

A MODEL RELATING VISUAL ATTRIBUTES IN THE RESIDENTIAL ENVIRONMENT TO FEAR OF CRIME

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ABSTRACT

In this research, the investigator derived empirically multiple regression equations predicting fear of crime as a function of judged visual attributes of residential exteriors. Slides of thirty residential sites were used as stimuli. In a first phase, between four and fifteen planners and architects were requested to rate visual attributes in each setting on eighteen bi-polar descriptor scales. In a second phase, lay participants of two kinds (26 elderly, and 47 people diverse in age) were asked to evaluate each setting on a bi-polar scale assessing the expected rate of vandalism, robbery, burglary, and assault. The multiple regression equations for both the elderly and the more diverse population showed significant correlations between visual attributes in the scenes and fear of crime.

BACKGROUND

The fear of predatory crime (such as burglary, robbery and assault) represents a salient and growing problem in many public settings [1]. The fear can make people feel like captives unable to move around safely in their own neighborhood and home. While the fear of crime is a prominent problem for many people, it is a particularly important problem for the elderly. A number of studies have found that the perception of personal safety was a major concern of the elderly [2-4]. In one study, one of the most cited reasons for an elderly person moving was the fear of crime in housing and neighborhood [5].

One relatively new response to this problem has been in the area of crime prevention through environmental design. Researchers identified relationships between crime or fear of crime and a variety of environmental factors such as territoriality [6-7], number of walkers present [8], building maintenance,

lighting, mixed use, traffic flow, landscaping and visibility of entry and exits [9] and relation between support systems and dominant land use [10].

Absent in this research is an investigation of the relationship of aesthetic factors to fear of crime. The visual aesthetic of the environment has been consistently found as a major dimension of people's environmental experience [11-14]. This important dimension of aesthetics might have a prominent influence on the fear of crime. Yet research has been deficient in investigating this relationship. Some research has delineated dimensions of perception [11-14], but has failed to relate those to environmental characteristics. Other research which has made the connection between visual characteristics of the environment and response [15-17] has failed to investigate perception of crime as a response.

It is the objective of this research to explore the relationship between visual attributes in the residential environment and the fear of crime. Specifically, it is the hypothesis that in relation to residential exteriors, certain visual attributes relate to people's evaluation of the setting in terms of its safety from predatory crime. It is expected that these relationships will appear for both an elderly population and a population diverse in age. People are diverse in terms of such factors as class, ethnicity, sex, race and environmental experience. While groups who differ along these dimensions might respond differently from one another, it is not the purpose of this research to sort these differences out. The position is taken that despite group difference there are some universal principles underlying evaluation which most people share. As a result, the investigator believes that a model can be developed which predicts the most probable response as a function of visual attributes in the environment.

METHOD

The research has two phases: 1) Planners and architects were shown thirty slides of residential settings and were asked to rate each setting on eighteen bi-polar scales describing attributes of the settings; and 2) elderly people and a population diverse in age were presented the same slides and asked to rate their perception of the crime at each setting on a bi-polar scale. This paper presents first the method for Phase 1, then the method for Phase 2, and then the description of the results from both phases.

It was felt that the descriptors of the physical attributes should be representative of descriptions by those who develop the design guidelines and manipulate the environmental attributes while designing. As a result, in Phase 1, environmental practitioners were selected as judges. However, it was felt that the evaluations of the settings should be representative of evaluations by those who would be living in the settings. As a result, in Phase 2, lay respondents were selected as evaluators. Multiple regression equations were developed using the attribute descriptors as predictor variables and the crime response as criterion variables.

The sample of thirty residential settings was developed through the use of a stratified sampling technique in the city of Pittsburgh, Pennsylvania. Each strata represented a residential land-use type. Within each strata, a random process was used to select a district, a street in the district, a direction along the street, and a distance from the corner to the setting. A color slide was taken at each setting. The slides of the settings consisted of a wide angle (35 mm) view down the road, which lined up but excluded cars on the left side of the street in view, and had the sun at the photographer's back. All slides were taken on clear fall days. Research has found that responses to color slides are similar to actual responses [17, 18].

Phase 1

Subject—Forty-two practitioners voluntarily participated as judges in the first phase of the study. They consisted of professional planners, architects and upper level college students in those fields in Harrisburg and State College, Pennsylvania.

Thirty-one descriptor scales were divided into four sets. Each of the twenty-four professionals was assigned at random to one of the four sets of scales. Eight descriptors from the thirty-one were selected for additional consideration. They were divided into two sets of four. An additional eighteen professionals were divided such that nine used one set and nine used the other sets of descriptors.

Through factor analysis, reported elsewhere, the full set of thirty-one descriptors was narrowed down for this study to the eighteen descriptors displayed in Table 1 [19]. The descriptor scales were selected according to two criteria, that each have precedence in previous research in aesthetics and that they represent a comprehensive set of descriptors.

Procedure—Each practitioner was presented with thirty slides, one at a time, of residential settings in Pittsburgh, Pennsylvania. They were told to use the 7 point bi-polar descriptors scales to describe each setting. The descriptor scales and number of judges per scale are shown in Table 1.

Each practitioner was first shown the full set of slides to help anchor their judgments, and was given one additional slide as a training slide before starting the task. The slides were presented to each practitioner arranged in one of two orders to mitigate possible order effects.

Phase 2

Elderly Subjects—Thirty mobile elderly residents (5 at each of 6 different private elderly housing projects in Knoxville, Tennessee) were contacted for interviews to evaluate the thirty settings. Data from four residents was dropped because they performed the task incorrectly. Of the twenty-six respondents,

Table 1. Descriptive Scales and Number of Judges

<i>Descriptors</i>	<i>Judges</i>
Uniform-diverse	15
Ornate-plain	15
Ambiguous-clear	15
Commonplace-usual	15
Disorganized-organized	15
Closed-open	15
Colorful-dull	15
Well-kept-dilapidated	15
Fitting-unfitting	4
Much mystery-little mystery (new information gained from several steps into the scene)	5
Prominence (from prominent to not in sight) of:	
Natural elements	5
Buildings	5
Shapes	4
Surface texture	4
Verticles	4
Brick	6
Cars	5
Poles, wires and signs	5

eight were black and eighteen were white, twelve were male and fourteen were female.

General Population Subjects—Forty-seven respondents from seven neighborhood groups contacted in Harrisburg, Pennsylvania, volunteered to take part in the study. These seven groups were diverse in socio-economic characteristics. The characteristics of the participants are displayed in Table 2.

Procedure—Each participant was presented with the thirty slides of residential environments one at a time. They were told to evaluate the environment

Table 2. Socio-Economic Characteristics of Participants

<i>Characteristic</i>	<i>Number of Subjects</i>
Sex	
Male	29
Female	18
Age	
Under 21	2
21-30	30
31-40	9
41-50	3
51-60	2
Over 60	1
Race	
Black	7
White	40
Other	0
Marital Status	
Single	22
Married	19
Other	6
Number of Children	
0	26
1	10
2	2
Over 2	8
Education	
Some high school	1
High school graduate	8
Some college	16
College graduate	32
Income	
\$0- 9,999	10
\$10,000-19,999	27
\$20,000-29,999	6
Over \$30,000	4

portrayed in each slide on four 7 point scales, one of which was a scale on which they were to estimate (from high to low) the rate of robbery, burglary and assault.

Each respondent was shown the full set of slides to help anchor their judgments and were given one slide as a training slide before starting the task. The slides were presented to each respondent in one of two orders to mitigate possible order effects.

RESULTS

Separately for the elderly and the general population participants, a stepwise multiple regression procedure was used to regress the descriptor attributes onto the fear of crime variable. The number of variables in each model was limited to those variables which, when added to the model, showed significant effects ($p < .05$) in relation to F values. Each variable in the final model had significant effects as shown by F values ($p < .05$). As expected, the results indicate that several of the descriptors represent good predictor variables in predicting response to environments in terms of the perceived crime rate. For each of the multiple regression equations, the null hypothesis of no association was rejected and highly significant ($p < .001$) relationships were found.

For the elderly participants, the model of fear of crime as a function of environmental attributes is:

$$\text{LOW CRIME} = 5.61 - .52 \text{ DILAPIDATION} - .26 \text{ DIVERSE}$$

This relationship yields $R^2 = .77$ ($F(2,27) = 44.79, p < .0001$).

For the general population participants the model is:

$$\begin{aligned} \text{LOW PERCEIVED CRIME} = & .60 + .38 \text{ NATURE PROMINENT} + \\ & .27 \text{ SHAPE PROMINENT} + .30 \text{ WELL KEPT.} \end{aligned}$$

This relationship yields $R^2 = .78$ ($F(3,26) = 31.58, p < .0001$).

DISCUSSION

The interpretation of the results indicates support of the hypothesis that evaluations of neighborhood settings in terms of fear of crime are related, in part, to the quantity of certain visual attributes present in residential exteriors. The analysis produced two models, one for the elderly and one for a more diverse population, both of which accounted for over 75 per cent of the variation in response.

As the results are correlational, it would be misleading to suggest that the

predictors explain fear of crime response. In addition, it is assumed in the analysis that the relationships are linear, while they might be non linear. Furthermore, it is uncertain whether the predictors apply to other populations in other parts of the country. These predictors can best be interpreted as hypotheses about the relation of aesthetic factors as fear of crime.

Specifically, these hypotheses are:

1. in relation to the perception of residential environments by mobile elderly in urban settings, improvements in the upkeep and decreases of the diversity of building will produce a reduction in the fear of crime; and
2. in relation to the perception of residential environments by the general population, increases in the prominence of nature, and the shapes of buildings, and improvements in the upkeep of buildings will produce a reduction in the fear of crime.

In both cases above, it is expected that a reduction in dilapidation would have a positive effect. This hypothesis is supported by other research [19, 20] which finds upkeep as a major factor contributing to response to environments. The relation of dilapidation to fear of crime might represent a function of previous experience with dilapidated settings (other low income areas having higher rates of crime) which produces negative associations carried to other dilapidated settings. While much research in aesthetics has not identified this factor [15], most of that research has not centered on the man-made environment, where the factor of upkeep becomes prominent.

For the elderly, a reduction in diversity was related to increased safety. This might be congruent with the inverted U-shaped function posited by Wohlwill [15]. He states that as environmental stimulation (such as diversity) increases, affect increases to a point, after which further increases in stimulation would produce decrements in affective response. It might well be that because of the decreased visual acuity of the elderly, even small amounts of environmental diversity would represent sensory overload and produce decrements in affect. Further, research is needed to explore this hypothesis.

The sample population from the general public responded favorably to settings with vegetation and settings having prominent building shapes. It has been argued that certain aspects of the natural environment produce positive affect [21]. It is uncertain here whether nature per se, its ability to diminish the visual prominence of buildings, its relation to wealth, or positive associations with nature explain the result. The author is also uncertain as to the cause of preference for prominent building shapes. The findings with regard to nature and building shapes are indicative of areas requiring further exploration.

Overall, this research suggests that the manipulation of specified visual attributes of the building exterior can improve people's perception of that environment in terms of safety from crime. This, in turn, could contribute to a greater sense of community, which would provide social controls to reduce the

crime. Further research is necessary to explore whether manipulation of the specified attributes would produce the desired effects in both the region where the research was completed as well as in other regions.

REFERENCES

1. J. M. Tien, T. A. Repetto, and L. Hanes, *Element of CPTED*, prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, Washington, D.C., 1976.
2. C. Hartman, J. Horovitz, and R. Herman, Designing for the Elderly, *Design and Environment*, pp. 48-51, Winter 1975.
3. J. K. Molozemoff, J. G. Anderson, and L. V. Rosenbaum, *Housing for the Elderly: Evaluation of the Effectiveness of Congregate Residences*, Westview Press, Boulder, Colorado, 1978.
4. E. A. Rose, *Housing for the Aged*, Saxon House, Hamshire, England, 1978.
5. E. M. Brody, Community Housing for the Elderly: The Program, the People, the Decision-Making Process and the Research, *Gerontologist*, 18, pp. 121-128, 1978.
6. O. Newman, *Defensible Space: Crime Prevention Through Urban Design*, The MacMillan Company, New York, 1972.
7. C. Cooper, St. Francis Square: Attitudes of Its Residents, *A.I.A. Journal*, 56:6, pp. 22-27, 1971.
8. S. Angel, Discourage Crime Through City Planning, prepared for National Aeronautic and Space Administration, Working Paper No. 75, Berkeley, California, 1968.
9. G. Luedtke and Associates, *Crime and the Physical City*, prepared for U.S. Department of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice, Detroit, Michigan, 1970.
10. R. Gardiner, Crime and the Neighborhood Environment, *H.U.D. Challenge*, 8:2, pp. 9-13, 1976.
11. D. Canter, An Intergroup Comparison of Connotative Dimensions in Architecture, *Environment and Behavior*, 2, pp. 37-48, 1969.
12. J. Harrison and P. Sarre, Personal Construct Theory in the Measurement of Environmental Images: Problems and Methods, *Environment and Behavior*, 3, pp. 351-374, 1971.
13. R. G. Hershberger and R. C. Cass, Predicting User Response to Buildings, *Man Environment Interaction: Evaluation and Application, the State of the Art in Environmental Design Research*, G. Davis (ed.), Proceeding from Environmental Design Research Association, Milwaukee, Wisconsin, 1974.
14. D. Lowenthal and M. Riel, The Nature of Perceived and Imagined Environments, *Environment and Behavior*, 4, pp. 189-207, 1972.
15. J. F. Wohlwill, Environmental Aesthetics: The Environment as a Source of Affect, *Human Behavior and Environment*, Vol. 1, I. Altman and J. F. Wohlwill (eds.), Plenum Press, New York, 1976.

16. D. E. Berlyne, *Studies in the New Experimental Aesthetics: Steps Toward an Objective Psychology of Aesthetic Appreciation*, Halsted Press, New York, 1974.
17. E. H. Zube, R. G. Pitt, and T. W. Anderson, *Perception and Measurement of Scenic Resources in the Southern Connecticut River Valley*, Institute for Man and His Environment, University of Massachusetts, Amherst, Massachusetts, 1974.
18. E. L. Shafer, Jr. and T. A. Richards, A Comparison of Viewer Reactions to Outdoor Scenes and Photographs of those Scenes, U.S. Department of Agriculture, Forest Service, *Research Paper* NE-302, 1974.
19. J. L. Nasar, The Evaluative Image of a City, in *Environmental Design: Research Theory and Application*, A. Seidel and S. Danford (eds.), Proceedings of the Tenth Annual Conference of the Environmental Design Research Association, Buffalo, New York, 1979.
20. G. L. Peterson, A Model of Preference: Qualitative Analysis of the Visual Appearance of Residential Neighborhoods, *Journal of Regional Science*, 7, p. 1, 1967.
21. S. Kaplan, R. Kaplan, and J. S. Wendt, Rated Preference are Complexity for Natural and Urban Visual Material, *Perception and Psychophysics*, 12:4, pp. 354-356, 1972.

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