

## DEFENSIBLE SPACE THEORY AND THE POLICE: ASSESSING THE VULNERABILITY OF RESIDENCES TO BURGLARY

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### Abstract

This study examines how defensible space theory and recent modifications to it apply to assessments of single-family dwelling vulnerability to burglary by police officers. Fifty photographs of detached houses were scored on fifty-five specific physical cues in six defensible space cue categories. Forty-one police officers reliably rated the vulnerability of the houses to burglary. A modified Brunswik lens model was used to determine which cue categories police officers use to assess vulnerability. Simple and partial correlation analyses show how road and occupant surveillability, actual barriers, traces of occupancy, and house value are related to vulnerability assessments by police; symbolic barriers are unrelated to their assessments. Police assessments of vulnerability are, based on previous research, very similar to those of residents, but less similar to those of burglars. Suggestions for a more parsimonious and pluralistic defensible space theory are made.

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### Introduction

The physical and social attributes of residences and surrounding neighborhoods influence the perceptions of both residents and visitors. In order to form an impression of a dwelling's security or vulnerability to crime, observers employ visible cues. Based on ideas expressed by Jacobs (1961), Newman (1972) formulated defensible space theory, which holds that certain features of physical settings, such as indicators of territory and surveillance opportunities, can reduce crime. Newman proposed that environmental designers can strategically use these features to defend an area against crime.

Initial research into defensible space theory attempted to find direct links between physical design features and crime rates (e.g. Newman, 1972; Pablant & Baxter, 1975) but met with mixed results. More recently, researchers have focused on the role of mediating variables, such as perceptions or assessments of physical design features (Brower *et al.*, 1983; McGahan, 1984; Macdonald & Gifford, 1989; Brown & Bentley, 1993; Shaw & Gifford, 1994). The idea is that design features influence crime by creating impressions in observers which range from assessments that a given setting is defensible

against crime to assessments that it is vulnerable to crime.

An apparent assumption of defensible space theory (Newman, 1972) is that all observers will employ the same physical cues to reach the same conclusions about a setting's defensibility. Following Macdonald and Gifford (1989), and Shaw and Gifford (1994), we examine this proposition. The present study has three main purposes. The first is to determine whether or not the design features that defensible space theory (including some recent extensions of it) proposes as indicators of vulnerability predict vulnerability assessments by police officers. As issue here is whether the evidence will support the theory as it is, or whether it requires further modification.

The second purpose is to determine whether or not the design features are weighted similarly by observers who all play relevant parts in the criminal justice context, but have different experiences and backgrounds (i.e. police, burglars, and residents). This purpose concerns the universality of the theory's proposed indicators of vulnerability.

It is important to know how noncriminals assess setting vulnerability. For example, when crime prevention programs are implemented the police perspective must be understood so that officers can

recognize the differences, if any, between their own way of assessing vulnerability and that of criminals. If the vulnerability assessment policies of police and criminals differ, but police officers assume that their own assessment policies are the same as those of criminals, then officers in crime prevention programs may mis-advise residents by teaching them to attend to the wrong set of house and property features.

If observer groups do differ — for example, if police, burglars, and residents assess vulnerability differently — then architectural designs intended to deter crime must take these differences into account. If assessment differences do exist, crime prevention will not be maximized by architectural designs that reflect residents' or police assessments of the setting's vulnerability, but rather by designing settings to reflect the criminal's perspective. After all, the ultimate purpose of defensible space theory is to help deter criminal actions.

Therefore, this study examines the way police officers assess residential vulnerability to burglary. Understanding their perspective will permit comparisons of the assessment policies of three major groups in the crime context: burglars, residents, and the police. Ideally, these comparisons should not be confounded by differences in the physical settings to be assessed. This study facilitates this goal by employing the same set of residences previously used to determine the assessment policies of burglars (Macdonald & Gifford, 1989) and residents (Shaw & Gifford, 1994). Thus, our third purpose is to identify any differences in assessment policy between police, residents, and burglars in order to inform and facilitate crime prevention programs.

#### *Defensible space theory and recently proposed modifications*

Defensible spaces are said to possess several key physical elements. Two territorial factors, according to the theory, are actual and symbolic barriers. Actual barriers are physical impediments to access, such as high fences and hedges. Symbolic barriers are physical characteristics of a house, such as ornamentation and nameplates, that indicate personal property and that the owners care about and are prepared to defend their residence.

The theory also predicts that the opportunity for surveillance of the residence has an impact on the perception of vulnerability to burglary. Highly surveillable residences afford a clear view of the property from both the house and street, which

increases security. When surveillance is difficult, increased concealment opportunities are presumed to increase the dwelling's vulnerability to burglary.

Since Newman's formulation of defensible space theory, various modifications have been proposed. For example, Brown and Altman (1981, 1983) and Brown (1985) suggested adding traces of occupancy, that is, environmental cues which indicate the presence or absence of occupants. Dwellings that appear unoccupied were hypothesized to increase the perceived safety of access for burglars, which should lead to increased vulnerability to burglary.

The market value of the residence is another possible vulnerability indicator. Macdonald and Gifford (1989) obtained professional market appraisals of residences which were assessed for vulnerability independently by burglars. The burglars assessed more valuable houses as more vulnerable to burglary.<sup>1</sup>

Macdonald and Gifford (1989) also proposed, on conceptual grounds, that surveillability should be divided into two types: surveillability from the external perspective, such as that from the road and neighbors' homes, and surveillability from an internal perspective, such as the ease with which a resident can scan for approaching potential intruders from inside the house. Specifically, road surveillability refers to the ability of passers-by and neighbors to view a house and property. The number of windows visible from the road and whether a neighbor's house is visible are examples of cues within this category (Macdonald & Gifford, 1989). In contrast, occupants' surveillability has to do with residents' abilities to view their property and outside activity. Cues belonging to this category include the number of blocked/unblocked windows (e.g. by drapes or blinds), which can restrict or permit residents to view their yard and the approach to their house, and whether noise would be created by someone nearing the house (Macdonald & Gifford, 1989).

Of course, these two surveillability categories overlap to some extent ( $r=0.61$ ). Despite this, the usefulness of this distinction was demonstrated in two previous studies (Macdonald & Gifford, 1989; Shaw & Gifford, 1994) in which both road surveillability and occupants' surveillability differentially predicted vulnerability. Also, the two forms of surveillability are not strictly mirror images. For example, during the day it is easier to look out of a window than it is to see inside a house from the outside.

Newman's theory and these suggested modifications lead to the general defensible space hypothesis

that houses with more actual barriers, more symbolic barriers, more surveillability from the street and from inside the house, more traces of occupancy, and lower market value will be assessed as less vulnerable to burglary.

#### *The police perspective*

Resident, burglar, and police perspectives are all important facets of Crime Prevention Through Environmental Design (CPTED) programs. Newman (1975; Newman & Franck, 1982) and others (e.g. National Crime Prevention Council [NCPC], 1989) emphasize that residents are 'key agents in ensuring their own security' (Newman, 1975, quoted in Taylor *et al.*, 1980, p. 61). Others point out the importance of the criminal's point of view (Macdonald & Gifford, 1989; Cromwell *et al.*, 1991; Brown & Bentley, 1993). In particular, some researchers have begun to examine the differential effect of defensible space features on criminals and residents (Perkins *et al.*, 1990; Shaw & Gifford, 1994).

Police should not be omitted from these comparisons; they perform an integral role in teaching crime prevention techniques, such as target hardening (NCPC, 1989), and they form a communicative link between residents and criminals. Nevertheless, police assessments of the defensible space qualities of environments are not well understood. The tendency of police officers to form images of larger environments such as neighborhoods as 'trouble areas' has been examined, and it appears police do use specific characteristics of these settings to structure their assessments (McGahan, 1984, p. 125).

Logie *et al.* (1992) took perhaps the first step towards integrating and comparing information from three of the groups of interest in this study—police officers, residents, and (juvenile) burglars. That study's focus was on recognition memory, but its findings have implications for CPTED. Their subjects first identified houses (from photographs) that would be appealing to burglars. Later, the subjects were given a surprise recognition memory test in which some of the physical features of the houses had been changed. The young burglars performed slightly better than police (and better than criminals who had committed other offenses), and both the police and the young burglars performed better than the residents.

Logie *et al.*'s (1992) results also demonstrated that burglars and police, but not residents, interpret the presence of a car (a sign of occupancy) as a deterrent to burglary. Both burglars and police indicated

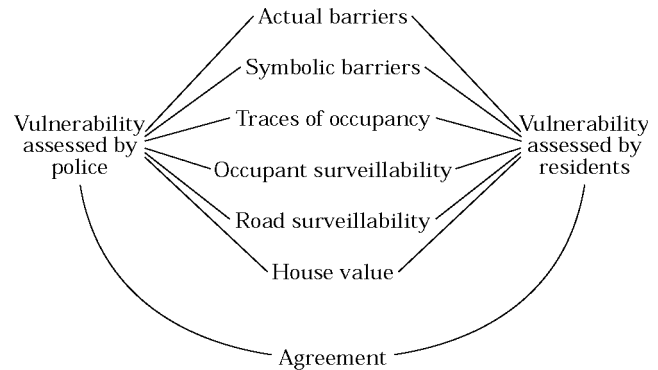


FIGURE 1. A modified Brunswik lens model for comparing the defensible space cue utilization policies of two groups, in this case police and residents.

that houses with hedges and fences (concealment opportunities) are very attractive targets, whereas residents seemed unaware of the potential of this factor. All three groups in the study agreed that a burglary attempt was less likely if there was an alarm, but not if a lock alone was present.

The present study investigates the role of 55 specific physical cues and six cue categories representative of related groups of cues as potential influences on police assessments of residential vulnerability to burglary. It then compares police assessment policies to those of burglars and residents, identified in earlier studies (Macdonald & Gifford, 1989; Shaw & Gifford, 1994).

#### *Brunswik's lens model as a framework*

Brunswik's (1956) lens model provides a useful framework for understanding the perceptual relations between observers and environments. His model was adapted by Shaw and Gifford (1994); their adapted model will be used in this study (see Figure 1). The adapted model includes cue utilization (the relative importance or weight that perceivers place on each cue category) on both sides of the model, so that the assessment policies of two observer groups can be represented and compared in one figure.<sup>2</sup>

Cue utilization is represented by the simple (or partial) correlation coefficients between mean vulnerability assessments and the six cue categories. Agreement between the observer groups is represented by the correlation between the groups' assessments of vulnerability across all targets (houses).

*The differential assessments of burglars and residents*

Macdonald and Gifford (1989) assessed adult and youth burglars' perceptions of a house's vulnerability to burglary. A partial correlation analysis of their data by Shaw and Gifford (1994) to isolate the effects of each cue category concluded that both adult and youth burglars assess houses with high market value and low road surveillability as more vulnerable to burglary, which is consistent with defensible space theory and its extensions. However, contrary to the theory, actual barriers, symbolic barriers, traces of occupancy, and occupant surveillability had no significant effect on burglars' assessments. Occupants' surveillability (for adult burglars only) and symbolic barriers were significant as simple correlations, but dropped out in the partial correlation analysis (i.e. when each cue category was correlated with vulnerability after all other cue categories were controlled).

Subsequently, Shaw and Gifford (1994) used the same experimental paradigm to examine residents' assessment policies. After partial correlation analysis (as in the earlier study), residents were found to assess greater vulnerability in houses with fewer actual barriers, fewer traces of occupancy, and less road surveillability. Residents did not use symbolic barriers, occupant surveillability, or house value as significant indicators of vulnerability. However, the simple correlations revealed a different pattern for actual barriers, occupant surveillability, and traces of occupancy; higher vulnerability was associated with actual barriers and reduced occupant surveillability, but occupancy traces were not significantly related to burglary risk.

These studies, therefore, find different patterns of simple and partial correlations between cue categories and perceived burglary risk; this dual pattern will be investigated further in this study of police assessments of vulnerability. We believe the pattern of partial correlations is preferable when defensible space theory is tested and that the pattern indicated by the simple correlations is preferable when everyday residences are considered, that is, when the various dimensions of defensible space are naturally intercorrelated.

Based on partial correlations, residents and burglars used (only) one of the six cue categories (road surveillability) in the same significant way (Shaw & Gifford, 1994). Neither the symbolic barrier nor occupant surveillability cue categories were used by these groups. The three remaining cue categories

were significantly used either by residents or burglars, but not by both.

Based on the simple correlations, the two surveillability cue categories were used in the same significant way, but traces of occupancy were not utilized by either group. The remaining three categories were significantly used by only one of the groups. Thus, the pattern of results differs depending on whether the goal is to test theory or to explicate the dimensions of defensible space in a set of everyday buildings.

The two groups' across-houses assessments of vulnerability were significantly correlated ( $r=0.68$ ), and almost half their variance is shared. This agreement probably is based on their similar reading of the one cue category that significantly influenced both groups, road surveillability, although some of their agreement could be based on similar readings of cues that were present but not measured in those studies. Of course, over half the variance of the assessments by residents and burglars is *not* shared. This represents their differential use of cues to assess vulnerability (and some measurement error).

*Hypotheses*

The present study investigates how police officers utilize defensible space cues in their vulnerability assessments. No study has yet examined how police officers, as a group, assess vulnerability from defensible space cues. We know from the research just described that different observer groups (such as burglars and residents) use different sets of cues to assess vulnerability even when they are shown the same houses. Thus, police may use the same or other cue categories to assess vulnerability. However, because we have no basis for speculating which cues or cue categories that might use, the most appropriate formal hypothesis is that police will make their assessments in accordance with defensible space theory and its extensions. We do so because the theory is silent on the possibility of reliable differences in the ways that defensible space cues are interpreted by different groups, and thus tacitly asserts that all groups who assess the same physical setting will do so in the same way.

Thus, our formal hypotheses are that, consistent with defensible space theory and its extensions, the presence of territorial markers or cues (i.e. actual and symbolic barriers) and opportunities for surveillance of the house and property (i.e. visibility by the occupants and from the road) will be associated with lower assessed vulnerability to burglary.

We also expect that traces of occupancy and lower house value will also lead to assessments of lower vulnerability to burglary by police officers.

## Method

### *Subjects*

The subjects were 41 police officers (33 male and 8 female), between the ages of 24 and 52, from a municipal police department of a medium-sized Canadian city. The officers had, on average, 11.6 years of experience. After we received permission from the Deputy Chief to recruit officers for the study, each police officer was contacted by phone. The officers represented various ranks (including two reserve officers) from the patrol, street crime, and child and youth units. The response rate was virtually 100 per cent (one officer had to go on patrol before the interview could begin).

### *Materials and measures*

The same 50 photographs of single-family dwellings from the Macdonald and Gifford (1989) and Shaw and Gifford (1994) studies were used. As noted earlier, we used the same photographs to maximize the similarity of the stimuli for all groups, so that any differences could clearly be attributed to observer rather than environmental differences. The 55 individual cues and six cue categories reliably rated in the Macdonald and Gifford (1989) study were also used in this study.<sup>3</sup>

### *Procedure*

The police officers were interviewed singly either in a private office or a conference room at police head quarters. They were seated across a table from the interviewer. Cards with the numbers 1 to 7 printed on them were spread out in front of the officer. Two cards, labeled 'highly likely' and 'not likely' were placed under the cards marked number 1 and number 7, respectively.

The interviewer then verbally gave the following instructions:

I am interested in crime prevention through environmental design. Specifically, I would like to know what police officers think makes a house vulnerable to burglary. I would like you to look through these photographs and rate the houses in them on a scale of 1-7, as to how likely you believe they are to be burglarized. Please the houses you believe most

likely to be burglarized under number 1, which is marked 'highly likely'; and place the houses you believe least likely to be burglarized under number 7, which is marked 'not likely'. Rate the houses based on how they appear at the time the picture was taken, and place at least three photographs under each number.

The last instruction was intended to encourage the officers to use the full range of the vulnerability scale. After rating the photographs, each officer was asked to explain his or her reasoning for placing the photographs in the two most extreme categories. The ratings for each photograph and the explanations were recorded by the experimenter. Each officer's sex, age, years of experience, main assignments and geographic locations of service were recorded, as was the approximate number of residential burglary (break-and-enter) investigations in which he or she had been involved. The presentation order of the photographs was counter-balanced across the police officers.

## Results

### *Reliability of assessments*

In the original study (Macdonald & Gifford, 1989), one researcher and three graduate students rated six of the 50 photographs on the 55 separate physical cues. Because the reliability of these ratings was extremely high (from 0.98 to 1.00), one researcher rated the other 44 photographs. The inter-rater reliability (intraclass correlation) for the cue categories was 0.95 for actual barriers, 0.72 for symbolic barriers, 0.93 for traces of occupancy, 0.96 for road surveillability, and 0.89 for occupant surveillability.<sup>4</sup> House value was reliably rated (0.91) by three professional property appraisers.

In this study, all 50 photographs were rated on vulnerability to burglary by the 41 police officers, whose assessments were highly consistent: the inter-rater reliability of their assessments was 0.97. As a group, the officers strongly agreed among themselves which houses were more (and which were less) vulnerable to burglary.

### *Police officers' perceptions of vulnerability*

*Individual cues.* When the 55 individual cues were correlated with the police officers' assessments, ten zero-order correlations were found to be significant (at least  $p < 0.01$ ).<sup>5,6</sup> Police believe that vulnerability to burglary is *less* if:

- (1) the back yard is separated from the front yard by an actual barrier ( $r = -0.50$ ,  $p < 0.001$ );
- (2) the front door is solid, with no glass ( $r = -0.51$ ,  $p < 0.001$ );
- (3) a glass panel is not located next to the front door ( $r = -0.52$ ,  $p < 0.001$ );<sup>7</sup>
- (4) a carport or garage is present ( $r = -0.52$ ,  $p < 0.001$ );<sup>8</sup>
- (5) at least three-quarters of the yard is visible from the road ( $r = -0.71$ ,  $p < 0.001$ );
- (6) at least three-quarters of the house is visible from the road ( $r = -0.75$ ,  $p < 0.001$ );
- (7) more windows are clearly visible from the road ( $r = -0.45$ ,  $p < 0.001$ );
- (8) the front door is visible from the road ( $r = -0.41$ ,  $p = 0.003$ );
- (9) a neighbor's house is visible (in the photo) ( $r = -0.39$ ,  $p = 0.006$ );
- (10) the distance from the road is less than 20 feet ( $r = -0.40$ ,  $p = 0.004$ );

The first four of these cues are from the actual barriers category; the last six are from the road surveillability category. Overall, these findings indicate that more actual barriers (e.g. solid front door) and greater road surveillability (e.g. windows visible) lead police to believe that a house is less vulnerable to burglary. However, individual cues offer, in general, a somewhat unstable picture; for this reason we place more emphasis on groups or categories of similar cues, in order to achieve more stability and clarity in the constructs that predict vulnerability assessments. We turn next to those categories.

*Cue categories.* Multiple regression analysis showed that the cue categories as a group strongly predict the police officers' vulnerability assessments [ $F(6, 43) = 57.26$ ,  $p < 0.001$ ]. Together, they explained a very large proportion (adjusted  $R^2 = 0.87$ , or 87%) of the variance in the police officers' vulnerability assessments.

How does each cue category contribute to this? Based on simple Pearson correlations, the presence of actual barriers indicated to police officers that the house was more likely to be burglarized ( $r = 0.33$ ,  $p < 0.02$ ), which is the reverse of conventional defensible space wisdom. When the houses exhibited more opportunities of surveillance by occupants ( $r = -0.60$ ,  $p < 0.001$ ) or from the road ( $r = -0.87$ ,  $p < 0.001$ ), they were judged to be less vulnerable to burglary. Symbolic barriers, traces of occupancy, and the market value of the house were

not significantly correlated with police officers' vulnerability assessments.

However, the simple Pearson correlations provide only one view of the relation between the cue categories and burglary risk. Although Macdonald and Gifford (1989) attempted to select a sample of residences in such a way that the cue categories would be uncorrelated, they did not completely succeed in doing so. Most cue categories were independent, but Shaw and Gifford (1994) noticed that some pairs of cue categories were significantly correlated.<sup>9</sup> Thus, the simple correlations represent the results as they might occur in an everyday sample of actual residences, in which the cue categories are somewhat interrelated.

As noted earlier, a more theory-oriented analysis would try to isolate the role of each cue category. Therefore, as in Shaw and Gifford's (1994) study, an attempt was made to estimate the independent relation of each cue category to the police officers' vulnerability assessments by computing partial correlations. In each case, the effect of other cue categories was partialled from the simple correlation between a given cue category and the vulnerability assessment in order to gain an alternative perspective of the relationship (see Table 1).

The partial correlations of three cue categories (symbolic barriers, road surveillability, and house value) with assessed vulnerability did not greatly differ from their simple Pearson correlations. However, the partial correlations for the other three showed important shifts, as described in the following paragraphs.<sup>10</sup>

As shown in the last column of Table 1 and in Figure 2, when all other cue categories are controlled for, vulnerability is correlated  $-0.43$  ( $p < 0.05$ ) with the presence of actual barriers, in strong contrast with the simple correlation of  $+0.33$  ( $p < 0.05$ ). Thus, although the simple correlation suggests that police officers significantly associate greater vulnerability with *more* actual barriers, the partial correlation analysis indicates that when the effect of other cue categories is controlled, police officers significantly associate greater vulnerability with *fewer* actual barriers. The picture painted by the partial correlation analysis is consistent with the results for the individual cues in the actual barrier category and with defensible space theory.

Second, the simple correlation between assessed vulnerability and traces of occupancy was  $-0.20$  (N.S.), but the partial correlation was  $-0.68$  ( $p < 0.001$ ). Thus, if other cue categories are controlled, it appears that police do assess houses with

TABLE 1  
Correlations between the cue categories and police officers' vulnerability assessments

|                              | Variables partialled |        |        |        |        |        | All variables |        |
|------------------------------|----------------------|--------|--------|--------|--------|--------|---------------|--------|
|                              | None                 | 1      | 2      | 3      | 4      | 5      |               | 6      |
| 1 Actual barriers            | 33*                  | —      | —32*   | 35*    | -29*   | 27     | 33*           | -43*   |
| 2 Symbolic barriers          | 09                   | 00     | —      | 07     | -08    | 07     | 07            | 09     |
| 3 Traces of occupancy        | -20                  | -22    | -19    | —      | -62*** | -22    | -19           | -68*** |
| 4 Road surveillability       | -87***               | -87*** | -87*** | -92*** | —      | -80*** | -87***        | -89*** |
| 5 Occupant's surveillability | -60***               | -58*** | -60*** | -61*** | -17    | —      | -61***        | 02     |
| 6 House value                | 05                   | 05     | 00     | 03     | -10    | 11     | —             | -28    |

Note. \* $p < 0.05$  \*\* $p < 0.01$  \*\*\* $p < 0.001$ . Decimal points omitted.

more traces of occupancy as less vulnerable to burglary. This also supports defensible space theory.

Third, the Pearson correlation between vulnerability and occupant surveillability was  $-0.60$  ( $p < 0.001$ ), but the partial correlation was  $0.02$  (N.S.). Thus, if the influence of all other cue categories is controlled, police officers' assessments are not influenced by occupant surveillability. So, this extension of defensible space theory is not supported in the case of police, but it does influence vulnerability when considered in conjunction with other cue categories.

Regardless of whether simple or partial correlations are utilized, road surveillability appears to be the most important influence on police officers' vulnerability assessments. Even when all other cue categories are controlled for, it accounts for 79 per cent of the variation in their assessments. Table 1 shows that road surveillability also had the most drastic effects on the partial correlations for other cue categories. It probably accounts for the reversal of the actual barrier correlation, because actual barriers and road surveillability are strongly correlated.

In summary, then, based on the partial correlations, police believe that houses with high road sur-

veillability, more actual barriers, and more traces of occupancy are less vulnerable to burglary. The house's market value, occupant surveillability, and symbolic barriers do not appear to influence police assessments after the other cue categories are partialled.

The next section reveals that, consistent with the findings just discussed, police frequently indicate (when explaining vulnerability in their own words) that opportunities for surveillance and concealment and indicators of occupancy are important indicators of burglary risk.

*Police officers' verbal explanations*

The frequency with which police officers offered various explanations for their assessments is shown in Table 2. The most frequently offered reasons for rating a house as 'highly likely' to be burglarized were the presence of concealment opportunities (80%), that it was set back from the road (63%), that it was a secluded property (59%), and that it appeared that no-one was home (29%).

Their most frequently offered reasons for rating houses as 'not likely' to be burglarized were that it was too open (68%), the neighbors were too close

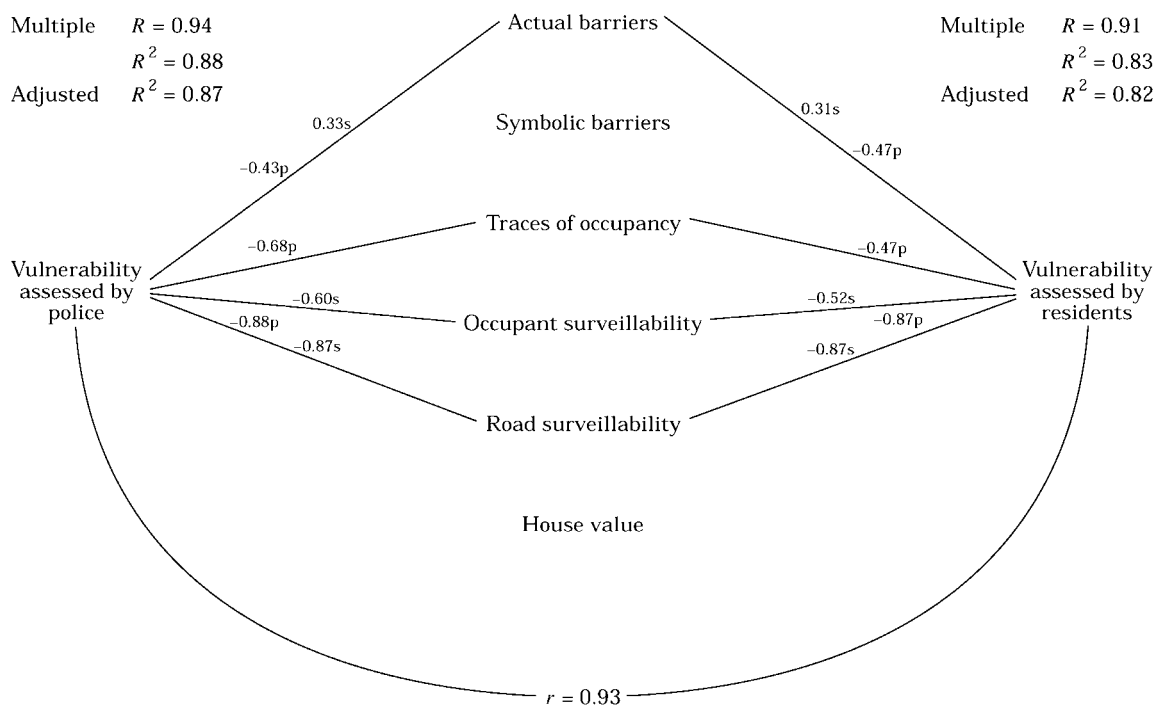


FIGURE 2. The cue utilization policies of police and residents. The data for residents are from Shaw and Gifford (1994). An 's' appended to a correlation signifies the simple (Pearson) correlation; a 'p' appended to a correlation signifies the partial correlation (all other cue categories controlled).

TABLE 2  
Police officers' explanations for vulnerability assessments

| Reasons for sorting houses into category | Per cent who mentioned |
|--|------------------------|
| <i>'Highly vulnerable'</i>               |                        |
| Secluded property                        | 59                     |
| Concealment opportunity                  | 80                     |
| Appearance of value                      | 10                     |
| Sliding glass doors                      | 2                      |
| Set back from the road                   | 63                     |
| Number of exits                          | 7                      |
| Lots of windows                          | 5                      |
| Appears no-one home                      | 29                     |
| <i>'Not vulnerable'</i>                  |                        |
| 'Beware of dog' sign                     | 2                      |
| Too open                                 | 68                     |
| Neighbors too close                      | 51                     |
| Lack of value                            | 24                     |
| Appears occupied                         | 39                     |
| Too easy to see in windows               | 22                     |
| Too much value                           | 10                     |
| Fences visible                           | 32                     |

(51%), that it appeared to be occupied (39%), fences were present (32%), the house had low market value (24%), and that it was too easy to see in the windows (22%).<sup>11</sup>

*Police agreement with residents and burglars*

Next, we examined the extent to which police assessments of vulnerability agree with those of burglars and residents. In the adapted lens model we use, agreement is the Pearson correlation between the (mean) assessments of each group across all the target houses. Agreement between police and residents was  $r=0.93$  (see Figure 2). Because the youth and adult burglars in the Macdonald and Gifford (1989) study strongly agreed with each other ( $r=0.84$ ), their assessments were combined. Police-burglar agreements was  $r=0.61$  ( $r<0.001$ ) (see Figure 3), and burglar-resident agreement was  $r=0.71$  ( $p<0.001$ ).

**Discussion**

This study investigated whether police officers' assessments of vulnerability to burglary are related to the presence of defensible space features in the manner predicted by Newman (1972) and others who later modified his theory. In addition, by comparing the assessment policies of police officers with those of burglars and residents who viewed the same stimuli in previous studies, we could examine

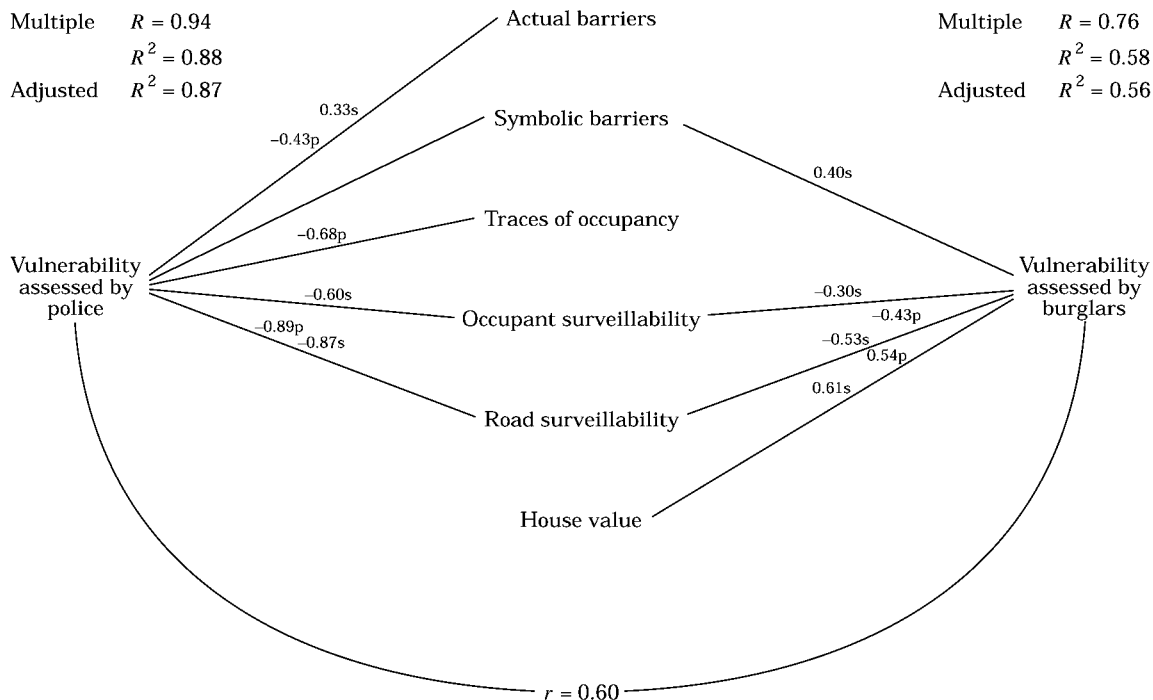


FIGURE 3. The cue utilization policies of police and burglars. The data for burglars are from Macdonald and Gifford (1989); the figures are based on the averages of the adult and youth burglars' assessments in that study because the two groups' assessments were highly correlated ( $r=0.84$ ). The 's' and 'p' designations are explained in Figure 2.

the generalizability of the theory across different observer groups.

Based on the partial correlations, which represent the independent influence of each cue category and are best used to test theory, three of the six defensible space cue categories significantly affect police officers' vulnerability assessments, and three do not. Only (more) actual barriers, (more) traces of occupancy, and (greater) road surveillability seem to have independent validity as predictors of (lower) vulnerability to burglary. The results for actual barriers vary with the analytic approach: independent of other cue categories, they lead to assessments of lower vulnerability by police, but in the context of the actual sample of residences, they appear to cause police to assess houses as more vulnerable. Results also vary for traces of occupancy. Independent of the other cue categories, traces of occupancy lead police to assess houses as less vulnerable to burglary, but do not impact police assessments when these cues are viewed in context. Occupant surveillability is an important signaler of reduced vulnerability in the simple correlation approach, but unimportant as an independent cue category. This probably occurred because occupant surveillability is, after all, fairly redundant with road surveillability. Symbolic barriers and house value have no influence on police assessments of vulnerability in either the sample or partial correlation approaches.

The three significant cue categories together explain a very significant proportion of the variance in police assessments. This is the basis of our claim that pruning traditional defensible space theory to three cue categories does not weaken its ability to explain how assessments of defensibility are created; the three cue categories explain 87 per cent of police assessments.

Furthermore, the same cue categories (regardless of whether the pattern of simple or partial correlations is considered) explain the assessment policies of residents (*cf.* Shaw & Gifford, 1994) in almost exactly the same way. Police and resident assessments are correlated 0.93. The same pruned form of defensible space theory appears to work very well for both police and residents.

However, the cue categories that so well explain the police and resident assessment policies are not the same as those that explain the burglar's perspective (*cf.* Macdonald & Gifford, 1989). Burglars do not pay significant attention to actual barriers or traces of occupancy, as do residents and police.<sup>12</sup> They do pay significant attention to the market value of the house, which police and residents do not.<sup>13</sup> The sim-

ple correlations show that burglars attend to symbolic barriers (and occupant surveillability for adult burglars), but the partial correlation analysis indicates that the draw is house value; it just so happens that more expensive houses have more symbolic barriers (Shaw & Gifford, 1994, Tables 3 and 4). Only one cue category predicts assessed vulnerability in all three groups (regardless of the type of correlational analysis): road surveillability. This one cue category is the only portion of defensible space theory that holds across all three groups.

In terms of agreement, police vulnerability assessments shared 31 per cent of their variance with those of youth burglars, and 36 per cent of their variance with those of adult burglars. Thus, police-resident assessments are modestly related to those of burglars. Perhaps this is just enough agreement to create the false impression that all observers assess cues the same way; if burglars' assessments were more distinct it would be more obvious to the casual observer that they assess residential vulnerability differently.

In sum, based on the partial correlations, defensible space theory does not need all its hypothesized cue categories and is not universal. Police and residents perceive burglary risk quite similarly and both groups see it differently than burglars do. It would seem that more parsimonious versions of defensible space theory can be constructed, but these will be different for different observer groups.

#### *Defensible space theory for police*

The most interesting finding is that, based on simple correlations, police officers judged houses with more actual barriers as *more* vulnerable to burglary, but after partialing, the results conformed with the traditional defensible space notion that actual barriers reduce vulnerability. Why did this occur? Road surveillability clearly had the greatest impact on police perceptions of vulnerability, but it and actual barriers are often naturally confounded in real houses. Although actual barriers can impede accessibility, they may also obstruct visibility of the house and property from the viewpoint of occupants and passers-by. Once unconfounded by partial correlation analysis, the 'more expected' outcome (according to theory) was found.

#### *Police assessments versus those of burglars and residents*

Perhaps it is surprising that the police and burglar perspectives are not more similar. Both groups are

trained observers who work on the same problem (albeit with opposite goals) and who communicate and presumably learn from one another. In contrast, residents are unaccustomed to critically observing their environment, tend to dislike thinking about burglary, and usually have no direct contact with burglars.

The differences must be related to their different experiences. Burglars, through their direct experience with break-and-enters, have learned what to look for when they 'case' a target house and what to expect when they break into that house. In contrast, police officers are trained to observe crime scenes, interview criminals and, obviously, do not experience burglaries as the perpetrators. Thus, police officers do not learn from breaking into a house, but from observing the after-effects. Residents' experiences with burglary also are second hand, in that they receive their education from the police (unless they have been victimized).

Agreement between police and resident vulnerability assessments was very high: they shared 86 per cent of their variance and did not significantly differ in the importance they placed on any of the cue categories. Perhaps this agreement occurs because police have successfully communicated their perspectives on vulnerability to residents. Perhaps it is because police and residents share other experiences and values, which are not the same as those of burglars. For example, burglars, but not the others, must consider the probability of being caught, desperation, and the degree of challenge that a house represents, among other factors. Burglars may often be lower in socio-economic standing. These and other factors may explain the discrepancy between the police-resident and burglar assessments.

### *Practical implications*

These findings are useful as the basis for recommending changes to defensible space theory, but they also speak to practical issues in crime prevention. For example, when residents elect to screen their houses with tall opaque fences or shrubs in the pursuit of privacy, they make their houses appear more inviting to burglars by decreasing road surveillability. Because burglars are the key to burglary, understanding *their* assessment criteria is crucial to counteracting burglary. This study shows that burglars have a somewhat different perspective from the police and residents. This has at least two important implications. First, police and residents must realize that there is a difference, and second

they must base their prevention programs on the burglar's view of vulnerability rather than their own.

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### Notes

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(1) Burglars typically report that they prefer more expensive targets, which they claim are more vulnerable to burglary (Maguire & Bennett, 1982; Bennett & Wright, 1984; Cromwell *et al.*, 1991). However, when they actually choose a site to burglarize, it is often located in a neighborhood close to their own homes. The target, however, is likely to be one of the more valuable sites in that area (Repetto, 1974). In order to gain a clearer picture of burglars' decision-making about their target, further research is needed—specifically, an explicit comparison between 'better' and 'worse' houses within poor neighborhoods and 'better' and 'worse' houses within richer neighborhoods.

(2) The original Brunswik model includes cue utilization on the right side of the lens and ecological validity on the left. Ecological validity would be appropriate in a study designed to examine direct links between environmental cues and crime occurrence. A full, traditional lens model study of defensible space theory with ecological validity ('reality') on the left side, and cue utilization (assessments of observers) on the right side, in the tradition of Craik and Appleyard (1980), would make a useful addition to a literature.

(3) Originally, Macdonald and Gifford (1989) rated each photograph on 64 individual cues and five cue categories. Nine of the 64 individual cues were sums of individual cues. House value, the sixth cue category, was created *post hoc*.

(4) The cue categories of actual and symbolic barriers, traces of occupancy, and road and occupant surveillability do not represent summed individual cues; rather, each category was comprised of ratings that were based on conceptual descriptions of each category along with several examples. For example, 'Traces of Occupancy: these cues indicate the probability that the occupants are home or away. Cars in the driveway, smoke from the chimney, and interior lights are traces of presence [occupancy]. Uncollected mail and exterior lights on at inappropriate times are traces of absence' (Macdonald & Gifford, 1989, p. 196).

(5) Although the hypotheses in this study are directional, all significance tests were two-tailed. This is because results to date are inconclusive and we wished to avoid Type II errors. When more than one comparison was made, a conservative alpha level was employed to lessen the chances of making a Type I error. An alpha level of  $p < 0.05$  was applied to the results for the multiple regression analyses and simple correlations between each cue category and the vulnerability assessments (because the overall multiple regression was significant). An alpha level of  $p < 0.01$  was applied to the analyses involving the individual cues and the explanations.

(6) Vulnerability was coded 1=high vulnerability and 7=low vulnerability; the cue categories were coded 1=highly representative of the category and 7=not representative of the category. The individual cues were coded as follows: 1=absent and 2=present. For clarity of presentation, we have reversed the sign of the correlations between individual cues and vulnerability (which is akin to reverse coding the individual cues prior to performing calculations). Hence, it appears that the correlations for the individual cues and vulnerability are in the opposite direction to those for the categories, but this is actually not the case.

(7) Upon closer inspection, it appears that this individual cue was incorrectly coded in the earlier studies—it should have been reverse coded, but was not. As a result, correlations between this cue and vulnerability ratings were in the incorrect direction in the previous studies. This cue was recoded for the current study and as such, the results reported here are correct. In this case, it is the absence of a glass panel next to the front door that is the actual barrier.

(8) This individual cue was coded as an actual barrier; however, it could also be a cue for traces of occupancy.

(9) Despite efforts to orthogonalize all predictors and because the real world is difficult to orthogonalize, some cue categories are correlated (e.g. actual barriers and road surveillability are correlated [ $-0.52$ ,  $p < 0.001$ ]; symbolic barriers and house value are correlated [ $0.58$ ,  $p < 0.001$ ]).

(10) It is important to note that when the direction of the association between vulnerability and a cue category reverses (e.g. from  $r = 0.33$  to  $r = -0.43$ ) or when there is a large change in the size of the association, suppressor variables may be present. Suppressors hamper interpretation because they indicate that there is a pattern to the intercorrelations among the categories that constrains the error variance in other categories. As a result, care must be taken when interpreting the result, care must be taken when interpreting the results when such a reversal or change is evident.

(11) This is classified as a 'not likely' explanation because it refers to the fact that if it is easy to see in the windows, passers-by would be able to see an intruder in the house. It is also possible to interpret it as a 'highly likely' explanation, in that if it is easy to see in the windows, burglars would be able to view the residents' valuables.

(12) Although burglars do not indicate that they pay attention to actual barriers or traces of occupancy during a study, it is likely that they take note of concealment opportunities and occupancy when they are assessing an actual target. When in the field, burglars often report looking for actual barriers such as hedges in order to

locate places to hide (e.g. Cromwell *et al.*, 1991). Also, many say that they discount actual barriers because they believe they can find a way into any house they choose (this is likely partly a boast and partly the truth [skill]) (Macdonald & Gifford, 1989). When assessing the occupancy of a real target, burglars are likely to use direct methods, such as calling the house or ringing the doorbell, over and above attending to traces (e.g. Cromwell *et al.*, 1991).

(13) See Note 1.

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