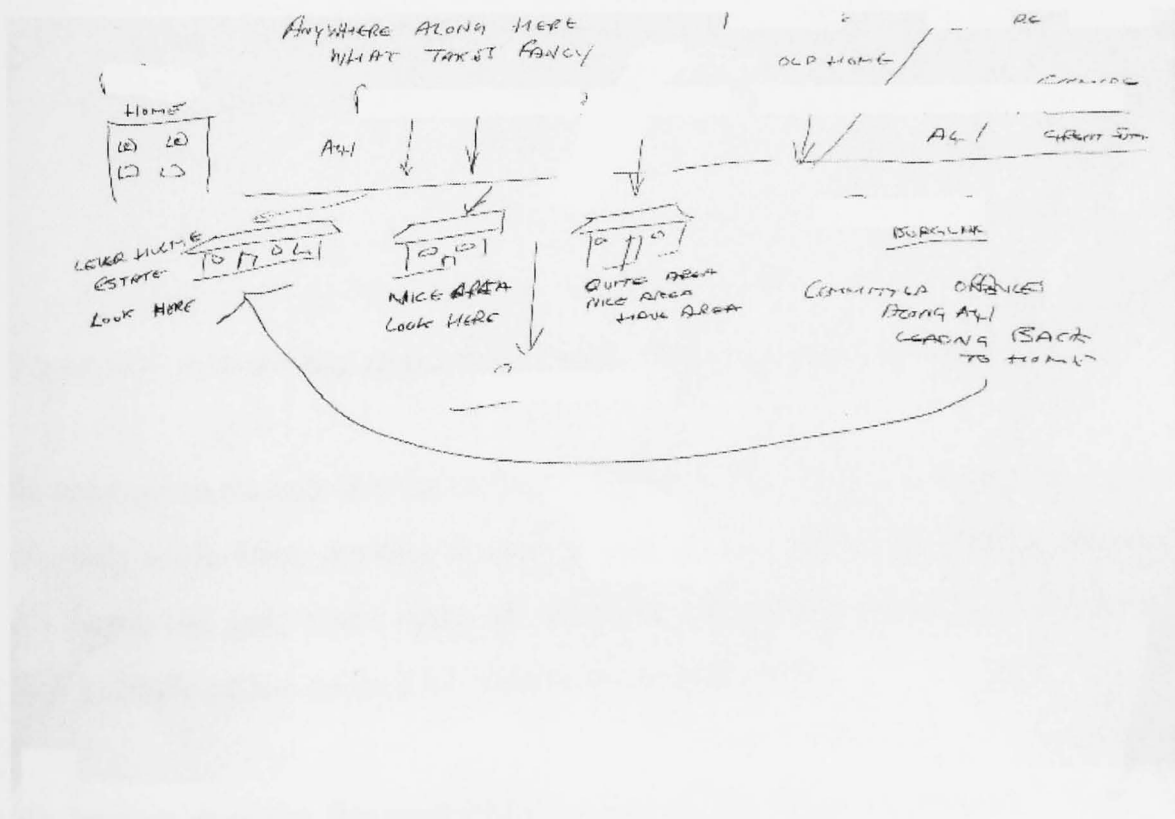


Figure 10.5: A Sketch Map Drawn by a 'Commuter'

10.4.2. Spatial Behaviour Strategies and Extent of Search

As mentioned above, 'Marauders' used the three search strategies equally. On the other hand, 'Fringers' were generally more likely to invest in extensive search. Neil was a prolific burglar admitting to committing more than a thousand burglaries in his criminal career. Neil's home was surrounded by trading estates from which he stole (see figure 10.6). Neil's map is important because it exemplifies how the stages of decision making all come together in the offenders' spatial behaviour. The map shows a clear directional bias and two clusters.

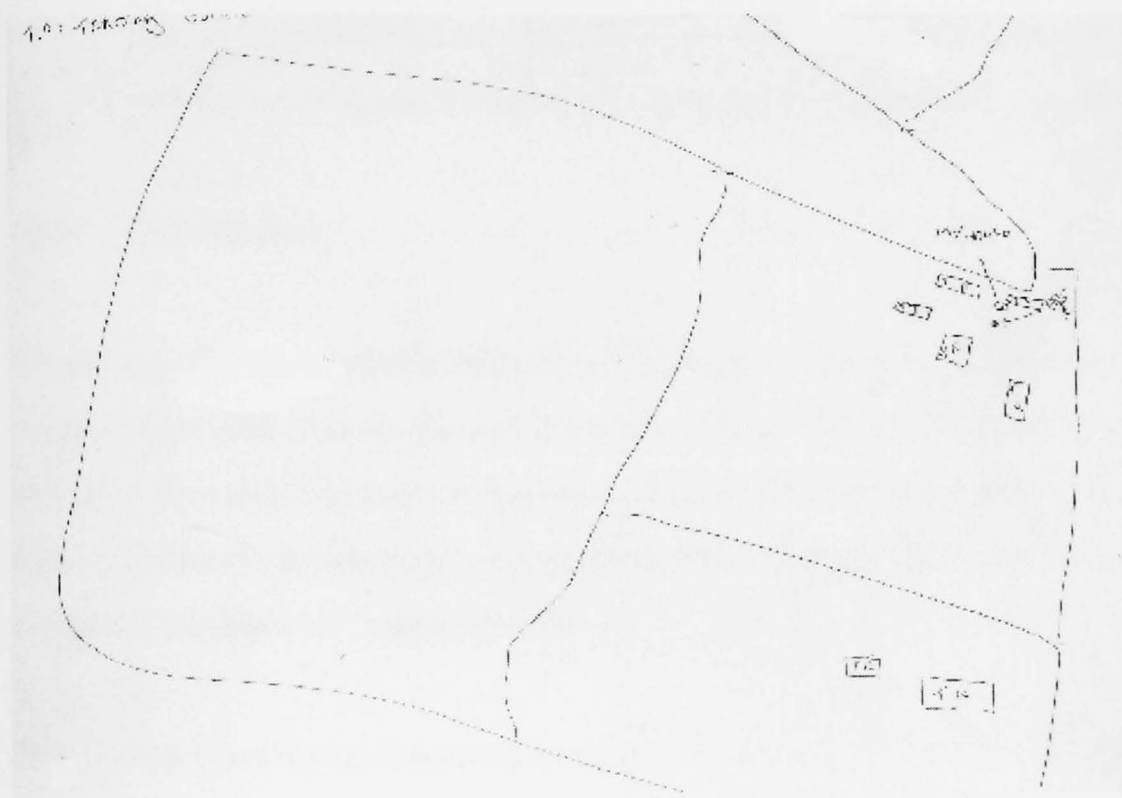


Figure 10.6: A Sketch Map Drawn by a 'Fringer' Conducting Extensive Search

In relation to choice strategies (see chapter 9), Neil used a 'Specific Target' strategy. He only stole from trading estates or golf clubs. While the trading estates were near his home the golf clubs were all over the UK. When asked how he knew about the golf clubs location he said he used maps to find them.

As he was drawing the map Neil explained that there were areas (on the left side of the map) he would never go to, because there was nothing there to steal. He would only commit commercial burglaries, thus making him dependent on trading estates as crime locations. His 'Specific Target' strategy was justified by his avoidance of

people's homes and for not hurting anyone by stealing from factories. He also claimed he could make up to £3000 for burglaries. He invested in extensive search behaviour as he describes:

“You drive down the motorway, you head to an area, you know which area you're heading to, as you get closer to the area, it says 'industrial area' that way, so you head for that way. Industrial areas are the trading area estates... If we're in the car, when we get to places we look around for somewhere to hide afterwards, we'll go round check all the different routes, all the little lanes here and there, between them. Then we drive to the place, do it and then drive straight back to where we're going to hide. It's organised.” (Interview 4, pg. 4)

10.5. Conclusions

Modelling offenders' spatial behaviour has received substantial attention over the past two decades. The present chapter tested the 'Circle Theory' with data from undetected offences. Second, it aimed to identify strategies offenders used in their spatial behaviour and examine them in relation to other strategies they used in previous stages of the decision making process.

The results in previous chapters contended the premise that offenders operate from a fixed base. The offenders were found to change addresses fairly often. The frequent change of base is an important strategy in detection avoidance. The offenders maximise the potential of an area they live in and as they get too known they move away to another. The advantage is they are anonymous in a new area, and thereby reducing the risks of detection.

Four mobility strategies were identified. The results showed 'Marauders' were likely to travel outside the home range and further afield on occasion. They used opportunities that arose to travel further away from their base and mix their spatial behaviour. This suggests the offenders travelled further than the literature assumes. It also raises the question whether the offenders get away with crimes they do not commit closer to home, biasing the results from studies of detected crimes.

The main argument for using sketch maps, as an interviewing tool was the input it could give to the psychological processes involved with spatial behaviour. The sketch maps were used as examples of offenders travelling patterns but also to explain directional bias and topological and affective constraints. Their use supports the claim that locations offenders' travel to should not be considered as simple dots on a map but as a reflection of a decision making process.

The study suffers from some limitations. First, the small sample size prevents from statistical generalisations. Second, some offenders used different strategies. Since this was an exploratory attempt there is no estimate of the overall use of each of the strategies, or which strategy is more likely to be used with others. It is recommended that future research should use a questionnaire in order to analyse the frequency of use of strategies. This will benefit our understanding of pattern of behaviour, improve predictive models of offenders spatial behaviour and home location and assist police investigations.

Also, the maps were on an area where most of the offences took place. Future studies, can look at the scale the offenders were operating in. Thus, local offenders will draw maps of a local area, whereas offenders, who covered large areas, will draw those. This will give a better indication of the actual criminal area the offenders covered and its relation to their home. Finally, the literature indicates women's spatial behaviour is more restricted than males. It will be important to determine if there are any gender differences between offenders as well.

Chapter 11

Conclusions

This thesis followed Canter and Larkin's (1993) view that each and every location used by an offender is of psychological and investigative importance. Hence, the interest of this thesis was not in modelling the objective distances but in understanding the subjective aspects of spatial decision making. The main benefit of understanding offenders' spatial decision making is the insight it offers to the psychological significance of the relationship between locations.

The criminological literature which discusses offenders' spatial behaviour accepts the existence of a decision making process but only rarely examines its influence on the offenders' choice of location. Hence, it lacks a thorough explanation of the decision making process itself, the factors influencing it and the manner in which it affects offenders' subsequent spatial choices and actions. This thesis aimed to add to the understanding of offenders' spatial behaviour by examining these processes.

The present thesis sought to conceptually develop ideas proposed by consumer literature and apply them to property crime. Serial offences provide a wealth of information that is directly open to empirical test. Using property crime to explore the conceptual issues under study was proposed to be particularly helpful. Property crimes are common offences. They account for 78% of all crimes recorded by the British Crime Survey and for 82% of the total recorded crimes in 2001/2002 (Home Office, 2002). Property offences are very definably located in space and hence, the environmental factors that predispose that site to be a target can be identified relatively easily. Therefore, it was proposed that, if evidence could be found for psychological processes shaping property offenders' spatial decision making, then, conceptually, an examination of their behaviour may reveal findings relevant to other types of offender.

A revised model of Golledge and Stimson's (1997) spatial decision making model presented in chapter 1 offered the conceptual framework. It considers offenders

mobility as a manifestation of a psychological process, which is composed of several stages. The strength of the model is in the inclusion of the spatial context to a decision making process in conjunction with existing models of decision and choice making. The model emphasises the progressive and accumulative nature of the decision making process. It includes five stages i.e., goals, information search, cognitive maps, evaluating alternatives and spatial behaviour. It encompasses the dynamic make-up of this process given that individuals constantly learn, evaluate and grow with experience. In other words, the offenders' strategy of search, their mobility levels, their strategy of choice were all proposed to influence their spatial behaviour.

In order to examine these conceptual processes 28 property offenders were interviewed and asked to draw sketch maps of areas where they committed most of their offences. It was proposed that by exploring offenders' cognitive maps, their background information and criminal activity, processes and factors which influenced their spatial decision making would be revealed. This was based on Lynch's (1960) study and earlier experience gained from a pilot study (presented in chapter 2) which included interviews with 16 property offenders in drug rehabilitation counselling centres.

The sketch maps were used to extract a representation of series of crimes, and to facilitate in understanding psychological factors influencing offenders' spatial decision making. This led to two data sources available for analysis. Firstly, the offenders' sketch maps provided a visual source of information. This included 28 maps from the main study and in order to support the results 16 maps from the pilot study were included in the analysis. Secondly, an interview with the offenders provided an additional source of information. The sketch maps were analysed using a revised classification system (presented in chapter 5).

The theoretical framework for explaining the stages of offenders' spatial decision making brought together theories from the fields of psychology, criminology, geography and economy. The theories have a common concept. They represent a continuum of possible behaviours which identify a strategy rather than a type of offender. The aim was to question existing typologies and to shift the discussion to that of behavioural strategies.

Therefore, the aim of this thesis was to advance research in this area in two ways. First to provide an opportunity to understand offenders' spatial behaviour by examining their decision making process and factors affecting it. Second, to provide a conceptual system to explain all types of offender. Therefore, the research objectives were to identify the strategies offenders use in their spatial decision making and to examine the relationship between the ways offenders perceive their environment and their subsequent criminal location choice.

11.1. Empirical Findings

The conceptual framework for this thesis was based on Golledge and Stimson's (1997) revised spatial decision making model. Thus, the discussion will follow the four stages.

11.1.1. Information Search

Decisions that offenders make about the amount and type of information to acquire when evaluating potential crime site locations are a fundamental aspect of their decision making process. Nevertheless, offenders' access to information has been subject of very little attention in the literature. Although the process has been mentioned, there is no available empirical analysis of this topic or a discussion of specific factors and psychological processes involved in offenders' information search.

The thesis aimed to develop this aspect of decision making further by using concepts which are derived from non-criminal spatial behaviour literature. It relied on studies of consumer behaviour and residential mobility, where the issues of utility, location choice and travel apply as well (Golledge and Stimson, 1997; Garling, 1989). Thus, the aim was to uncover which factors determine offenders search behaviour and which strategies offenders use in their information gathering behaviour.

The findings presented in chapter 6 show that offenders were similar to consumers in that they used several sources of information to acquire knowledge about possible

locations and products. These included direct inspection, co-offenders and potential buyers. The offenders indicated they tried to find information about what was there to steal and its location. Furthermore, in support to Tibbetts and Gibson (2002), variables such as time constraints, price, and experience were found to be relevant to offenders as well as to consumers.

On the other hand, offenders differed from consumers as they tended to spend more time searching for opportunities than consumers do. This was explained by the risks involved with their behaviour. Another possible explanation was the prolific nature of their offences. Most of the offenders needed to support their drug habit and constantly had to search for opportunities to make money and buy drugs.

The study had the advantage of drawing information directly from the offenders' as they explained their behaviour. Three search strategies relating to the amount of time offenders invested in searching for opportunities have been identified. The most common strategy was an extensive search strategy, followed by a mixed search strategy. The offenders' explanation for using an extensive search strategy related to the value of the stolen goods, safety issues such as security design and escape routes and speciality of stolen product. Mixed search strategy was subjected to situational factors, opportunities, and risks involved with offending behaviour.

The offenders also clarified the central role networking played in their search for products and locations. Offenders benefit from having a 'market' where they not only can sell their stolen goods but they also benefit from receiving specific products. This helps them to minimise the amount of time they need to spend searching for opportunities. At first, these findings seemed to support the rational choice theory. The offenders seemed to try to maximize their benefits and minimise the costs. However, one of the theory's main drawbacks is that it is an optimal theory of behaviour. Overall, the results supported the criticisms of the theory, as real life limitations on the offenders such as time limitation, lack of motivation, financial pressure were found to influence the offenders' choices.

11.1.2. Cognitive maps

The second stage of the decision making process focused on internal information and the relationship between perception and behaviour. The information people build up may reflect not only their surroundings but also many other aspects of themselves and their lives. In the same way, a property offender's cognitive system will contain information about where crime sites are and how likely a successful offence will be at each location (Hodge, 1998).

Studies that approach this topic recognise the relationship between imagery and behaviour and the significance of the relationship between the subjective and objective environment and its influence on spatial behaviour. They focus on patterns of crimes in various urban areas or on the strategies offenders use in selecting various crime site locations. However, they lack an encompassing discussion of the decision making process itself and an examination of the intervening factors influencing it. They do not examine the content of the knowledge the offenders have gained or how they process such information. Finally, they do not empirically test how offenders' perceptions and habits influence their criminal activity. This thesis aimed to develop these topics by examining the relationship between offenders' perception and behaviour and the strategies they used.

Cognitive maps are the subjective representation of one's environment. The assumption was that by examining factors influencing offenders' cognitive maps it would be possible to understand the process leading to their spatial behaviour. Such relationship was expected to be modified by the extent of search the offenders' conduct, by their mobility patterns and the various geographical areas they operated in. Sketch maps were used to extract the psychological factors influencing the offenders' perception of and interaction with the environment.

Sketch mapping is a useful technique that can give insight to people's acquisition and organisation of spatial information. Several researchers have offered classification schemes, the most popular one being Appleyard's (1970). A methodological study of the inter-rater reliability of Appleyard's sketch maps classification schemes was carried out and was presented in chapter 5. This was the first in-depth study of inter-

rater reliability of Appleyard's styles. Two groups of 10 judges were asked to evaluate sketch maps. The first group judged 16 maps from the pilot study whereas the second group judged 28 maps from the main study.

The reliability of Appleyard's sketch maps classification scheme was found to be unacceptably low. The study then presented and tested a refined model. By using the refined styles it was possible to consider the two dimensions researchers typically consider in their analysis of sketch maps. This included the dimension of map complexity and a better distinction between spatial/sequential elements. The revised model scored higher on the inter-rater reliability test, although the scores remained fairly low.

The variances in the judges' scores of the refined model were not a result of poor definition of the styles but due to the hybrid nature of real life sketches. The judges explained they found the refined styles easier to decide on, but varied in their assessment of dominant elements in particular maps. It was also explained by individual differences in spatial cognition and assessment, and by lack of training in this area. It was concluded that sketch map classification schemes are a subjective method of analysis. The analysis regarding offenders' cognitive maps was carried out by focusing only on the dimensions which could be clearly identified and supported by a verbal interview.

The aim for testing offenders' cognitive maps was to assess whether the cognitive maps of offenders have become more detailed as offenders were more mobile or as the extent of their search behaviour grew. Overall, the findings presented in chapter 8 supported Murray and Spencer's (1981) conclusion that the more people travel and are exposed to new environments the better their skill of cognitive representation of it and the more detail and complex their sketch maps are. However, the results also suggested that the effect of offenders mobility and extent of search are better reflected in the analysis of type of elements used rather than the maps complexity. Those offenders who interact more actively with the environment exhibit route knowledge whereas offenders who remain local rely more on landmark knowledge.

This study also pointed to a significant finding that stand in contradiction to existing literature. As early as the pilot study it became clear that offenders did not necessarily have a fixed based from which they operated. Furthermore, the assumption that offenders are either local or commuters to other areas has also been disputed. There was found to be much greater variety in the offenders' spatial behaviour which is not considered by discussions referring only to typologies.

11.1.3. Evaluating Alternatives

Once offenders have gathered information and perceived areas they were aware of, it remained unclear how they selected between the alternatives available to them and chose a location to offend in. There are a relatively small number of factors in everyday life that impose upon all individuals and constrain their freedom to occupy certain space and time locations (Golledge and Stimson, 1997). This means that offenders have to adopt 'strategies' for using a limited quantity of information to the best possible effect.

The study presented in chapter 9 aimed to shift the discussion from a simplistic debate of risks and rewards to that of preferences and constraints by using three inter-related approaches. The aim was to try and uncover which strategies offenders use in the selection of areas and how do preference and constraint influence their travelling choice as this would assist to deduce reasons as to why an offender follows one path rather than another. Therefore, and building on initial findings from the pilot study, the aim was to find which factors influenced the offenders' selection process and which strategies offenders' used in their selection of alternative. Nine factors (e.g., violent areas, lack of familiarity, police presence, time, ethnic areas, money, distance, values) have been identified as possible constraints or preferences of offenders travel choice, which supports existing studies and expand on them. Also, four strategies have been identified. These include being target specific, using a card file strategy, using a process of elimination (satisficing) and being opportunistic.

An argument was made against the use of rational choice theory as a singular explanation of offenders' choice. The results substantiate the use of these three inter-related theories in explaining offenders' strategies of choice. Offenders were found to

be similar to consumers in that they are constrained by real life limitations and cannot evaluate all the opportunities they have become aware of. Thus, they chose to 'satisfice' by using a process of elimination. Furthermore, there was also support to the argument that offenders do not always make rational choices due to the use of drugs and affective factors, such as values, which acted as constraints.

Situational and individual differences were also discussed supporting CEST theory. Similarly to results from previous stages in the decision making model, offenders were found to be mixing strategies rather than act as a distinct type of offender. This was possibly due to the fact that most offenders committed various types of crime and had to adjust their behaviour according to the type of crime they were committing at the time.

11.1.4. Spatial Behaviour

Attempts to explain variations between offenders in terms of their spatial behaviour have typically focused on ways in which offenders use their environment. Studies have concentrated on the distances offenders travel from the home to the crime locations and the directions around the home in which they travel. The emphasis of such studies is on the choice itself in the form of patterns of crime in urban areas or various strategies offenders' use in selecting crime site locations. This approach to offenders' spatial behaviour has two shortcomings. First, it deduces from the offenders' behaviours as to their perception of the environment and its effect on them. Second, it ignores the vital input the offenders can reveal, regarding their spatial behaviour and the processes involved in their spatial decision making.

Since this thesis followed Canter and Larkin's (1993) view that each and every location used by an offender is of psychological and investigative importance the interest of this thesis was not in modelling the objective distances but in understanding the subjective aspects of spatial decision making. Therefore, it examined whether offenders' perception of their own activity was similar to the behavioural patterns suggested by the Circle Theory. The Circle Theory has been the basis of computerised models (Canter et al. 2000; Rossmo, 2000), which have been used to assist police investigations. Therefore, it was vital to assess its validity with data obtained directly

from offenders regarding crimes they admitted to committing rather than those which they have been convicted for. This type of information could also help determine which strategies the offenders used in their spatial behaviour and how these related to the other stages of the decision making process. Therefore, the aim was to determine which strategies the offenders used in their spatial behaviour and what was the relationship between these strategies, the extent of search and mobility levels.

The results in previous sections contended the premise that offenders always operated from a fixed base. Instead, the offenders were found to change addresses fairly often. The frequent change of base was an important strategy in detection avoidance. The offenders maximised the potential of an area they lived in and as they got too known they moved away to another area. The advantage was they were anonymous in a new area, and thereby reduced the risks of detection.

Four mobility strategies were identified and are presented in chapter 10. These include the existing 'Marauder' and 'Commuter' and the new 'Flinger' and 'Cluster'. The results showed 'Marauders' were likely to travel outside the home range and travelled further on occasion. They used opportunities that arose to travel further away from their base and mix their spatial behaviour. This proved the offenders covered greater distances than the literature assumes. It also raised the question whether offenders were undetected because they did not commit crime closer to home, biasing the results of studies using detected crimes as their source of data.

The main argument for using sketch maps, as an interviewing tool was the input it could give to the psychological processes involved with spatial behaviour. Sketch maps were used in this study as examples of offenders travelling patterns but also to explain directional bias and topological and affective constraints. This supported the claim that locations offenders' travel to should not be considered as simple dots on a map but as a reflection of a decision making process.

11.2. Theoretical Implications

This thesis provides a theoretical framework which gives a much richer picture of a dynamic and complex decision making process than previous discussions which

focuses on isolated behaviours of individuals. The five-stage spatial decision making model which was presented in chapter 1 was the basis for discussion. The model offers an insight to information search strategies leading to and influencing spatial behaviour patterns.

It is important to note that the thesis does not make the claim that offenders are consciously following such a strict structure. The spatial decision making model is dynamic and each stage is evolving with the offenders' growing experience. The use of such a model is for theoretical debate and to focus the discussion on various factors and strategies which all contribute to the final result in the form of a crime site selection. Thus, the model goes beyond the study of property offenders and gives a conceptual framework to apply to other types of offender.

The findings presented in this thesis advance our understanding of offenders' behaviour in several ways. Previous studies have typically inferred to the offenders' decision making process from their behaviour. One of the main advantages of this thesis is that it offers an insight to the offenders' own account of the thought process involved with crime site selection. This allows us to see offenders in a new light, as individuals who are influenced by psychological processes and compare their decision making process to that of consumers.

As mentioned above, as early as the pilot study it became clear that the assumption in the literature that offenders have a fixed base from which they operate is not necessarily accurate. This finding has theoretical implications such as on studies of consistency. The current belief is that offenders exhibit higher levels of geographical consistency than behavioural consistency. The offenders' frequent change of base has theoretical implication in terms of development of theory of offenders mobility patterns and our understanding of and modelling of criminal behaviour.

The variations in offenders' behaviour has another theoretical implication. The debate regarding offenders' spatial behaviour relates to offenders in terms of typologies. This thesis shows that variations in offenders' behaviours are mainly due to situational and individual factors. The theoretical discussion of offending behaviour is advanced by

the opportunity to move away from rigid typologies to that of strategies which give a better sense of real life behaviour patterns.

This thesis uses sketch-mapping technique in order to extract information directly from the offenders themselves regarding their perception of the environment and their behaviour in it. The method tested in chapter 5 led to the conclusion that sketch map classification is a subjective method of analysis and should be improved. However, it is an extremely useful method for studies such as this thesis. It is a useful interviewing tool as it helps offenders' explain their behaviour and visually and verbally explain the relationship between different locations they are aware of or that they use.

The study of information search advances the theoretical understanding of the process of offenders' information search as part of a more complete decision making process. More specifically, the study clarifies the manner in which offenders search for information, what they search for and the sources of information they used in order to learn about potential crime site locations.

This thesis also advances theoretical knowledge by moving away from using the 'Rational Choice Theory' as a singular explanation of offenders' spatial behaviour and offered three inter-related theories which have been proved useful and were used to explain four different strategies of choice. The use of these theories allows for the behaviour to be seen as part of a continuum of behaviours which can be tested and analysed further.

Finally, this thesis advances theoretical knowledge of offenders' spatial behaviour it expanded on existing literature. Previous studies have often relied only on information gathered from detected crimes. This thesis offers a new perspective on offenders' behaviour as the information was gathered directly from offenders themselves regarding crimes they claim to have committed. Thus, the discussion included a vast number of crimes which allowed for a clearer analysis of series of crimes and for a better understanding of the offenders' career development and the role of the home in their location choice. These are all key concepts to models of offenders' spatial behaviour and have been better understood in light of this new type of data.

11.3. Investigative Implications

The assumption that offenders operate only from a fixed base has been disproved. The study offers new strategies which offenders use and an understanding of the factors influencing the variations in offenders mobility patterns. This has major investigative implications. First, investigators should not assume offenders always live near by their crime site locations as even offenders who preferred to remain local occasionally travelled further. Second, investigators should also consider that offenders who moved from one area often go back to it and use existing networks. Therefore, they should not only consider present residents of an area when searching for possible suspects but also consider offenders who have resided in a given area and moved away. Third, the new strategies of spatial behaviour may lead to a refinement of existing spatial behaviour models and thus improve identification of search areas. Thus, search areas could be narrowed down and assist police investigations.

Police forces will benefit from understanding offenders' search strategies in terms of distribution of search areas and communication between offenders. This may help police forces to adopt preventative measures and stop offenders from acquiring information on which they base their choice of location. Understanding offenders' use of various sources of information highlighted the importance of networking. Offenders used several sources to acquire information of opportunities and used established networks for selling goods. Investigators can benefit from this finding by improving intelligence acquisition. This may also assist police in linking crimes.

Identifying the manner in which drug use affects spatial behaviour has been neglected in the literature. This has important investigative implications as this thesis clarified the affect drug use has on spatial behaviour patterns showing offenders are in constant pursuit for money. This led to variations in their mobility patterns. Investigators can benefit from this by being able to identify areas which offenders will be more likely to travel to and direct preventative measures more efficiently.

Finally, the findings gave support to the deterring effect of CCTV and guards on offending preference. Understanding the attractiveness of areas can help police forces know where to allocate police officers or CCTV. At the same time, understanding

what attracts offenders to certain areas can help police forces in placing deterring measures in these locations.

11.4. Limitations of the Present Research

The main limitation of this thesis is the small sample size, which prohibited a quantitative examination of the processes discussed. Since the pilot study indicated there was a decision making process that needed to be explored, the focus of the main study changed quite significantly. Therefore, the main study is to some extent an exploratory study. This led to many unanswered questions and factors which offenders recalled could not be quantified. Similarly, the offenders used different strategies of behaviour and it was not possible to estimate the overall use of each of the strategies, or which strategy was more likely to be used in conjunction with others.

The fact that the offenders in the sample resided and offended in different areas across the North West of England prevented from comparing accuracy of perception, personal drawing skills and individual difference. Also, there are no ethnic minorities or females in the sample of the main study. Research shows that these groups use the environment differently. A comparison with the white male sample would have made the study more complete. The chance to interview female offenders in the pilot was unique and offered some clues to female offenders' lifestyles and offending behaviour patterns. Unfortunately, as there were only 4 female offenders the information they gave could not be used to conclude of any gender differences.

11.5. Implications for Future Research

Future studies aiming to use interviews with offenders as their data base must be aware of the limitations and sensitivities of the establishments involved. Such research should consider time limitations for setting up the interview, ethical issues such as asking offenders about crimes they were not convicted for and the great variations between prisons as to how interviews should be conducted, issues of confidentiality and access to pre-conviction files.

Giving out questionnaires consisting of lists of factors influencing offenders' strategies will help to quantify the results and lead to more statistical testing and validate the results. A questionnaire should also be used in future studies in order to understand offenders' use of strategies. It is recommended that future research should shift the discussion from typologies of offenders to the strategies and assess the frequency and pattern of their use. This will benefit further our understanding of patterns of behaviour, improve predictive models of offenders' spatial behaviour and home location and assist police investigations.

As part of exploring factors which attract or deter offenders to certain areas, future research should explore offenders' perception of risk in areas where they live and offend and compare these with areas of known criminal behaviour. Studies may also find it beneficial to use other population groups such as female offenders or other types of criminal.

As sketch mapping was found to be a useful interviewing tool it is recommended for other studies to continue its use. A possible solution to the subjective nature of sketch map classification schemes may be to train judges in their assessment. It is recommended that any future analysis using this technique will assess map styles using the average score of several judges and that these classification schemes should not be the sole basis for evaluating sketch maps and that an interview should be included.

Future studies may also find it beneficial to compare sketch maps drawn in specific areas with actual crime rates. Mapping styles can be studied in relation to use of vehicle and familiarity levels as well. Finally, future studies can examine the scale offenders are operating in. Thus, local offenders will be asked to draw maps of a local area, whereas offenders, who covered large areas, will draw those. This will give a better indication of the actual criminal area the offenders covered and its relation to their home.

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Appendix 1

The Pilot Study

Figure 1: Interview Design

P		
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This confidential questionnaire is designed to explore the issues surrounding offenders' perception of the environment. This study is being carried out, as part of a PhD in Investigative Psychology. Your responses are completely anonymous and will be kept confidential.

Please answer the questions below. We value your honest responses, and appreciate your participation in this study.

Part I

Date of Birth: _____

Gender: M / F

Years of Education: _____

Please indicate which of the following offences did you commit?

Type of Crime	Number of Crimes
Burglary	
Theft	
Robbery	
Armed Robbery	
Shop Lifting	
Damage to Property	
Fraud	
Drug Possession	
Drug Supply	
Public Disorder	
Assault	
Other	

Did you live at the same address while committing the offences or were there multiple addresses? _____

Part II

Give an A3 paper, a selection of pens, including coloured ones.

The drawing instructions:

“I’d like you to draw a sketch map of your home area at the time of the offences discussed. It doesn’t have to be an accurate map- just the image you have of the area you lived in and considered to be part of your neighbourhood”.

Could you please indicate the locations of your home, any places you would visit in the course of your everyday activities, and any offences locations in that area.

Part III

1. How long have you been living in that area for?
2. Are all the locations where you have committed a crime are represented on this map? If not, what proportion is?
3. Did you plan your offences?
4. What were the most important considerations in selecting a crime location? Did it have to do with the area or were you interested in particular properties?
5. Did your familiarity with the area related to your locational decision in anyway?
6. Did drugs influence your choice of venue? If so, how?
7. What was the goal of the offences? “thrill seeking”, “goal oriented” both?
8. What is the furthest approximate distance you have travelled to commit a burglary? What is the shortest? Could you please mark the distances between the different locations and the home?
9. What was your usual transport to and from the sites? Can you indicate a route you would take to a location?
10. Are there any areas where you would not have committed an offence? Why ?
11. How old were you at the time of your first offence? Last?
12. Did the area you chose to commit offences change as you got older? If so, why?
13. Do you know people from your neighbourhood without a criminal past that may be willing to speak with me?

Part IV

Please circle one number in response to each question.

Very Slightly Neutral Slightly Very

- | | | | | | | | |
|--|-----------|---|---|---|---|---|------------|
| 1. How do consider your neighbourhood? | Risky | 1 | 2 | 3 | 4 | 5 | Safe |
| 2. How familiar are you with the area/s where the offences took place? | Familiar | 1 | 2 | 3 | 4 | 5 | Unfamiliar |
| 3. How would you describe the area where the offences took place? | Wealthy | 1 | 2 | 3 | 4 | 5 | Poor |
| 4. How would you describe your life at the time of the offences ? | Difficult | 1 | 2 | 3 | 4 | 5 | Simple |
| 5. How would you describe yourself at the time of the offences? | Calm | 1 | 2 | 3 | 4 | 5 | Violent |
| 6. Were the targets ? | Easy | 1 | 2 | 3 | 4 | 5 | Difficult |
| 7. How would you describe the area where the offences took place? | Hostile | 1 | 2 | 3 | 4 | 5 | Friendly |
| 8. How would you describe police protection of the area where the offences took place? | Strong | 1 | 2 | 3 | 4 | 5 | Weak |
| 9. Was the value of the property taken...? | High | 1 | 2 | 3 | 4 | 5 | Low |

Thank You

Figure 2: Poster Posted in Counselling Centres

Wanted

Volunteers are needed to take part in a study looking at how people perceive their environment. My name is **Karen** and I am a researcher at the **University of Liverpool**.

If you are aged between **17-39** and have been involved in **any kind of criminal activity, past or present**, then I would like to hear from you.

All you would have to do is to spend about **half an hour** with me. You would be interviewed about your **life history** and your **opinions** on a number of issues. The interview will be totally **confidential** and **anonymous**.

If you are interested in speaking to me, then just let reception know and a time will be arranged when we can meet.

Thank you

Table 1: Offenders' Age Group

AGE GROUP	FREQUENCY N=16	PERCENT (%)
20-25	2	12.5
26-30	2	12.5
31-35	8	50
36+	4	25
Total	16	100

Table 2: Education Level of Offenders

YEARS OF EDUCATION	FREQUENCY N=16	PERCENT (%)
1-6	3	20
7-10	5	33.3
11-12	5	33.3
13+	2	13.3
Total	15	100

Table 3: Overall Number of Crimes Committed

ESTIMATED NUMBER OF OFFENCES	FREQUENCY N=16	PERCENT (%)
1-10	1	6.3
11-30	1	6.3
31-50	0	0
51-100	4	25
101-500	5	31.3
501-1000	1	6.3
+1000	4	25
Total	16	100

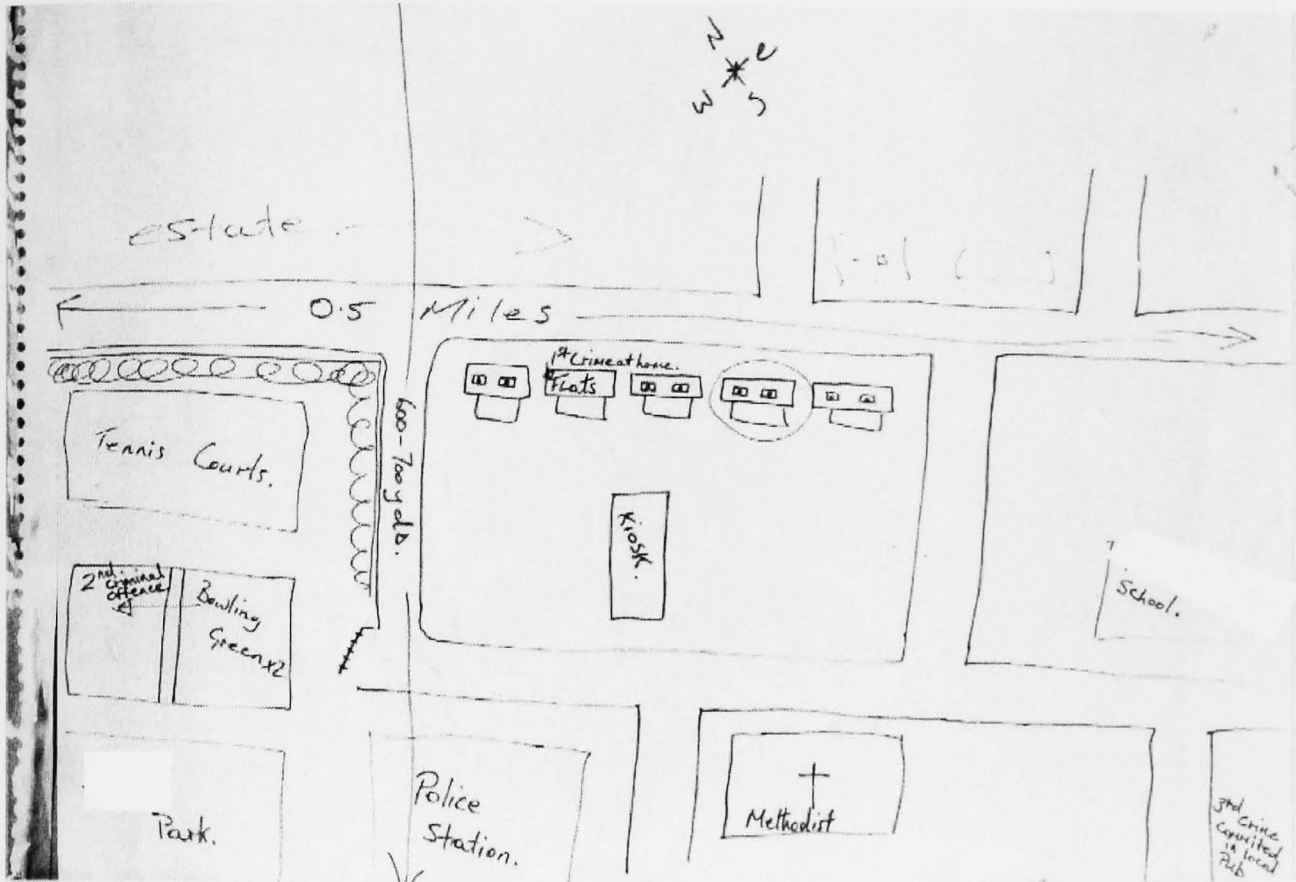
Table 4: Summary of Criminal Activity by Type of Crime

TYPE OF CRIME	AVERAGE NUMBER OF CRIMES COMMITTED
Theft	109 (101-500)
Shoplifting	244 (101-500)
Robbery	2 (1-10)
Burglary	32 (51-100)
Theft of Cars	1 (1-10)
Fraud (e.g. credit cards/ cheques)	37 (31-50)
Assaults	9(1-10)
Public Disorder	16 (11-30)
Damage to Property	25 (11-30)

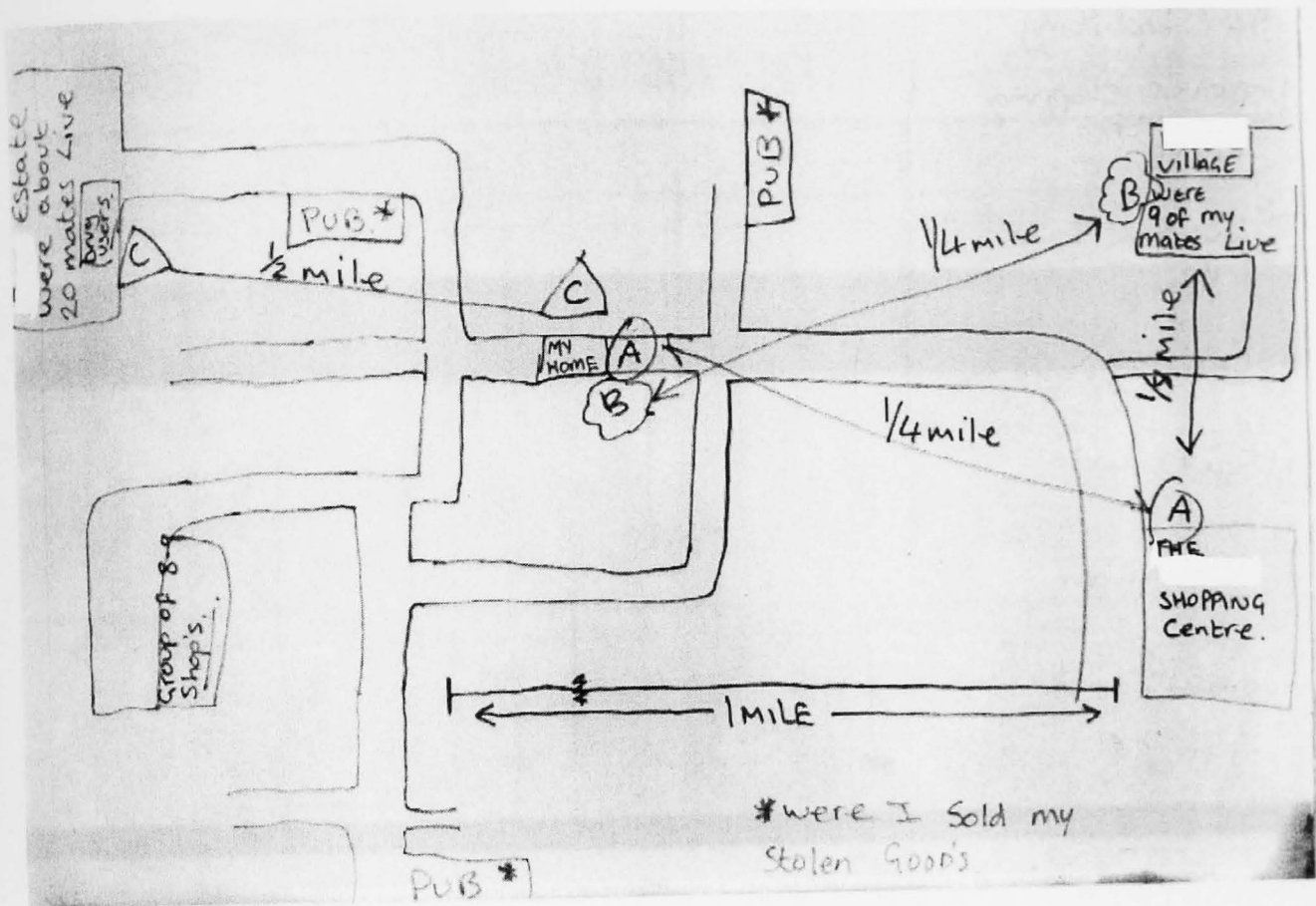
Appendix 2

The Pilot Study's Sketch Maps

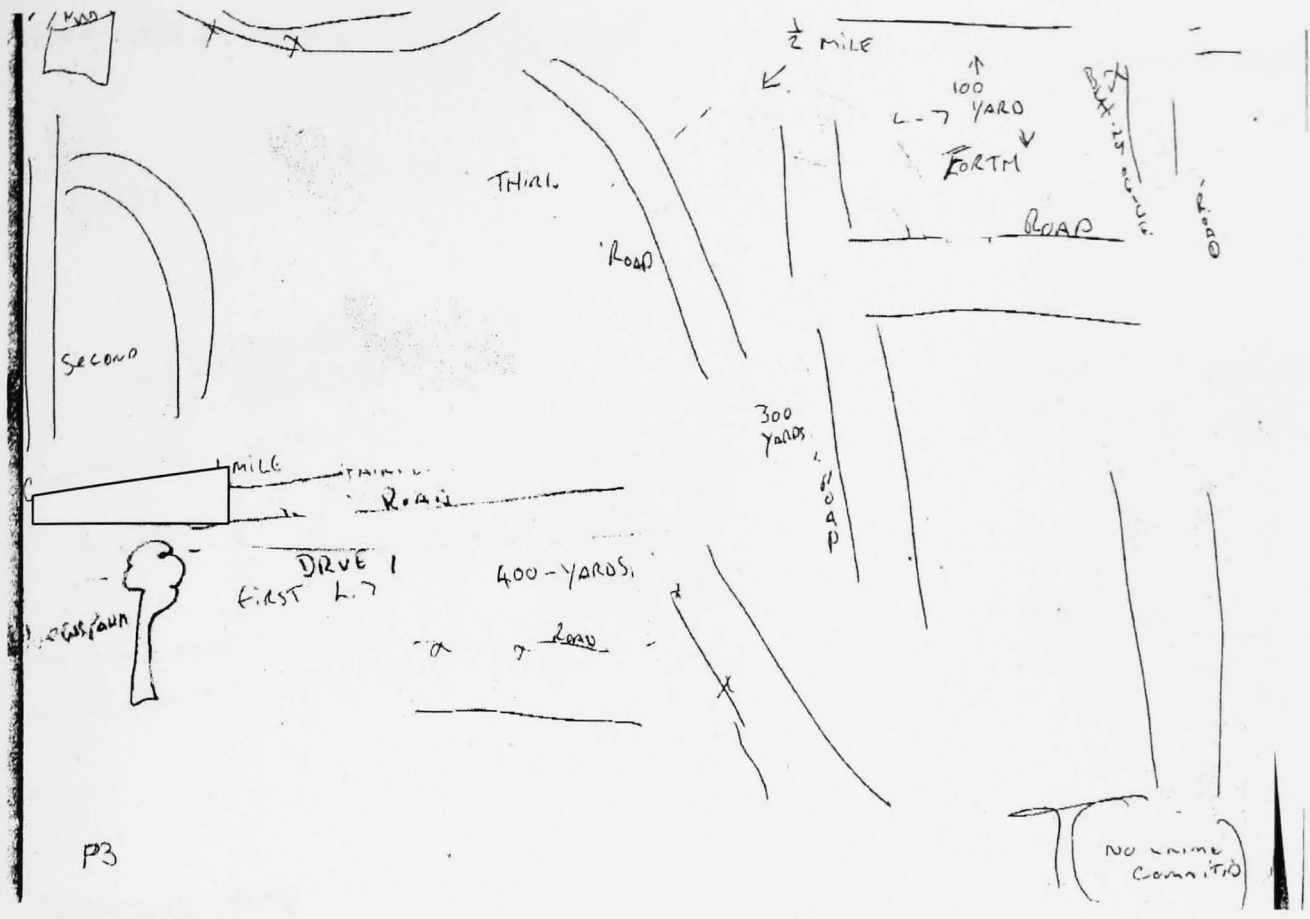
Map 1

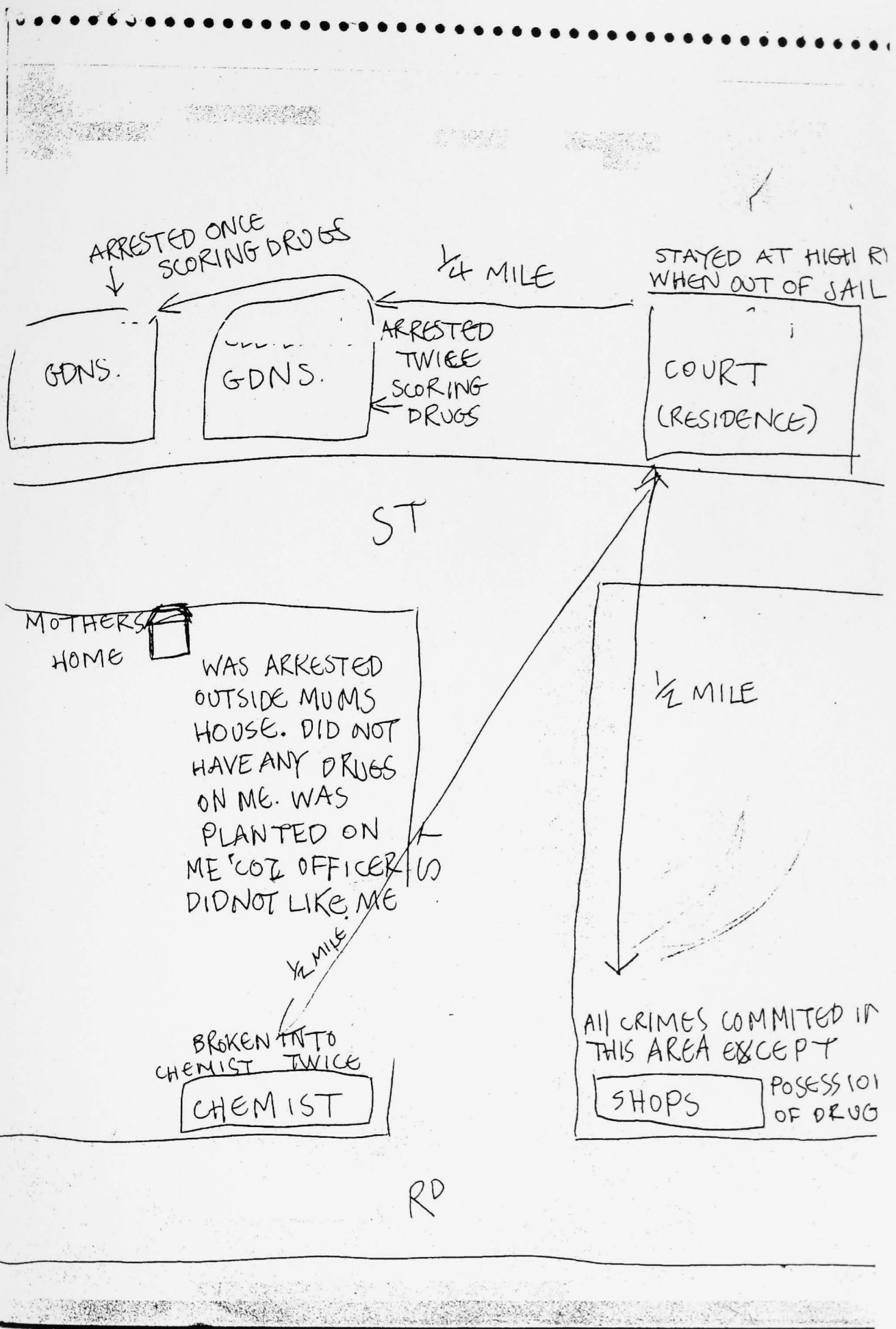


Map 2

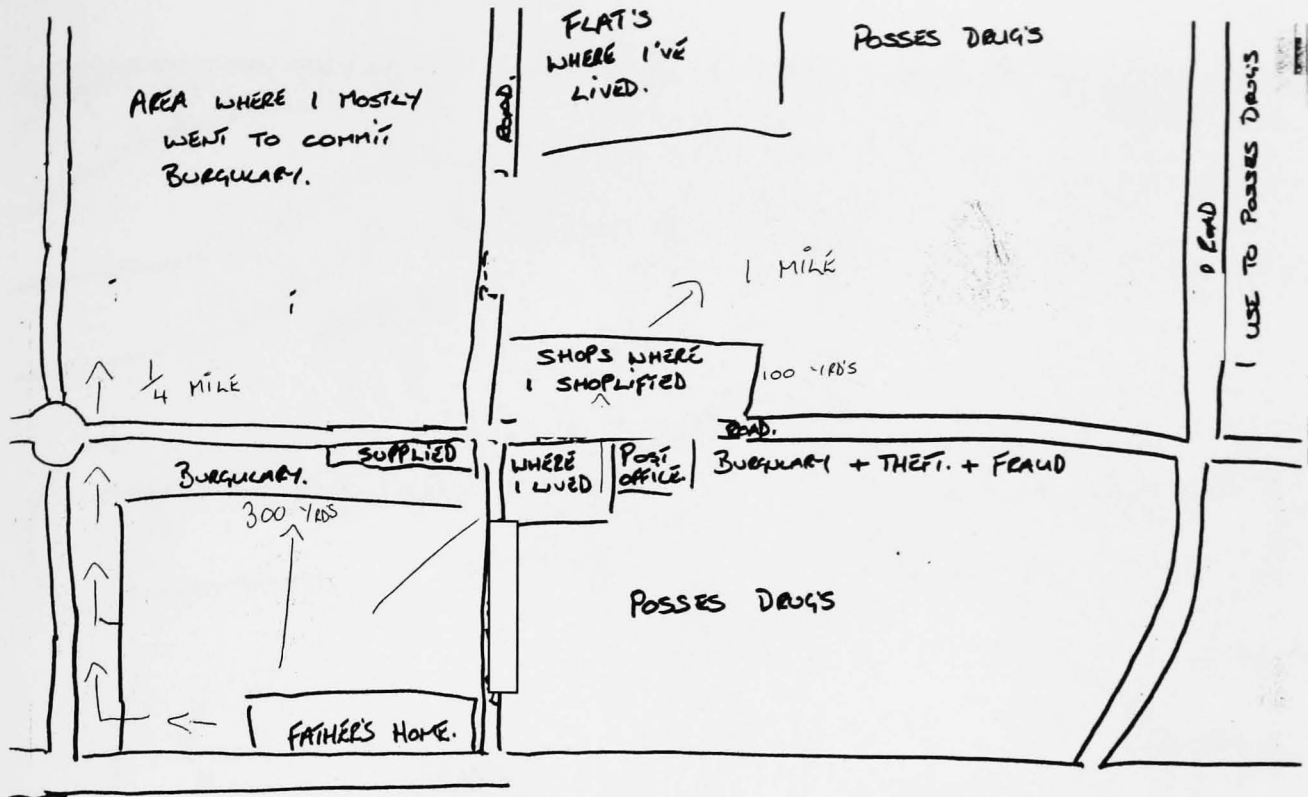


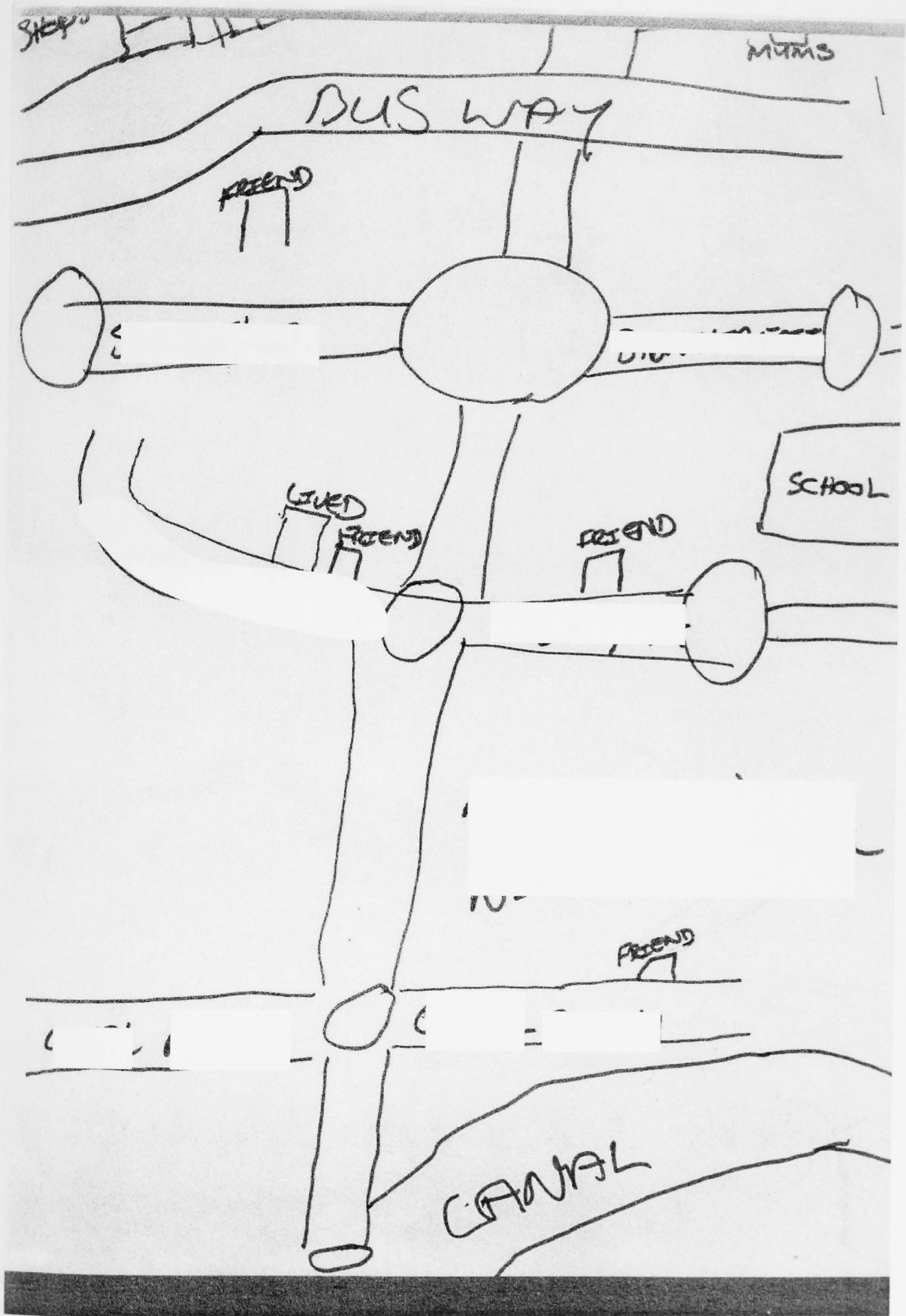
Map 3

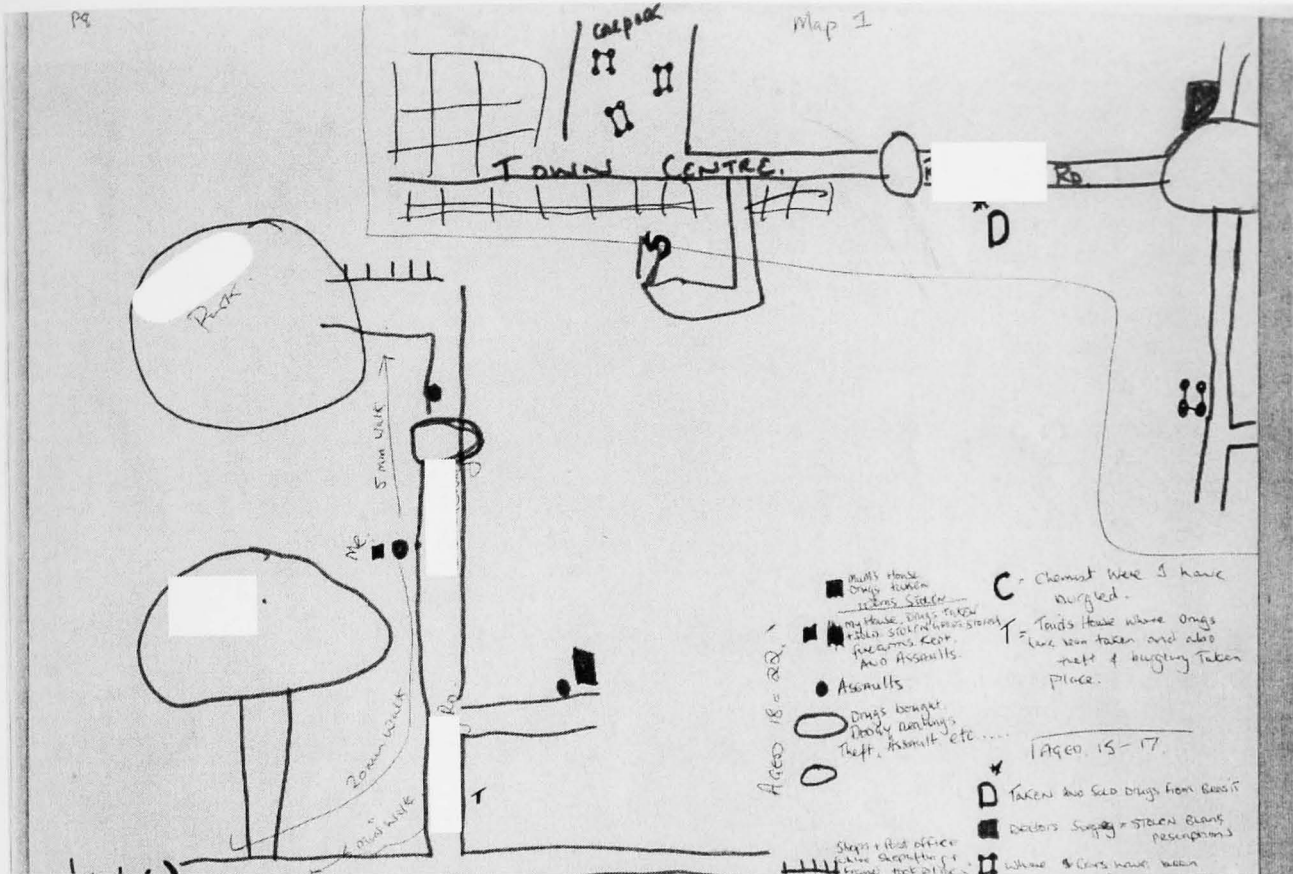


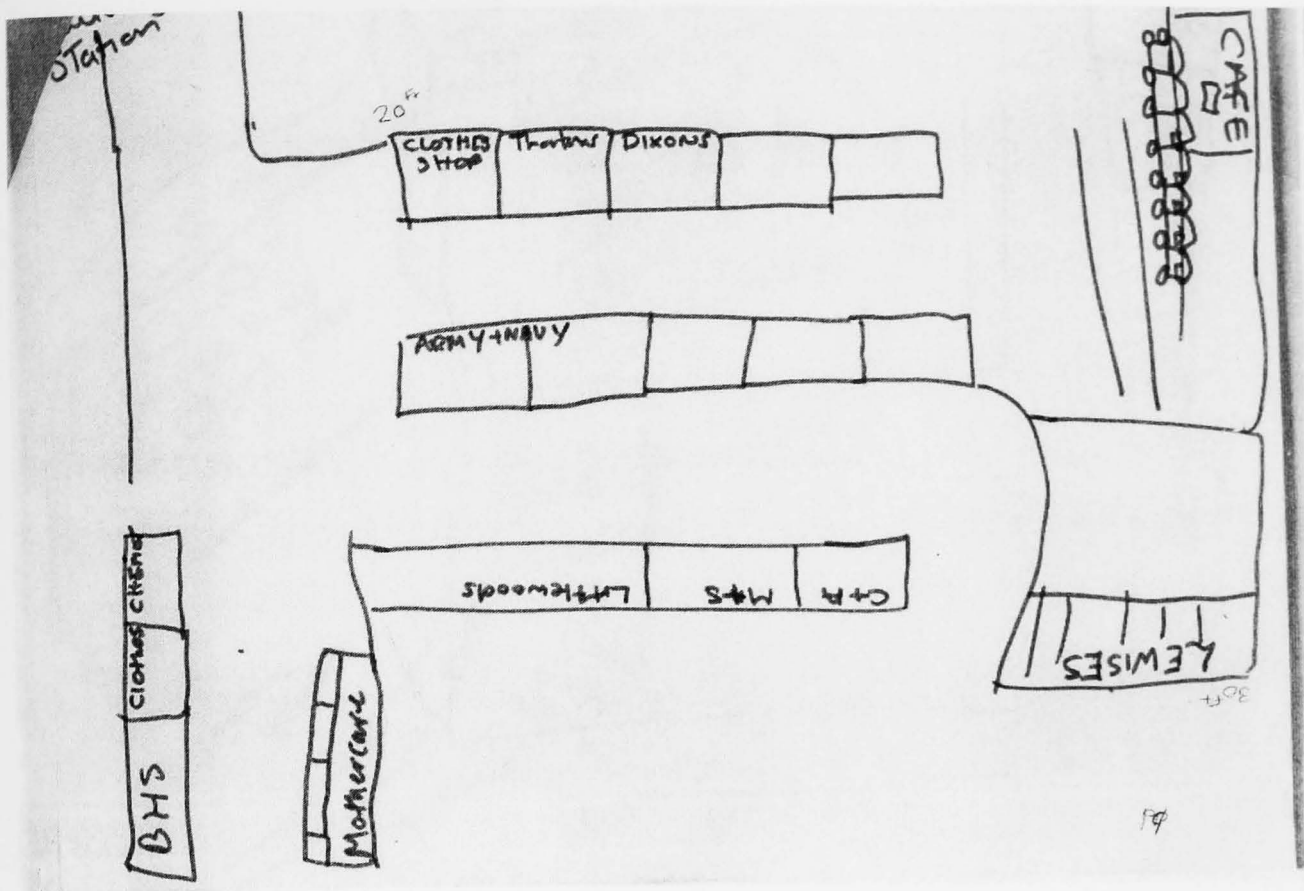


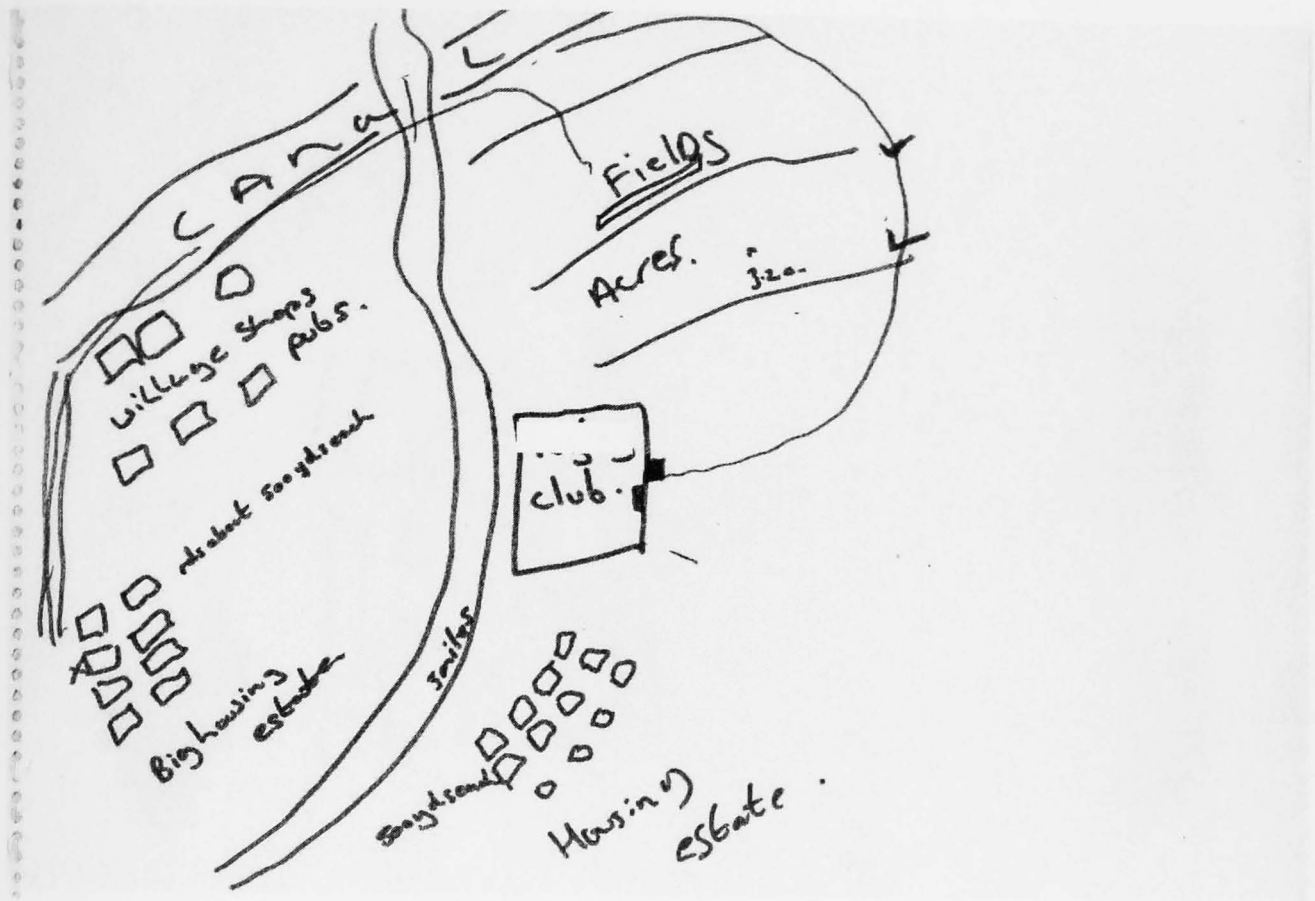
Map 6





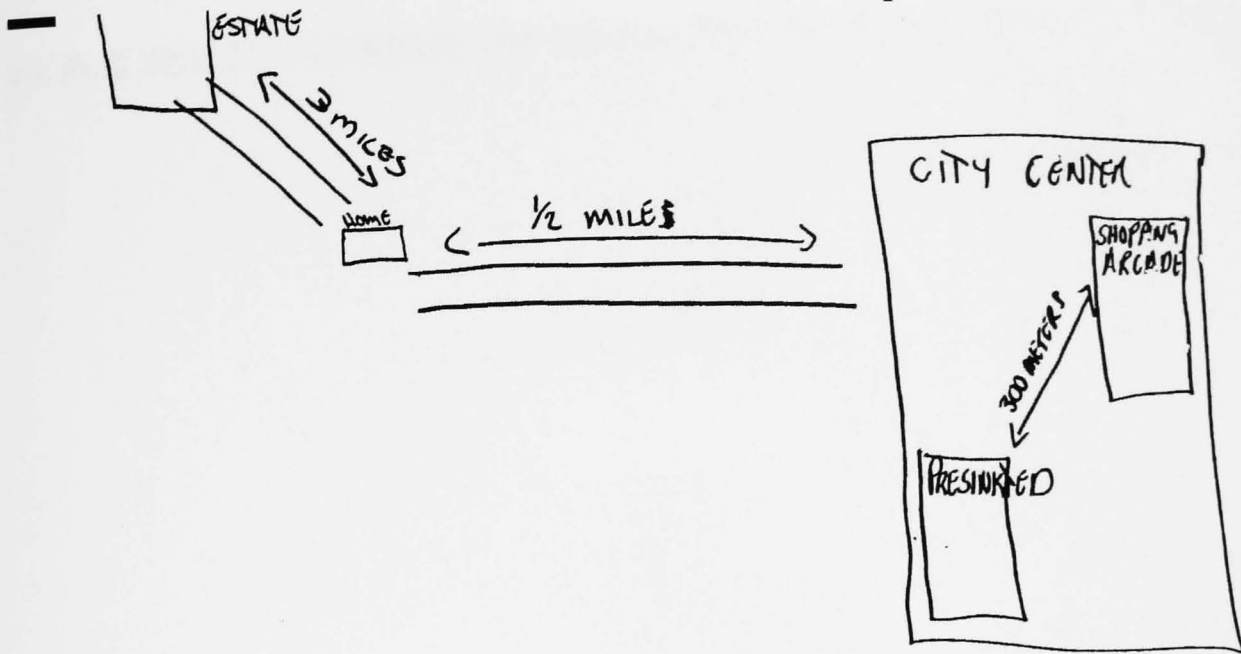




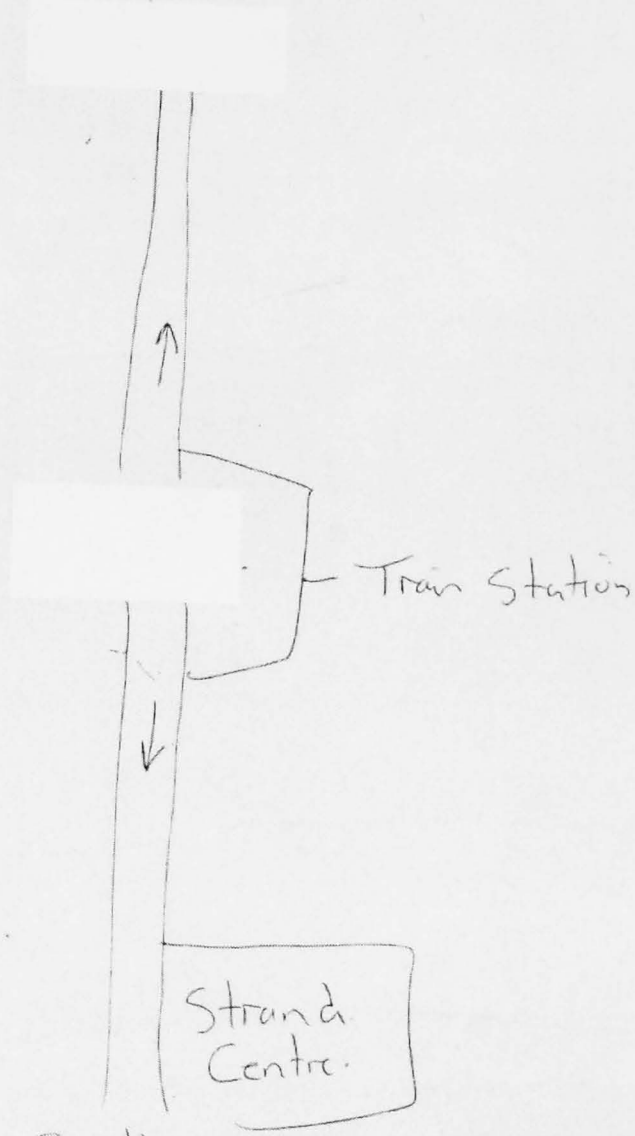




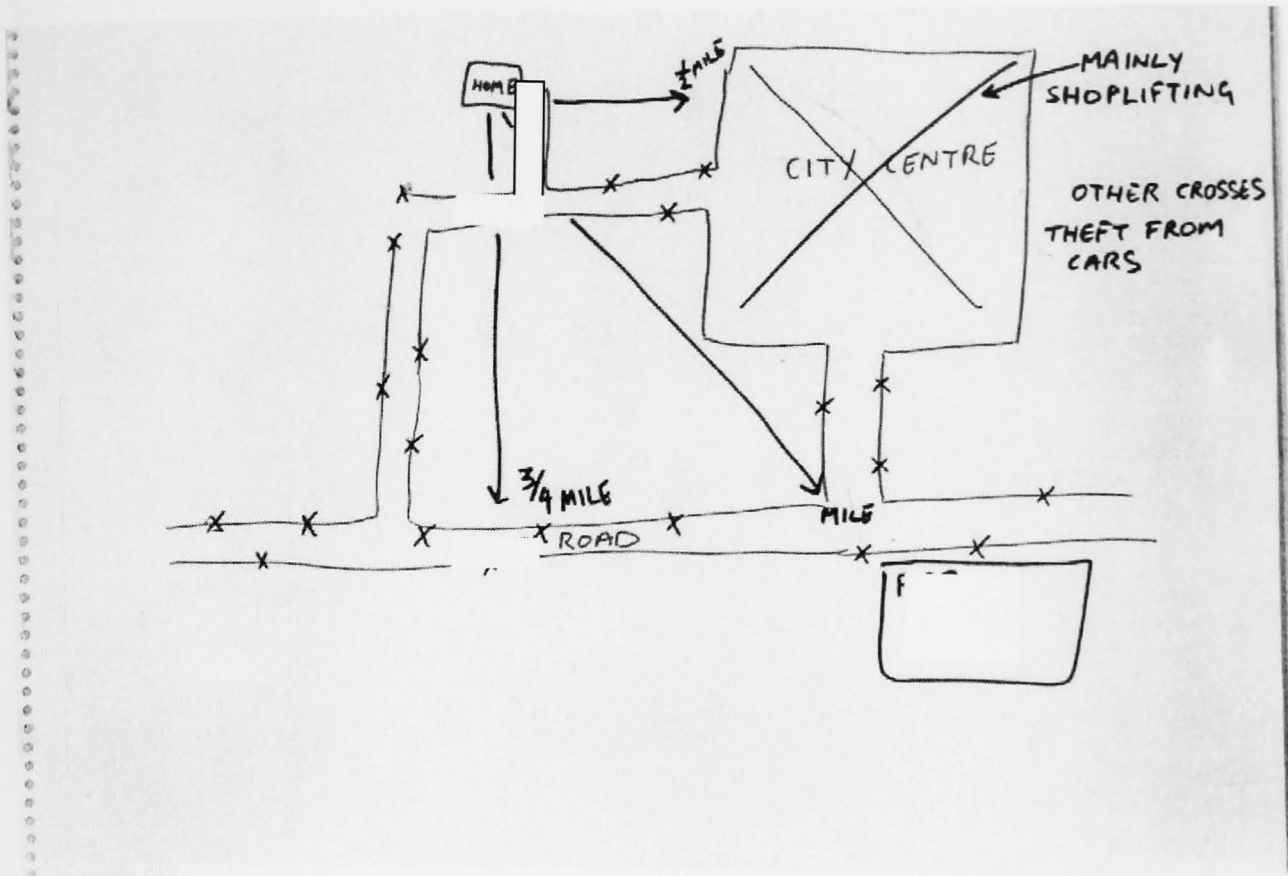
Map 12

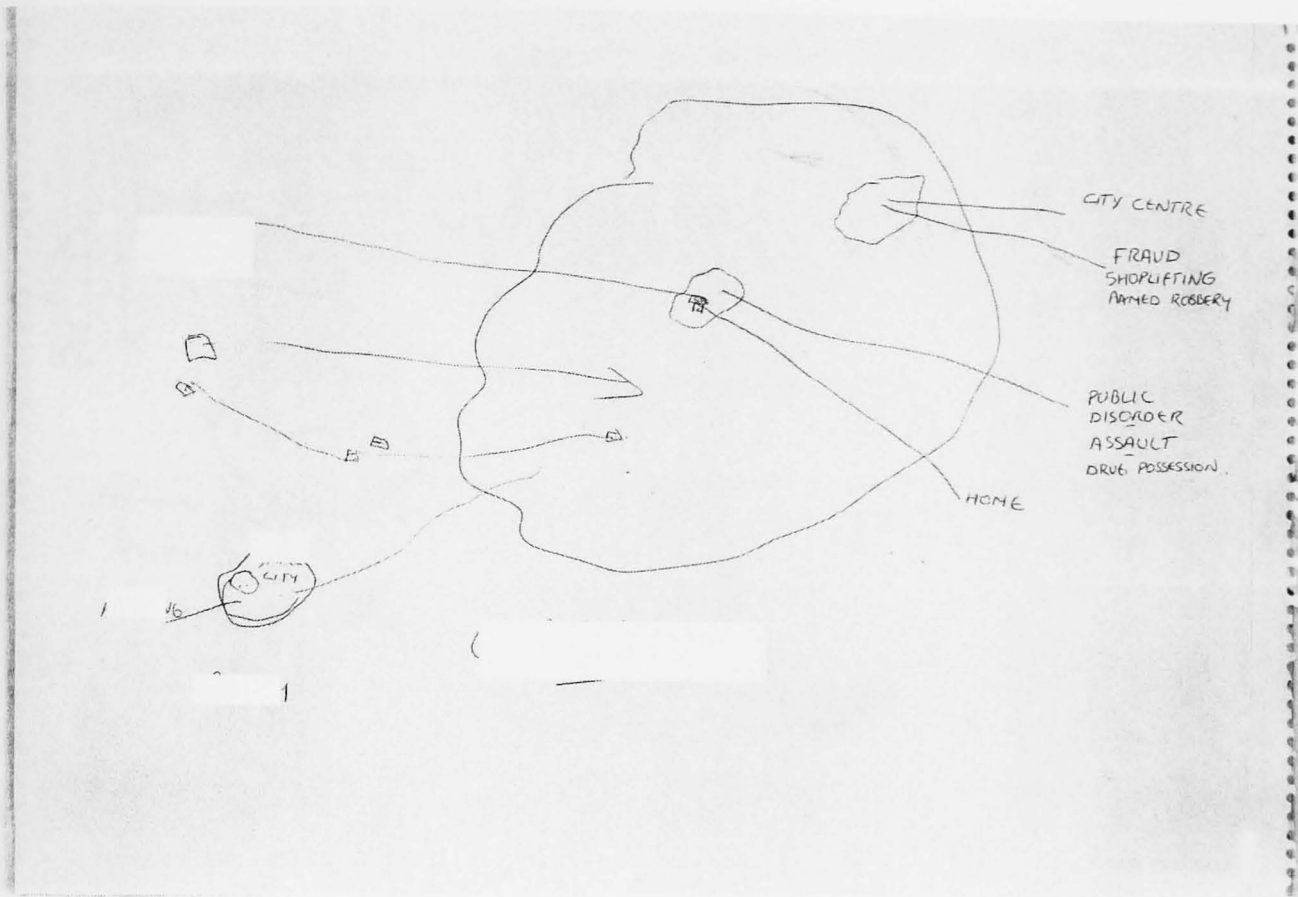


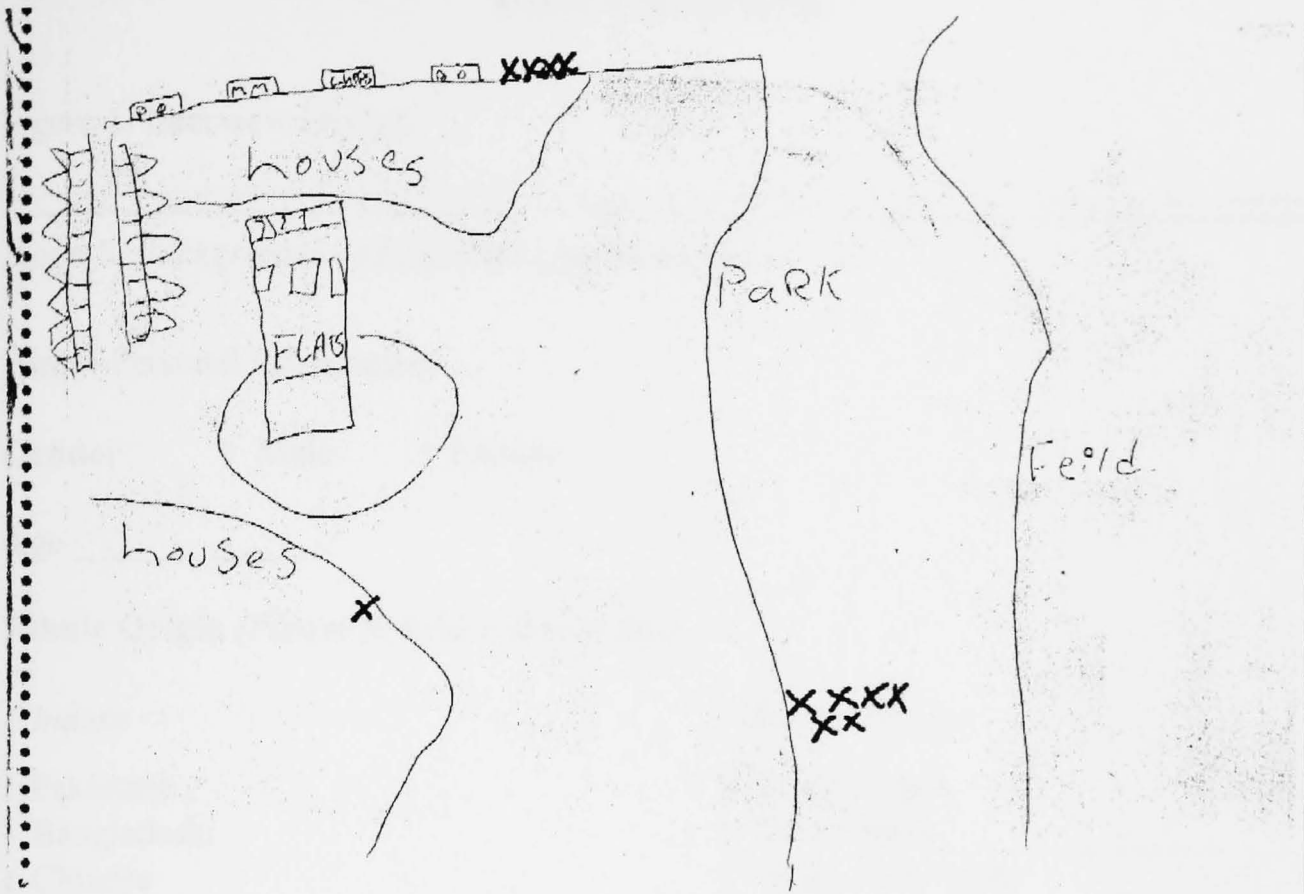
SHOPS



We used to steal goods to order every day
for nine years till I retired. We used to travel
all over the country stealing goods to order.







Appendix 3

Data Collection

Figure 1: Interview Design

Stage 1: Background and Lifestyle Questionnaire

Part 1: Personal information

Gender Male Female

Age _____

Ethnic Origin (*Please tick the relevant box*)

- | | |
|---|---|
| <input type="checkbox"/> Indian
<input type="checkbox"/> Pakistani
<input type="checkbox"/> Bangladeshi
<input type="checkbox"/> Chinese
<input type="checkbox"/> Asian-other _____
<input type="checkbox"/> Arab
<input type="checkbox"/> Black- Caribbean | <input type="checkbox"/> Black- African
<input type="checkbox"/> Black- Other
<input type="checkbox"/> Mixed Race _____
<input type="checkbox"/> White- UK/ Irish
<input type="checkbox"/> White- European
<input type="checkbox"/> White- Other _____
<input type="checkbox"/> Other _____ |
|---|---|

Marital Status Prior to Prison (*Please tick the relevant box*)

- | | |
|---|---|
| <input type="checkbox"/> Single
<input type="checkbox"/> Married
<input type="checkbox"/> Had a partner | <input type="checkbox"/> Lived with a partner
<input type="checkbox"/> Divorced
<input type="checkbox"/> Widow/er |
|---|---|

Has this status change since being in Prison? No / Yes. Am now

Children

No/Yes , how many _____

Are the child/ren from the same partner? No / Yes

Education (*please tick all relevant boxes*)

Primary School		University	
Comprehensive School		NVQ	
Private school		HND	
O level/ GCSE		BTEC	
A level		Other. Please specify, _____	
College			

Training

Do you have other qualifications (e.g. military training)?

Employment

What was your most recent employment?

Driving

Do you have a driving licence No / Yes

Are you disqualified from driving? No / Yes

If yes: what for and how long?

Have you ever owned a vehicle? No / Yes. How many? _____

If yes, which one(s)? *(Please tick where relevant)*

- A car A van
- A motorcycle A bicycle Other _____

Family Background

As a child who did you mainly live with? (Please tick the relevant box)

My Mum and Dad	
My mum	
My Dad	
My Mum and Step Dad	
My Dad and Step Mum	
Other relatives	
Foster parents	
Adopted parents	
In Children's or Community Home	
Other	

Drug Use

Based on the following 5-point scale, please rate how often you have engaged in this behaviour?

(Please circle answer that applies best)

1. *Never*
2. *A few times (not more than 10 times)*
3. *Quite often (between 10 and 50 times)*
4. *Often (between 50 and 100 times)*
5. *Very often (more than 100 times)*

Drank alcohol (wine, beer, spirits, etc.)	1	2	3	4	5
Smoked marijuana (grass, weed, pot, etc.)	1	2	3	4	5
Sniffed glue, petrol or other solvents (tippex, thinner, etc.)	1	2	3	4	5
Taken barbiturates (downers) without prescription	1	2	3	4	5
Taken speed (uppers) without prescription	1	2	3	4	5
Taken ecstasy	1	2	3	4	5
<i>Used heroin</i>	1	2	3	4	5
Used cocaine	1	2	3	4	5
Taken methadone	1	2	3	4	5

Part 2: Criminal Behaviour

Offence history

How old were you when you first started offending? _____

How old were you at the time of your first conviction? _____

Roughly how many times have you been arrested? _____

Summary of previous criminal activity (if you do not know the exact number, then please make an estimate)

Type of crime	Number of crimes committed	Number of convictions
Theft		
Shoplifting		
Handling stolen property		
Robbery		
Burglary House		
Burglary other		
Taking cars		
Theft from cars		
Fraud inc Credit cards/ cheques		
Assault		
Firearms offences		
Offensive weapon		
Dealing in drugs		
Possessing drugs		
Drunk or Disorder behaviour		
Damage to Property		
Arson		
Sexual offences		
Rape		
Homicide/Manslaughter		
Prostitution		
Driving under influence		
Other		

Part 3: Additional details

Additional Background Details

Name of Prison: _____

Earliest date of release: _____

What offence are you currently sentenced for? _____

How long is the sentence? _____

Were you convicted with anyone else? No / Yes

Stage 2: Time Line of Area of residence and criminal activity

Years (e.g 1976- 1979)	Area of Residence (e.g. Speke, Walton)	Area Where you Committed Crime and Residence Area	<i>Safety</i> (1- Very Safe 5- Very Risky)	<u>Type and Number</u> of Crimes Committed in the Area	Reasons for changing residence or area (time served in prison)
		Same			
		Different			
		Mixed			

Stage 3: The Drawing Instructions

“I’d like you to draw a sketch map of your home area at the time of the offences discussed. It doesn’t have to be an accurate map- just the image you have of the area you lived in and considered to be part of your neighbourhood”.

Could you please indicate the locations of your home, any places you would visit in the course of your everyday activities, and any offences locations in that area.

Stage 4: Probing Questions

- What was your transportation to/from the area?
- Did you think how you were going to carry out the crimes before you did them?
- Is being familiar with the area important to you? Would you go to an area you don't know?
- Did drugs influence the choice of where to go? If so, how?
- What is important to you in an area where you'd offend in?

- Wealthy/Poor
- Close/ Far
- Up a hill/ Flat
- Centre of town/ Suburbs

- Did you prefer committing these crimes at a certain time of day?
- Did the weather effect your choice of where to go?
- Do you think about the chances of getting caught when you committed these crimes?
- Do you think about the chances of getting hurt when committing these crimes?
- What do you consider a high/low risk area?
- Would you avoid an area you consider risky?
- Did you prepare an escape route before you committed crimes?
- Can you indicate a route you would take to and from a crime location?
- Where would you normally go after a crime? Are these locations on the map?
- Do you know if a lot of people committed crimes there as well? How do you know that?
- Does that make it more or less attractive to you?
- Are there any areas where you wouldn't offend in? Why?
- What is the furthest distance you've ever travelled to commit a crime?
- What is the shortest distance you've ever travelled to commit a crime?
- Do you normally offend on your own or with someone else? Why?

Figure 2: Introduction to the study

Introduction to the study

I am a researcher from the Department of Psychology at the University of Liverpool. I am carrying out a study on the perception of the environment and crime.

The entire interview should take an hour.

I want to assure you of complete confidentiality and anonymity throughout this research. I am not part of the Police, Prison or Probation service. Nothing that you say to me will be repeated to members of these services.

I will not at any stage reveal your name or anything else that would enable people to trace your answers back to you. However, please do not disclose any information about future plans to commit a crime, as I may have to pass this information to the relevant authorities.

1. I would like you to sign a consent form agreeing to take part in the study.
2. I would like you to give me some details about your background and lifestyle.
3. I would like you to draw sketch maps of places you lived and committed crimes.

I would like to inform you that the interview would be taped.

Are you happy to take part in this research?

Do you have any questions before we go on?

Figure 3: Consent Form

Informed Consent Form

As a researcher at the University of Liverpool, I am conducting a thesis into cognitive maps and crime. You will be asked to describe your criminal history and to draw maps. The entire interview should take an hour.

The interview is entirely **confidential**. I am not part of the Police, Prison or Probation service. Nothing that you say to me will be repeated to members of these services. The only people who will have access to the transcripts will be qualified research assistants at the University of Liverpool.

Moreover, your name (or other identifiable characteristics) will not appear anywhere other than this consent form and will be kept separate from the material obtained from your interview. Some portions of your transcripts might be reproduced in the materials that result from this research, but respondents will remain **anonymous** in such documents.

Your participation in this project is completely **voluntary**. You are free to refuse to answer any questions or to stop the interview at any time.

You are asked to answer as honestly as possible.

I thank you in advance for giving up your time to help with this project.

If you have any questions about the thesis please feel free to ask them during the interview.

I consent to participate in this research study

Signature

Date

Name

Table 1: Number of Prisoners by Type of Crime in HMP Alt Course

TYPE OF CRIME	NUMBER OF PRISONERS
Burglary	155
Theft	80
Robbery	64
Overall	299

Table 2: Number of Prisoners by Type of Crime in HMP Kirkham

TYPE OF CRIME	NUMBER OF PRISONERS
Burglary	59
Theft	21
Robbery	16
Overall	96

Table 3: Interview Details by Number, Date, and Location

NAME OF ESTABLISHMENT	INTERVIEW NUMBER	DATE OF INTERVIEW
HMP Altcourse	1	13.11.01
	2-6	20.11.01
	7-8	24.11.01
	9-11	27.11.01
	12-15	22.1.02
HMP Kirkham	16-20	4.2.02
	21-23	5.2.02
	24-28	6.2.02
	29-32	7.2.02
	33-35	8.2.02
Wirral Probation Centre	36	12.3.02
	37	20.3.02

Table 4: A Summary of the Number of Interviews Conducted in Each Establishment by the Type of Crime the Participants Were Convicted for

	BURGLARY	ROBBERY	THEFT	TOTAL
HMP Alt-Course	11	4	0	15
HMP Kirkham	12	4	4	20
Wirral Probation Centre	1	0	0	1+ 1 Assault
Total	24	8	4	

Table 5: Summary of Number of Maps

NUMBER OF MAPS	NUMBER OF PARTICIPANTS	TOTAL NUMBER OF MAPS
1 Map	12	12
2 Maps	22	44
3 Maps	1	3
Total	35	59

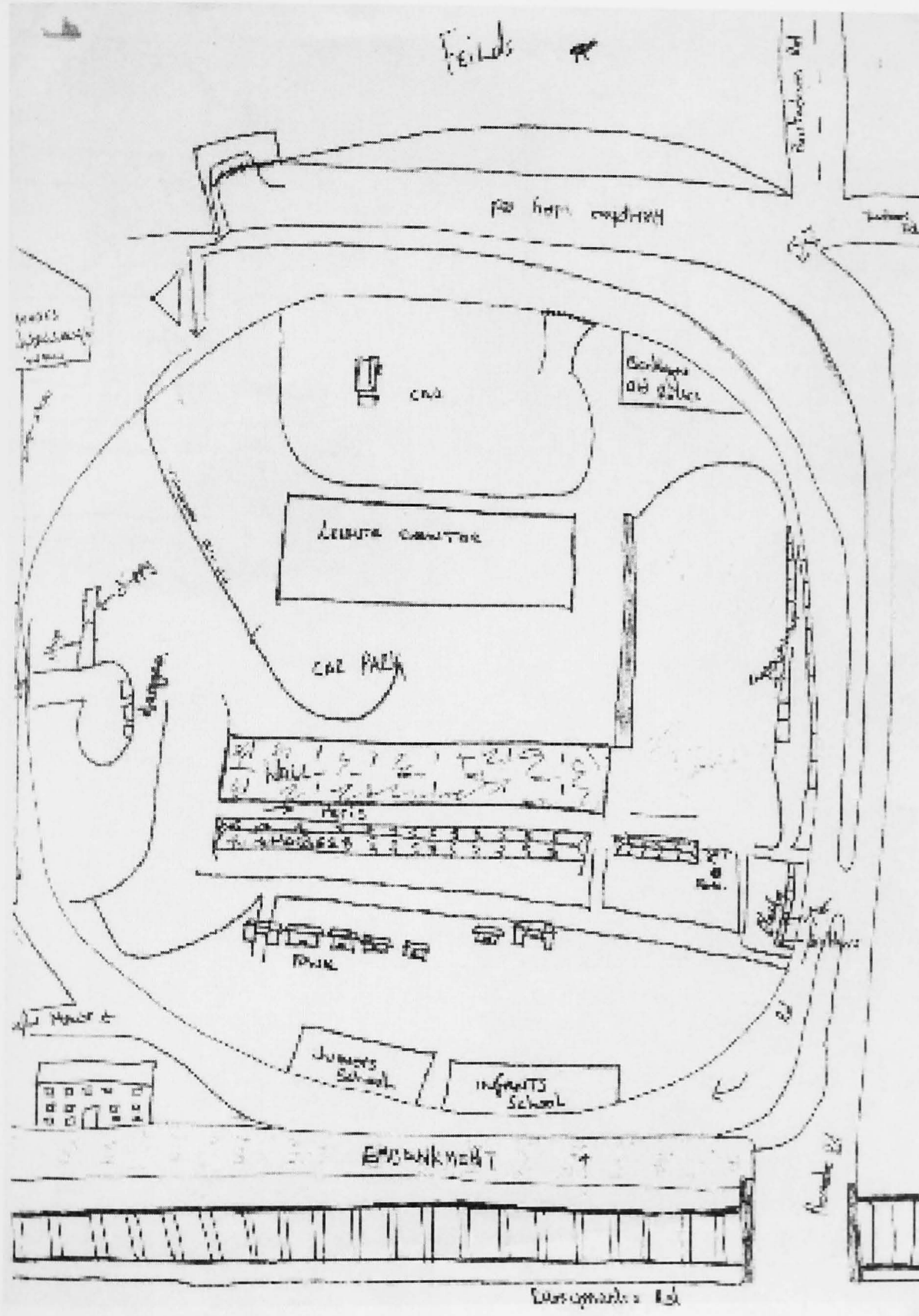
Table 6: Offenders' Reference Number

OFFENDER'S REFERENCE NUMBER IN FINAL SAMPLE	OFFENDER NUMBER BY ORDER OF INTERVIEW
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	16
16	19
17	20
18	21
19	22
20	24
21	25
22	26
23	27
24	31
25	32
26	33
27	34
28	37

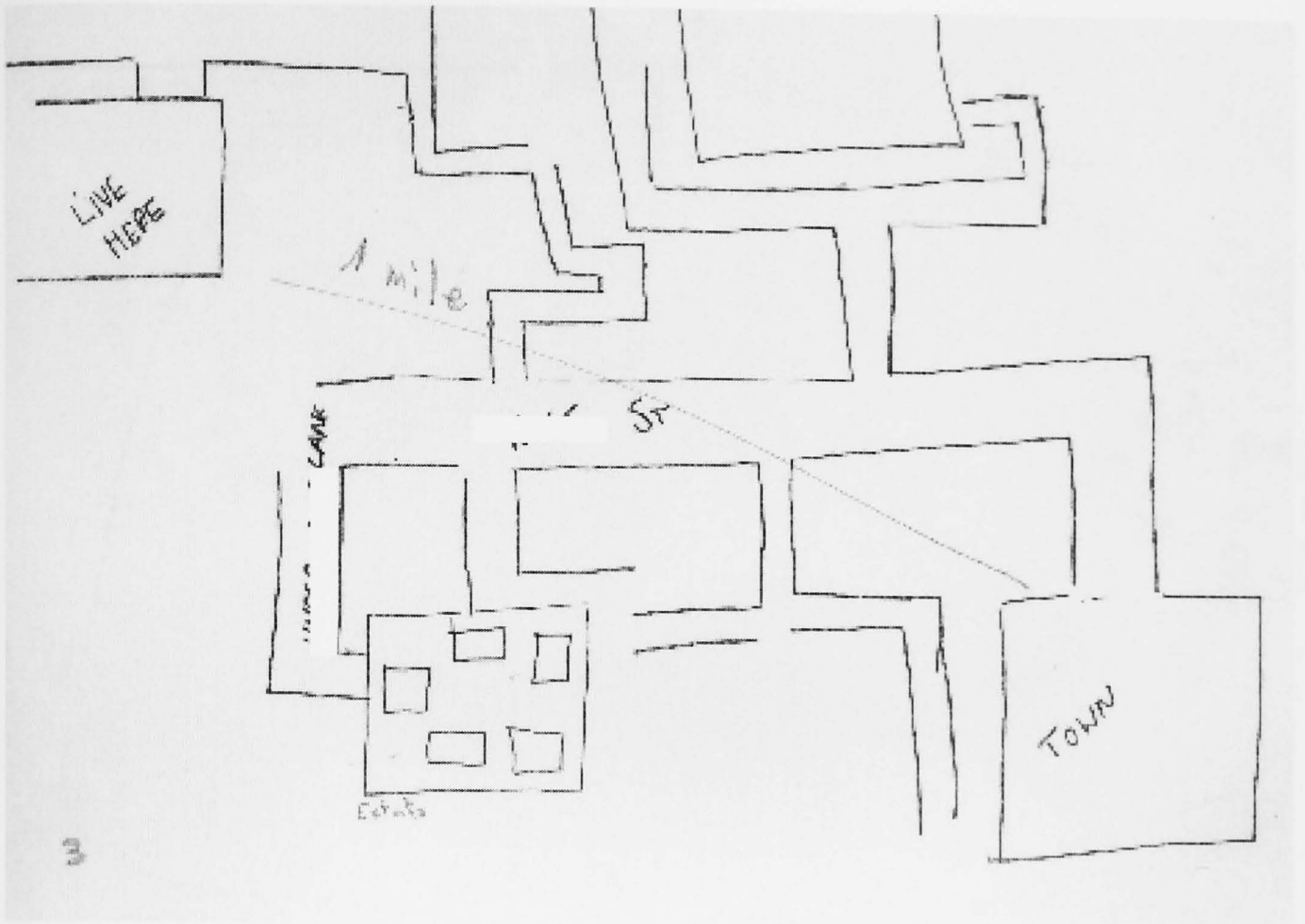
Appendix 4

The Main Study's Sketch Maps

Map 1



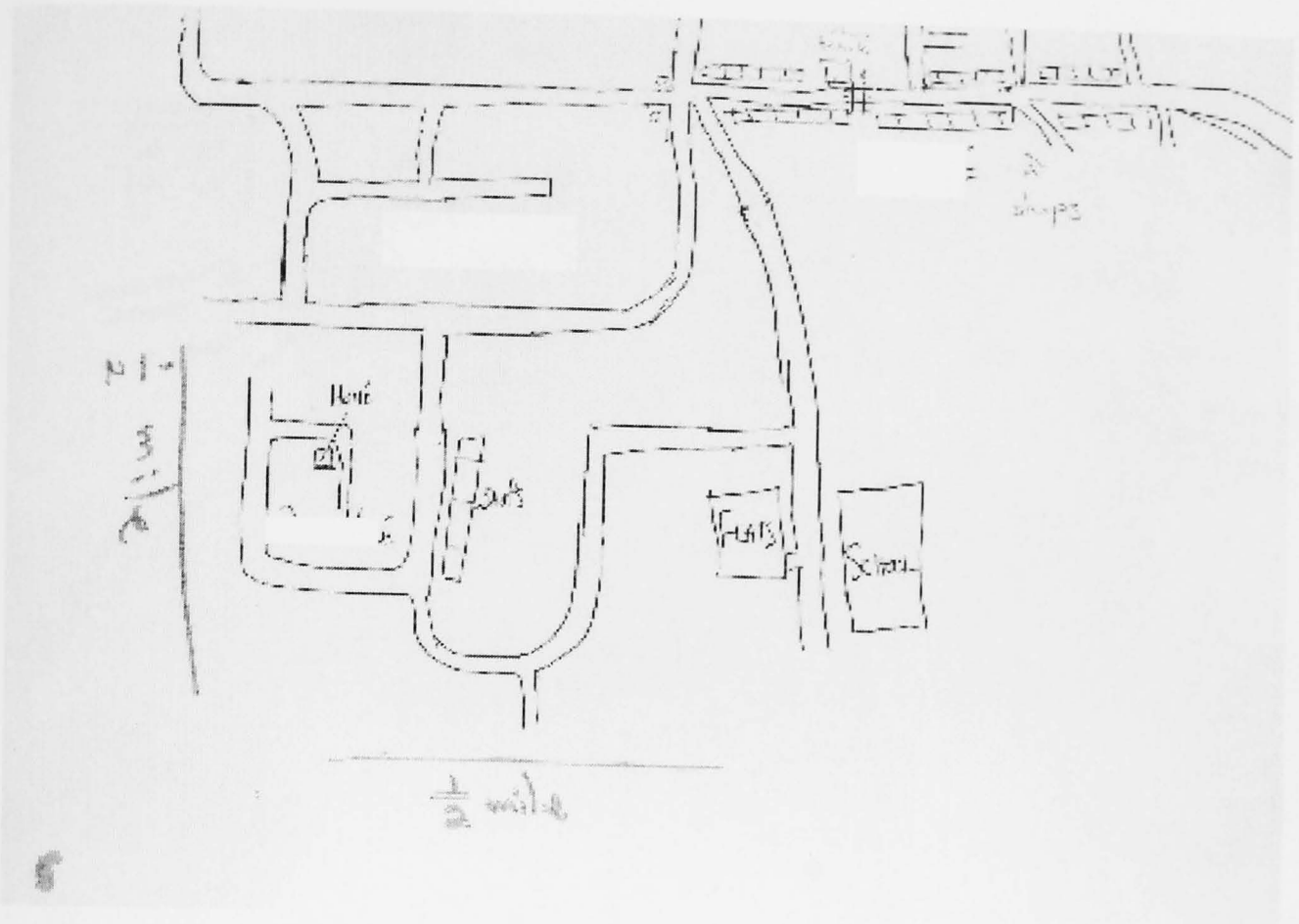
Map 3

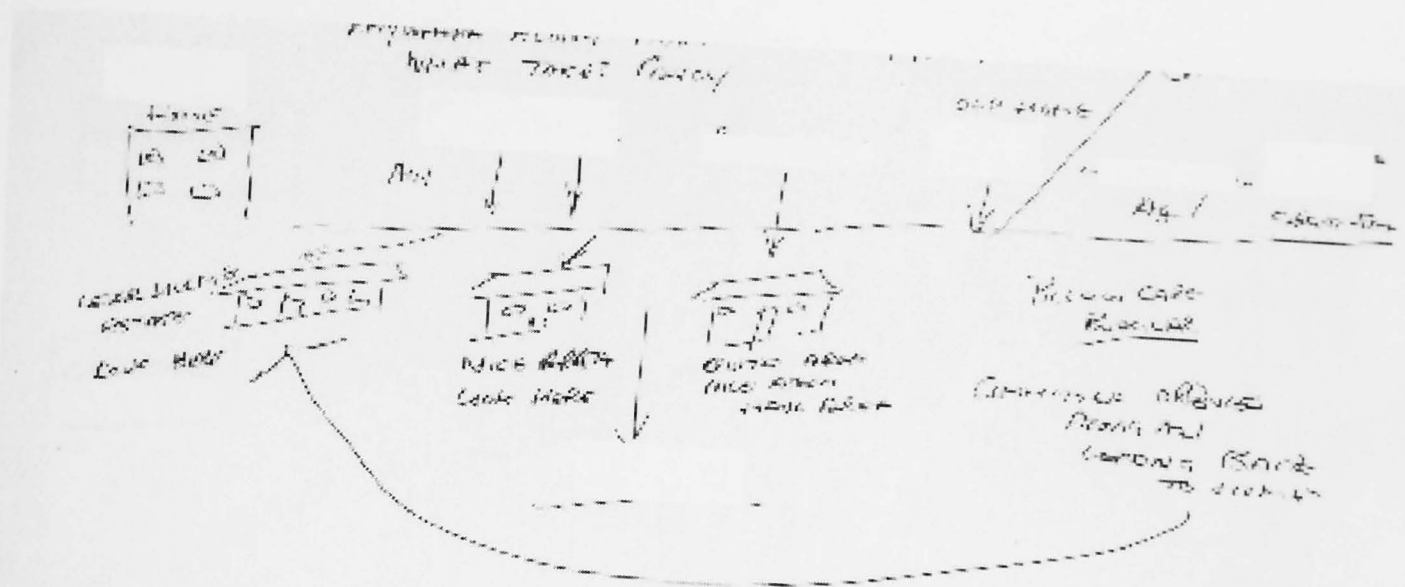


Map 4



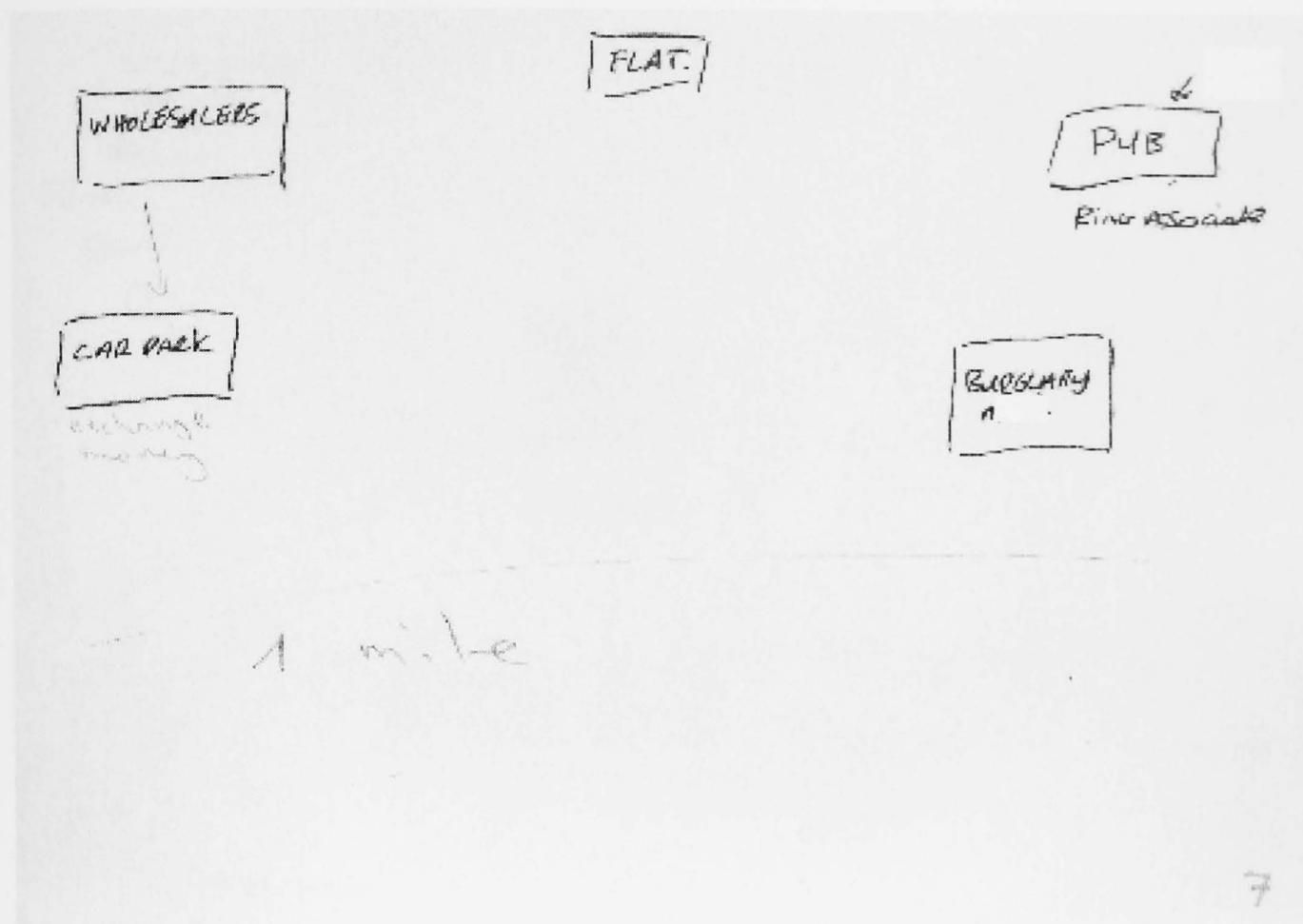
Map 5



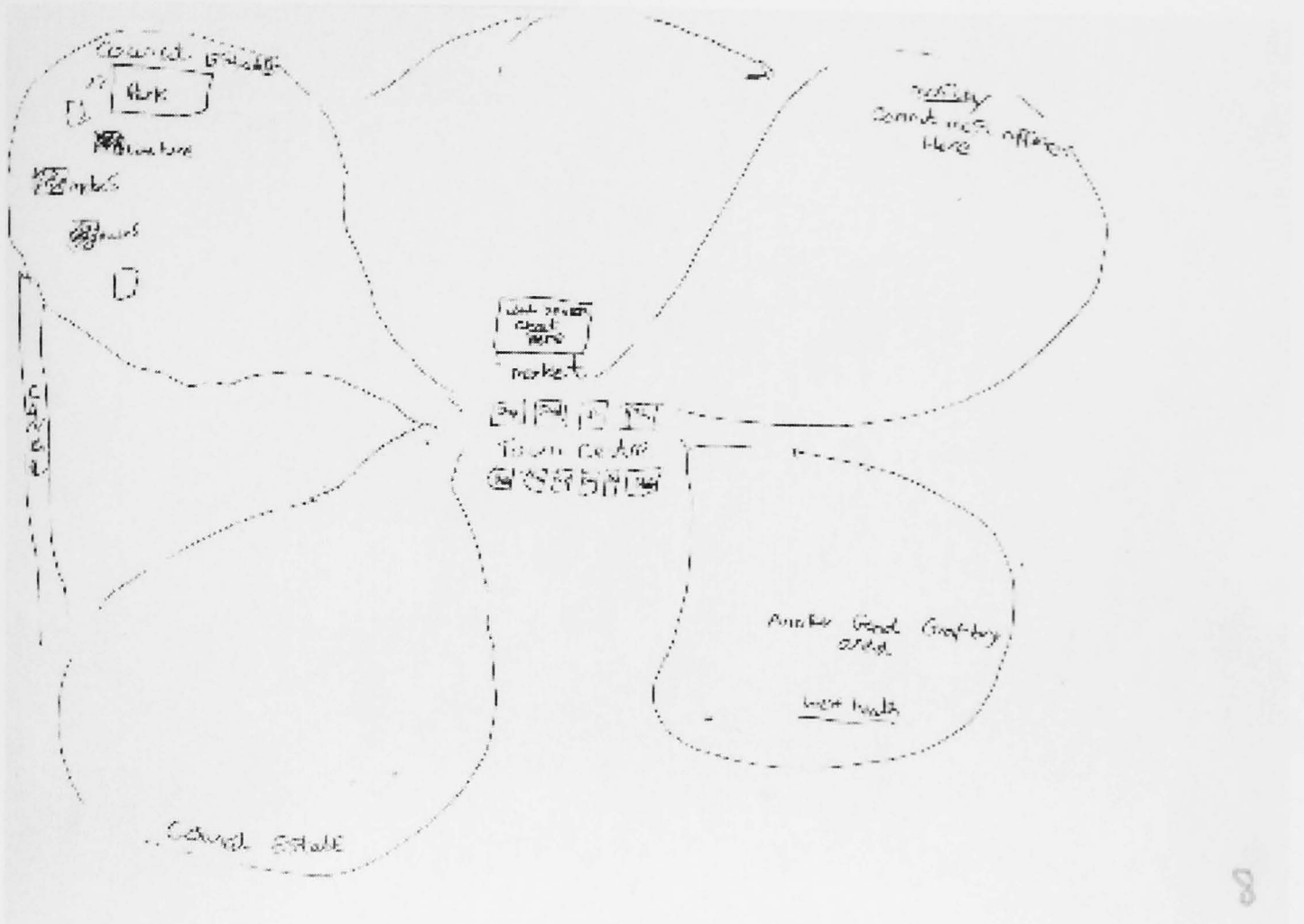


6

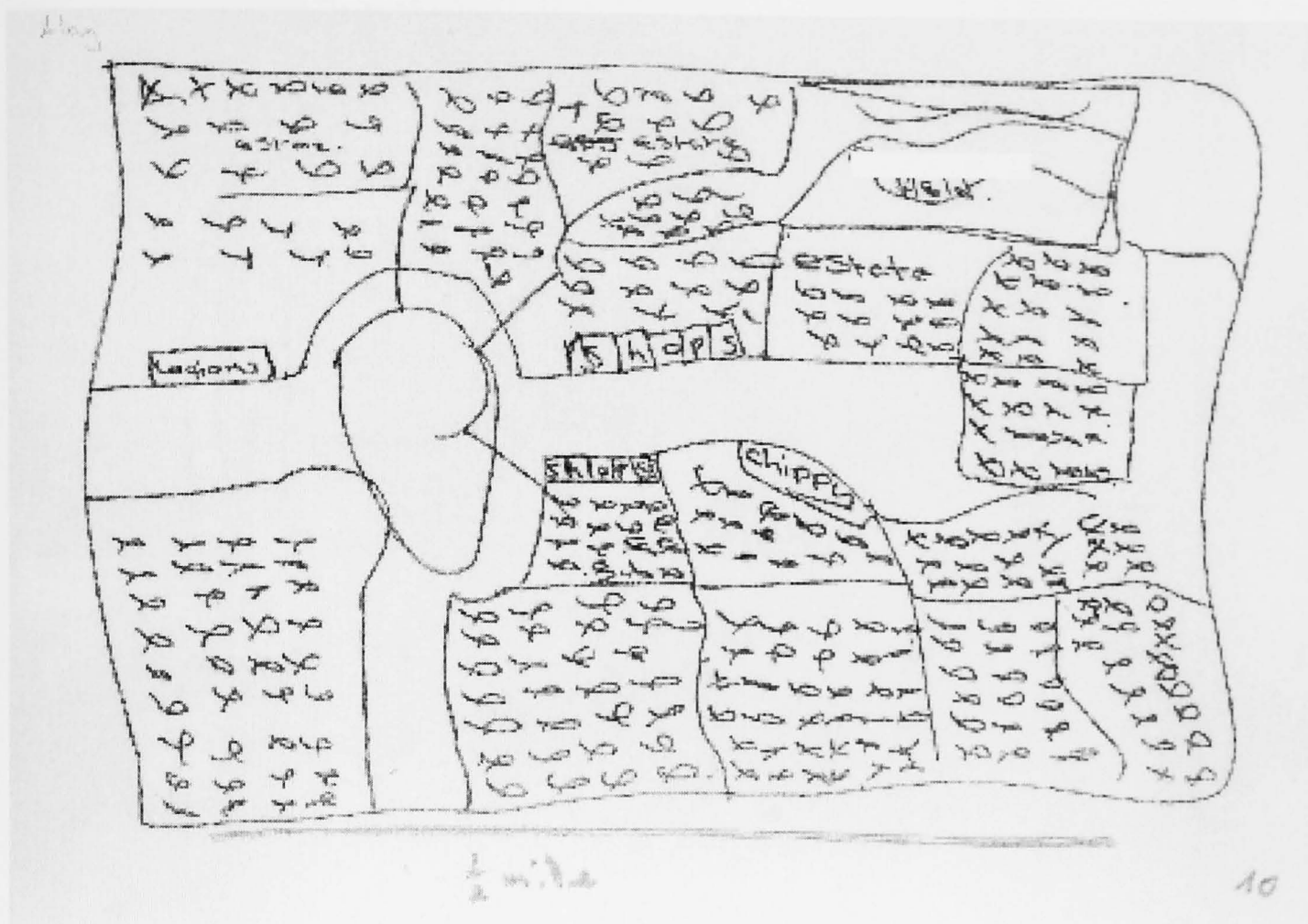
Map 7

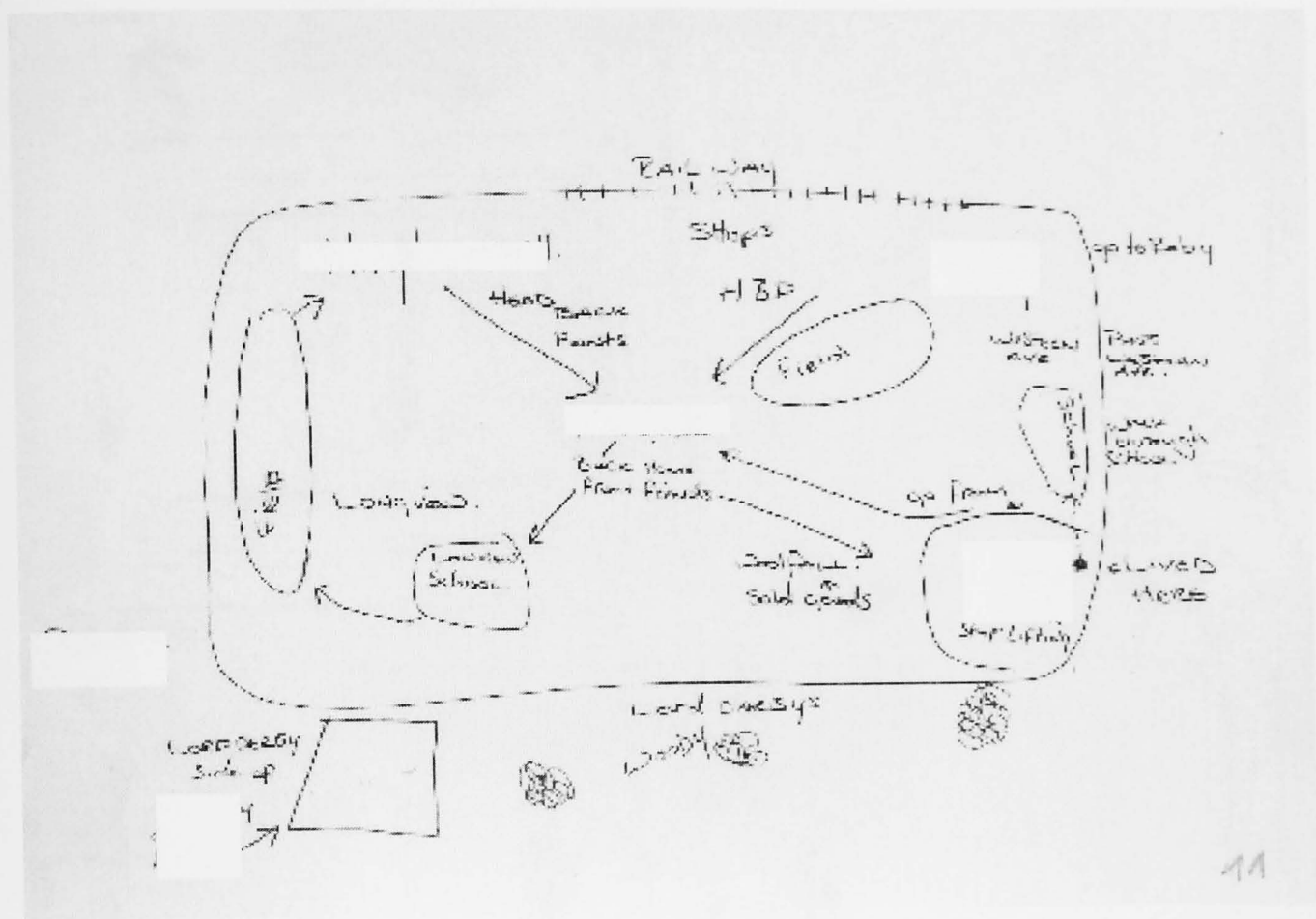


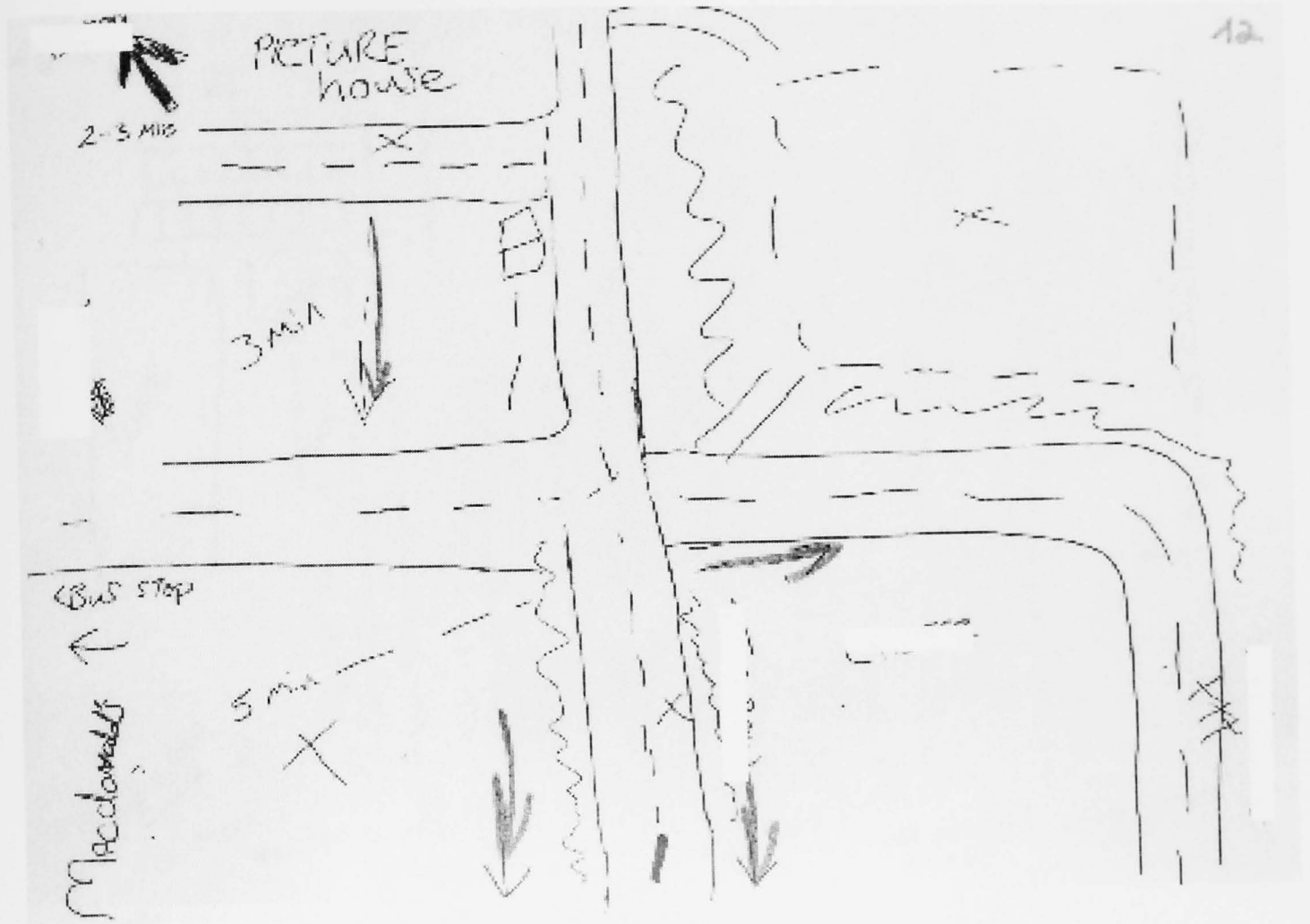
Map 8



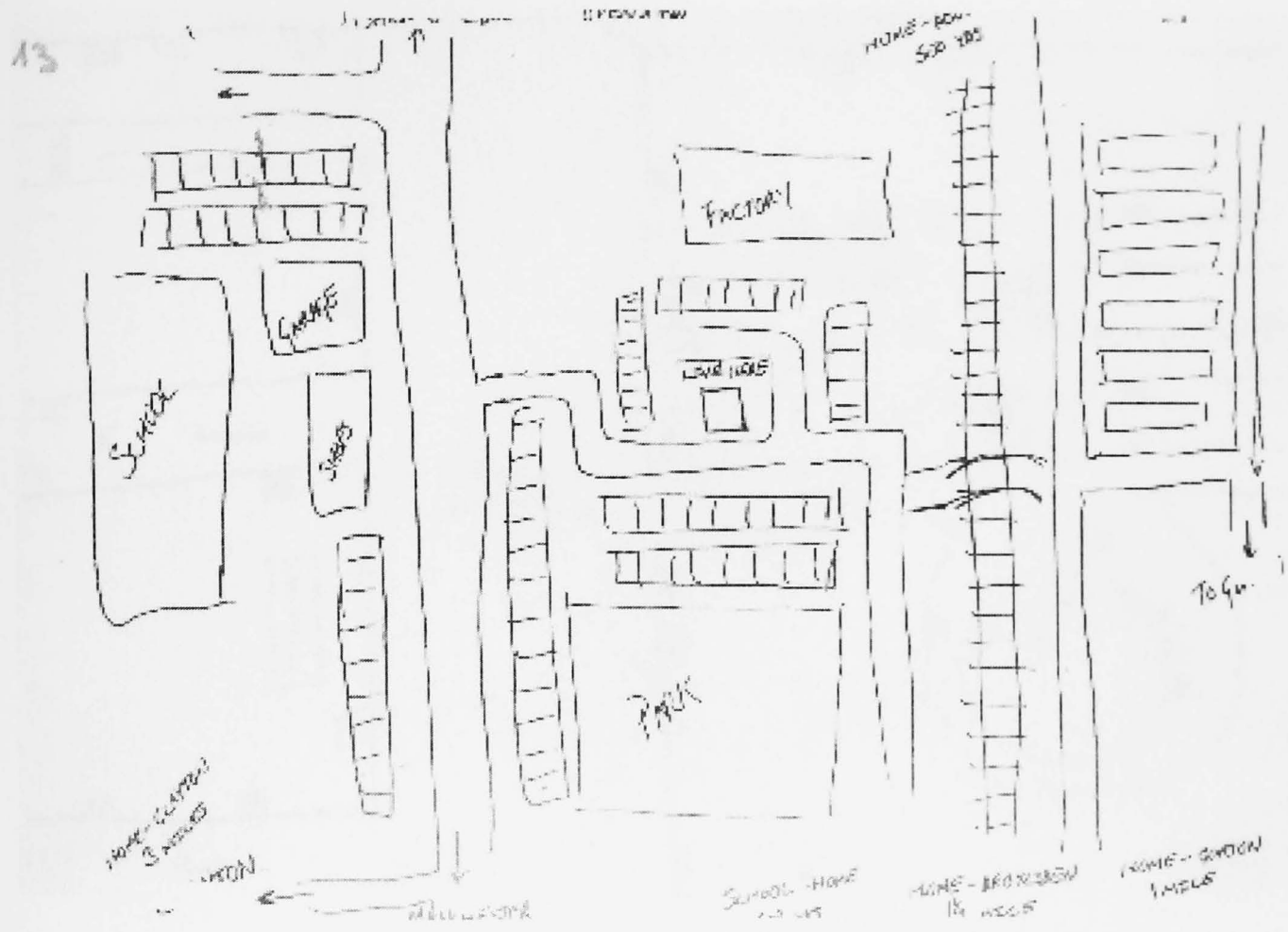




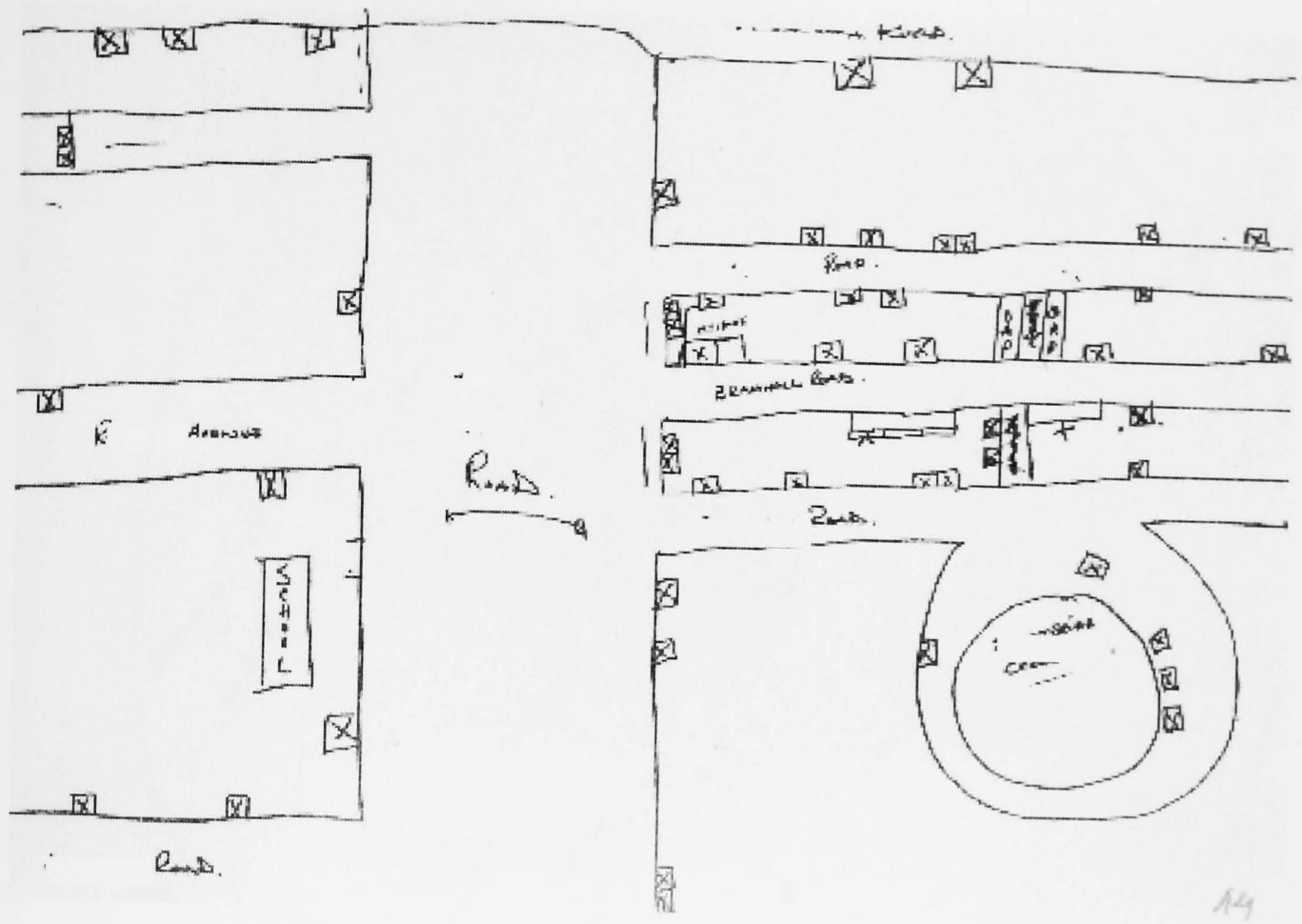


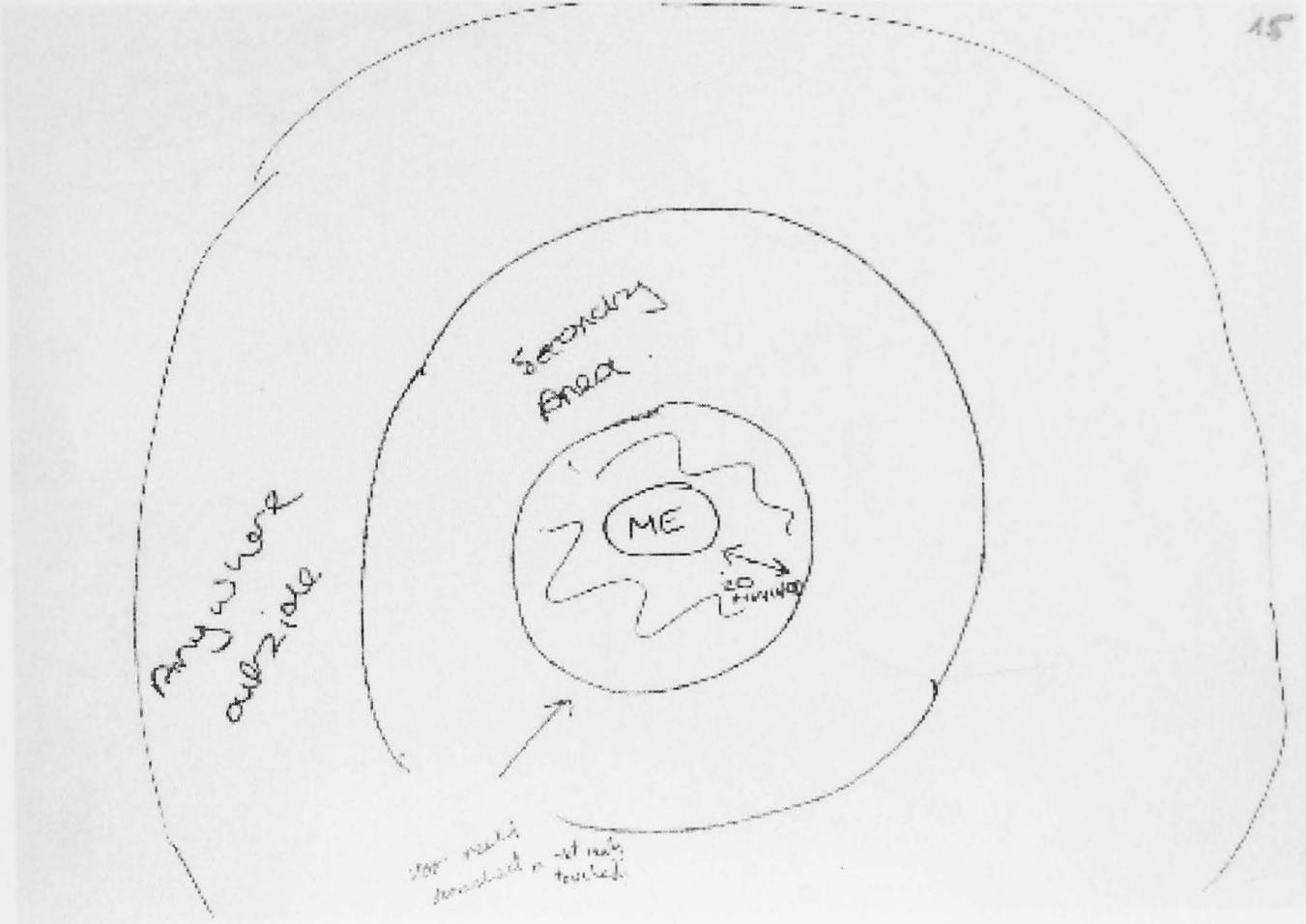


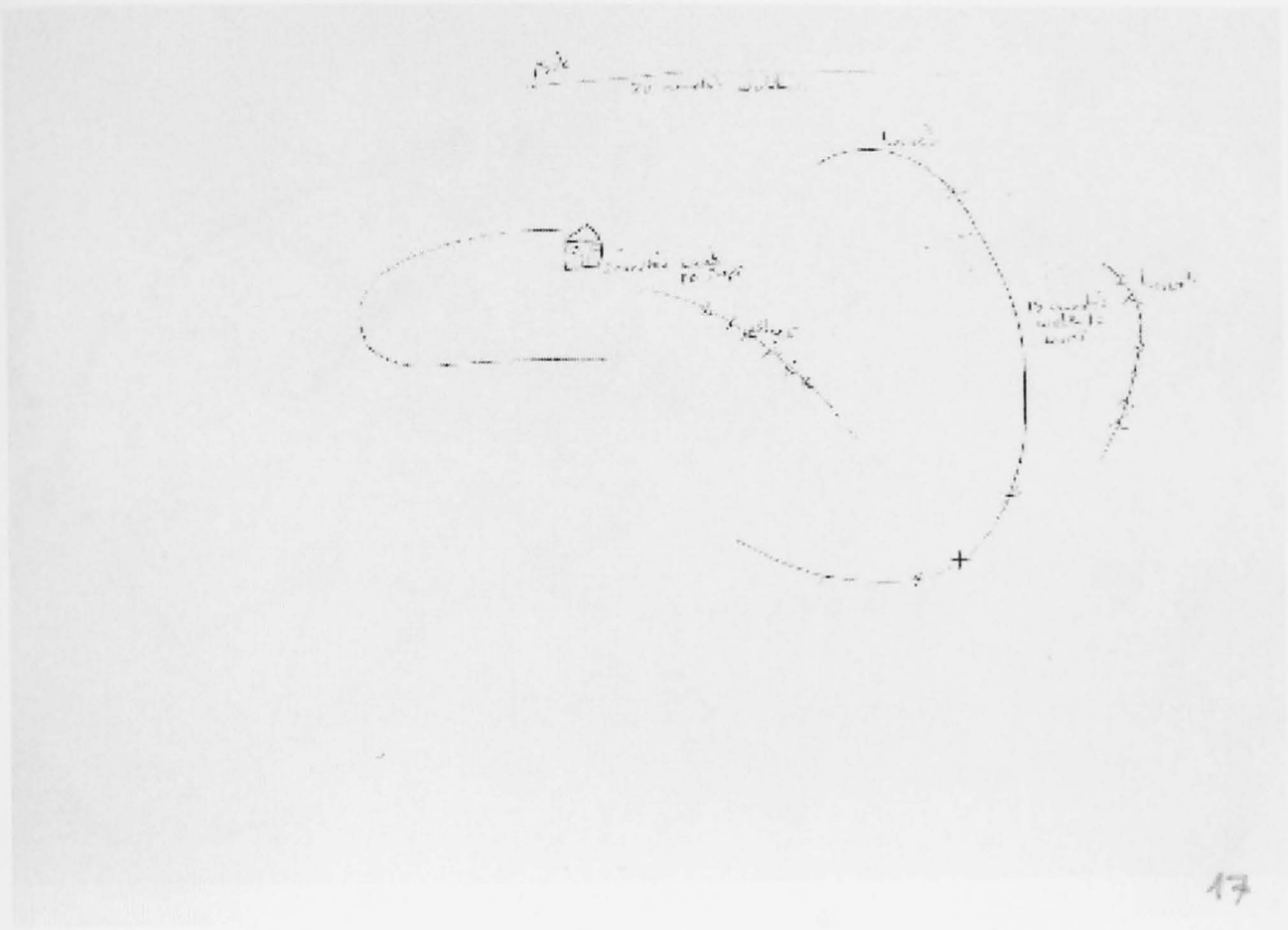
Map 13

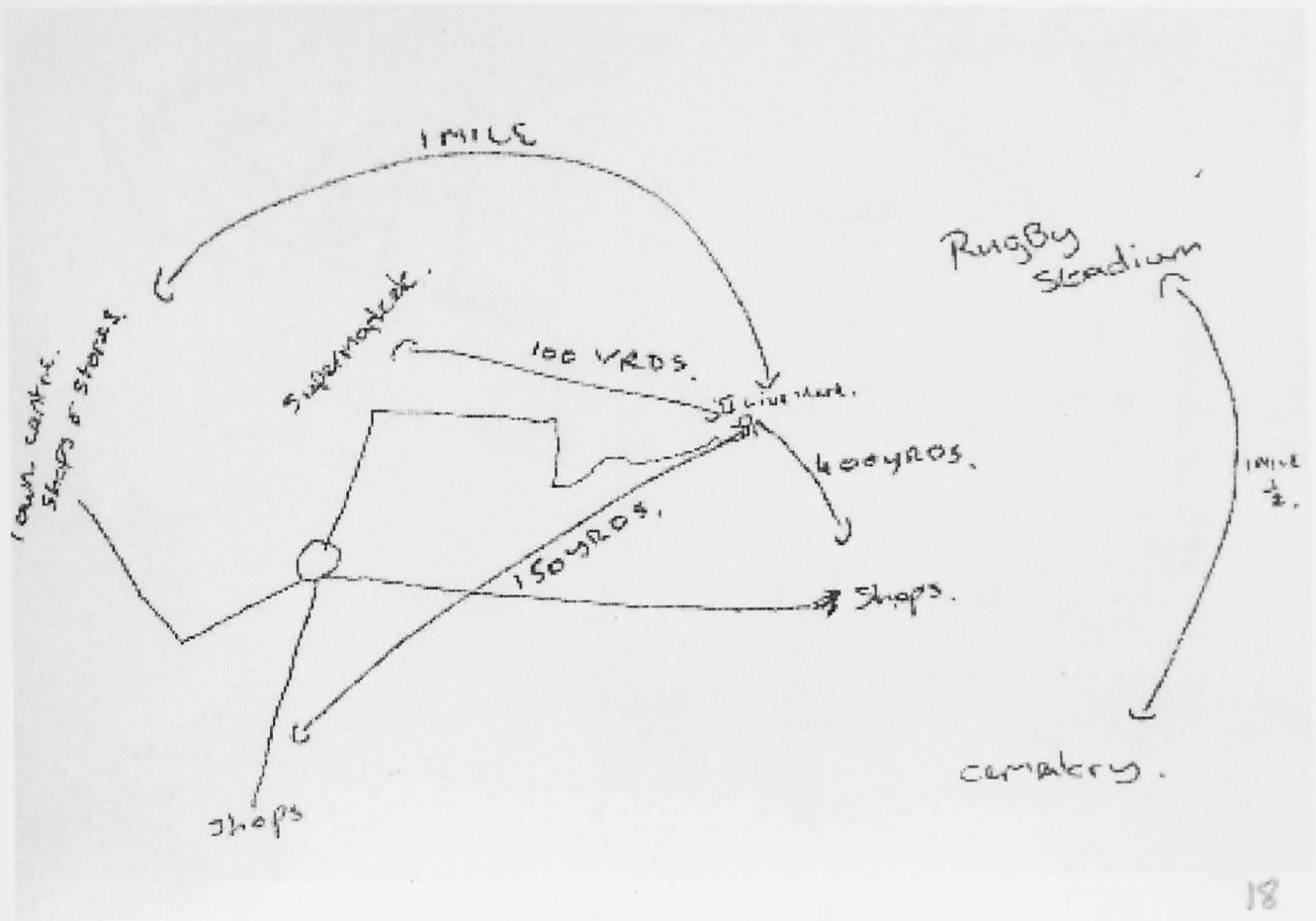


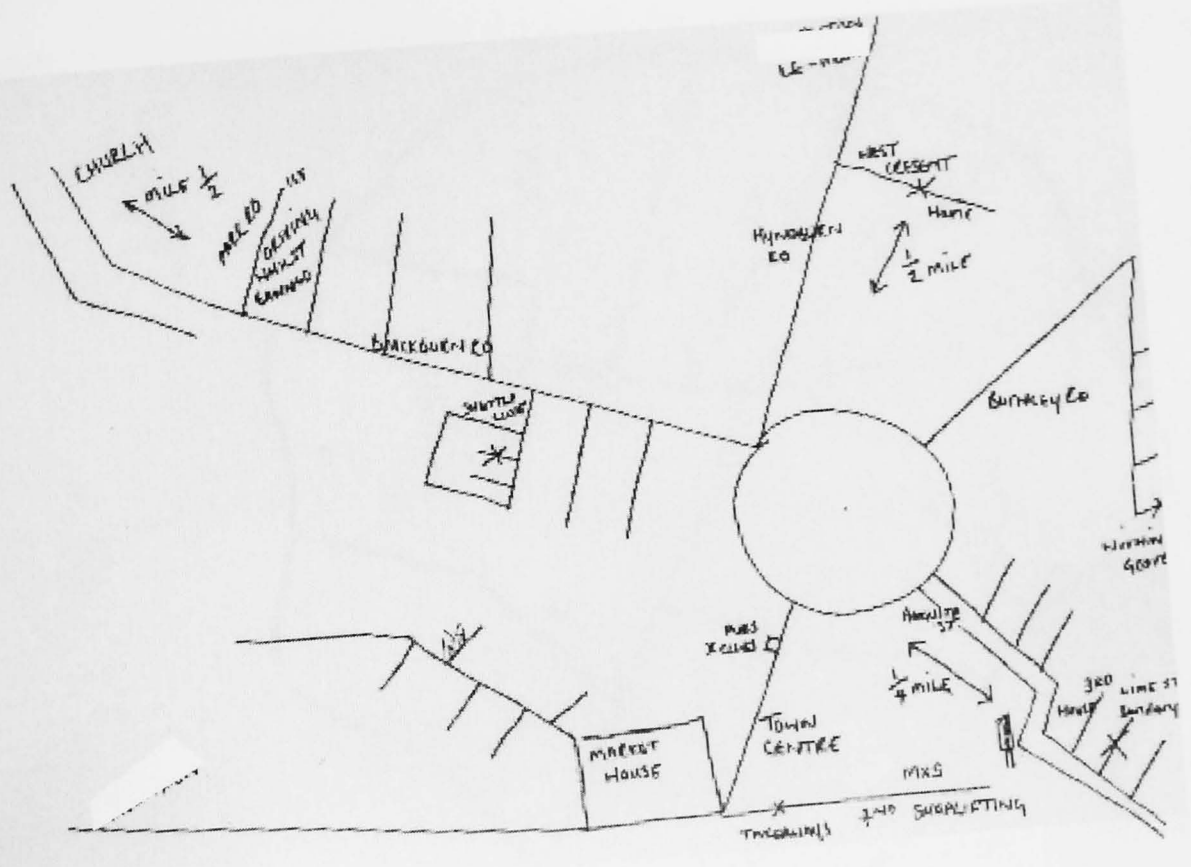
Map 14



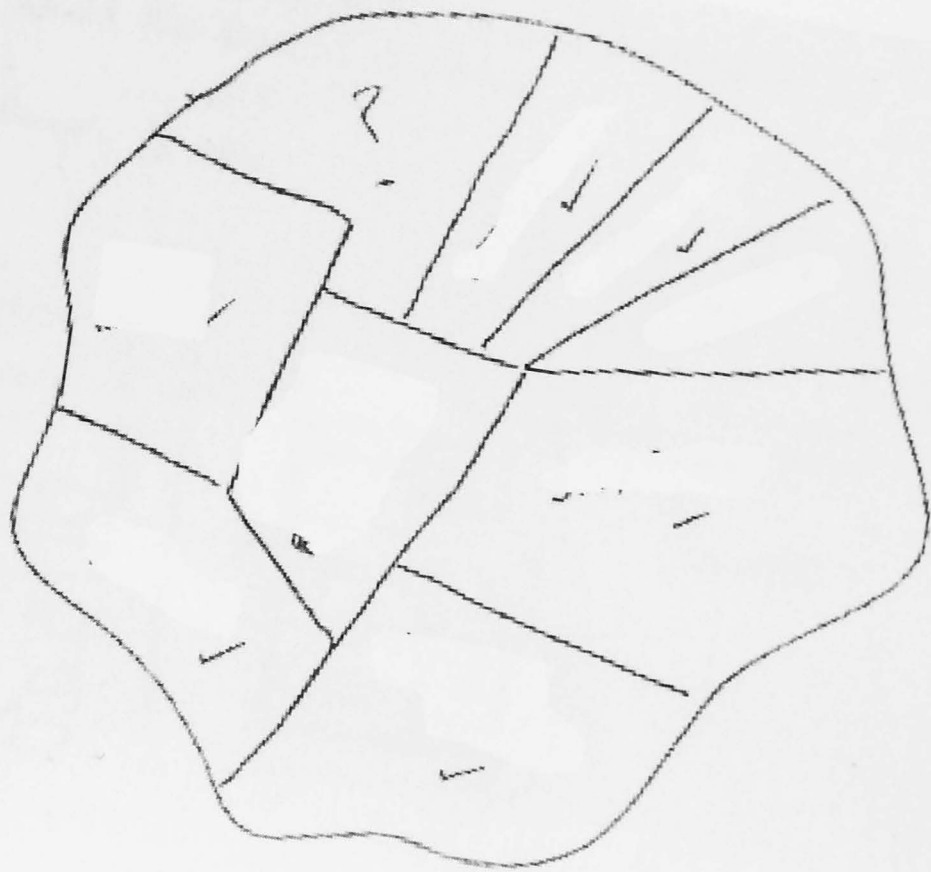








19

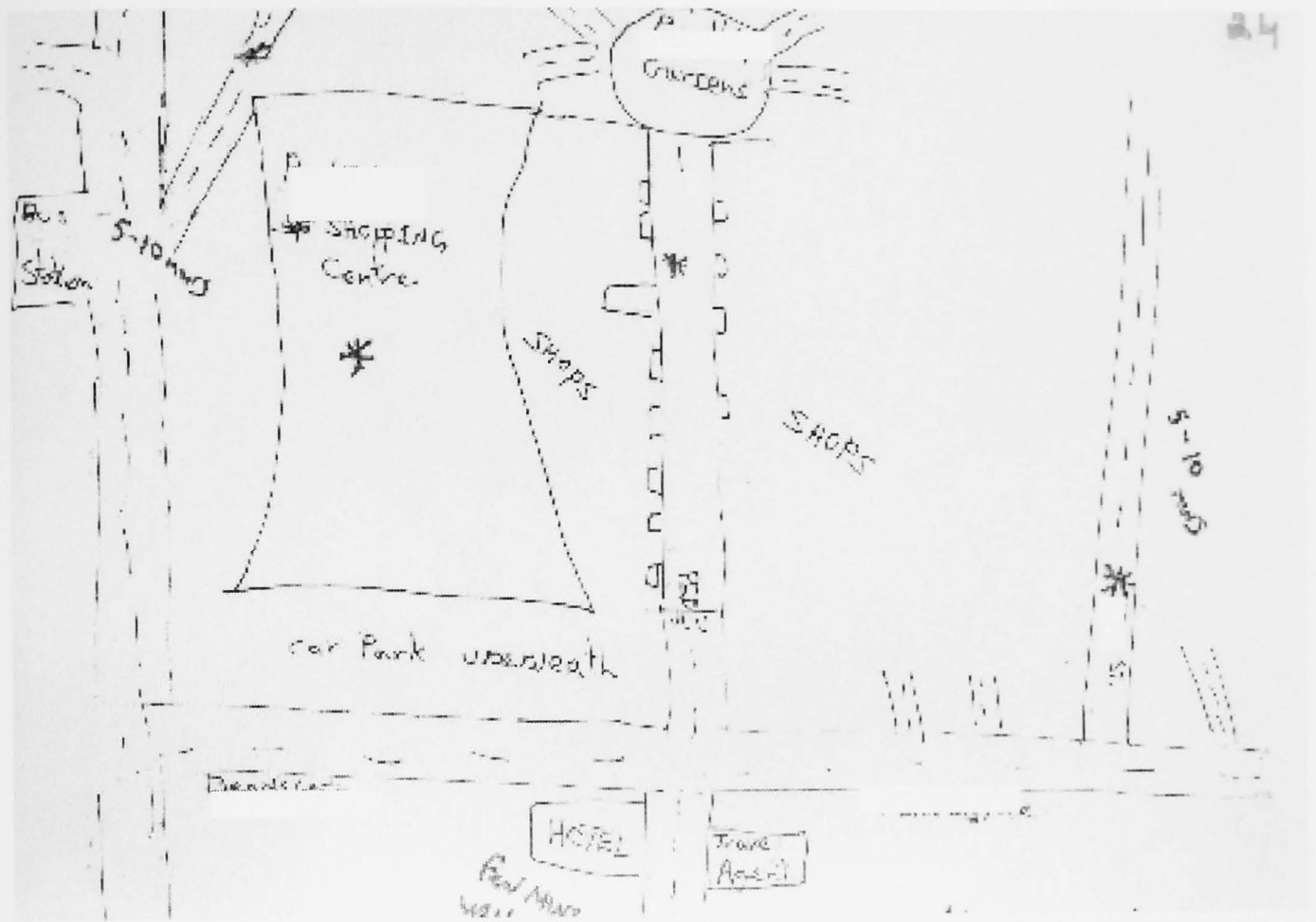


20

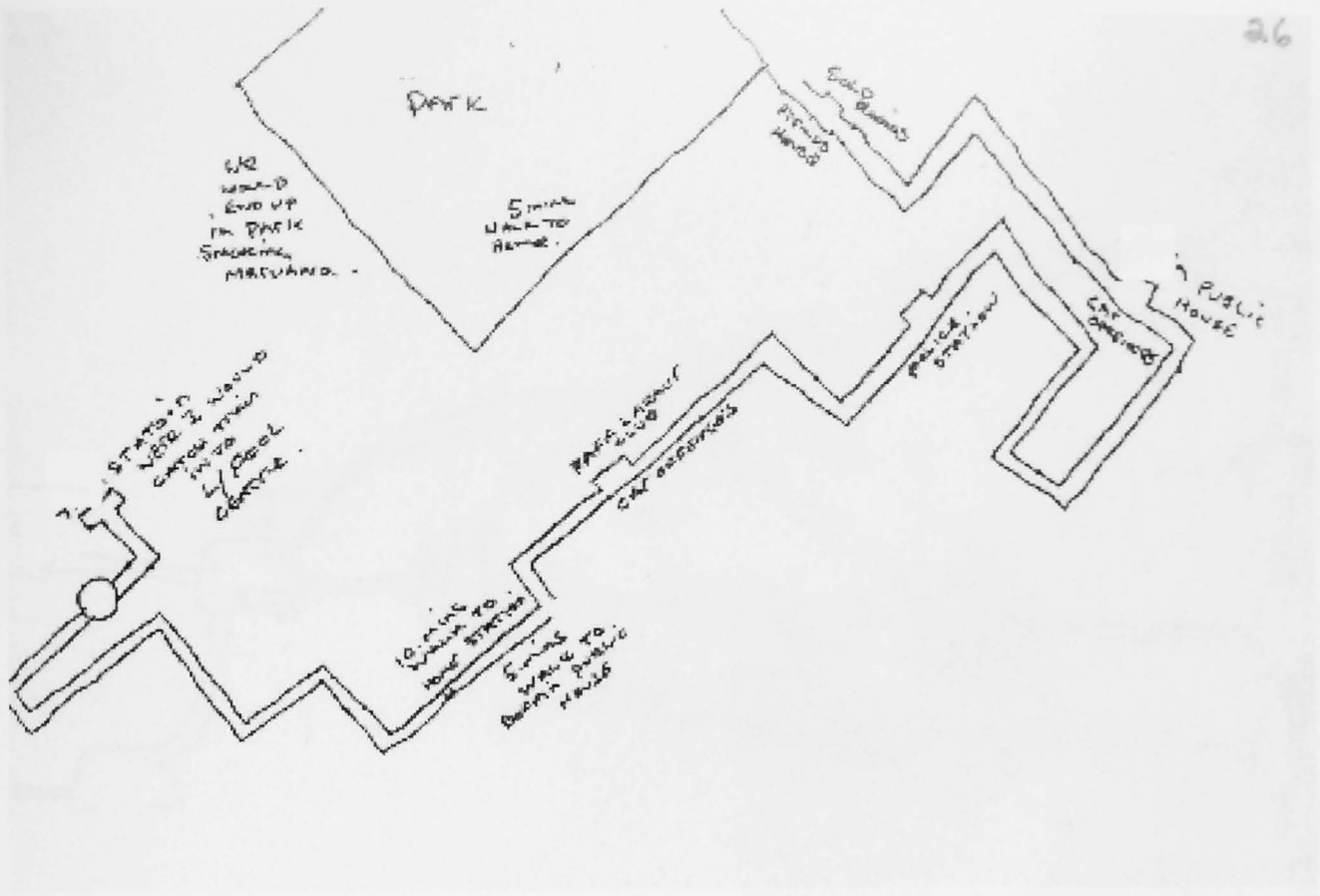
From [dashed line] to [dashed line] City Centre
would Be Roughly 2 miles
[dashed line] to Full [dashed line]
Roughly $\frac{1}{2}$ mile

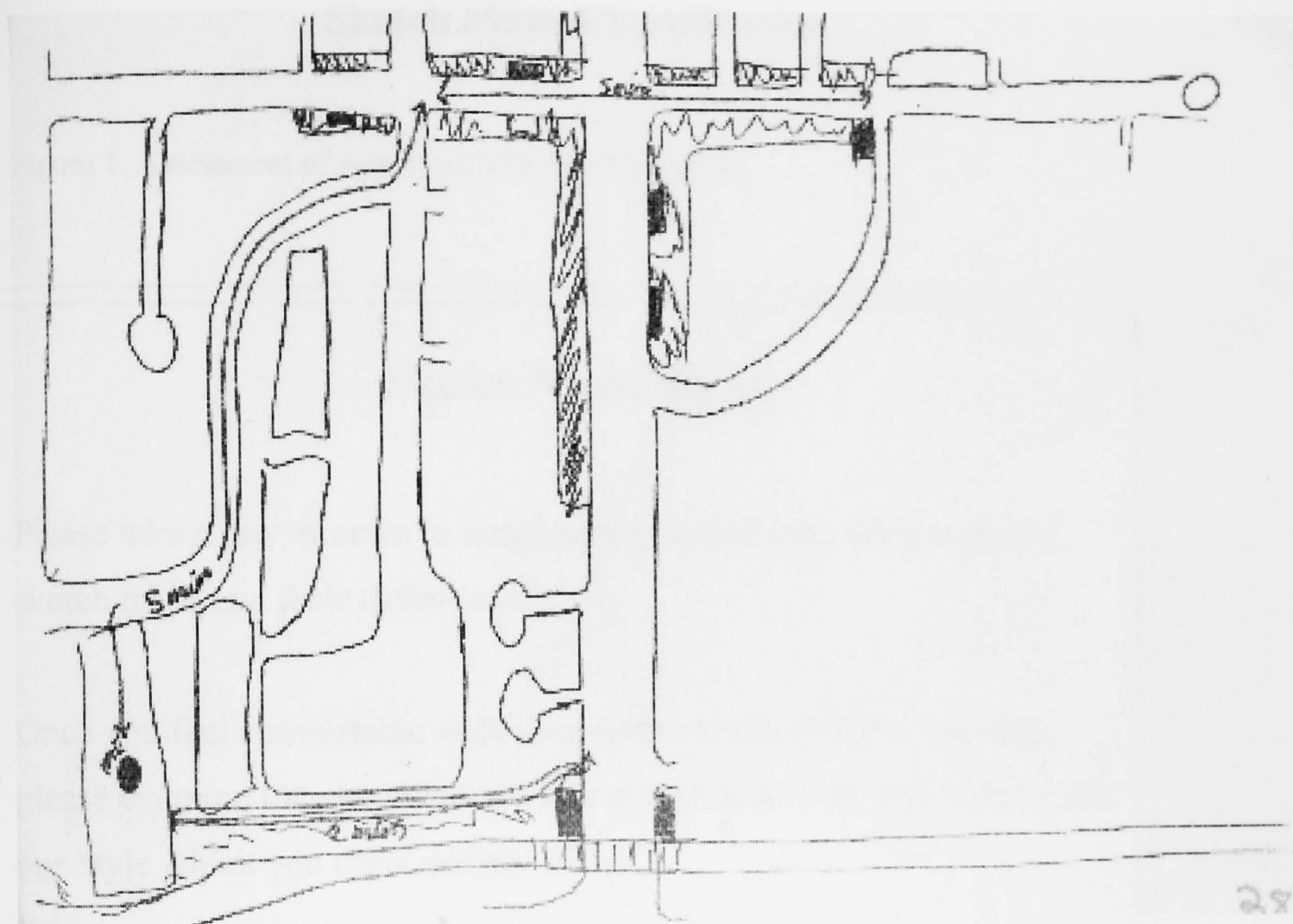


21









If you have any questions about this map, please contact the author.

Appendix 5

Sketch Maps Classification

Figure 1: Assessment of Appleyard's Sketch Map Styles

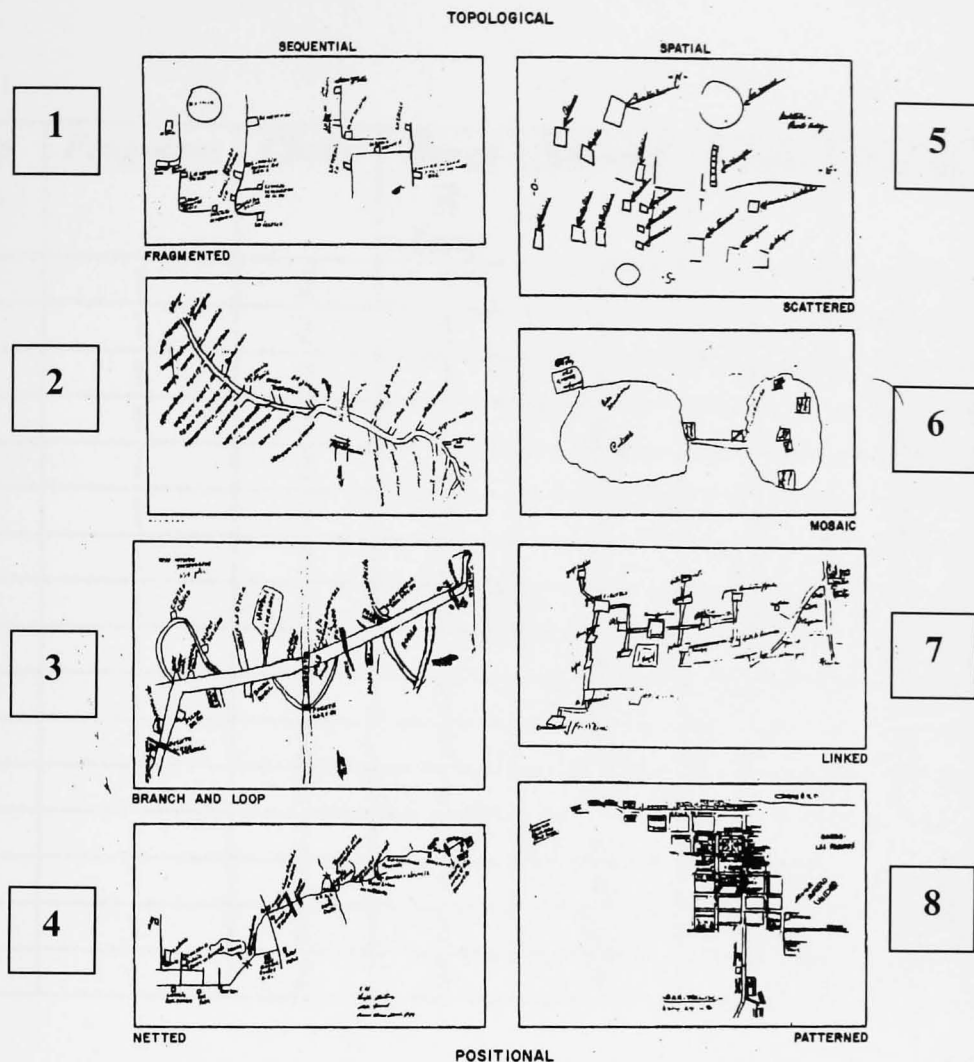
Sketch Maps Styles

Please take a few minutes to familiarise yourself with the 8 styles of sketch maps and their definitions.

Once you feel comfortable with your understanding of the 8 groups, please examine the photocopied maps provided and for each map circle one style which you think defines it best.

If you have any questions please do not hesitate to ask

Thank you



a. Reprinted from *Planning Urban Growth and Regional Development* (1969), by Lloyd Rodwin and Associates pp. 438-9. By permission of MIT Press.

- A. Sequential Dominant Style: When the maps are drawn according to road or street system.
1. *Fragment*: The most primitive map style. It contains fragments of sequences unconnected to each other and out of serial order.
 2. *Chain*: A more schematic type of map which includes curves and bends.
 3. *Branch and Loop*: Contains loops and branches as common outcrops from the basic linear system
 4. *Network*: More completed road system. These maps may include river location
- B. Spatial Dominant Style: When the maps include spatial elements as landmarks and district.
5. *Scatter*: The most primitive type. It contains groups of landmarks without a connection between them.
 6. *Mosaic*: Contains districts and boundaries
 7. *Link*: Places or districts are connected by a road system
 8. *Pattern*: The most complete and accurate type of map, with an outline of the area.

Name: _____

Date: _____

<i>Map No.</i>	<i>Fragment</i>	<i>Chain</i>	<i>Brand & Loop</i>	<i>Network</i>	<i>Scatter</i>	<i>Mosaic</i>	<i>Link</i>	<i>Pattern</i>
1	1	2	3	4	5	6	7	8
2	1	2	3	4	5	6	7	8
3	1	2	3	4	5	6	7	8
4	1	2	3	4	5	6	7	8
5	1	2	3	4	5	6	7	8
6	1	2	3	4	5	6	7	8
7	1	2	3	4	5	6	7	8
8	1	2	3	4	5	6	7	8
9	1	2	3	4	5	6	7	8
10	1	2	3	4	5	6	7	8
11	1	2	3	4	5	6	7	8
12	1	2	3	4	5	6	7	8
13	1	2	3	4	5	6	7	8
14	1	2	3	4	5	6	7	8
15	1	2	3	4	5	6	7	8
16	1	2	3	4	5	6	7	8

Figure 2: Assessment of Refined Sketch Map Styles

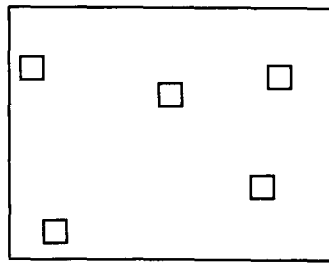
Sketch Maps Styles

Please take a few minutes to familiarise yourself with the 5 styles of sketch maps and their definitions.

Once you feel comfortable with your understanding of the 5 groups, please examine the photocopied maps provided and for each map circle one style which you think defines it best.

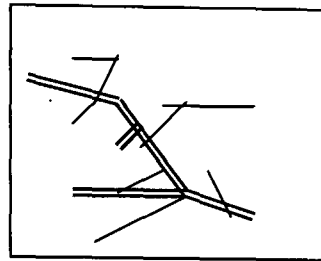
If you have any questions please do not hesitate to ask

Thank you



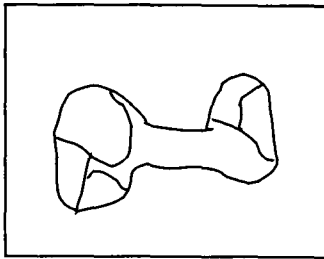
Disperse

1



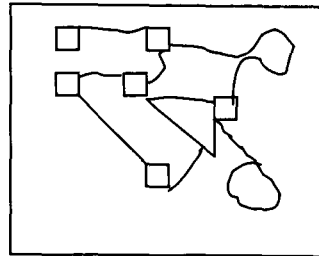
String

2



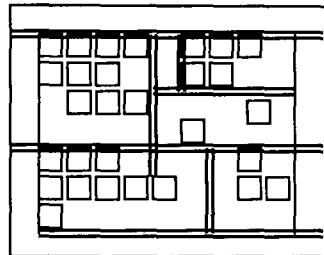
Border

3



Link

4



Pattern

5

1. *Disperse*: The most primitive map style. It contains fragments of sequences or elements unconnected to each other and out of serial order.
2. *String*: A schematic type of maps, which contains curves and bends.
3. *Border*: The map distinctly contains districts and borders.
4. *Link*: Places or districts are clearly connected by a road system.
5. *Pattern*: The most complete type of map, which resembles a cartographic map.

Name: _____

Date: _____

<i>Map No.</i>	<i>Disperse</i>	<i>String</i>	<i>Border</i>	<i>Link</i>	<i>Pattern</i>
1	1	2	3	4	5
2	1	2	3	4	5
3	1	2	3	4	5
4	1	2	3	4	5
5	1	2	3	4	5
6	1	2	3	4	5
7	1	2	3	4	5
8	1	2	3	4	5
9	1	2	3	4	5
10	1	2	3	4	5
11	1	2	3	4	5
12	1	2	3	4	5
13	1	2	3	4	5
14	1	2	3	4	5
15	1	2	3	4	5
16	1	2	3	4	5

Table 1: Group 1 Judging 28 Sketch Maps by Appleyard's Styles

SERIAL NUMBER	OFFENDER NUMBER	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	JUDGE 6	JUDGE 7	JUDGE 8	JUDGE 9	JUDGE 10	AGREEMENT PERCENTAGE	STYLE NUMBER
1	1	6	8	7	7	6	7	7	8	7	8	50	7
2	2	3	7	2	2	8	7	2	8	2	7	40	2
3	3	7	7	2	2	7	6	7	7	2	2	50	7
4	4	6	6	5	6	6	5	5	5	5	1	50	5
5	5	7	7	2	7	4	7	7	3	7	3	60	7
6	6	1	2	6	6	2	1	1	2	7	6	33	1,2,6
7	7	5	5	5	5	5	5	5	5	5	5	100	5
8	8	6	6	6	6	6	6	6	6	6	6	100	6
9	9	6	6	5	6	5	6	6	6	5	5	60	6
10	10	6	5	6	7	8	6	6	6	6	2	60	6
11	11	6	5	6	6	6	6	6	6	6	6	90	6
12	12	2	6	7	2	7	7	2	7	7	1	50	7
13	13	7	7	7	7	8	7	4	7	7	3	70	7
14	14	3	7	7	3	8	3	2	3	3	3	60	3
15	16	6	6	5	6	5	6	5	5	6	6	60	6
16	19	8	7	4	3	8	4	4	4	4	4	60	4
17	20	5	1	5	1	1	6	5	5	5	5	60	5
18	21	1	5	1	6	1	6	5	5	7	1	40	1
19	22	4	7	3	3	4	3	7	2	7	3	40	3
20	24	6	1	7	6	6	6	6	6	6	6	80	6
21	25	7	7	2	3	7	7	2	4	1	7	50	7
22	26	6	5	6	6	7	7	5	6	7	7	40	6,7
23	27	5	5	2	6	7	7	5	1	7	2	30	5,7
24	31	7	7	7	6	8	7	7	3	2	7	60	7
25	32	1	1	1	3	7	7	5	5	5	6	30	1,5
26	33	2	7	2	6	2	7	2	2	2	2	70	2
27	34	7	3	7	3	3	7	7	7	7	3	60	7
28	37	3	7	2	2	4	7	2	4	2	1	40	2
Total		139	153	127	132	156	166	133	138	143	118		

Table 2: Group 2 Judging 16 Sketch Maps by Appleyard's Styles

OFFENDER NUMBER	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	JUDGE 6	JUDGE 7	JUDGE 8	JUDGE 9	JUDGE 10	AGREEMENT PERCENTAGE	STYLE NUMBER
1	8	7	7	8	7	7	7	7	3	3	60	7
2	7	4	2	8	2	4	7	2	7	7	40	7
3	1	1	1	1	1	1	5	1	2	2	70	1
4	7	7	7	2	6	7	1	5	7	1	50	7
5	1	5	5	5	5	5	5	1	5	5	80	5
6	7	7	2	2	6	7	6	8	7	7	50	7
7	3	4	2	3	2	4	2	7	2	7	40	2
8	6	7	4	1	7	1	1	6	3	6	30	6,1
9	1	5	5	5	5	5	1	1	2	1	50	5
10	7	6	6	7	6	5	5	5	2	1	30	6,5
11	1	4	1	7	2	1	1	1	8	6	50	1
12	6	7	5	6	6	1	5	1	7	5	30	6,5
13	2	6	5	7	2	5	1	1	1	7	30	1
14	3	7	1	4	7	7	2	1	7	3	40	7
15	6	6	6	6	5	6	1	6	6	6	80	6
16	5	6	6	5	6	5	5	1	2	7	40	5
Total	71	89	65	77	75	71	55	54	71	74		

Table 3: Group 1 Judging 28 Sketch Maps by Refined Styles

SERIAL NUMBER	OFFENDER NUMBER	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	JUDGE 6	JUDGE 7	JUDGE 8	JUDGE 9	JUDGE 10	AGREEMENT PERCENTAGE	STYLE NUMBER
1	1	5	5	5	4	5	4	4	4	4	5	50	4,5
2	2	4	4	2	2	5	4	4	5	5	3	40	4
3	3	4	4	4	2	4	4	4	2	4	2	70	4
4	4	3	3	3	3	3	3	3	1	3	3	90	3
5	5	4	4	4	4	5	3	4	4	4	3	70	4
6	6	1	1	1	2	4	2	1	2	1	1	60	1
7	7	1	1	1	1	1	1	1	1	1	1	100	1
8	8	3	3	3	3	3	3	3	3	3	3	100	3
9	9	1	3	1	2	3	3	1	3	3	3	60	3
10	10	4	4	3	3	5	3	2	4	3	1	40	3
11	11	3	1	3	3	3	3	4	3	1	3	70	3
12	12	2	2	4	2	2	4	2	3	4	2	60	2
13	13	5	4	4	4	5	4	2	5	5	2	40	4,5
14	14	4	5	4	4	5	5	5	4	5	4	50	4,5
15	16	3	1	3	3	3	3	1	1	3	3	70	3
16	19	4	5	4	4	5	4	5	4	5	5	50	4,5
17	20	1	1	1	1	2	2	1	2	2	1	60	1
18	21	2	1	1	2	2	2	1	2	4	2	60	2
19	22	2	2	2	2	2	4	2	4	4	4	60	2
20	24	3	3	3	3	3	3	3	3	3	3	100	3
21	25	4	5	4	4	4	4	4	4	4	4	90	4
22	26	1	1	3	4	4	4	4	4	2	4	60	4
23	27	4	4	2	4	2	4	2	2	4	2	50	2,4
24	31	4	5	2	4	5	4	4	4	4	4	70	4
25	32	2	2	2	2	2	4	2	2	2	3	80	2
26	33	4	4	4	4	2	4	4	2	2	2	60	4
27	34	4	4	4	4	4	4	4	4	4	4	100	4
28	37	4	4	2	2	5	2	2	4	2	4	50	2
Total		86	86	79	82	98	94	79	86	91	81		

Table 4: Group 2 Judging 16 Sketch Maps by Refined Styles

OFFENDER NUMBER	JUDGE 1	JUDGE 2	JUDGE 3	JUDGE 4	JUDGE 5	JUDGE 6	JUDGE 7	JUDGE 8	JUDGE 9	JUDGE 10	AGREEMENT PERCENTAGE	STYLE NUMBER
1	5	5	5	5	4	4	4	4	4	5	50	4,5
2	4	4	5	2	2	4	4	2	5	5	40	4
3	1	2	2	1	1	1	1	1	2	2	60	1
4	4	5	4	4	4	2	4	2	5	4	60	4
5	1	1	1	1	1	1	1	2	1	1	90	1
6	4	4	4	5	4	4	4	2	5	5	60	4
7	2	2	4	4	4	2	2	2	4	4	50	2
8	2	4	3	4	4	3	1	3	2	2	30	2,3,4
9	1	2	2	1	5	2	1	1	2	1	50	1
10	2	3	2	3	3	3	1	1	4	4	40	3
11	3	5	2	5	2	2	1	1	5	3	30	2,5
12	4	2	2	4	4	1	1	4	3	3	40	4
13	2	2	3	4	4	1	2	1	1	2	40	2
14	4	4	4	5	2	4	4	2	4	4	70	4
15	3	3	3	3	3	3	1	1	3	3	80	3
16	3	3	3	1	3	1	1	1	3	2	50	3
Total	45	51	49	52	50	38	33	30	53	50		

Table 5: A summary of Agreement's Percentage

	GROUP 1 (28 MAPS)	GROUP 2 (16 MAPS)	TOTAL (44 MAPS)
Assessment 1	57	48	53
Assessment 2	66	53	61

Appendix 6

The Participants

Table 1: Offenders' Age Group

AGE GROUP	FREQUENCY N=28	PERCENT (%)
21-25	8	28.6
26-30	10	35.7
31-35	7	25
36+	3	10.7
Total	28	100

Table 2: Offenders' Main Care Taker

MAIN CARETAKER	FREQUENCY	PERCENT
Mother and Father	10	35.7
Mother	8	28.6
Mother and Stepfather	3	10.7
Father and Stepmother	2	7.1
Other relatives	1	3.6
Foster care/Adopted Parents	1	3.6
Other	3	10.7
Total	28	100

Table 3: Offenders' Marital Status

MARITAL STATUS	FREQUENCY N=28	PERCENT (%)
Single	17	60.7
Married	2	7.1
Had a partner	1	3.6
Lived with a partner	7	25
Divorced	1	3.6
Total	28	100

Table 4: Offenders' Education Level

Education Level	FREQUENCY N=28	PERCENT (%)
Primary School	3	10.7
Comprehensive/Private	11	39.3
O level/ GCSE	5	17.9
A level/college/NVQ/HND/ BTEC	9	32.1
Total	28	100

Table 5: Type of Crime for Which Offenders Were Convicted

TYPE OF CRIME	FREQUENCY N=28	PERCENT (%)
Burglary	16	57.1
Robbery	5	17.9
Theft	3	10.7
Combined	4	14.3
Total	28	100.0

Table 6: Number of Crimes Offenders' Committed

ESTIMATED NUMBER OF OFFENCES	FREQUENCY N=28	PERCENT (%)
1-10	2	7.1
11-30	4	14.3
31-50	2	7.1
51-100	3	10.7
101-500	8	28.6
501-1000	3	10.7
+1000	6	21.4
Total	28	100

Table 7: Summary of Criminal Activity and Conviction Rate

TYPE OF CRIME	AVERAGE NUMBER OF CRIMES COMMITTED	AVERAGE NUMBER OF CONVICTIONS	PERCENT OF SUCCESS IN CONVICTION VS. CRIMES COMMITTED
Theft	70 (51-100)	8 (1-10)	11%
Shoplifting	233 (101-500)	6 (1-10)	3%
Handling Stolen Property	118 (101-500)	1 (1-10)	0.8%
Robbery	8 (1-10)	1 (1-10)	12.5%
Domestic Burglary	65 (51-100)	6 (1-10)	9%
Commercial Burglary	132 (101-500)	4 (1-10)	3%
Theft of Cars	40 (31-50)	2 (1-10)	5%
Theft from Cars	70 (51-100)	1 (1-10)	1%
Fraud (e.g. credit cards/cheques)	6 (1-10)	1 (1-10)	6%
Damage to Property	9 (1-10)	1 (1-10)	11%

Table 8: Offenders' Tendency to Offend with Others

	FREQUENCY N=28	PERCENT (%)
Only by Himself	2	7.1
Mostly by Himself	10	35.7
Often with Others	2	7.1
Mostly with Others	8	28.6
Only with Others	6	21.4

Table 9: Frequency of Drug use and Type of Drug

FREQUENCY OF USE	ALCOHOL	MARIJUANA	SMIFFING GLUE	BARBITURATES	SPEED	ECSTASY	HEROIN	COCAINE	METHADONE
Never	2	4	20	8	6	9	8	4	14
Rarely	6	1	4	7	3	5	1	6	5
Quite Often	6	3	0	3	7	4	1	7	4
Often	4	4	3	4	5	1	3	3	1
Very Often	10	15	1	6	7	9	15	8	4

Appendix 7

Information Search

Table 1: Offenders' Information Search

INFORMATION SEARCHED	FREQUENCY (N=28)	PERCENT (%)
Information Source		
Direct Inspection	29	100
Heard from Co-Offender	19	67.9
Heard from a Family Member	1	3.6
Heard from a Buyer	17	60.7
Heard from an Acquaintance	13	46.4
Total Number of Sources Considered		
Mean	3	
Median	3	
Type of Information (Product Information)		
Potential Price	9	32.1
Cash	18	64.3
Jewellery	12	49.2
Cloths	8	28.6
Food	4	14.3
Electrical Equipment	11	39.3
Other	16	43.2
Type of Information (location information)		
Awareness of police location	16	57.1
Awareness of escape route	15	53.6

Table 2: Mode of Travel

MODE OF TRAVEL	FREQUENCY (N=28)	PERCENT (%)
Walk to/from crime site location	19	67.9
Offender drive to/from crime site location	14	50
Other drive to/from crime site location	12	42.9
Ride a bike to/from crime site location	4	14.3
Take bus to/from crime site location	5	17.9
Take train to/from crime site location	5	17.9

Table 3: Extent of Information Search

EXTENT OF SEARCH	FREQUENCY (N=28)	PERCENT (%)
Limited Search Only	4	14.3
Extensive Search	9	32.1
Mixed Strategy	8	28.6
Unknown	7	25.0
Total	28	100.0

Appendix 8 Offenders' Cognitive Maps

Table 1: Overview of Results of Extent of Search, Mobility Levels and Map Style

SERIAL NUMBER	OFFENDER NUMBER	MAP STYLE	LOCAL	OCCASIONAL TRAVELLER	FIXED BASE	NO FIXED BASE	LIMITED SEARCH	EXTENSIVE SEARCH	MIXED STRATEGY
1	1	4,5		√					√
2	2	4		√					√
3	3	4				√			√
4	4	3			√			√	
5	5	4		√					
6	6	1		√					
7	7	1	√				√		
8	8	3			√		√		
9	9	3			√				
10	10	3		√					
11	11	3	√					√	
12	12	2	√						
13	13	4,5				√		√	
14	14	4,5		√					
15	16	3				√		√	
16	19	4,5				√		√	
17	20	1				√		√	
18	21	2			√				√
19	22	2		√			√		
20	24	3				√			
21	25	4			√		√		
22	26	4		√					√
23	27	2,4			√				√
24	31	4		√					√
25	32	2			√			√	
26	33	4		√				√	
27	34	4			√			√	
28	37	2			√			√	

Table 2: Level of Maps Complexity and Mobility Levels

MAP STYLE	LOCAL	OCCASIONAL TRAVELLER	FIXED BASE	NO FIXED BASE	TOTAL
Dispense, String and Border	3	3	7	3	16
Link and Pattern	0	7	3	3	12
TOTAL	3	10	10	6	29

Table 3: Type of Element and Mobility Levels

MAP STYLE	LOCAL	OCCASIONAL TRAVELLER	FIXED BASE	NO FIXED BASE	TOTAL
Dispense and Border	2	2	3	3	10
String, Link and Pattern	1	8	7	3	18
TOTAL	3	10	10	6	28

Table 4: Maps Complexity and Extent of Search

MAP STYLE	LIMITED SEARCH	EXTENSIVE SEARCH	MIXED STRATEGY	TOTAL
Dispense, String and Border	3	6	2	11
Link and Pattern	1	4	5	10
Total	4	10	7	21

Table 5: Type of Element and Extent of Search

MAP STYLE	LIMITED SEARCH	EXTENSIVE SEARCH	MIXED STRATEGY	TOTAL
Dispense and Border	2	4	0	6
String, Link and Pattern	2	6	7	15
TOTAL	4	10	7	21

Appendix 9

Evaluating Alternatives

Table 1: Preference of Weather Conditions

WEATHER	NUMBER OF PARTICIPANTS
Winter	5
Summer	2
Does not matter	12
Missing	9
TOTAL	28

Table 2: Preferences of Topological Layout

TOPOLOGICAL LAYOUT	NUMBER OF PARTICIPANTS
Flat ground	7
Hill	2
Does not matter	8
Missing	12
TOTAL	28

Table 3: The Presence of Other Offenders in an Area

PRESENCE OF OTHERS	NUMBER OF PARTICIPANTS
Avoid Area	14
Go Anyway	6
Missing	8
TOTAL	28

Table 4: Number of Offenders Thinking of Chances of Getting Caught/Hurt

CHANCES OF GETTING CAUGHT/HURT	NUMBER OF PARTICIPANTS
Yes	7
No	18
Missing	3
TOTAL	28

Appendix 10

Spatial Behaviour

Table 1: Mobility Strategies of Offenders in Pilot Study

OFFENDER NUMBER	MOBILITY STRATEGY
1	Marauder
2	Marauder
3	Marauder
4	Marauder
5	Cluster
6	Fringer
7	Commuter
8	Cluster
9	Commuter (no home on map)
10	Fringer
11	Marauder
12	Cluster
13	Cluster
14	Fringer
15	Cluster
16	Fringer

Table 2: Mobility Strategies, Travelling Patterns and Search Behaviour of Offenders in Main Study

SERIAL NUMBER	MOBILITY STRATEGY	TRAVELLING PATTERNS	SEARCH BEHAVIOUR
1	Fringer	Occasional	Mixed
2	Marauder	Occasional	Mixed
3	Commuter	No fixed base	Mixed
4	Fringer	Fixed base	Extensive
5	Marauder	Occasional	Unknown
6	Commuter	Occasional	Unknown
7	Marauder	Local	Limited
8	Fringer	Fixed base	Limited
9	Commuter	Fixed base	Unknown
10	Marauder	Occasional	Unknown
11	Fringer	Local	Extensive
12	Commuter	Local	Unknown
13	Marauder	No fixed base	Extensive
14	Marauder	Occasional	Unknown
15	Marauder	No fixed base	Extensive
16	Fringer	No fixed base	Extensive
17	Fringer	No fixed base	Extensive
18	Fringer	Fixed base	Mixed
19	Marauder	Occasional	Limited
20	Clusters	No fixed base	Unknown
21	Marauder	Fixed base	Limited
22	Marauder	Occasional	Mixed
23	Marauder	Fixed base	Mixed
24	Commuter	Occasional	Mixed
25	Commuter	Fixed base	Extensive
26	Marauder	Occasional	Extensive
27	Clusters	Fixed base	Extensive
28	Fringer	Fixed base	Extensive

Table 3: Summary of Mobility Strategies of Offenders in Pilot and Main Studies

MOBILITY STRATEGY	NUMBER MAIN (PILOT)	PERCENT MAIN (PILOT)	TOTAL MAIN (PERCENT)
Marauder	12 (5)	43 (31)	17 (39)
Fringer	8 (4)	29 (25)	12 (27)
Cluster	2 (5)	7 (31)	7 (16)
Commuter	6 (2)	21(13)	8 (18)

Table 4: Spatial Behaviour Strategies and Mobility Levels

	LOCAL	OCCASIONAL	FIXED BASE	NO FIXED BASE	TOTAL
Marauder	1	7	2	2	12
Fringer	1	1	4	2	7
Cluster	0	0	1	1	2
Commuter	1	2	2	1	6
Total	4	10	8	6	28

Table 5: Spatial Behaviour Strategies and Extent of Search

	LIMITED	EXTENSIVE	MIXED	UNKNOWN	TOTAL
Marauder	3	3	3	3	12
Fringer	1	5	2	0	8
Cluster	0	1	0	1	2
Commuter	0	1	2	3	6
Total	4	10	7	7	28