TERRITORIALITY, ENVIRONMENTAL CUES AND RESIDENTIAL BURGLARY

by

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ABSTRACT

The relationship between territorial cues and residential burglary was examined using concepts from Newman's (1972) defensible space theory, and Brown and Altman's (1983) conceptual model for crime site selection. The goals of this thesis were to (a) determine if burglars agree among themselves on their evaluations of potential crime sites, (b) test the hypothesis that surveillable residences that communicate an image of long term care and commitment on the part of the occupant, are unlikely to be selected as burglary targets, and (c) determine which specific environmental cues combine to form an impression of a surveillable, well-maintained and protected home.

Fifty photographs of residential homes were evaluated with a modified version of an instrument designed by Brown and Altman (1983) to assess five categories of environmental cues believed to be important to the choice of a crime site. These cue categories are (a) surveillability from the road, (b) opportunity for occupants to survey the property, (c) traces of the presence of residents (d) clearly differentiated property boundaries (e) personalization and evidence of care and attention. Forty-three

offenders (20 youth, 23 adults) who were previously convicted of residential breaking and entering sorted the photographs along a seven point continuum ranging from likely to unlikely targets.

Correlational and regression analyses were used to identify which specific environmental cues, and which cue categories, are associated with ratings of vulnerability. Homes that were easily surveyed were rated as the least vulnerable targets. In contrast to previous research (Brown & Altman, 1983), homes displaying territorial markings and personalizations were associated with high ratings of vulnerability. Results indicate that the influence of perceived pay-off should be integrated into future research.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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Introduction

During the last two decades some programs have attempted to prevent crime by changing the environment where crimes typically occur. This approach is based on assumptions about offenders' perceptions but to date there is very little information on which environmental features influence offenders' perceptions and decisions. The purpose of this thesis is to examine some of these assumptions through direct tests of burglars' perceptions.

Using the environment to prevent crime is not a new or revolutionary idea. Castle walls and moats were used centuries ago to protect people and their possessions. But the changing nature of cities and crime has required a change in crime prevention strategies. Instead of recommending the erection of walls and fortresses, current strategies involve the creation of surveillable, clearly defined, and personalized environments.

The most influential model underlying the environmental dimension of crime prevention is Oscar Newman's defensible space theory (1972). Defensible space has two important characteristics: it is easily observed by others, and it displays evidence of territorial concern. Newman believes that visible properties increase the potential for others to witness and identify the offender. But Newman also points out that the offender's risk of apprehension is minimal, even

in surveillable areas, if no one assumes the responsibility to watch and intervene. Newman proposes that offenders are sensitive to the probability that neighbourhood residents are exercising this responsibility. This sensitivity leads offenders to avoid areas that communicate the occupant's territorial concern through personalizations and care.

Newman's work received substantial support in the form of United States government grants, influenced building policy guidelines in several states, and was the catalyst for many research and modification projects (Brown, 1980). In spite of financial support and an extensive body of empirical research, the deterrent value of territorial displays remains unclear. The territorial aspect of defensible space has been described as the weakest link in the theory (McInnis, Burgess, Hann & Axon, 1984). Some researchers note that Newman's ideas on territoriality have not received empirical support (Phelan, 1977; Poyner, 1983), or been adequately tested (Mawby, 1977). Other reviewers (e.g., Taylor, 1980) have criticized Newman's conceptual view of human territoriality.

Direct investigations of how offenders perceive territorial cues are rare (exceptions are Bennett & Wright, 1984 and Phelan, 1977). Whether clearly marked boundaries, personalizations, and maintenance deter offenders remains unknown. The goal of the present paper is to explore the territorial aspect of defensible space theory from the

perspective of residential burglars. The specific questions addressed are: Do burglars agree on their appraisals of environments? Are properties that are easily surveyed and display evidence of territorial concern perceived as risky targets? If so, which specific environmental cues communicate this message?

The Logic Linking Crime to the Environment

Programs that attempt to prevent crime through environmental features are based on the belief that offenders, like everyone else, are influenced by their perceptions of the physical environment (McInnis et al., 1984). This view represents a shift away from traditional beliefs about offenders and crime. One traditional criminological perspective viewed offenders as pawns of pathological social or biological forces (Holzman, 1982). Sensitivity to differential levels of vulnerability and skill at evaluating the environment did not fit into the image of someone controlled by outside forces. Preventative programs based on this perspective tried to change the offender's motivations, level of education, and social and economic background.

An alternative view of the offender is based on the premise that property crime involves choice, skill, and the same considerations of any activity geared towards economic gain (Holzman, 1982). Support for this assumption comes from interviews with offenders. Bennett and Wright (1984) report

that offenders are aware of the situational constraints and opportunities. Letkemann (1973) comments that an offender "...shares with legitimate tradesmen a particular sensitivity towards those aspects of the everyday world that affect, or are affected, by his work" (p. 137). One researcher was so impressed with the offender's sensitivity to the environment he described the successful burglar as "an up-to-date urban psychologist" (David, 1974, p. 8).

This change of perspective on the offender also changed views about crime. If property crimes were not committed randomly in space by impulsive offenders, then concentrating on the offender was "an overly simplified orientation" (McInnis et al., 1984). A paper presented by Brantingham and Brantingham, reported by McInnis et al., 1984, describes crime as an event involving a motivated offender and a vulnerable target. Prevention may be achieved by altering any condition involved in the event, including the vulnerability of the target.

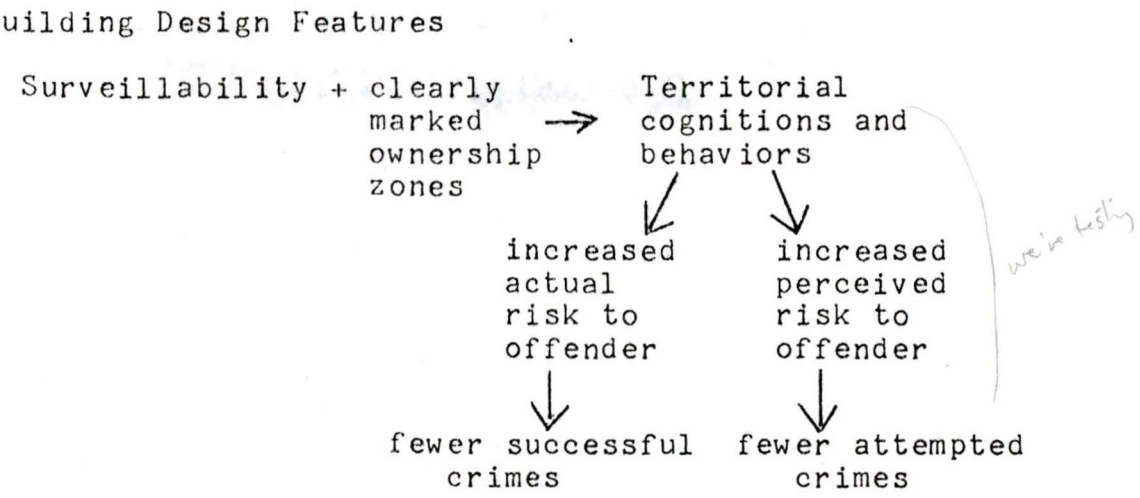
The next step for crime prevention programs was to identify the environmental features that contribute to the perception of vulnerable and secure environments. Most of the empirical tests of the link between crime and the environment stemmed from defensible space theory.

Defensible Space Theory

Newman's defensible space theory (1972) reflects his professional training as an architect. Newman observed that

contemporary urban structures did not permit neighbours to interact with one another to develop the sense of community and territoriality necessary for informal social controls. The solution to this problem in Newman's point of view is architectural design. The two most important elements of Newman's theory are features that create opportunities to survey the property and clearly demarcate zones that are controlled by the residents. These features are hypothesized to increase both the actual and perceived risk for the offender (see Figure 1).

Figure 1. Newman's defensible space model



Newman (1972) describes territoriality as a universal but latent instinct that can be "released" by building design. For some reviewers this view of territoriality was unacceptable and equivalent to environmental determinism (e.g., Quinney, 1975; Reppetto, 1974). One critic even described Newman's concept of territoriality as an "ignorant

view of human nature" (Hillier, 1973). However, these strong reservations about the territoriality aspect of defensible space theory did not reduce its impact on crime prevention programs. Many residential modification projects adopted the strategies of surveillability and territoriality (e.g., Clason Point and Markham Gardens, New York City; Asylum Hill, Hartford, Connecticut).

Although these modification projects involved multi-family public housing complexes, Newman's work was directed towards all forms of residential housing. Because single family houses are closest to the ideal of defensible space (Wilson, 1980) the key to safe multi-family complexes is to make them as much like single-family housing as possible. The smaller units and private yard provide the optimum conditions for the surveillability and territoriality strategies.

Surveillability

In defensible space theory, "surveillability" refers to the potential for owners and neighbours to keep watch over the area as they perform their daily activities. It does not include formal surveillance mechanisms such as guards and cameras, or require inconvenient behaviours such as stationing residents at windows. Specific strategies for creating a surveillable property include the size and placement of windows in key areas of the home. For example, kitchens and other rooms that are centres for daytime

activities should have large windows overlooking entrance ways (McInnis et al., 1984). Other strategies involve removing shrubs, alcoves and other features that provide a place for an intruder to hide.

A great deal of accumulated evidence supports the belief that surveillability contributes to an occupant's security. Poyner (1983) comments that the surveillability aspect of Newman's theory "has survived the rigours and vagaries of all the research programmes on the topic" (p. 13). Studies that compared burglarized with non-burglarized homes found non-burglarized homes were more likely to be visually accessible (Brown & Altman, 1983; Reppetto, 1974; Waller & Okihiro, 1978). Interview studies report that burglars expressed a concern for the openness of a potential target (Bennett & Wright, 1984; Maguire & Bennett, 1982; Phelan, 1977; Walsh, 1980).

Even with this consistent and supportive evidence, increasing surveillability is a simplistic and incomplete solution to crime prevention. A basic premise of Newman's theory (1972) is that surveillability alone will not deter burglary. He believes that open and easily surveillable areas do not represent a risk to offenders if no one assumes the responsibility to monitor the property. Surveillability must be accompanied by the appearance that the owner and the neighbours would notice an offender, identify the offender as an intruder, and choose to intervene.

Evaluations of formal surveillance programs provide some support for this proposition. Closed circuit television cameras in stores in Britain were only effective deterrents to crime if it was apparent that store personnel were monitoring the cameras (Mayhew, 1981). A housing unit in New York installed television cameras throughout the building and transmitted the pictures to a channel on the residents' television sets. Very few residents ever watched this channel and there was no change in crime rate with the exception of an increase in the theft of television cameras (Rand, 1984).

Mayhew (1981) points out that available research provides more information on the actual risk involved in being observed while committing a crime than how offenders perceive this risk. According to a study that staged shoplifting incidents in the direct view of shoppers, actual risk may not be high. Only 28% of the shoppers noticed the theft despite the use of attention-attracting procedures (Gelfand, Hartmann, Walder, & Page, 1973). Even when crimes are noticed there is no guarantee that observers will intervene or report the crime. Gelfand et al. found that only 30% of the shoppers who did notice the shoplifting reported the incident to store officials.

The reasons given for not reporting the shoplifting point to a diffusion-of-responsibility effect (Gelfand et al., 1973). Observers do not feel personally responsible so

they do not intervene. This suggests that witnesses who have some degree of personal commitment and control over a property are more likely to recognise an intrusion and feel a responsibility to report it. Mayhew (1981) speculates that "offenders have a reasonably good idea of the chances of intervention" (p. 121). According to Newman, the probability of being challenged is evaluated through environmental cues which communicate messages about territorial feelings.

Territoriality

Newman believes that a clearly defined and well maintained property "will make its own statement of territorial claim" (1972, p. 51). The yard that surrounds a detached residence provides a buffer zone separating the occupants from neighbours and the public. Even more effective are "zones of influence" defined by either symbolic or actual barriers. Actual barriers include fences and gates, or any mechanism that physically impedes entry. Examples of symbolic barriers are signs, elevation changes, and plantings. According to Newman, these features will enhance occupants' feelings of control and responsibility over the area, increase social cohesion in the neigbourhood, and establish an informal but effective message of social control. If the space is clearly defined, potential offenders will not be able to take advantage of a "no-mans' land" to get access to the target and they will feel more vulnerable and uncomfortable entering the property (McInnis

et al., 1984).

The proposed relationship between territoriality cues, (actual and symbolic barriers), and social cohesion is linked to residents' feelings of control over their property. The argument for a territorial cue/social cohesion relationship points out that perceived lack of control increases fear of crime and distrust of others (McInnis et al., 1984). This fear may lead to isolating behavior (e.g., remaining indoors, avoiding neighbours and social contact). Clearly defined areas are believed to foster feelings of ownership and control, reducing fear of crime and enhancing the degree of social cohesion.

Territorial Research

Building design and territorial attitudes. One research approach focuses on Newman's belief that certain environmental features will increase social cohesion and territorial behaviors. A modification project that added curbs, wider walkways, lights and play areas to a housing complex reports an increase in use of the neighbourhood and shared activities with neighbours which were maintained at least three years after the changes (Murray, 1983). But other residential areas modified in similar ways showed no difference in neighbourhood interactions or satisfaction (Hunter, 1978; Chenoweth, 1977, cited in Brown & Altman, 1983).

Social cohesion and crime rate. Attempts to relate the

level of social cohesion to crime rate, regardless of the building's physical features, also report mixed results. A study of burglary in Toronto found levels of social cohesion did differentiate between burglarized and non-burglarized houses, but this relationship was not confirmed in apartment blocks (Waller & Okihiro, 1978). Conflicting results were also found in a study conducted in Thunder Bay. Contrary to predictions, residents in neighbourhoods with a high rate of property crime know more of their neighbours and visit them more often than areas with a low rate of crime. But more residents in the low crime area asked their neighbours to watch their home if they were away and felt more confident that their neighbours would intervene if they witnessed someone damaging their property (Worrell & Sparkes, 1982).

Design and crime rate. Another research approach relates territorial cues directly to crime rate without measuring territorial attitudes and degree of social cohesion. A comparison of different residential neighbourhoods found areas with lower crime rates had more territorial displays and defensible space features (Newman & Franck, 1980). Pablant and Baxter (1975) found that well-maintained schools experience low rates of vandalism and break-ins. But research on residential modification projects are less encouraging, depending upon the length of time between the modifications and the evaluation. A reduction in crime rate did follow modification according to an evaluation

conducted shortly after one project was completed. However, a second evaluation two years later found the burglary rate was exactly the same as the expected rate if no modifications had been introduced (Murray, 1983). Another modification project reports a shift in the time frame when crimes occur which led to an overall increase in crime rate (Taylor, 1980).

Methodological Problems

The methods used in these studies lead to interpretation problems. Because modification projects make many changes to the physical environment at one time the effects are mingled together. If a modification project is successful there is no means of separating the effects of increasing surveillability from the effects of territorial displays. Do offenders feel more vulnerable because they are more visible, because they feel residents are more likely to take action against them, or as Newman believes, because of the combined effects of the surveillability and territorial strategies?

Practical difficulties in conducting successful modification projects also complicate the interpretation of results. The architectural design of existing housing may be difficult to modify into optimal examples of defensible space specifications (Mayhew, 1979).

To complicate the issue even further, modification of design features are often only one part of a larger crime prevention project. Defensible space alterations are

sometimes introduced concurrently with neighbourhood police patrols, the formation of residents' councils and the building of recreational facilities (Taylor, 1980). If the desired results are achieved it is difficult to know if they were due to the physical changes or the social and law enforcement changes.

Additional problems stem from the use of reported crime rates. A substantial amount of crime is never reported to the police (Evans & Leger, 1980). Even if they are reported, variations in definitions and efficiency among police departments may give a distorted impression of the actual frequency of some crimes (McInnis et al., 1984). Reported crime rate may have ambiguous implications. If a major crime prevention campaign is in operation residents may be more likely to report crimes. This increase in reporting practice would appear as an increased crime rate and the prevention program would be incorrectly judged as ineffective.

A solution might be to supplement official crime records with victim surveys but these also have limitations. The accuracy of survey data is reduced by resident mobility and the victim's inability to remember details when there is a lapse in time between the theft and the study.

Some critics (e.g., Adams, 1973; Mawby, 1977) believe the mixed findings may be blamed on vague theoretical concepts as well as on imperfect methodology. The concepts,

particularly territoriality, are not clearly defined, and the design mechanisms require a unifying framework. Brown and Altman (1981) address this problem. They developed a conceptual model of crime site selection to clarify "the behavioural and environmental factors underlying defensible space."

Brown And Altman's Crime Prevention Model

Brown and Altman's concept of human territoriality differs from the instinctual view found in Newman's writings. It is described as a social/physical mechanism for controlling social interaction and is defined as:

> a self/other boundary mechanism that involves personalization or marking of a place or object and communication that it is 'owned' by a person or group. (Altman, 1975, p. 107).

Functions of territoriality. Marking or personalizing an area is conceptualized as an environmental message that fixes boundaries and prevents unwanted intrusion. A number of studies support this view. Marking and personalizing property have been linked to territorial behavior and cognitions (Taylor & Stough, 1978), faster defence of a territory measured by the length of time it takes to respond to a knock on the door (Edney, 1972), and less fear of intrusion in elderly homeowners (Patterson, 1978). Studies in cafeterias and libraries found clothing and books placed on tables and chairs effectively keeps people away (Becker,

1973).

Others suggest that markers can also facilitate social interaction (Greenbaum & Greenbaum, 1981). In this view, personalizations communicate information about the owner which may clarify expected roles and provide an attractive environment conducive to social interaction. One study found that the more a home was decorated and maintained, the more the residents interacted with neighbours (Greenbaum & Greenbaum, 1981).

Together, these functions of territorial behavior clarify social interaction by providing control over who enters, and who is excluded from the territory. If territories are not established or effectively regulated, problems in social interactions may develop. Pairs of men who were isolated for a long periods of time in small quarters were more likely to complete the experiment if they developed territories (Altman, Taylor & Wheeler, 1971). Behavioural problems were reduced in a boys' home when territorial and dominance patterns were established (Sundstrom & Altman, 1974). The research on human territoriality suggests territorial marking provides the occupant with a control over the area which is necessary to the social system.

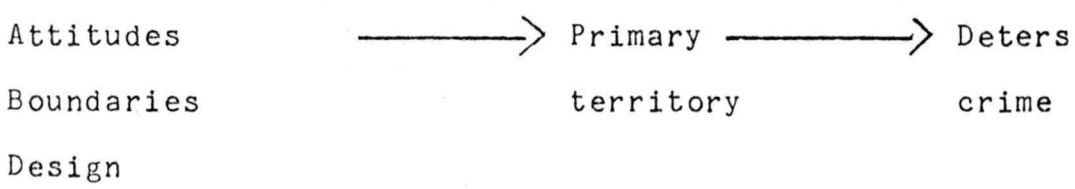
Types of territories. The degree of control depends upon the type of territory. Altman (1975) suggests there are three types of territories: primary, secondary, and public.

Each territory can be differentiated by the kinds and quantity of markers and personalizations used. "Primary territories are owned and used exclusively by individuals or groups, are clearly identified as theirs by others, are controlled on a relatively permanent basis, and are central to the day-to-day lives of the occupants" (Altman, 1975, p. 12). These territories are usually marked with many personalizations and decorations; any unwanted intruder will probably be challenged.

Secondary territories are less exclusive, less controlled, and less important to the occupants. The neighbourhood pub is a secondary territory to a regular patron. Sometimes markers are used to claim the area, often access is communicated by verbal and bodily messages. Public territories are usually occupied for only short periods of time, not exclusively owned by any person or group, and not under a great deal of control by occupants. Few physical markers are used. Instead, bodily and verbal behavior deter intrusion. A seat on a bus is an example of a public territory.

According to Brown and Altman, the more a house appears to be a primary territory the less likely a burglar will choose it as a target. (See Figure 2).

Figure 2. Brown and Altman's crime site selection model



Comparison to defensible space theory. The main difference between this model and Newman's defensible space theory is the emphasis on building design. Instead of being the vehicle that permits or inhibits social interaction, the design of a building becomes one of many possible factors that communicate a territorial message. Territorial cognitions and displays are possible without optimum design features. Also, optimum design features are possible without territorial behavior and cognitions. Although Brown and Altman feel social cohesion and territorial behaviors contribute to the image of a risky target, they are not regarded as necessary mediating variables. Offenders may respond directly to the environmental potential for territoriality instead of waiting to see if neighbours behave territorially (Brown, 1980).

Brown and Altman's (1981) approach does not suggest that the environment determines behavior, but it does influence behavior in a probabilistic way. Although the deterrent

value of territorial behavior is the threat that caring, and vigilant residents and neighbours will intervene, the method of evaluating this possibility is through the appearance of the environment.

According to Brown and Altman (1981) this response to the environment's potential for territoriality takes the form of a sequence of decisions. Judgments are made about the neighbourhood, street, property and home. At each point offenders must decide if they can successfully cross the boundary. Success is not getting caught and moving around the area without arousing suspicion. These decisions depend upon the territorial message transmitted through environmental cues.

Categories of territorial cues. Brown and Altman (1983) also contribute a classification system for quantifying the environmental cues needed in the decision making process. Five categories of territorial cues are considered important, four of which address territorial messages in an environment: actual and symbolic barriers (borrowed from Newman), traces of occupancy, and social climate. The fifth category is detectability. This category combines the surveillability potential with features that would allow residents to hear an intruder enter the property. Brown and Altman attempted to create a comprehensive list of specific cues that belong to these five categories.

The first category of cues, actual barriers, is derived

directly from Newman's defensible space theory. Actual barriers are physical objects that "literally impede access" to the site (Brown and Altman, 1981). Some examples are fences, gates, walls, and locks.

The second category is also taken from Newman's theory. Symbolic barriers do not restrain access physically, but "communicate territoriality, ownership, and occupancy" (Brown and Altman, 1981). Examples are plantings, flower beds and decorations.

A third category of territorial cues is traces of occupancy. Implied presence is communicated by such cues as cars in the driveway, absence by such cues as accumulated mail.

The term social climate refers to Brown and Altman's (1981) category for the community's concern and willingness to control access to the area. This category will not be used in the present study because the emphasis here is on the residence itself. Social climate was the only category that did not differentiate between burglarized and non-burglarized houses in Brown and Altman's (1983) empirical study.

The surveillability aspect of the theory was addressed through the detectability category. This involves the opportunity for residents of an area to detect intruders. Examples of cues included in this category are physical design features of the home such as placement of windows, and features of the yard such as the size and placement of

shrubs. Brown and Altman treated the detectability potential of a property as one category.

The present study divides this category into two: 'surveillability from the road' and 'surveillability for the occupant'. Surveillability from the road refers to the visibility of the property and home for neighbours and other people using the street. Surveillability for the occupant refers to the visibility of the property for someone inside the house. Newman considers the surveillance opportunity for both neighbours and residents important aspects of defensible space. However, features that provide visibility for neighbours do not necessarily ensure visibility for the occupant. Large and strategically placed windows provide little opportunity for surveillance if the curtains are drawn. Fences along the boundary lines of a property reduce visibility for neighbours, but occupants may have a clear view of their property.

Empirical support. Brown and Altman (1983) conducted an empirical investigation to test their model. They hypothesized that the more a home was defined as a primary territory by some combination of symbolic or actual barriers, traces of occupancy, opportunity to visually or auditorily detect intrusion and a protective social climate, the less likely the home would be burglarized. Burglarized homes were identified through police records, and each house was rated on the cue classification system. A comparison between

burglarized and non-burglarized houses supported their model. Houses that were easily viewed from the road, and displayed territorial markers communicating privacy and individuality were more likely to be in the non-burglarized group. Social climate was the only category that did not differentiate between burglarized and non-burglarized homes. Although the difference between the 2 groups was significant the 5 classes of territorial cues explained only 16% of the variance.

Brown (1983) feels the time lag between the offence and the time of measurement may have weakened the results due to a reaction to the burglary. Burglarized homes were evaluated up to 15 months after the offence and many physical changes could have occurred. She notes that 8% of the burglarized homeowners reported erecting a fence after the burglary. However, a reaction to the burglary may have influenced resident behaviour in ways that strengthened her results. Months after the burglary victims report less pride in their home and a lower sense of security than residents of nonburglarized homes (Brown, 1983). This lower level of pride may have existed prior to the burglary, communicating an image of a vulnerable target, or may have developed as a reaction to being burglarized. Perhaps symbolic markers of value were removed from the yard, and home maintenance chores were neglected as a response to reduced feelings of security

and control.

The available research does not provide direct evidence that potential offenders decode the environmental cues in the way Brown and Altman predict. Some support comes from research with other population groups. One study found that residents rated signs of long term effort and care almost as effective as fences and gates in communicating a sense of private property and deterring trespassing (Brower, Dockett & Taylor, 1983). In another study, "environmental experts" evaluated the crime vulnerability of residential streets. Poor maintenance, lack of exterior decoration, and an "excessively public residential setting" were associated with vulnerability (Craik & Appleyard, 1980). Although supportive, these studies do not provide evidence that offenders evaluate vulnerability in the same way as residents and environmental experts.

Tests of Offenders' Perceptions

Few investigators have asked offenders which environmental features are important. The few studies that are available on offenders' perceptions do not find any support for the importance of territorial cues. Phelan (1977) presented slides of previously burglarized apartment blocks to 16 convicted offenders. The offenders rated each apartment block's vulnerability to burglary on a seven-point scale and answered open-ended questions. There was no indication that offenders attended to the environmental cues

other than the surveillability of the property. These results led Phelan to advocate modifying the theory to include only the surveillability aspect.

However Phelan's suggestion must be viewed with caution. He did not attempt to systematically vary the features believed to influence choice of target, nor to collect ratings on nonburglarized apartment blocks. The cues included distance to the front door, the visibility of the entrance-way from the street, and presence or absence of foliage. These variables provide no means of measuring the more subtle symbolic aspects of the environment.

Any features that are particularly important to an offender may emerge in response to the open-ended questions, but this would suggest that burglars have a conscious awareness of the appraisal process. The conceptual models of crime site selection do not assume that the evaluation of environmental cues is necessarily conscious or easily articulated (Brantingham & Brantingham, 1978).

Bennett and Wright (1984) devised three research techniques using videotapes and photographs to assess the extent to which burglars consider defensible space factors in their choice of targets. One hundred and thirty burglars were shown either the videotapes or the photographs. The first technique attempted to simulate the decision processes involved in choosing a burglary site. The second technique was designed to examine the sequential order in which

offenders seek information during the process of selecting a target. The third method examined the influence of five specific cues; alarms, cars in the driveway of target homes, cars in the driveway of neighbour's homes, window and door locks, and a large hedge.

The examination of the decision process encouraged offenders to verbalize any thoughts they had on the suitability of the homes as a target for burglary. Usually the offenders' concerns were related to risk factors (i.e., openness, occupancy, proximity of neighbours) but some of the offenders' comments were on the condition of the home. The offenders assumed that occupants who took care of the outside of their home would adorn the interior of the home with the symbols of affluence and comfort that make the home a worthwhile target. Conversely, homes that were not well maintained were rejected because of the expectation of low profit. These findings support the claim that surveillability is important but do not support the idea that a well-maintained appearance reduces the probability of residential crime. The deterrent value of symbolic barriers and territorial cues seems to be questionable.

Bennett and Wright's (1984) evaluation of the influence of specific cues found that alarms, cover provided by the hedge, and occupancy were the most important cues. Locks and implied presence of neighbours did not influence the offenders' choice.

Although Bennett and Wright conducted a comprehensive investigation of the burglars' decision process, one comment directed at Phelan's work applies here. With the exception of the evaluation of the five specific cues, their methods required offenders to possess a conscious awareness of the factors which influence their decisions. Theoretical models (e.g. Brantingham & Brantingham, 1978; Carter & Hill, 1980) and anecdotal studies (Letkemann, 1973) emphasize that an offender's environmental evaluations may develop as an intuitive "gut feeling" about certain sites rather than a conscious process.

Many of the features used in modification projects were not identified as important cues by the offenders who participated in Bennett and Wright's study. For example, modifications typically involve the introduction of curbs, plantings, sidewalks, fences and personalizations. None of these were mentioned by offenders. Either they are ineffectual, or offenders are not consciously aware of their influence.

The literature also lacks evidence that offenders agree with one another on evaluations of potential crime sites. If offenders do not share perceptions of a vulnerable target, then modifying and creating environments based on specific guidelines can not be an effective deterrent. If they do share common perceptions of vulnerability, the literature has not identified which cues are important.

Throughout this paper burglars have been referred to as a cohesive group, but it is important to recognise the possibility of individual differences in perceptions of target vulnerability. Offenders vary in age, experience, and motivation. Some may be influenced by drugs, or the need for them. These characteristics could influence their environmental assessments. Although the rationale for crime prevention through the physical environment relies on the assumption that cues are communicated clearly and consistently, the natural environment is complex and allows for a variety of interpretations. Brantingham and Brantingham (1978) propose a model of crime site selection that takes into account individual differences and a belief in recognizable patterns of human perceptions.

Brantingham and Brantingham's Crime Site Selection Model

According to Brantingham and Brantingham's (1978) model, personal experience and information passed on from other offenders lead to the construction of an image of the ideal crime site. These images are unique to the individual but the variations among individuals are not unlimited. Brantingham and Brantingham use evidence from work on "mental maps" to illustrate the existence of patterns in environmental perceptions.

Brown and Altman's and Brantinghams' models are similar, but a subtle difference may have research implications. Both

include categories of cues, but the Brantinghams' stress the need to evaluate the overall impression, and not just the individual cues. According to Brantingham and Brantingham (1978) and Carter and Hill (1980) an offender's choice of target is based upon a Gestalt-type image that would have a different meaning if the features were considered separately or in different combinations. The checklist of cues found in Brown and Altman's study may not be the most useful method to understand why one home is more vulnerable to burglary than others.

The need for an evaluation of environments other than the individual cue level is demonstrated by an attempt to replicate Brown and Altman's (1983) empirical investigation (Brown, 1983). In the replication the categories remained useful for predicting vulnerability to burglary, but the influence of individual cues changed. For example, the original study reports that burglarized homes are less likely to have garages. The opposite result was found in the second study: garages were associated with burglarized homes. Brown points out this makes sense when more than the garage itself is considered. In the first sample the predominant design included a detached garage, while in the second the garages were usually connected to the home. This change altered the overall impression in some way. Two homes may not share any common attributes at the cue level, but both could be considered vulnerable to burglary.

Although measuring on the cue level alone may not adequately deal with the way the home is perceived the converse approach is also limited. Concentration on an overall impression is rather abstract, and presents problems both for research purposes and crime prevention programs. Asking crime prevention officials to design a surveillable property that communicates territorial concern is an equivocal assignment. Although some features would probably be common to many designs it is likely the crime prevention officials would create properties that differ in many ways. Providing guidelines for future crime prevention projects would be difficult. The present study will evaluate the houses at both a cue and category level in order to try to understand the cue-category links.

Summary of Literature Review

Reviews of defensible space research identify questions that have not been adequately tested. Mayhew (1979) notes that the "crucial surveillability/territoriality partnership" proposed by Newman needs to be considered further (p. 156). McInnis et al. (1984) call for "more research on the environmental stimuli that affect a potential offender's perception of whether or not a particular environment is vulnerable" (p. 321). Brown (1980) suggests it may be fruitful to directly examine burglars' perceptions in terms of the environmental cue categories used in her study (p. 94). Previous direct investigations of offenders'

perceptions (Bennett & Wright, 1984; Phelan, 1977) have considered a limited number of cues and have not been sensitive to the possible unconscious nature of environmental assessments.

The goal of the present study is to address three questions that remain unanswered. Are evaluations of the vulnerability of a residence to breaking and entering consistent across offenders? Are the environmental cues and cue categories proposed by Brown and Altman useful predictors of vulnerability ratings? Is there support for Newman's premise that a property must appear both surveillable and clearly marked with territorial cues in order to deter potential burglars?

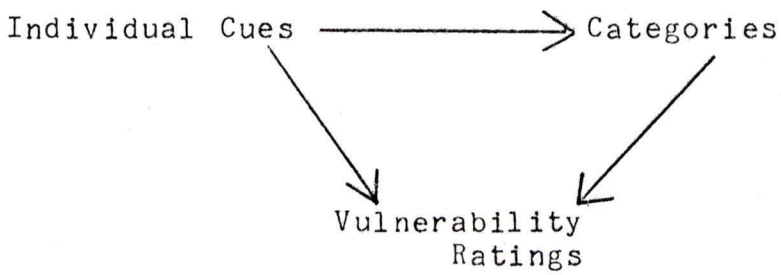
Hypotheses

The hypotheses of this study are:

1. Offenders convicted of breaking and entering agree on evaluations of vulnerability to break and enter.
2. Houses with more actual and symbolic barriers, surveillability, and signs of occupancy are associated with low vulnerability.
3. Surveillability (from within the house and from the road) combined with territorial cues are more likely to be associated with low vulnerability ratings than surveillability alone.

To test these hypotheses in a way that does not require a conscious awareness of the decision process, offenders are asked to sort photographs of houses in terms of vulnerability to breaking and entering. The photographs were assessed by Brown and Altman's (1983) detailed measure of specific territorial cues. The photographs were also rated on how well they represent the categories proposed by Brown and Altman. Investigating the associations between individual cues and vulnerability, as well as categories and vulnerability, addresses the suggestion that environmental perceptions involve a Gestalt-type image (Brantingham & Brantingham, (1978). This method of analysis also provides a way to examine cue-category links. See Figure 3 for a diagrammatic representation of the present study.

Figure 3. Diagrammatic representation of present study



Method

Choice of a Residential Area

Previous studies investigating residential property crime at a neighbourhood level have indicated an increased

likelihood of residential breaking and entering in houses located in the vicinity of small shopping centres (Engstad, 1980; Worrell and Sparkes, 1982). A small shopping centre was the starting point for a search for a suitable residential area. The researcher photographed houses on side roads where there were no commercial buildings on the block. The houses photographed for the study were within approximately five blocks of one another. Because there was no diversity of the road edge, one of the cues identified as important in Brown and Altman's work, a second small shopping centre was located off the same main road. The second area was in the same municipality within five miles of the first area but, unlike the first area, had sidewalks.

Photographing the Homes

One hundred and thirty two colour photographs were taken of residential houses. All photographs were taken from the road, facing the front entrance, with a 35 mm camera between the hours of 11:00 a.m. and 2:30 p.m. on cloudy winter days. The photographs were taken to provide as much information about the site as possible, including the road edge and the side boundaries. Photographs that were too dark (n = 3), out of focus (n = 5), or provided information that might have identified the residential area (n = 3) were discarded.

Procedure For Selecting The Photos

The set of 121 photographs was evaluated independently by five raters along the five dimensions hypothesized to be

important factors in the offender's choice of a target. The raters were either graduate students or former students with an undergraduate degree. Each rater was provided with an explanation of the dimensions. "Rating" the photographs involved sorting them into piles along a continuum of how well the photo represents that particular dimension. (See Appendix A for a copy of the instructions).

The reliability coefficients (Cronbach's alpha) representing raters' agreement on the rank ordering of the photographs were high on 4 of the dimensions: actual barriers .95; surveillability from the road, .96; surveillability for the occupant, .89; appearance of occupancy, .93. It was satisfactory for the symbolic barriers category, .72. A mean rating and standard deviation was computed on the five dimensions for each of the 121 houses.

Houses were selected for the study based on two requirements. First, that the sample of houses vary along the five dimensions. Second, that the sample provide a balanced combination of all the categories. A set of 50 photographs fulfilling these requirements was selected. (Appendix B shows the photographs used in the study). Ten houses were chosen to represent each of the five categories. Five houses with the highest, and five with the lowest mean rating for each category were chosen. (See Appendix C for mean rating on each category for the 50 houses).

To ensure a balance across all categories a Wilcoxon's

rank sum test was performed. Substitutions were made in any dimensions that caused unbalance in other dimensions. For example, the five houses initially chosen as representative of high actual barriers were significantly different from houses representing low actual barriers on the dimension of surveillability from the road. Substitutions replaced a few of these houses with others which had high actual barrier ratings plus high visibility ratings. This procedure ensured that variation in each dimension was not confounded with variation in any other dimension. (Appendix D shows means of the 50 houses across all categories arranged by the category they represent).

The 50 photographs were enlarged to 5" x 7" format and mounted on a black matte with a protective plastic cover. Each photo was numbered for identification.

Measures

Category ratings. The ratings used for selecting the sample were also used as category ratings in further analyses. The reliabilities (measured by Cronbach's alpha) of the five raters on the 50 houses were: actual barriers, .95; surveillability for occupant .91, surveillability from the road .96, appearance of occupancy, .94. One rater's view of symbolic barriers was not consistent with the other four raters. Perhaps there was difficulty interpreting the definitions. Reliability was increased to .82 from .71 by dropping this rater from the analysis.

Evaluations of environmental cues. Brown and Altman's (1983) measurement instrument was adapted for the specific needs of the present study. Their cues included information on the number of cars passing the home, the number of public buildings on the block, and the number of neighbours or residents who questioned the researchers' activities. Because the present photographs did not provide the type of information necessary to measure social climate the sections that measured this variable were deleted. Cues that were present in fewer than five of the houses in the sample were also dropped because the variability was judged as insufficient to provide a useful analysis. The final version used in this study involved 64 items. (Appendix E contains a copy of the modified rating instrument.) Brown and Altman attempted to generate a comprehensive list of all the features of a house that could be classified into the five categories. They identified each of the variables as belonging to one of the five categories based on the decisions of a panel of raters (n = 4). They revised the instrument three times until all raters agreed on the classification of the items. This classification system was retained in the present study. Most of the cues were rated on a present/absent basis although some involved a count of the number of items present.

This instrument was designed as a detailed measure of objective cues. Six photographs were chosen at random and

rated by the experimenter and three graduate students who were unfamiliar with the photographs. Reliabilities (measured by Cronbach's alpha) were: surveillability for the occupant, .99, surveillability from the road, .99; occupancy, 1.00; actual barriers, .99; and symbolic barriers, .98. Given this high interrater reliability, the measurement instrument was considered objective and the ratings of the remaining 44 houses were performed only by the experimenter.

Vulnerability to burglary ratings. The 50 photographs were shown to 44 raters, 24 adults and 20 young offenders incarcerated in correctional institutions. (See Appendix F for the offenders' ages and their self reports of the number of houses they had broken into.) Participation in the study was restricted to offenders with at least one conviction of residential breaking and entering on their records. Only male offenders were approached. Females were excluded because very few females commit residential breaking and entering (Reppetto, 1974, Waller & Okihiro, 1978). The only other requirement for participation was a willingness to volunteer.

The adult burglars received a written notice circulated to appropriate offenders by the correctional centre's staff. This notice described the study and instructed interested persons to file a personal request form with their living unit officer. The response rate was low. The notice was circulated three times. The correctional centre's staff did

not keep a record of the exact number of offenders who received a notice but the researcher estimates that only 10 out of 100 responded. An additional 14 volunteers approached the experimenter in person while the project was in progress.

The young offenders were informed of the study verbally by the youth detention centre's probation officer who described the study and asked appropriate offenders if they would like to participate. Twenty out of the 25 persons approached agreed.

The researcher met with each adult offender individually in a small private interview room in his living unit, and with each young offender in an interview room off the main reception lobby of the correctional centre.

The presentation order of the photographs was counterbalanced across raters. The task involved sorting the photographs into seven piles. Seven cardboard squares with the numbers 1 to 7 written on them were placed across the table. Square number 1 was marked "highly likely", and number 7 "not likely." The following instructions were given verbally. "I will show you photographs of fifty houses. Based on your experience, I want your opinion whether or not the houses are likely to be broken into. Look through these photographs. Put the houses you feel are the most likely to be broken into underneath number 1, which is marked 'highly likely'. Put the houses you feel are the least likely to be broken into under number 7, marked 'not likely'. The

remaining numbers are for the houses in between. Please put at least three pictures under each number."

The words "likely" and "not likely" were chosen as a neutral prompt that was unlikely to sway the ratings towards one particular element of the decision-making process. Other possible phrases such as "good target" or "easy to break into" may have led the offenders to consider only the possible reward value or the ease of entry.

After the subject had sorted the 50 pictures into the 7 piles the experimenter recorded which pictures were in each pile and asked the subject to provide reasons for sorting the houses into the two extreme piles, "highly likely" and "not likely" to be broken into. The researcher then asked the offender's age, and for an estimate of the number of successful break-ins he had performed.

Restricting the photographs to single family dwellings photographed in the daytime reflects an assumption that these homes and this time of day provide some opportunity for residential breaking and entering. To check the validity of this assumption the researcher asked the offenders if the photographs showed an appropriate neighbourhood, type of residence (single family dwelling versus apartment blocks), and time of day. The researcher also asked the offender if he usually chose a target from the physical features of a home, or if he determined in advance if the residents were away, or had some specific knowledge about the contents of

the house.

One adult offender did not find the task meaningful. He felt the decision to offend was an either-or proposition. He rejected the seven pile continuum in favor of two piles, one representing a "yes" pile, the other a "no" pile. This offender's ratings were not used in the study, reducing the number of adult raters to 23.

The sorting task usually involved a meeting of approximately 30 minutes, the post-sorting interviews ranged from 20 minutes to 2 hours.

Results

Analysis To Determine If The Adult And Young Offender Groups Should Be Combined

An initial analysis examined the possibility of combining the adult and young offenders into one group. A oneway analysis of variance between the means of the two groups indicated insufficient homogeneity of variance. A second oneway analysis of variance performed on each house found differences between adult and young offender vulnerability ratings on 10 of the 50 homes. These findings create some reservations about combining the groups. More importantly, various papers (e. g., Rand, 1984; Reppetto, 1974; Walsh, 1980) report that differences in age and experience affect choice of target. This led to the decision

to analyze the adult and young offender data separately.

Hypothesis 1: Agreement Among Offenders

The degree of agreement among the offenders was assessed by computing the internal consistency (Cronbach's alpha) of the vulnerability ratings. The offender groups do show highly reliable ratings: alpha for adult offenders was .96, for young offenders .88.

Cronbach's alpha provides information on the reliability of the offenders' ratings as a group. An intraclass correlation (Guilford, 1965, p. 281) was computed to determine the typical reliability of a single rater's ratings. The intraclass correlation reliability was .48 for a typical adult offender and .26 for a typical young offender.

A mean vulnerability score was computed for each of the 50 homes for both the adult and the young offender groups. Table 1 shows these mean ratings and standard deviations. An examination of the pattern of decisions indicates the adult group was more likely than the youth to rate homes towards the extreme categories. Figure 4 displays the frequency of the mean ratings for the adults and the young offenders over the seven levels of vulnerablilty.

Hypothesis 2: Testing Categories and Specific Cues as Predictors of Vulnerability

Multivariate (multiple regression) and univariate tests (Pearson correlations) were used to determine the degree of

Table 1.

Means and Standard Deviations of Vulnerability Ratings for Adult (N=23) and Young (N=20) Offenders

House #	Adult Mean	Adult Standard Deviation	Youth Mean	Youth Standard Deviation
1	1.57	.79	1.90	1.55
2*	5.74	.86	4.50	2.09
3	3.09	.90	2.65	1.39
4	1.74	1.14	2.05	1.57
5*	5.91	1.47	4.90	1.71
6	3.09	1.08	3.00	1.45
7	2.83	1.70	2.60	2.11
8	1.65	.83	1.75	1.33
9	3.22	1.76	3.80	1.77
10	1.52	.59	1.85	1.18
11	4.43	2.19	4.75	1.94
12	5.35	1.70	4.55	1.70
13	3.04	1.85	3.80	1.77
14	2.04	1.11	2.90	2.13
15	3.26	1.39	3.35	1.14
16	6.04	1.30	5.55	1.23
17	2.30	1.29	2.90	1.52
18	2.48	1.75	3.10	1.48
19	2.96	1.26	3.60	2.06
20	4.43	2.57	3.45	2.19
21	3.30	2.64	3.80	2.57
22*	5.96	.98	4.95	1.43
23	5.30	1.66	4.80	1.64
24*	5.22	1.68	3.15	1.42
25	4.91	1.93	4.80	1.47
26	4.43	1.59	4.80	1.47
27	4.87	1.89	3.65	1.63
28*	2.35	1.47	3.65	1.98
29	4.52	1.83	4.85	1.63
30*	2.65	1.47	4.10	2.51
31*	4.57	1.16	3.10	1.59
32	5.78	.90	5.65	1.14
33	2.57	1.80	3.05	2.11
34	2.78	1.48	3.60	1.27
35	5.35	1.30	5.25	1.68
36	5.87	.97	5.35	1.84
37	2.57	1.12	3.35	2.16

(table continues)

House #	Adult Mean	Adult Standard Deviation	Youth Mean	Youth Standard Deviation
38*	2.22	1.00	3.05	1.61
39	5.00	1.41	4.05	1.67
40	5.26	1.71	4.50	2.14
41	5.04	1.69	5.35	1.27
42	4.74	1.54	4.20	1.61
43	3.52	1.38	2.75	1.48
44*	1.96	1.46	3.00	1.97
45	5.83	1.44	5.20	1.36
46	4.00	1.35	3.85	2.03
47	2.22	1.48	3.25	2.02
48*	3.30	.93	4.55	1.90
49	4.35	1.72	3.45	2.01
50	1.65	.78	1.95	1.39

Note: Maximum rating possible = 7.
1 = High vulnerability
7 = Low vulnerability

* Homes with significantly different ratings (.05) between adult and young offenders.

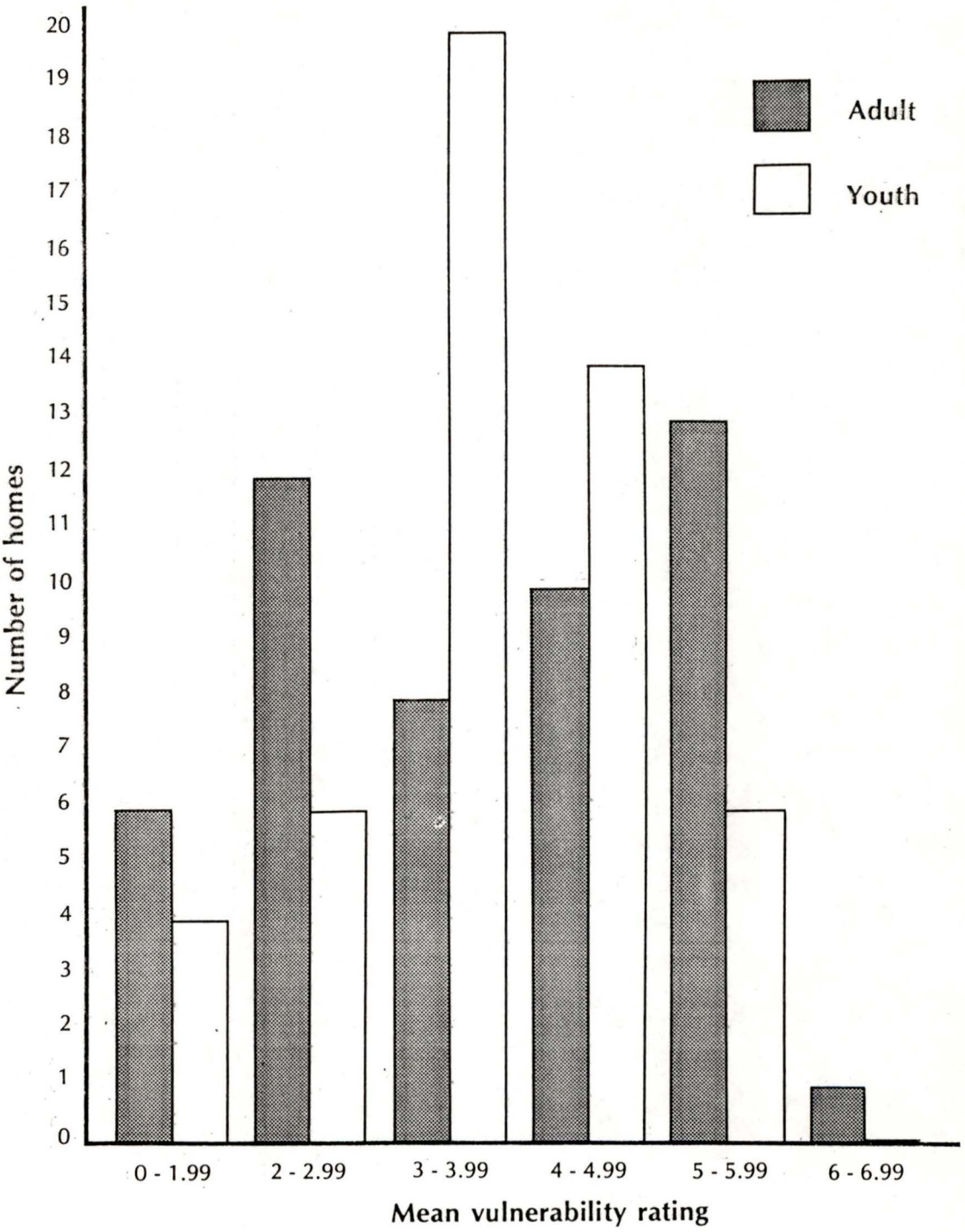


Figure 4. Frequency of vulnerability ratings by offender group.

association between the cue-categories and the vulnerability ratings. A significant multivariate test in both the adult (F = .001) and young (F = .001) offender groups enabled the researcher to examine the univariate correlations without the problem of experimentwise error. Experimentwise error rate is defined as the risk of declaring at least one comparison significant when all correlations in the matrix are non-significant (Hummel & Sligo, 1971). Examining the multiple regression test first is analogous to Hummel and Sligo's use of a multivariate analysis of variance, followed by univariate analyses of variance to control the experimentwise error rate.

Pearson correlations between categories and vulnerability ratings. Hypothesis 2 predicts an association between high ratings on the five categories and low vulnerability ratings. One-tailed probability tests were originally planned because this hypothesis predicts a directional relationship. According to Brown and Altman (1983), the more actual and symbolic barriers, cues of occupancy, and the higher the surveillance opportunity from both the road and the residence, the more likely a home would be avoided by burglars. However, this directional relationship was not supported for all 5 categories, so 2 tailed probability tests at the .05 level are reported. In the adult sample the hypothesis was supported by

surveillability from the road (r = -.55, p < .000), and surveillability for the occupant (r = -.36, p< .011), but contrary to expectations many symbolic barriers (r = .28, p < .05) were associated with high vulnerability ratings. Actual barriers and cues of occupancy were not significantly correlated to vulnerability ratings. Similar results are found in the young offender sample. Surveillability from the road is significantly correlated with vulnerability in the direction of the hypothesis (r = -.45, p < .001) but many symbolic barriers were associated with high vulnerability in the direction opposite to the prediction (r = .34, p < .015). Actual barriers, surveillability for the occupant, and cues of occupancy were not significantly correlated to vulnerability ratings. Table 2 displays the category-vulnerability correlations.

Multiple regression analysis. A multiple regression analysis (SPSS-X) examined the association between the five cue-categories and the vulnerability ratings. The overall relationship was significant for both the adults (F = 6.32, p < .001), and young offenders (F = 6.76, p < .001). These categories explained 42% of the variance in the adult vulnerability ratings, and 43% in the young offender vulnerability ratings for this sample of homes. An index to predict the strength of the relationship in other samples (adjusted R squared) estimates that 35% of the variance in the adult ratings and 37% in the young offender ratings would

Table 2.

Category-vulnerability Correlations

	Adult Offender Vulnerability Ratings	Young Offender Vulnerability Ratings
Surveillability (road)	-.55***	-.45***
Surveillability (occupant)	-.36**	-.20
Symbolic barriers	.28*	.34*
Actual barriers	.26	.11
Occupancy	-.06	-.13

*** .001

** .01

* .05

Note Category ratings ranged from 1 - 7, 1 = high ratings.

Vulnerability ratings ranged from 1 - 7, 1 = high ratings.

be accounted for by these five categories.

In summary, the categories are quite useful in predicting vulnerability, but the relationship between symbolic barriers and vulnerability was in the opposite direction of the prediction. Table 3 summarizes the multiple regression analysis.

Cue-Category Links

To identify which specific cues are associated with the categories, Pearson correlations were performed between the specific cues hypothesized to represent these categories (Brown & Altman, 1983) and the category ratings. Because a large number of correlations were planned, precautions were taken to reduce the risk of significant correlations occurring by chance alone. Alpha was set at .05, two-tailed test and a multistage Bonferonni procedure (Collis & Rosenblood, 1985) was used to control for experimentwise error. The correlations between the specific cues and the category ratings and the specific cues and the vulnerability to burglary ratings are shown in Figure 5.

Specific Cues and Vulnerability Ratings

Replication of Brown and Altman's analysis. Brown and Altman (1983) conducted a factor analysis on each of five categories of cues in order to reduce the number of variables. The present study replicated their procedure. A separate principal component analysis was performed for each

Table 3.

Multiple Regression Analysis of Categories as Predictors of Vulnerability

Adult offender ratings

Multiple R	.65
R squared	.42
Adjusted R squared	.35

Analysis of variance

	DF	Sum of Squares	Mean Square
Regression	5	42.37	8.47
Residual	44	59.03	1.34

F = 6.32 Significance of F = .0002

Variables in the equation

	Beta weight	Sig T	Simple r
Surveillability (road)	-.63	.0008	-.55*
Symbolic barriers	.33	.008	.28*
Occupancy cues	-.08	.50	-.06
Actual barriers	-.12	.43	.26
Surveillability occupant	-.03	.86	-.36*

Young offender ratings

Multiple R	.66
R squared	.43
Adjusted R squared	.37

Analysis of variance

	DF	Sum of Squares	Mean Square
Regression	5	23.33	4.67
Residual	44	30.36	.69

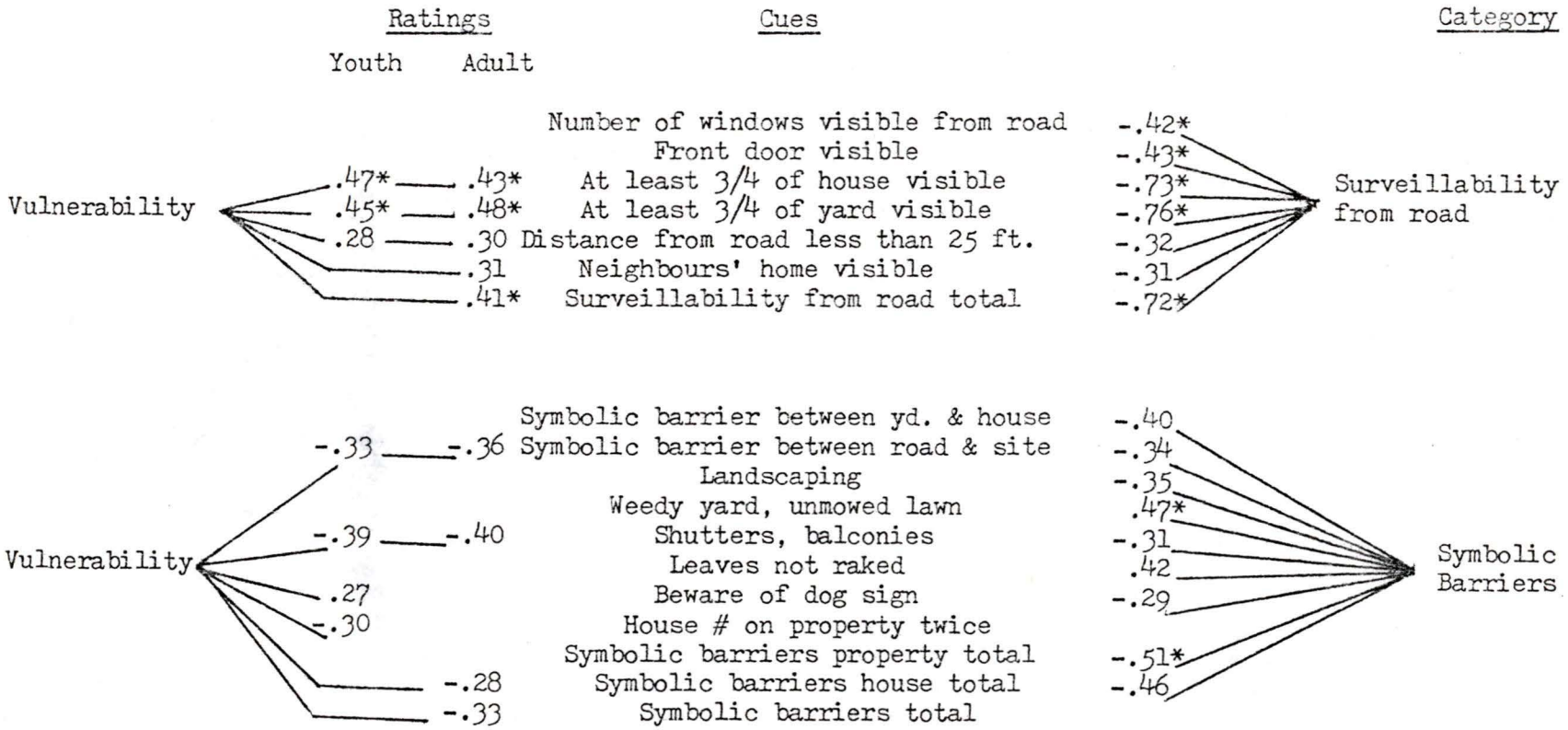
F = 6.76 Significance of F = .0001

Variables in the equation

	Beta weight	Sig T	Simple r
Surveillability (road)	-.76	.0001	-.45*
Symbolic barriers	.40	.001	.34*
Occupancy cues	-.16	.18	-.13
Actual barriers	-.29	.04	.11
Surveillability (occupant)	-.17	.25	-.20

Note: * represents a significant correlation.

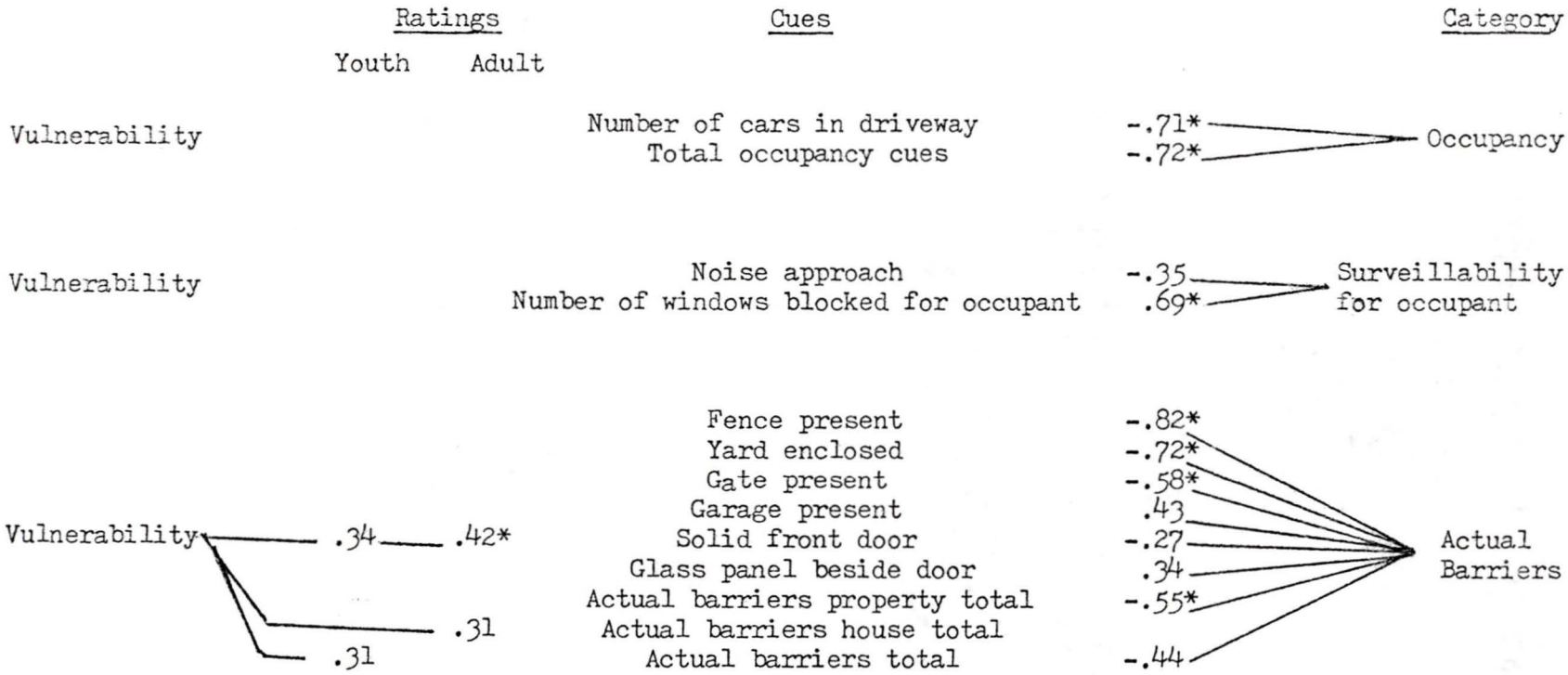
Figure 5. Cue-category, cue-vulnerability correlations



Note: All correlations are significant at a .05 level, two-tailed test.
* indicates a significant correlation after a multi-staged Bonferonni test.

continued

Figure 5 continued



category using only the variables hypothesized to belong in that category. The principal component analyses were expected to provide scales that were useful predictors of vulnerability ratings. This expectation was not met. Scales derived from the principal component analyses of the present study were non-significant when entered into a multiple regression equation. (See Appendix G for scale items, factor loadings, reliabilities, and results of the multiple regression analysis).

Pearson correlations between specific cues and the vulnerability ratings. Pearson correlations were performed between the specific cues and the vulnerability ratings. Alpha was set at .05, 2-tailed test. All specific cues that were significantly related to vulnerability ratings are shown in Figure 5. Because so many correlations were computed some of the significant correlations may be spurious. Two criteria were used to evaluate this possibility. One was a multi-stage Bonferonni test. The other was a comparison with previous studies that measured the same cues to differentiate between burglarized and non-burglarized homes (Brown, 1983; Brown & Altman, 1983).

Very few specific cues were significantly correlated with vulnerability ratings after the multi-stage Bonferonni test or were also significant in the previous studies. The findings will be briefly described for each of the five

categories.

Surveillability from the road. Items that indicated whether or not the house and yard were visible from the road were significantly correlated with vulnerability ratings for both groups of offenders. This significance was confirmed by a multi-stage Bonferonni procedure. The adult offenders also appear concerned if a neighbour's home is in close proximity to the potential target (r = .31, p < .02). This replicates a finding from Brown and Altman's research (1983).

Symbolic barriers. The presence of symbolic barriers between the road and site was significantly associated with higher vulnerability for both adult (r = -.36, p < .01) and young offenders (r = -.33, p < .01). This item was significant in Brown and Altman's study (1983) but was more likely associated with non-burglarized properties. Offenders in the present study associated structural extras on the house (i. e., shutters, balconies) with higher vulnerability. These findings are counter to the prediction of the present study.

Actual barriers. Actual barriers (e. g., fences) that define the boundaries of the property were not significantly correlated with vulnerability in either the adult or young offender vulnerability ratings. But an interesting correlation was evident between low vulnerability and actual barriers of the house itself. A solid front door, as opposed to doors with glass panels, was correlated with low

vulnerability in both the adult (r = .42, p < .01) and young offender (r = .34. p < .01) groups.

Occupancy and surveillability for the occupant. No items in these categories were significantly correlated with vulnerability in either group of offenders.

Hypothesis 3: Surveillability Without Territorial Cues has Little Deterrent Value

The third hypothesis, derived from Newman's ideas, predicted that the proportion of variance accounted for by a combination of surveillability and territoriality would exceed the proportion of variance explained by surveillability alone. To test this hypothesis three new variables were created. A surveillability variable was created by adding together the 'surveillability for the occupant' and the 'surveillability from the road' category ratings. The sum of actual and symbolic barriers was computed to create a territoriality variable. To examine the interaction between surveillance and territoriality, the product of the surveillability variable and the territoriality variable was computed (Cohen & Cohen, 1975, Chapter 4). These three variables; surveillability, territoriality and the product were transformed into standardized z-scores.

A multiple regression analysis (SPSS-X) was performed entering surveillability first, then territoriality, and

finally the product variable with the vulnerability ratings as the dependent variable. The rationale for this approach is explained in Cohen and Cohen (1975, p. 295). Basically, Cohen and Cohen suggest that the product variable "carries", but does not equal the interaction. Because the product variable will generally be linearly correlated with both main effects, the product variable only becomes the interaction when the constituent variables are partialled out. Cohen and Cohen depict this relationship as:

$$u \times v = uv \cdot u, v$$

where $u \times v$ equals the interaction and uv the product variable. Partialling out the main effects from the interaction is achieved by entering the main effects into the regression equation before the product variable.

The increment contributed by the product variable was non-significant for both groups of offenders, adding only 3% of variance accounted for in the adult sample, and 1% in the young offender sample (See Table 4 for the results). The Pearson r correlation coefficients indicate that both the surveillability and territoriality variables are more highly correlated with the adult and young offender vulnerability ratings then the product variable. These results do not fit the hypothesis. The influence of surveillability is apparently unrelated to territorial cues.

Table 4.

Multiple Regression Analysis of Surveillability, Territoriality and the Surveillability-Territoriality Interaction.

Adult Offenders

Variable Entered	Multiple *R*	*R* Square	Adj. *R* Square	Simple *R*
Surveillability	.51	.26	.25	-.51
Territoriality	.55	.30	.27	.37
Product	.57	.33	.28	-.22

Young Offenders

Variable Entered	Multiple *R*	*R* Square	Adj. *R* Square	Simple *R*
Surveillability	.37	.14	.12	-.37
Territoriality	.41	.16	.13	.28
Product	.42	.17	.12	-.16

Explanations for the "Highly" and "Not" Likely Ratings

Offenders were asked to provide reasons for sorting the homes into the two extreme piles. Table 5 summarizes the responses. The reasons most frequently given for sorting homes into the highly likely pile involved a reference to seclusion of the property as a whole (47%) and concealment opportunities provided by specific areas of the property (37%). Appearance of value in the home was the next most frequently mentioned reason (30%). The reasons most frequently given for sorting homes into the least likely target were: beware of dog sign (37%), home is too open (27%), neighbours too close (25%) and lack of value (25%). These ratings are not exclusive of one another. An offender who gave "appearance of value" as a reason for choosing a home as a likely target, and also gave "lack of value" as the reason for choosing a home as an unlikely target is included in both counts.

The Importance of House Value

Although Brown and Altman did not include a measure of the house's value in their analysis it seems this aspect of the houses may be an important factor in the choice of a target. The focus of the model is on variables that may affect the perception of risk but other factors probably

Table 5.

Offenders' explanations for vulnerability ratings

Reasons for sorting into "Not likely" target pile

explanation	Adult		Youth		Total	
	#	%	#	%	#	%
"beware of dog" sign	10	44	6	30	16	37
too open	6	24	5	29	11	27.5
neighbours too close	4	17	6	35	10	25
lack of value	5	22	5	29	10	25
appears occupied	4	17	2	12	6	15
windows - too easy to see inside	3	13	-	0	3	7.5
wooden window frames	2	9	1	6	3	7.5
too much value	3	13	-	0	3	7.5
too secluded	1	4	1	6	2	5
too obvious people away	2	9	-	0	2	5
fences	-	0	1	6	1	2.5

Reasons for sorting into "Highly likely" target pile

explanation	Adult		Youth		Total	
	#	%	#	%	#	%
secluded property	15	63	5	25	20	47
concealment opportunity	9	39	7	35	16	37
appearance of value	8	35	5	25	13	30
sliding glass doors	2	9	1	5	3	23
car type implies "good" taste	4	17	4	20	8	19
aluminum window frames	4	17	3	15	7	16
set back from road	3	13	2	10	5	12
number of exits	4	17	-	0	4	9
lots of windows	3	13	1	5	4	9
appears noone home	2	9	-	0	2	5
no trespassing signs (therefore value)	2	9	-	0	2	5
no carport or garage	1	4	-	0	1	2
garage doors closed	-	0	1	5	1	2

contribute to the decision process. Scarr (1973) suggests that the choice of target involves a balance between perceived risk and perceived payoff.

A measure of value was added to the present study to assess the influence of perceived reward on the choice of target. Each home was rated on a 1 - 5 scale assessing house value. Three accredited real estate appraisers served as raters. "Rating" again involved sorting the photographs into piles representing a continuum of value from high to low. Value in this case was determined by house form, elaborateness of the decorations, lot size, and general impression of maintenance in the same way a realtor assesses market value. Reliability (Cronbach's alpha) for the ratings was .91. The mean rating of the three appraisers represents the value assigned to each house.

The value measure was strongly correlated with vulnerability for both the adults (r = .55, p < .001) and the young offenders (r = .63, p < .001). A multiple regression analysis was performed (SPSS-X) adding the value rating to the categories as predictors of vulnerability. The overall percentage of variance accounted for was compared to the regression analysis which included only the five original categories. Adding this variable improved the predictive value of the equation from 42 to 55% for the adults and 43 to 57% for the young offenders. Results are shown in Table 6.

Table 6.
Multiple Regression Analysis of Categories as Predictors for Vulnerability Including Value of Property Variable

Adult offender ratings

Multiple R .74
R squared .55
Adjusted R squared .49

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	6	55.83	9.30
Residual	43	45.57	1.06

F = 8.78 Significance of F = .0001

Variables in the Equation

	Beta weight	Sig T	Simple r
Value of home	.52	.0009	.55
Actual barriers	.01	.92	.26
Occupancy	-.04	.71	-.06
Surveillability (occupant)	-.14	.30	-.36
Symbolic barriers	-.03	.86	.28
Surveillability (road)	-.39	.022	-.55

Young offender ratings

Multiple R .76
R squared .57
Adjusted R squared .51

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	6	30.62	5.10
Residual	43	23.07	.54

F = 9.51 Significance of F = .0001

Variables in the Equation

	Beta weight	Sig T	Simple r
Value of home	.53	.0006	.63
Actual barriers	-.16	.20	.12
Occupancy	-.12	.25	-.13
Surveillability (occupant)	-.05	.69	-.20
Symbolic barriers	-.04	.78	.34
Surveillability (road)	-.53	.002	-.45

Correlations between categories and vulnerability controlling for house value. Previous investigations (Brown & Altman, 1983) attempted to hold the socio-economic factors constant by limiting the focus of the study to one specific location. However, even within one block with similar quality and style of houses it is possible to find a diverse range of values, levels of maintenance, and choice of decorations. Although controlling for the value of homes is difficult, if not impossible, it is possible to examine the original hypothesis by statistically controlling for value. Partial correlations were performed to examine the relationship between the categories and vulnerability removing the influence of house value. The relationship between symbolic barriers and vulnerability ratings of both offender groups changed from significant to non-significant when house value was controlled. The correlation between vulnerability ratings and surveillability for the occupant changed from non-significant to significant in the young offender sample. This change was not expected and is difficult to interpret. Correlations between vulnerability and the other categories were not significantly changed. (The partial correlation matrix is shown in Appendix H).

Further support for the strength of the value rating is provided by partial correlations between value and the vulnerability ratings controlling for symbolic barriers. The

probability levels were unchanged for both the adult (r = .50, $p < .001$) and young offender (r = .57, $p < .001$) groups. These results suggest that the significant correlation between symbolic barriers and the vulnerability ratings is due to the association between symbolic barriers and the appearance of value.

Information from Open-ended Questions

Suitability of neighbourhood. Offenders were asked to comment on the researcher's choice of neighbourhood. Seventeen of the 23 adult offenders (74%) felt it was a good choice. Four of the remaining six prefer more expensive areas. One said he preferred less expensive areas because it is more likely the residents would be at work and because police concentrate their patrols on wealthier sections of the city. The remaining adult offender usually chose apartment blocks over detached houses. Usually apartment blocks displayed the residents' names on the mail box so the offender could telephone to check if anyone was home.

Fourteen out of 20 young offenders (70%) said it was a good choice of neighbourhood. Three of the remaining six said they preferred more expensive neighbourhoods, the other three felt all neighbourhoods present a equal number of opportunities.

Preferred time of day. Twenty-one out of 23 adult offenders (91%) and 15 out of 20 young offenders (75%) said they preferred daytime over night time "jobs". The two

remaining adult offenders said choice of time depended upon many circumstances. These circumstances involve both internal states of the offender, such as need for money immediately, or external factors such as a lucky discovery of the perfect target. Three of the remaining five young offenders said they had no preference and two said they would only break into a home at night.

Previous knowledge of the owners or contents of the home. The researcher also asked the offenders if they usually knew something about the owners or had some information about what was inside before they broke into a home. Three of the 23 adults (13%) and 3 of the 20 young offenders (15%) said they always had some specific knowledge of the people and the hours they worked, usually based on information from friends. Lengthy observation was reported by one young offender who "cases" a target for at least a week before entering the home. Casing involved keeping a record of what time the occupants left and returned each day of the week. The researcher enquired if he also noticed when the neighbours were usually home but he felt this was unecessary. One other young offender claimed he paid paper boys a small cut of the profit if they informed him when clients cancelled their paper while away on holiday.

Discussion

Programs that try to prevent crime through features of the environment are based on assumptions about offenders' perceptions. Attempts to translate those assumptions into effective strategies have been guided by little more than "informed hunch" (Bennett & Wright, 1984). The literature provides very little evidence that offenders decode environmental cues in the way that the crime prevention models predict. The goal of this thesis was to explore some of the assumptions through direct tests of the offenders' perceptions.

The results support the hypothesis that evaluations of vulnerability to residential breaking and entering are consistent across offenders. A second hypothesis that higher ratings on the environmental cue categories proposed by Brown and Altman (1981, 1983) would be associated with low vulnerability was not supported. The results suggest that the categories of visibility and symbolic barriers are useful predictors of vulnerability but the relationship between vulnerability and symbolic barriers is in the opposite direction to the hypothesis. In this study the more symbolic barriers displayed on a house, the more likely the offender will choose that house as a vulnerable target. A third hypothesis was also not supported. Surveillability and territorial cues in combination were not more likely to be

associated with low vulnerability ratings than surveillability alone. A post-hoc test suggests that the perceived value of a house influences target choice.

Offenders' perceptions

The environmental approach to crime prevention assumes that offenders' evaluations of the environment reflect shared patterns of perceptions. One goal of this thesis was to determine if this assumption is valid. The offender groups demonstrated highly consistent evaluations. The differences among them were minor and related to the two different age groups. Adult offenders as a group demonstrate more agreement among themselves than the young offenders. Intraclass reliability coefficients suggest that the typical adult offender is a more reliable rater than the typical young offender. Differences between the two groups involved a tendency of the young offenders to rate more houses into the middle levels of vulnerability than the adult group. Ratings on 10 of the 50 houses were significantly different between the two groups and in every case the difference was a more conservative evaluation by the young offenders.

If it is reasonable to assume that older offenders are more experienced than the under 18 years group, then this pattern of evaluations supports ideas about the developmental process of offending. The perceptional skills needed to evaluate environments (Brantingham & Brantingham, 1978; Letkemann, 1973), and confidence in decisions (Carter & Hill,

1980) are believed to develop over time through experience and success. Perhaps the tendency for the young offenders to place more houses into the middle categories of the vulnerability scales reflects less skill and confidence in their decisions than is found in the adult group.

Individual Cues and the Perception of Risk

One goal of the present research was to identify specific cues that are strongly associated with high and low vulnerability ratings. This study failed to identify many specific cues that influence the offenders' ratings. The cues that were important in Brown and Altman's study (1983) were not important in a replication of that study (Brown, 1983), nor were they highly correlated with the vulnerability ratings of the present study. These findings lend some support for the suggestion that an offender's choice of target is based upon a Gestalt-type image that would have a different meaning if the features were considered separately or in different combinations (Carter and Hill, 1980). This may partially explain the mixed results found in the modification projects.

Beware of dog signs. One specific cue that may be useful is a "beware of dog" sign. Although the correlation was not significant for the adult offenders, and only marginally significant for the young offenders ($r = .27$, $p < .05$), 44% of the adults and 30% of the young offenders

mentioned this as a reason for rating houses as unlikely targets.

The deterrent effect of beware of dog signs is consistent with Bennett and Wright's (1984) findings. Eighty-seven offenders were interviewed, two-thirds report they would avoid a house if they suspected a dog lived there. Worrell and Sparkes (1982) measured how many houses had dogs in residential areas with low, medium and high vandalism rates. Thirty-one percent of the households in the low vandalism area owned a dog but only 18% in the medium and 19% in the high vandalism areas.

It is possible the threat suggested by a beware of dog sign is more powerful than the dog itself. The present study did not measure the effect of the actual presence of dogs because only 2 of the 50 photographs showed a dog. A dog house was visible in another photograph. The actual or implied presence of a dog without the suggestion of threat did not seem to concern the offenders. If a beware of dog sign is an effective deterrent it provides an inexpensive and easy method to increase house security.

Surveillability and the Perception of Risk

The results of this study confirms previous findings that a surveillable property is likely to be avoided by offenders. Although the importance of surveillability potential is no surprise, the reasons why a surveillable property is avoided remains unclear. Many factors argue

against this influence; the reticence of people to intervene in crimes, the fact that an offence occurs infrequently and quickly makes it difficult for untrained people to be aware of its occurrence, and the fact that many people in neighbouring houses will be at work at the same time as the occupants of the target house (Hope, 1986). The present study hypothesized that territorial cues would be a mediating factor in the perception of surveillable properties. Results do not support this hypothesis. Surveillability and territorial cues in combination were not more likely to be associated with low vulnerability ratings than surveillability alone.

Territoriality and the Perception of Risk

In contrast to the deterrent value of surveillability, territorial displays were not associated with perceptions of increased risk. Three of the five categories (occupancy cues, symbolic barriers, and actual barriers), represented some form of territorial message, but none of these three categories were decoded by offenders as features to avoid.

Occupancy. The lack of influence of the occupancy cues is the most surprising. Previous research (Bennett & Wright, 1984) found that burglars view occupancy cues as strong deterrents. Comments made by the offenders when giving reasons for their choices may provide an explanation. Although offenders wish to avoid running into occupants, and consider this a central concern, it appears that the

offenders involved in this study do not rely on environmental features to decide if someone is at home. When asked about the influence of cars in the driveway and lights on in the home, many offenders say they usually conduct a more direct test of occupancy. Often they simply knock on the door and ask for a fictitious person if someone answers. If the resident's surname is available through mail in the mailbox or a sign on the house, the offender telephones the home from a nearby phone booth. One car in the driveway is not necessarily interpreted that someone is home. Similarly no cars in the driveway does not guarantee the house is not occupied.

Establishing actual, as opposed to perceived occupancy, plus the choice of a crime site that is not readily surveillable from outside of the yard, may preclude the deterrent value of territorial cues. Although there is an intuitive appeal to the proposition that territorial cues may deter offenders, it is difficult to see how this increased perception of risk would be maintained once the offender was certain the resident and neighbours were unable to monitor his activities. Crime prevention programs should recognize that offenders may develop techniques to assess the actual risk of intervention instead of choosing targets based on perceived risk.

Actual barriers. Actual barriers were also expected to increase security for the homeowner and discourage the

offenders. Besides clearly defining an area, fences, walls and gates provide a physical impediment that may hamper a hasty retreat. Brown and Altman's finding that yard barriers were associated with non-burglarized houses was not supported in this study.

One concern about Newman's defensible space guidelines was the contradiction between some of the strategies (Mawby, 1977). An actual barrier places a physical obstruction between the road and the house which may reduce the potential to survey the property. If this barrier is a chain-link fence, or similar material, then visibility is not reduced. However, many other types of fences and barriers provide visual cover for someone in the yard. If barriers reduce visibility they are likely to enhance the possibilities for a potential offender. The present study attempted to control for this potential conflict in the method of selecting photographs to include in this study but actual barriers and visibility from the road were unavoidably confounded in some cases.

Another explanation may account for the lack of influence of actual barriers. Results from the ratings, and the reasons given for choosing certain houses as likely and unlikely targets, suggest that offenders are more concerned about doors and window frames than fences and gates. But the actual barrier category ratings indicate that the student raters perceive the yard barriers as more representative of

actual barriers than house barriers.

Crossing yard boundaries may not be perceived by offenders as involving any degree of risk. Many legitimate visitors enter a yard for social and business purposes. Noticing someone approaching the door of a neighbour's house may not appear unusual but noticing that person enter the house uninvited would arouse suspicion. Perhaps concern about crossing into private areas does not begin until the boundaries of the house are crossed. Before preventative programs endorse the strategy of building fences it may be valuable to investigate the offenders' concerns about being observed at different stages of the offence.

Symbolic Barriers. Contrary to predictions, symbolic barriers were not perceived by the offenders to represent an increase in risk. Instead they were associated with vulnerable targets. This finding is consistent with the anectodal comments of offenders participating in Bennett and Wright's (1984) interviews. Some offenders interpreted decorated and well-maintained exteriors as indicators of interiors with valuable goods. Taylor, Brower and Stough (1976, cited in Brown, 1980) asked residents to rate sketches of store fronts on how safe and secure they appeared. Store fronts with decorations but no people visible in the sketch were rated as highly vulnerable to burglary. When symbolic barriers communicate the impression of value it appears that vulnerability is increased.

Symbolic Barriers and Perceived Pay-off

This study included a post-hoc evaluation of how the impression of a valuable house and property affected the vulnerability ratings. The appearance of value measure substantially increased the association between the categories and vulnerability ratings when added to a multiple regression analysis and value was more highly correlated with vulnerability than the other categories. These correlational and regression analyses suggest that perceived value is a correlate of vulnerability to burglary that should be investigated further.

Perceived Pay-off and Crime Site Selection Research

The crime site selection models emphasize the importance of perception of risk but other impressions probably contribute to the decision process. Although many writers (e.g., Brown & Altman, 1983; Repetto, 1974; Scarr, 1973) have acknowledged that the perceived payoff may be important to the decision process, this idea has not been incorporated into the empirical research. The logic behind preventing crime through environmental design relies on the assumption that offences involve a goal-oriented decision process. Brown and Altman (1983) restrict the applications of their model to "rational, goal-oriented and experienced rather than irrational, impulsive and inexperienced burglars" (p. 73).

Interviews indicate that burglars tend to view burglary as an economic activity (Letkemann, 1973; Macguire & Bennett, 1982) and identify profit as the major reason for committing an offence (Bennett & Wright, 1984). The belief in the goal-oriented and economic motivational factors suggests that offenders must supplement the perception of risk with some evaluation of the kinds of goods available in the house. The environmental messages the offender seeks from the environment may be a combination of the level of territorial concern and indicators of the occupants' lifestyle.

Evidence from areas other than crime prevention research indicates that houses do communicate many diverse and easily decoded messages about the occupant. Consumer research explores how consumption choices communicate information about the owner. A prevelant theme of advertising campaigns convinces consumers that others make judgments about them through their clothes, houses, and cars. People apparently find it an easy task, and are very consistent in the inferences they make about the occupants when they are shown a photograph of a house, including what objects they may possess, age, personality and occupation (Belk, Bahn & Mayer, 1982; Vershure, Magel & Sadalla, 1977).

This tendency to make inferences was evident in the present study. While rating the photographs, 30% of the offenders spontaneously offered some kind of lifestyle assumption when giving reasons for choosing houses. Ages of

the people who owned the house, occupations, whether or not they would keep cash in the house or have it all in the bank, hobbies, value of stereos, likelihood they possess compact electronic equipment and the probability they had insurance were all mentioned. Conspicuous consumption appears to be an effective way of transmitting messages about taste and lifesyle. This should be added to the possible variables that communicate an impression of vulnerability to property crime.

Limitations of the Present Study

Newman's defensible space theory was directed towards all forms of residential housing but most of his examples and the modification projects based on his theory dealt with large multi-family public housing complexes. Cues that are important in single family dwellings may not be important in other forms of housing. These complexes may offer the offender less opportunity to evaluate the likelihood of value inside from the outer appearance and social cohesion may be more evident on a shared property than detached dwellings. Because of this difference the results from this study may be relevant only to detached dwellings in similar neighbourhoods.

Conclusions are also resticted by the use of convicted offenders as raters. If skill at burglary relies on ability to assess risk through environmental cues, perhaps convicted offenders represent the burglars who are unable to

successfully read environmental messages. The study also faces possible bias from non-random subject selection. Not only is the sample limited to convicted offenders who volunteer to participate, the sample is also limited by the justice system's classification. Only a small fraction of offenders who are caught are sentenced. Offenders released during the judicial process may differ from the convicted offender in a way that affects the results of this study.

The present study has limitations that may have biased the decision process towards the reward end of the risk-reward balance. When actually committing a crime, the potential offender is in a dynamic and complex situation. The methodology of this study placed offenders in a quiet interview room, sorting static photographs for a researcher who was attempting to create a comfortable atmosphere. This situation may lead to the tendency to minimize the risk factors and emphasize the reward factors.

Perhaps a form of rationalization may be involved. Considering that raters were incarcerated in correctional institutes it may be assumed the act of burglary had a major impact upon their lives. If it appears there was a promise of a substantial reward involved their current situation may seem more justifiable.

Future Directions

The results of this study conflict with Brown and Altman's (1983) findings. Future studies could attempt to

address the problems presented by the conflicting results by combining the two methods. If a police department would be willing to inform a researcher of a break and enter immediately after it was reported then photographs could be taken of the target and adjacent houses without a time lag between offence and evaluation. Offenders could then be asked to make vulnerability ratings on photographs of the burglarized and non-burglarized houses. If the burglarized houses displayed fewer territorial messages but offenders chose houses that displayed evidence of value as more likely to be broken into, then it would appear the emphasis on reward is an artifact of the present methodology.

Research on individual differences. A number of questions require future research. This study did find some differences between the adult and young offender groups but other individual differences were not examined. A number of possible differences have been identified in the literature including motivation (Scarr, 1973), the influence of drugs, degree of experience, and success (Brantingham & Brantingham, 1978). Further studies should evaluate how these differences influence the perception of environmental cues.

Additional categories of cues that may influence the offenders' decisions. Although the five categories of cues plus an estimation of value appear to be useful predictors of vulnerability, approximately 50% of the

variance in the vulnerability ratings is not explained by these categories. With the exception of value, these categories were suggested by academics. A search for additional categories should turn to offenders for suggestions. Factors other than risk and perceived pay-off may be important but as yet are unidentified by the research.

Integrating territorial behaviours with territorial displays. Newman's defensible space theory involves two themes; enhancing residents' territorial cognitions and behaviours through environments they can survey, control and personalize, and the potential offenders' sensitivity to this territorial concern communicated by the environment. The present paper only looked at the second theme. Perhaps offenders assess the degree of territorial concern by observing the residents instead of the environment. An approach that combines territorial behaviours, the environmental cues and the offenders' perceptions would be valuable.

Summary

The present results confirm the hypothesis that the potential for neighbours to survey a property plays a central role in the decision process of a residential burglar.

There is no evidence that territorial displays in the form of actual or symbolic barriers or occupancy cues deter burglars. Many questions remain unanswered, but three attempts (Phelan, 1977; Bennett & Wright, 1984, and the

present study) to find evidence that offenders are influenced by territorial displays have failed. Many modification projects have added plantings, signs, curbs, fences and flowers. Although these are desirable for humanistic and aesthetic reasons, it appears their potential for preventing burglaries is negligible. If these displays communicate affluence they may attract offenders.

One of the most important findings of this study is the high reliability of the offenders' ratings. Offenders do evaluate the environmental cues and this evaluation may include messages about the goods inside the house as well as the surveillability aspect. Although obtaining a willing and representative sample is difficult, it appears that development of crime site selection models can benefit from directly testing the offenders' perceptions.

References

Adams, J. R. (1973). Defensible space. Man-Environment Systems, 3, 267-268.

Altman, I. (1975). Environment and social behavior: Privacy, personal space, territory, and crowding. Monterey, Ca: Brooks Cole.

Altman, I., Taylor, D. A., & Wheeler, L. (1971). Ecological aspects of group behavior in social isolation. Journal of Applied Social Psychology, 1, 76-100.

Becker, F. D. (1973). Study of spatial markers. Journal of Personality and Social Psychology, 26, 439-445.

Belk, R., Bahn, K. & Mayer, R. (1982). Developmental recognition of consumption symbolism. Journal of Consumer Research, 9, 4-17.

Bennett, T. & Wright, R. (1984). Burglars on burglary. Aldershot, Hampshire: Gower.

Brantingham, P. S. & Brantingham, P. L. (1978). A theoretical model of crime site selection. In M. Krohn & R. L. Akers (Eds.), Crime, law and sanctions (pp. 105-118). Beverly Hills: Sage.

Brower, S., Dockett, K., & Taylor, R. (1983). Residents' prceptions of territorial features and perceived local threat. Environment and Behavior, 15, 419-437.

Brown, B. B. (1980). Territoriality, defensible space, and residential burglary: An environmental analysis. Unpublished master's thesis, University of Utah.

Brown, B. B. (1983). Territoriality, street form, and residential burglary: Social and environmental analyses. (Doctoral dissertation, University of Utah, 1983). Dissertation Abstracts International, 44, 357B.

Brown, B. B. & Altman, I. (1981). Territoriality and residential crime: A conceptual framework. In P. J. Brantingham & P. L. Brantingham (Eds.), Environmental criminology. Beverly Hills, CA.: Sage.

Brown, B. B. & Altman, I. (1983). Territorality, defensible space and residential burglary: An environmental analysis. Journal of Environmental Psychology, 3, 203-220.

Carter, R. & Hill, K. (1980). Area-images and behavior: An alternative perspective for understanding urban crime. In D. Georges-Abeyie & K. Harries (Eds.), Crime: A spatial perspective (pp. 193 - 204) New York: Columbia University Press.

Cohen, J. & Cohen, P. (1975). Applied multiple regression/correlation analysis for the behavioral sciences. Hillsdale, NJ: Lawrence Erlbaum.

Collis, B. A. & Rosenblood, L. K. (1985). The problem of inflated significance when testing individual correlations from a correlation matrix. Journal for Research in Mathematics Education, 16(1), 52-55.

Craik, K. H. & Appleyard, D. (1980). Streets of San Francisco: Brunswik's lens model applied to urban inference and assessment. Journal of Social Issues, 36(3), 72-83.

David, P. R. (1974). The world of the burglar. Albuquerque: University of New Mexico Press.

Edney, J. (1972). Property, possession and permanence: A field study in human territoriality. Journal of Applied Social Psychology, 2, 272-82.

Engstad, P. (1980). Environmental opportunities and the ecology of crime. In R. A. Silverman & J. J. Teevan Jr. (Eds.), Crime in Canadian society (2nd ed.) (pp. 203 - 219). Toronto: Butterworths.

Evans, J. & Leger, G. (1980). Canadian victimization surveys. In R. A. Silverman & J. J. Teevan Jr. (Eds.), Crime in Canadian society (2nd ed.) (pp. 103 - 114). Toronto: Butterworths.

Gelfand, D. M., Hartmann, D. P., Walder, P., & Page, B. (1973). Who reports shoplifting? A field study. Journal of Personality and Social Psychology, 25, 276-285.

Greenbaum, P. & Greenbaum, S. (1981). Territorial personalization: Group indentity and social interaction in a Slavic-American neighborhood. Environment and Behavior, 13, 574-580.

Guilford, J. P. (1965). Fundamental statistics in psychology and education. New York, McGraw-Hill

Hillier, W. (1973). In defence of space. RIBA Journal, November, 539-544.

Holzman, H. R. (1982). The rationalistic opportunity perspective of criminal behavior. Crime and Delinquency, 28, 233-246.

Hope, T. (1986). Crime, community and environment. Journal of Environmental Psychology, 6, 65-78.

Hummel, T. J. & Sligo, J. R. (1971). Empirical comparison of univariate and multivariate analysis of variance procedures. Psychological Bulletin, 76, 49-57.

Hunter, J. (1978). Defensible space in practice. The Architects' Journal, 11, 675-77.

Jacobs, J. (1961). The death and life of great American cities. Toronto: Random House.

Jeffery. C. (1977). Crime prevention through environmental design. Beverly Hills: Sage.

Letkemann. P. (1973). Crime as work. Englewood Cliffs, N. J.: Prentice Hall.

Macguire, M. & Bennett T. (1982). Burglary in a dwelling. London: Heinemann.

Mayhew, P. (1979). Defensible space: The current status of a crime prevention theory. The Howard Journal, 18, 150-159.

Mayhew, P. (1981). Crime in public view: Surveillance and crime prevention. In P. J. Brantingham & P. L. Brantingham (Eds.), Environmental criminology (pp. 119-134). Beverly Hills, Sage.

Mawby, R. (1977). Defensible space: A theoretical and empirical appraisal. Urban Studies, 14, 169-179.

McInnis, P., Burgess, G., Hann, R. & Axon, L. (1984). The environmental design & management (EDM) approach to crime prevention in residential environments. (Programs Branch User Report, No. 1984-84). Ministry of the Solicitor General of Canada.

Murray, C. (1983). The physical environment and community control of crime. In J. Q. Wilson (Ed.), Crime and public policy, (pp. 107-122).

Newman, O. (1972). Defensible space: Crime prevention through urban design. New York: Macmillan.

Newman, O. (1975). Design guidelines for creating defensible space. Washington, D. C.: U. S. Department of Justice.

Newman, O. & Franck, K. (1980). Community and instability. Washington, D. C.: Govt. Printing Office.

Pablant, P. & Baxter, J. (1975) Environmental correlates of school vandalism. Journal of American Institute of Planners, 41, 270-279.

Patterson, A. H. (1978). Territorial behavior and fear of crime in the elderly. Environmental Psychology and Nonverbal Behavior, 2, 131-45.

Phelan, G. F. (1977). Testing academic notions of architectural design for burglary prevention. How burglars perceive cues in suburban apartment complexes. Paper presented to the annual meeting of the American Society of Criminology, November. Atlanta, Georgia.

Poyner, B. (1983). Design against crime: Beyond defensible space. Cambridge, England: Cambridge University Press.

Quinney, R. (1975). Criminology. Boston: Little, Brown.

Rand, G., (1984). Crime and environment: A review of of the literature and its implications for urban architecture and planning. Journal of Architectural and Planning Research, 1, 3-19.

Reppetto, T. A. (1974). Residential crime. Cambridge, MA.: Ballinger.

Scarr, H. (1973). Patterns of burglary. Washington D. C.: U.S. Department of Justice.

Sundstrom, E. & Altman, I. (1974). Field study of dominance and territoriality. Journal of Personality and Social Psychology, 30, 115-125.

Taylor, R. B. (1980). The defensibility of defensible space. In T. Hirschi & M. Gottfredson (Eds.), Understanding crime: Current theory and research (pp. 53-71). Beverly Hills, CA.: Sage.

Taylor, R. B. & Stough, R. (1978). Territorial cognition: Assessing Altman's typology. Journal of Personality and Social Psychology, 36, 418-423.

Vershure, B., Magel, S. & Sadalla, E. (1977). House form and social identity. In P. Suedfeld, J. Russell, L. Ward, F. Szigeti & G. Davis (Eds.), The Behavioral Basis of Design, Book 2: Session summaries and papers (pp. 273-278). Stroudsburg, Pennsylvania: Dowden, Hutchinson & Ross.

Waller, I. & Okihiro, N. (1978). Burglary: The victim and the public. Toronto: University of Toronto Press.

Walsh, D. (1980). Break-ins: Burglary from private houses. London: Constable.

Wilson, S. (1980) Vandalism and 'defensible space' on London housing estates. In R. V. G. Clarke & P. Mayhew (Eds.), Designing out crime. Home Office Research Unit.

Worrell, P. & Sparkes, A. (1982). A study of residential property crime in Thunder Bay. Ottawa: Solicitor General of Canada.

Appendix A

INSTRUCTIONS

For each of the five categories, first look through the photos and pick out the homes that appear to be the best representatives of homes high in that category. Put these photos into pile number 1.

Now look through the remaining photos and pick out the homes that appear lowest in the category - put these into pile number 7. Sort the remaining photos under the numbers in between. The lower the number the more the home fits the category, the higher the number the less the photo fits the category.

Please put at least 3 photos into each pile.

After you have sorted all the photos on one category write the numbers of the photos in each pile in the space provided on the ratings sheet. Then sort the photos into the next category.

THANK YOU!

DEFINITIONS

1. Symbolic barriers and markings:
physical features that do not restain access directly but serve to communicate territoriality and ownership.
Examples
- -decorative mailboxes
- -name plates
- -flower beds
- -plantings, low shrubs
- -elevation changes
- -appearance of maintenance and care
- -row of trees spaced so it is possible to walk in between.
- -decorative fences (under 3 ft. high)
- -ditches on the street edge

2. Actual barriers:
features that actually impede access to the site.
Examples
- -fences (over 3 ft. high)
- -gates
- -walls
- -hedges (over 3 ft. high)

3. Opportunity for an occupant to detect an intruder on the property. (Surveillability for occupant):
Examples:
- -windows facing the road
- -front windows not covered by shrubs or curtains, blinds etc.

4. Surveillability from road:
features that provide an opportunity to survey the property and home from the road and reduce the opportunity for concealment.
Examples:
- -no heavy shrubbery in front yard
- -no high hedges, walls and fences
- -doors and windows visible from road

5. Occupancy:
features that apply actual or implied presence of residents.
Examples:
- -parked cars in driveway or on street
- -garden tools, childrens' toys that indicate interrupted activities
- -people visible in yard or in the home
- -lack of accumulated mail and flyers

-lack of inappropriate lighting, (lights on in daytime)

Photograph #1

Photograph #2

Photograph #3

Photograph #4

Photograph #5

Photograph #6

Photograph #7

Photograph #8

Photograph #9

Photograph #10

Photograph #11

Photograph #12

Photograph #13

Photograph #14

Photograph #15

Photograph #16

Photograph #17

Photograph #18

Photograph #19

Photograph #20

Photograph #21

Photograph #22

Photograph #23

Photograph #24

Photograph #25

Photograph #26

Photograph #27

Photograph #28

Photograph #29

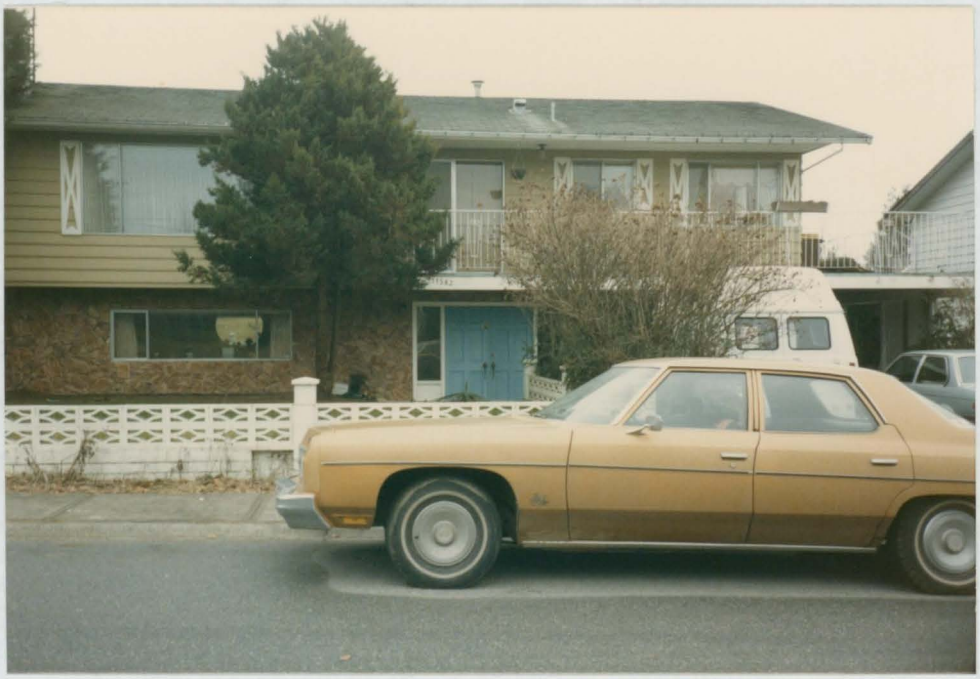
Photograph #30

Photograph #31

Photograph #32

Photograph #33

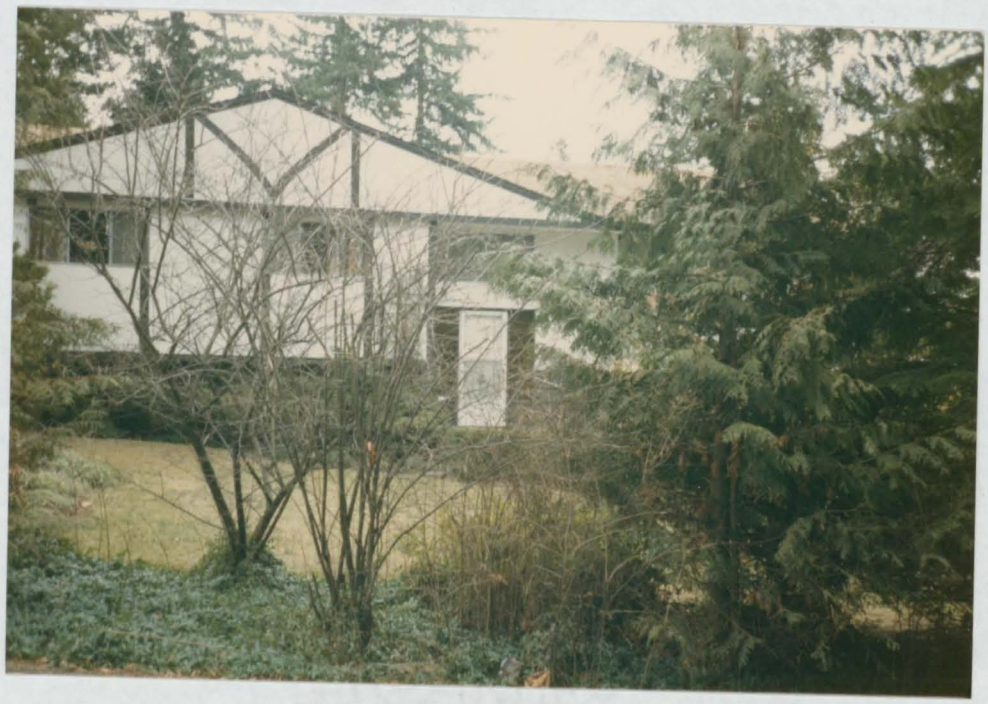
Photograph #34



Photograph #35

Photograph #36

Photograph #37



Photograph #38

Photograph #39

Photograph #40

Photograph #41

Photograph #42

Photograph #43

Photograph #44

Photograph #45

Photograph #46

Photograph #47

Photograph #48

Photograph #49

Photograph #50

Appendix C

Mean Ratings of Houses by Categories

House	Actual Barrier	Symbolic Barrier	Occupant Surveillability	Surveillability from Road	Occupied
1	4.8	4.0	4.0	3.6	1.0
2	3.2	5.8	1.8	2.8	2.2
3	4.6	3.0	4.8	4.8	5.2
4	2.8	2.8	2.0	4.8	1.8
5	7.0	5.4	1.8	1.0	5.4
6	6.8	3.6	4.6	2.0	6.8
7	4.4	5.0	5.4	5.2	2.0
8	2.4	2.0	5.0	4.8	4.6
9	5.5	1.8	4.4	4.4	6.8
10	3.6	2.0	6.0	6.4	5.0
11	3.2	4.6	5.2	5.8	1.8
12	6.2	4.4	5.2	2.4	1.2
13	5.6	5.0	3.4	2.6	6.6
14	1.2	3.4	3.8	2.8	5.6
15	6.0	3.2	2.6	4.0	5.2
16	1.8	3.6	3.0	1.0	4.8
17	3.4	2.6	6.0	4.4	6.6
18	4.8	4.4	4.0	1.0	6.2
19	5.4	4.2	4.6	4.2	1.4
20	6.2	2.6	1.4	1.6	5.6
21	3.2	4.0	6.2	6.8	5.0
22	5.6	5.8	1.2	2.0	4.6
23	6.8	6.0	3.8	2.0	4.6
24	5.6	5.4	6.0	3.6	7.0
25	5.2	4.0	1.8	1.6	4.6
26	7.0	5.0	3.6	1.8	2.0
27	4.6	2.2	1.6	2.8	4.4
28	5.4	3.8	4.4	2.0	6.2
29	7.0	5.6	2.0	1.6	3.4
30	2.0	5.0	6.4	7.0	4.4
31	4.8	4.4	3.4	3.6	6.8
32	3.4	4.4	4.6	3.0	1.6
33	2.0	4.8	5.2	6.6	5.2
34	5.4	2.0	5.0	3.8	6.2
35	3.6	2.8	3.6	3.4	1.2
36	2.0	5.4	3.2	3.8	1.6
37	6.0	4.6	2.6	2.4	1.6
38	4.6	5.2	4.4	5.6	5.0
39	3.2	3.8	1.6	2.0	5.4
40	3.8	2.8	3.2	2.4	5.6

(table continued)

	Actual Barrier	Symbolic Barrier	Occupant Surveillability	Surveillability from Road	Occupied
41	6.0	5.6	5.2	2.8	5.0
42	6.6	5.8	3.0	2.2	1.6
43	3.8	3.0	3.8	5.0	5.2
44	1.0	3.8	2.8	4.8	5.0
45	4.0	2.2	3.2	1.4	5.4
46	5.8	4.0	6.0	3.8	1.6
47	2.2	3.4	4.8	6.6	4.8
48	2.0	2.6	4.6	3.2	4.4
49	6.8	4.4	1.6	1.0	6.4
50	5.0	2.6	2.6	3.6	1.4

Note: Actual Barriers 1= many actual barriers
7= few actual barriers
Symbolic Barriers 1 = many symbolic barriers
7 = few symbolic barriers
Surveillability from road 1= high surveillability
7= low surveillability
Surveillability for occupant 1= high surveillability
7= low surveillability
Occupancy 1= many traces of occupancy
7= few traces of occupancy.

Appendix D

Mean Ratings of Houses Arranged by Category

Actual Barriers

House #	AB	SB	SOCC	SRD	OCC
36	2.0	5.4	3.2	3.8	1.6
44	1.0	3.8	2.8	4.8	5.0
48	2.0	2.6	4.6	3.2	4.4
4	2.8	2.8	2.0	4.8	1.8
14	1.2	3.4	3.8	2.8	5.6
26	7.0	5.0	3.6	1.8	2.0
5	7.0	5.4	1.8	1.0	5.4
45	5.8	4.0	6.0	3.8	1.6
42	7.0	5.8	3.0	2.2	1.6
49	6.8	4.4	1.6	1.0	6.4

Symbolic barriers

House#	AB	SB	SOCC	SRD	OCC
40	3.8	2.8	3.2	2.4	5.6
45	4.0	2.2	3.2	1.4	5.4
8	2.4	2.0	5.0	4.8	4.6
34	5.4	2.0	5.0	3.8	6.2

Symbolic barriers

House#	AB	SB	SOCC	SRD	OCC
7	4.4	5.0	5.4	5.2	2.0
2	3.2	5.8	1.8	2.8	2.2
23	6.8	6.0	3.8	2.0	6.4
22	5.6	5.8	1.2	2.0	4.6
41	6.0	5.6	5.2	2.8	5.0

Surveillability from the road

House #	AB	SB	SOCC	SRD	OCC
16	1.0	3.6	3.0	1.0	4.8
18	4.8	4.4	4.0	1.0	6.2
28	5.4	3.8	4.4	2.0	6.2
25	5.2	4.0	1.8	1.6	4.6
11	3.2	4.6	5.2	5.8	1.2
21	3.0	4.0	6.2	6.8	5.0
43	3.8	3.0	3.8	5.0	5.0
38	4.6	5.2	4.4	5.6	5.0
47	2.2	3.4	4.8	6.6	4.8

Surveillability for the occupant

House #	AB	SB	SOCC	SRD	OCC
15	6.0	3.2	2.6	4.0	5.2
39	3.2	3.8	1.6	2.0	5.4

Surveillability for the occupant continued

House #	AB	SB	SOCC	SRD	OCC
27	4.6	2.2	1.6	2.8	4.4
20	6.2	2.6	1.4	1.6	5.6
50	5.0	2.6	1.4	3.6	1.4
17	3.4	2.6	6.0	4.4	6.6
3	4.6	3.0	4.8	4.8	5.2
6	6.8	3.6	4.6	2.0	6.8
24	5.6	5.4	6.0	3.6	1.8
30	2.0	5.0	6.4	7.0	4.4

Occupancy

House #	AB	SB	SOCC	SRD	OCC
37	6.0	4.6	2.6	2.4	1.6
1	4.8	4.0	4.0	3.6	1.0
35	3.6	5.8	3.6	3.4	1.2
32	3.4	4.4	4.6	3.0	1.6
19	5.4	4.2	4.2	3.6	1.4
9	1.8	4.4	4.4	3.8	6.8
31	4.8	4.4	3.4	3.1	6.8

Occupancy continued

House #	AB	SB	SOCC	SRD	OCC
12	6.2	4.4	5.2	2.4	5.2
13	5.6	5.0	3.4	2.6	6.6
33	2.0	4.8	5.2	5.6	5.2

AB - Actual barriers

SB - Symbolic barriers

SOCC - Surveillability for occupant

SRD - Surveillability from the road

OCC - Occupancy cues

APPENDIX E

HOUSE # _____
BRIEF DESCRIPTION OF HOME TO IDENTIFY:

_____

_____

RATER _____

OPPORTUNITY FOR OCCUPANT OF HOME TO DETECT AN INTRUDER ENTERING THE PROPERTY

NOTE a = absent code as 1, p = present code as 2
code no (n) = 1 yes (y) =2

a p noise approach (gravel, rock, wooden stairs)
_____ number of unblocked windows facing road (blocked windows are covered by closed, opaque drapes or closed blinds or covered by shrubs

SURVEILLABILITY FOR RESIDENT

Total _____.

VISIBILITY OF HOME AND PROPERTY FROM ROAD

+____ number of windows with an unblocked line of vision for an observer on the road (do not include glass panels in doors).
-____ number of windows blocked for observer (line of vision to the windows may be blocked by shrubs, trees, hedges, fences etc. but this does not include interior blocking such as drapes and blinds.)
n y front door visible from street
n y all or most (3/4)of the front of home is visible from road
n y all or most of the front yard (3/4)is visible from road
n y neighbour's home visible on either side
n y neighbour's windows overlooking home
n y distance between the home and the road appears to be <20 feet

SURVEILLABILITY FROM ROAD

Total _____.

OCCUPANCY

a. indications of absence of people:

a p newspapers, flyers and uncollected mail in yard
a p light on inappropriately

b. indications of presence of people or interrupted activities:

a p signs of interrupted activity
+ ____ number of cars in driveway or garage
+ ____ number of cars in front of home
a p other (specify) _____

OCCUPANCY TOTAL____

ACTUAL BARRIERS

a. Is there an actual barrier (functional fence (>3 ft.), high wall) between:

a p yard and road
n y is there a gate (this includes gates on symbolic (<3 ft. fences)
n y if gate, is it open
a p Is garage or car port present?
n y garage doors open
_____ degree of enclosure 0=no, 1=sides 2=yard
n y back yard separated from front yard

b. Different types of doors present:

a p all glass, sliding doors
a p some glass
a p solid with no glass
a p screen door
a p glass panel window beside door
_____ actual barrier type 1=see through 2 =opague

ACTUAL BARRIERS TOTAL_____

SYMBOLIC BARRIERS

a. Street edge:

If street edge is visible mark the relevant space below
a p No boundary, or curbing only, or dirt path
a p ditch
a p sidewalk only, or sidewalk and curb
n y open access to site

Total _____

c .Is there a visible but symbolic barrier (trees, hedges (less than 3 ft.), shrubs, decorative fence (less than 3 ft.), wall) between:

n y yard and road
n y yard and house
n y yard and at least one of the bordering properties

Total _____

d. Distinctive features of the yard:

n y house is higher than the road
n y more than 4 steps to the front door
a p presence of trees, shrubs (more than 4)
a p extensive landscaping

a p lawn is unmowed and/or hedges are not trimmed, flower beds or walkways appear to be weedy. Please underline the specific cues that are present.
a p pieces of "junk" in yard (old lumber, broken toys, cars that appear to be non-functioning). Please underline the specific cues that are present
a p trash in yard or on boulevard

Total _____

e. Distinctive features of house:

a p shutters,and/or awning(s) and/or a balcony
a p decorative items (statues, vases, hanging flower baskets, trellis,etc.) (more than 3 of 1 item of the above or a combination of 3 or more different items)

a p home, roof or fence needs repair
a p flower beds
a p shaped and trimmed shrubs
a p leaves raked

Total _____

f. Other identification on site or house:

a p house number of property twice
a p number on street edge

g. Other signs on house:

a p beware of dog
a p neighbourhood watch
a p block parent

total # of signs _____

SYMBOLIC BARRIERS TOTAL_____.

Value 1. low
2. medium
3. high

Appendix F

Characteristics of Subjects

Age of offenders who participated

Adults

under 19	3
20 - 24	11
25 - 30	6
over 30	3
n =	23

Young offenders

14	1
15	8
16	5
17	6
n =	20

Self reported number of residential break-ins

	Adults	Youth
Range	1-4,000	2-400
under 10	6	3
10 - 99	7	10
100-199	3	2
200-299	1	4
300-500	2	1
500-1000	1	
over 1000	2	

Note: 1 adult declined to answer, 2 adults chose to disclose number of convictions.

Appendix G

Principal Component Analyses

Principal component analyses were performed to replicate the procedure followed by Brown and Altman (1983). A sample of 50 homes measured on 60 variables is a serious violation of the subject/variable ratio necessary for a principal component analysis procedure. Brown and Altman faced the same problem in their study. Their solution was to perform a separate analysis for each category using only the variables chosen to represent that category. This procedure was followed in the present study. Surveillability from the road and surveillability for the occupant were combined into one category as in the original Brown and Altman analysis.

Four principal component analyses, one for each category, and orthogonal rotations (via varimax) were performed using a SPSS-X statistical package. In each analysis factors with an eigenvalue >1 were used. Following Brown and Altman's procedure, variables with a factor loading of at least plus or minus .4 were included.

The principal component analyses did not yield the same factor structure found in Brown and Altman. The stated purpose of Brown and Altman use of this analysis was to reduce the number of variables and to produce reliable scales. Their paper did not report the reliability

coefficients obtained from their scales.

Scales that were both interpretable and reliable were retained for further analysis. Reliability was considered sufficient if the Cronbach's alpha coefficient exceeded .70. An additional scale was formed based on Brown and Altman's results and the theoretical concepts. Scale items and reliabilities are found in Table F-1.

Table F-1

Factor 1. Actual Barriers of the House	
Reliability = .85	Number of items = 5
	Factor loadings
sliding glass doors	.64
some glass in front door	.84
solid front door	.84
screen door	.73
glass panel beside door	.79
Factor 2. Actual Barriers of the Property	
Reliability = .80	Number of items = 3
	Factor loadings
fence between the property and the road	.79
gate present	.86
degree of enclosure of yard (complete)	
(sides only)	.81
(none)	
Factor 3. Proximity of Neighbours	
Reliability = .74	Number of items = 2
	Factor loadings
neighbour's home visible	.85
neighbour's windows visible	.87
Factor 4. Windows	
Reliability = .84	Number of items = 2
	Factor loadings
number of windows unblocked for occupant	.91
number of windows visible from the road	.82
Factor 5. * Signs of care and attention	
Reliability = .71	Number of items = 5
flower beds	
shaped and trimmed shrubs	
leaves raked	

weedy yard, lawn unmowed (recoded)
trash on boulevard (recoded)

Note: Factor 5 was not derived from the principal component analysis.

These scales were entered into a step-wise multiple regression analysis, no variables were associated with either the adult or youth ratings at the .05 level for the probability of F value. A straight multiple regression analysis treating the scales as predictors of vulnerability was performed. Results are listed in Table F-2.

Table F-2

Multiple Regression Analysis of Cue Scales on vulnerabililty ratings

	Multiple R	R Square	Adjusted R Square
Adult ratings	.28	.08	-.03
Youth ratings	.19	.04	-.07

These scales explain very little of the variance in the regression in both the youth and adult ratings and are not useful predictors of the vulnerability ratings. Although Brown and Altman's scales proved to be better predictors of which homes were burglarized, the magnitude of their results was also very small. Their 6 scales yielded a R square of .14, and an adjusted R square of .11.

The researcher of the present study performed a multiple

regression anaylsis with scales derived directly from those used in Brown and Altman's study. None of the variables entered the equation.

Appendix H

Correlations between Categories and Vulnerability Ratings Controlling for House Value

Correlations with adult offender vulnerability ratings

	Zero order correlations		Controlling for house value	
Category	r	p	r	p
Symbolic barriers	.28	.05	-.13	NS
Actual barriers	.26	.05	.29	.05
Surveillability (road)	-.55	.001	-.58	.001
Surveillability (occupant)	-.36	.01	-.47	.001
Occupancy	-.05	NS	.01	NS

Correlations with young offender vulnerability ratings

	Zero order correlations		Controlling for house value	
Category	r	p	r	p
Symbolic barriers	.34	.001	-.11	NS
Actual barriers	.12	NS	.13	NS
Surveillability (road)	-.45	.001	-.49	.001
Surveillability (occupant)	-.20	.NS	-.31	.01
Occupancy	-.13	NS	.07	NS

Appendix I

Data Coding Sheet

Surveillability for occupant:

CD1 - noise approach - scored present/absent (p/a)
CD3 - # of windows unblocked for occupant (#)

Surveillability from road:

CVRD1 - # of windows clearly visible from road
CVRD2 - # of windows covered by shrubs etc. so not clearly visible from road.
CVRD3 - front door visible from road (1= no) (2= yes)
CVRD4 - approx 3/4 or more of home visible 1=no, 2=yes
CVRD5 - approx 3/4 or more of yard visible " "
CVRD6 - neighbours' home visible 1=no 2=yes
CVRD7 - neighbours' windows visible 1=no 2=yes
CVRD8 - distance from road is less than 20 feet no/yes

Occupancy cues:

COCC1 - mail, flyers uncollected 1= absent 2= present -
COCC2 - lights on inappropriately " " -
COCC3N- signs of interrupted activity 1= ab 2=pr
COCC5 - # of cars in driveway #
COCC6 - # of cars on street #
COCC7 - other (i.e.) smoke visible from chimney 1=a 2=p

Actual Barriers

CAB1 - fence between property & road 1=n 2=y
CAB2 - gate present 1=n 2= y
CAB3 - gate closed 1=n 2=y plus missing (blanks)
CAB4 - garage or carport present 1=n 2=y
CAB5 - garage or carport doors open 1=n 2=y
CAB6 - degree of enclosure 0=none 1=sides 2=fully enclosed
CAB7 - back yd separated from front by actual barriers 1=n 2=y
CAB8 - sliding glass doors p/a -
CAB9 - front door some glass p/a
CAB10 - solid front door p/a
CAB11 - screen door p/a
CAB12 - glass panel beside door p/a -(note for p/a a=1 2 =p
ABTYPE - actual barrier 1= see through, 2. solid

Symbolic Barriers

CSB1 - street edge undefined no curb or sidewalk
1= a 2=p -
CSB2 - ditch 1= a 2 = p
CSB3 - sidewalk 1 = a 2=p
CSB4 - open access to site 1=yes 2=no
CSB7 - symbolic barrier between rd and site 1=no 2=yes
CSB8 - symbolic barrier between yard and house " "
CSB9 - symbolic barrier between yard and neighbours " "
CSB10 - home is higher than the road 1=n 2=y
CSB11 - more than 4 steps to front door 1=n 2=y
CSB12 - trees in front yard 1=no 2=yes -
CSB13 - landscaping 1=a 2=p
CSB14 - weedy yard, lawn unmowed 1=a 2=p -
CSB15 - junk in yard 1=a 2 =p -
CSB16 - trash on boulevard 1=a 2=p -
CSB17 - shutters, balcony etc.
CSB18 - personalizations planters, lawn ornaments
CSB20N - home, roof or fence needs repair 1=a 2=p -
CSB23 - house # on property twice 1=a 2=p
CSB24 - # on road edge 1=a 2=p
CSB25 - beware of dog sign 1=a 2=p
CSB26 - neighbourhood watch sign 1=a 2=p
CSB27 - block parent sign 1=a 2=p

Misc.

CV - estimate of value of property and home (low=1,
2= med 3 = high), initial, later changed to
ratings by appraisers,
APP1 to APP3 - appraiser ratings
ST - # of stories
CARE1 - flower beds 1=a, 2=p
CARE2 - shaped, trimmed shrubs 1=a, 2=p
CARE3 - leaves raked 1=a 2=p
TOTALS

CDT - dectectability for occupant cues total
CVRDT - cues visibility from road total
COCCT - cues of occupancy total
CABHT - actual barriers of house total
CABPT - actual barriers of property total
CABT - actual barriers total
CSBHT - symbolic barriers of house total
CSBPT - symbolic barriers of property total
CSBT - symbolic barrier cues total

Other abbreviations on WILKI SPSSX file:

house = house id #
jw1 to jw23 = judges from Wilkinson road
jy1 to jy20 = judges from youth detention centre
abr1 to abr5
sbr1 to sbr5
soccr1 to soccr5 — 5 raters on subjective
srdr1 to srdr5 — categories
ocr1 to ocr5

NOTE: abx = actual barrier mean of 5 raters
aby = actual barrier sd of 5 raters
sbx = symbolic barriers mean of 5 raters
sbxr = mean of 4 raters
sby = symbolic barriers, sd of 5 raters
voccx = surveillability (occupant) mean (5)
voccy = surveillability (occupant) sd (5)
vrdx = surveillability (road) mean (5)
vrdy = surveillability (road) sd (5)
occx = occupancy cues, mean (5)
occy = occupancy cues, sd (5)

Apprais = mean of 3 appraisers, used for value of house category - originally to divide homes into selection

Raw Data

```
DATA LIST RECORDS=4 NOTABLE /1 HOUSE 1-2
JW1 TO JW23 4-26
JY1 TO JY20 33-52
/2 ABR1 TO ABR5 4-8 SBR1 TO SBR5 10-14
VOCCR1 TO VOCCR5 16-20
VRDR1 TO VRDR5 22-26 OCR1 TO OCR5 28-32
/3 CD1 TO CD3 3-5 CDT 6 CVRD1 TO CVRD8 7-14
CVRDT 15-16
COCC1 TO COCC7 17-23 COCCT 24-25
CAB1 TO CAB12 26-37
CABPT 39-40 CABHT 41-42 CABT 43-44 ABTYPE 45
/4 CSB1 TO CSB27 3-29 CSBPT 30-31 CSBHT 32-33 CST 34
CSBT 35-36 CV 37 ST 38 APP1 TO APP3 40-42
CARE1 TO CARE3 44-46
BEGIN DATA
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02 667666753646666666666556      26247766517427641346
   23452 77645 11313 33323 31133 04
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  112112111112121211112211121+1-21+011 555 111
03 443442223224424338424432      532231234111226242 43
   34574 35124 63564 56544 44576 08
  1100022112120121110O1-111 1 1112112 +0-2-20
  211211222112211121111111111+3+10+421 333 120
04 32111112212122116231112       213311221171135112 12
   23252 24224 22222 64644 31131
  213442211111031111101+12211 2022111 +4-2+21
  121112220112211121111112111+6+20+832 121 222
05 476776277477754777775554      5125546673664477535
   77777 43776 31131 11111 44676 02
  114440222222101111001+011 220111212 +2+0+20
  112211111111111111111111111+0+00+022 233 112
06 322326252333452332333334      3255235132162332 3522
   77677 33363 66443 22222 77776 10
  111140222221091111001+011 210111211 +0+1+10
  211211122112111112121111111+0+20+231 122 212
07 223612314233631257221 22      372227622161132111 11
   33574 55555 65565 65555 31231 04
  110021111111022112102+211 1 2121100 +3-1+20
  000211211112121121111111111+0+10+132 132 111
08 111111123121232212221 41      211111311124113126 11
   11253 22123 65464 56634 45554 03
  111122211111011211001-1222222021221 +5+1+62
  211112210112111121211111111+2+20+432 121 222
09 235257633114311362224 35      434521246566334166 41
   11412 53554 65353 46423 77776 10
  110041211222071111111+0222222211120 +8+1+92
  112112111111111122111112111+2+30+532 132 112
```

```
10 1111312222111111222212 2       15122121221112411124
   33453 32212 66666 77666 62674 03
  11100011111100111111+011 1 2100000 +3+0+30
  11221122111211111111112111+3+20+531 112 122
11 436757377735411264227 27       667734436471247733 47
   32452 65534 46565 57755 13113 06
  12122011111102111110 1+121 1 2000000 +3+0+32
  12111212011211111111111111+4+00+412 434 122
12 777746374276563676463 73       44533772546523633757
   66676 55444 74366 22332 11121 09
  21013022221107111120 1+211 1 1211211 +3+1+40
  12121122111211111211111111+3+10+411 555 211
13 27566123412535232112241        232146666145331464 45
   56674 64555 53333 32332 67776 10
  11334022211208221100 1-211 221211222 +4+1+50
  21121121122212112111111111+1+10+222 333 112
14 11415211112133232213322        22224212521631617711
   11211 32354 43453 15413 45775 01
  11225012222109111100 1+02221 2221111 +7-1+62
  21111221121111112211111111+3+20+531 121 112
15 532214523435315331343 46       53363341442423533333
   56676 43423 31423 45443 47375 02
  11111211221031111001+011 1 1111211 +1+1+20
  12121122111211111211112121 11+3+10+421 222 222
16 77747765567776266767476        47764677635644656756
   13221 15444 33342 11111 44646 05
  21232022222107111100 1+0222222111221 +7+2+91
  21111212211211111122111111111+3+20+511 545 222
17 13241313336232211321114        22463412511222332634
   33452 33124 76566 46543 67776 10
  11102211121101111100 1+021 1 2121111 +3-1+21
  11221122111221111111111111111+4+00+431 411 222
18 11146111562113621323222        34437225311523343313
   34674 34366 44444 11111 64777 05
  11333022211207111100 1+011 1 1121212 +2-1+10
  11221121121111112121111111+2+20+432 333 212
19 32523634324225313132324        14365753115311332567
   46575 45345 64445 44544 21211 09
  11002111111101111220 1+311 1 0100000 +1+0+10
  21121121211211121121111111+0+10+132 222 111
20 52277711712165133677777        51471524331441767211
   66676 31171 12121 12212 67375
  11668022221112121100 1-111 221111212 +3+0+30
  21121122121221112211111 2111+3+30+632 111 122
21 11617112177212215166177        75677451515111311717
   42343 66215 67774 77776 52675
  1100  11111100111100 1+011 1 1100000 +0+0+00
  21111221111212111111111112+1+12+221 333 111
```

```
22 6646677457477766676656676767545656534633533
   56656 76565 11211 22222 43475 04
  1144412212120711110011+011 221111222 +2+1+30
  2112112222221211111111111111+2+00+212 444 111
23 6773275565563467666676147415366472653656664
   67777 65667 54343 12223 67577 04
  1111311122110412110011-111 221221001 +3-1+20
  2112111111111112121111111111-2+10-122 444 221
24 7657764376235672675646315333243314411643453
   65557 54567 57567 44433 77777 08
  1111101112210311110011+011 1 0100000 +0+0+00
  2112111121221111211111122111+1+20+321 433 121
25 3717652773525574336677564356455763743457624
   45575 31367 32211 13112 44474 05
  2123202222210711110011+011 221111212 +3+0+30
  2112112221121111111111111111+2+00+221 333 222
26 1555744165655537244644452366764653643647535
   77777 43576 44262 12312 21232 02
  1100212222220711110101+111 210211212 +1+0+10
  2112111221111111211111111111-1+10+022 231 222
27 7136666623367526466662744574333253523413714
   34574 11153 11222 23432 45472 07
  1188812122211111110011+111 1 1211211 +2+1+30
  2111122222222111122111111111+4+20+632 121 222
28 1131111344223712132242331377131534753336314
   64674 43363 64462 13312 57676 10
  1100302222120811110021+111 221221222 +4+0+40
  1122112221211111121111111111+4+10+532 231 122
29 4251274654747463753572473376543776643543734
   77777 34777 51211 12311 43334
  1122302222110711110011+011 221211212 +4+0+40
  0002111111121111111111111211+0+11+121 445 122
30 3212362422421251323212627277777324111631266
   13132 57715 67676 77777 53564 08
  1100001111110011110011+021 1 2000000 +3+0+32
  0001122111121211211111111111+1+10+211 555 110
31 4466436644354576345445373236223311343423145
   35556 64345 33434 43434 77776
  1122322112120411110011+011 210211202 +2+0+20
  2112111211121121111111111111-1+00-122 333 112
32 6665676466774567666656476666673576554747655
   23444 56533 55463 34323 11231 08
  1100302221120711111111+221 222211212 +5+0+51
  2112112211121111111111111111+1+00+111 544 120
33 2212337516412211222211633671612141124122227
   12142 65616 55664 77766 56555 06
  1100062111110012110011-12221 2011221 +5+2+72
  1211121111121211112111112111+2+20+412 554 111
```

```
34 22451113253421225523135       4445432333233463742354576 12232 74464 43444 66766 03
  1100322111120311110111+111 210211221 +2+2+40
  0002112221221111221111111111+4+20+622 334 122
35 557764467665552367755555       7567575476755376632223463 43223 43344 34433 11121 09
  1133312222120711112113+3222212221212 +6-1+51
  1122111111111111222111111111-1+20+122 232 111
36 667447757667776665655555       5717576275752775666412241 75645 33523 45523 31121 01
  1111202212120611110111+121 1 2111212 +3+0+32
  1122111111121111111121111111+1-10+011 545 000
37 52222122323334314131244       6627273141331371231466756 35366 43222 32322 14111 07
  2123312221110511110021+111 210111221 +0+2+20
  1212111211121111122111112111+2+20+431 543 222
38 32224152211331122332222       3233444141411253136634574 66635 25564 65665 54574 06
  1122202111110311110011+011 1 2011222 +2+1+30
  2111122211121111111111111111+2+00+222 333 112
39 45774246335555735667556       2636654374352442653123452 44425 11123 13321 57357 07
  2123212221120511110021+121 1 0111211 +1+1+21
  1212111111111111111111111111+0+00+011 444 112
40 17576764532567656763764       7416433455166477772134363 12272 34333 24222 53674 04
  1100412222220921110011-1122222111211 +6+1+70
  2111122221121111122211111111+4+30+722 231 122
41 56452577677662755452625       4745665644662567566756676 56566 65555 33422 53674 04
  1100202211110411210011+111 1 1111221 +1+2+30
  0001212211121111112111121211+4+31+711 555 122
42 57356624654425276744465       6146524362554336753477777 34464 56233 22321 44374
  1111111222210411110011+011 221211212 +4+0+40
  2112111211111111111111111111-1+00-131 133 122
43 44323542513322454743245       3425532142264211232134453 24342 24535 46645 65465 06
  1223221112210211110011+011 211200000 +2+0+20
  2112112222122111211111111121+4+11+632 222 121
44 12112111511211136512222       3473311421662142261111111 33364 23432 66624 46663 01
  1122501212210811110011+02221 2221111 +6-1+52
  2111121111111111111211112111+1+20+332 222 010
45 77777465625777537764666       5526663675775565653433473 13322 34342 11122 45576 03
  1122302221120711110011+0122222211221 +7+2+90
  2111122211121111111111122121+3+32+611 445 122
```

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46 532355444665334364552l4       45376141441412433767
   66575 45344 67566 34444 21131 02
  1100102121110311111101+111 211111211 +1+1+20
  1222112211121111111111111111+4+00+421 444 122
47 523121124413311131311l6       26462252415711211436
   21251 32624 53664 77667 46374 06
  1122202112110411110011+021 1 2111211 +3+1+42
  0002112211222111211111121111+4+20+622 312 021
48 33433333335432544225324       63374667726351623635
   13321 23323 55454 24424 15475 01
  1100122112210211211011+221 1 2112121 +3+0+31
  1121121211222111211111111111+6+10+722 313 222
49 533723474634574523155557      44347113721632237522
   67777 44446 21221 11111 67676
  1122302221110611110011+011 211211211 +2+1+30
  2112111111111111111111111111-2+00-221 234 212
50 121112212331231213111l2       12311123114412216111
   45655 32332 14323 44442 11122 09
  1155502112210811111102+311 211221212 +2-1+10
  1212112211121111212111111111+3+20+532 122 222
END DATA
COMPUTE CSB20N= CSB20 + CSB21 + CSB22
COMPUTE JX= MEAN (JW1 TO JW23)
COMPUTE JY= SD (JW1 TO JW23)
COMPUTE YJX= MEAN (JY1 TO JY20)
COMPUTE YJY= SD (JY1 TO JY20)
COMPUTE ABX= MEAN (ABR1 TO ABR5)
COMPUTE ABY= SD (ABR1 TO ABR5)
COMPUTE SBX= MEAN (SBR1 TO SBR5)
COMPUTE SBXR= (SBR1 + SBR2 + SBR3 + SBR5)/4
COMPUTE SBY= SD (SBR1 TO SBR5)
COMPUTE VOCCX= MEAN (VOCCR1 TO VOCCR5)
COMPUTE VOCCY= SD (VOCCR1 TO VOCCR5)
COMPUTE VRDX= MEAN (VRDR1 TO VRDR5)
COMPUTE VRDY= SD (VRDR1 TO VRDR5)
COMPUTE OCX= MEAN (OCR1 TO OCR5)
COMPUTE OCY= SD (OCR1 TO OCR5)
COMPUTE COCC3N= COCC3 + COCC4
COMPUTE JUDGE= MEAN (JW1 TO JY20)
COMPUTE APPRAIS = (APP1 + APP2 + APP3)/3
RECODE CSB14 (2 = -1)
RECODE CSB16 (2 = -1)
```

VITA

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Author [redacted]

JULIA EMERALD MACDONALD

NOVEMBER 24, 1986.