Volume II

The Link Between Crime and the Built Environment

Methodological Reviews of Individual Crime-Environment Studies

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July 1980

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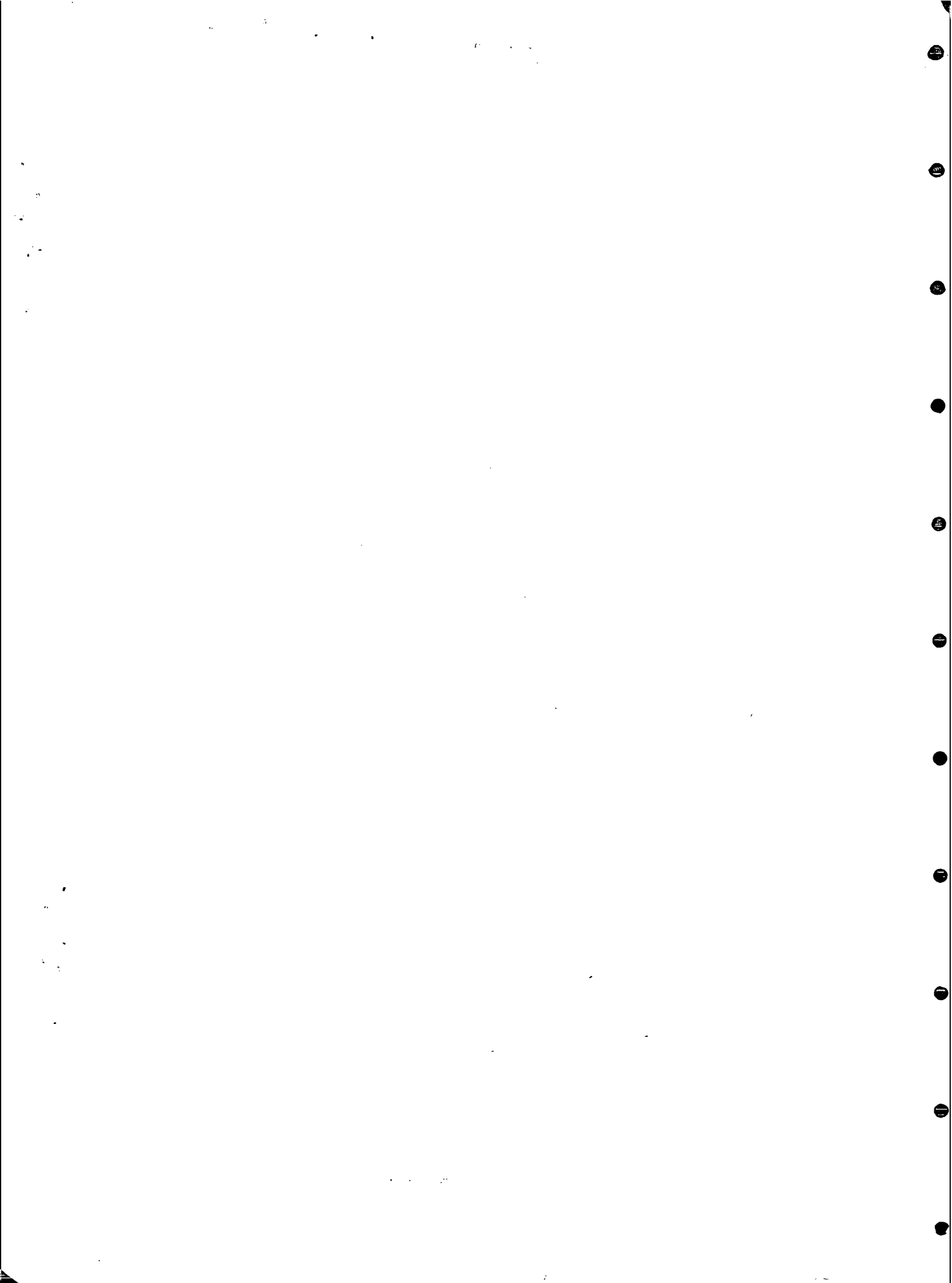Herb Rubenstein
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Introduction

The crime-environment studies reviewed in this section have been divided into two groups. The first group -- Task Five Level Assessment -- consists of the more methodologically complex studies. The second group -- Task Three Level Assessment -- also consists of studies which cover a broad range of topics and analytic techniques. No value judgment has been made, and none should be inferred, regarding either the quality or relevance of studies placed in one group as opposed to the other. The division has been made solely for the reader's convenience.

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Task Five

Level Assessment

EVALUATION OF THE CABRINI-GREEN
HIGH IMPACT PROGRAM

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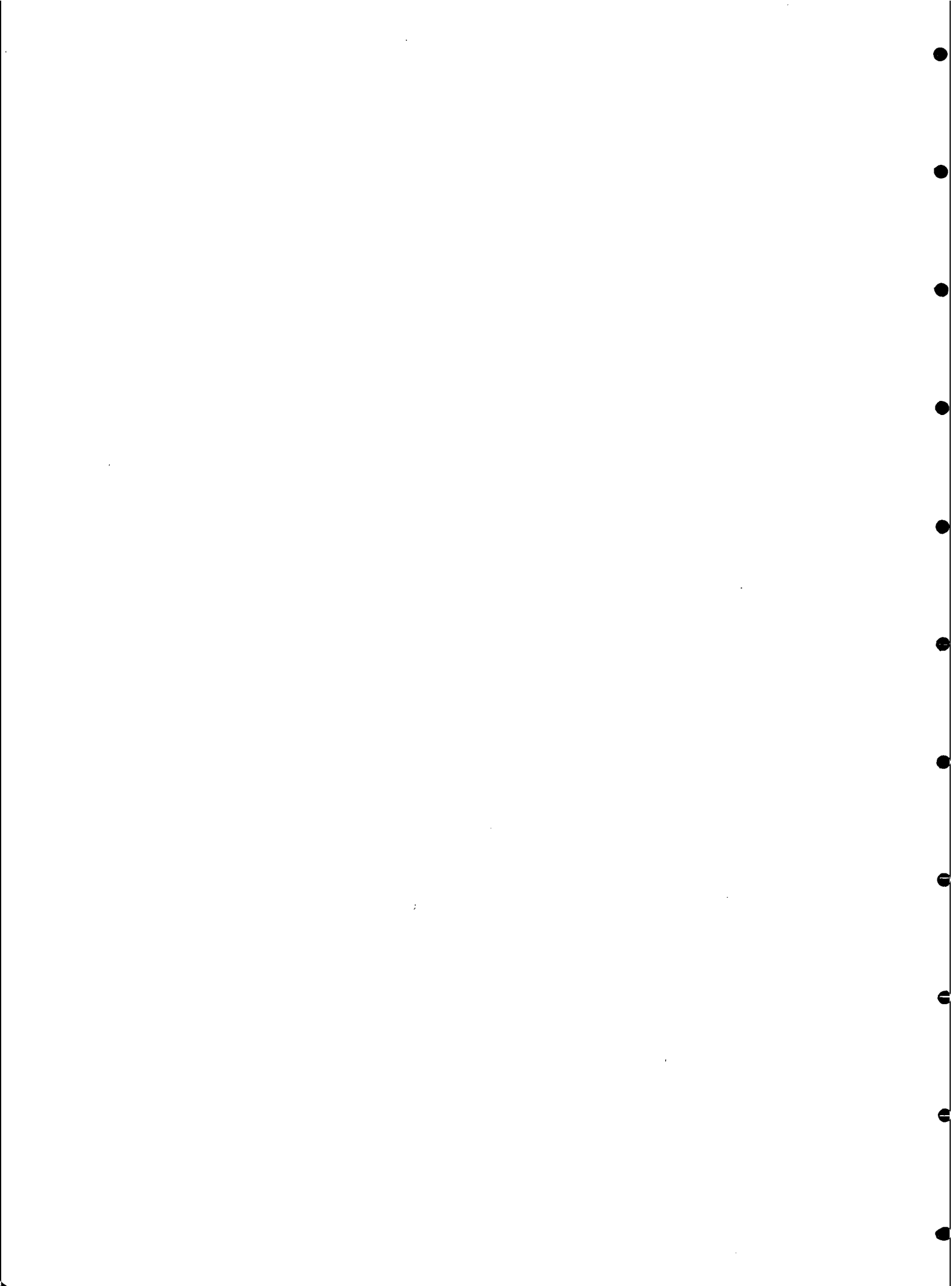
OVERVIEW

This review covers the following reports written by Arthur Young and Company on the Evaluation of the Cabrini-Green High Impact Program.

- Evaluation Plan: Deliverable Product No. 2a
- First Year Evaluation Report
- Second Year Evaluation Report

The High Impact Program was actually five separate programs including:

- Architectural Security Program
- Courtyard Security Fencing Program
- Prevention and Treatment Program
- Management Outpost Program
- Administrative Assistance and Development Program

This methodological review thoroughly assesses the overall evaluation effort with special attention paid to the evaluation of physically oriented crime reduction practices.

STUDY OBJECTIVES

The purpose of this set of studies was to evaluate the implementation process and the impact of the Architectural Security Program and other aspects of the High Impact Program on perceived and actual security of public housing residents. In addition to investigating the program's impact on crime and fear of crime, the study investigated the program's effects on vandalism and maintenance costs. The programs implemented included a broad range of physical, social and management oriented activities.

RESEARCH DESIGN

The basic design of the study was a quasi-experimental approach which used a non-equivalent control group. The evaluation of the High Impact Program (HIP) included collection of baseline and follow-up data (two follow-up surveys) on the experimental site -- the Cabrini-Green Housing Development, and on a control site, Stateway Gardens, which was similar to Cabrini Green. The separate evaluation of the Architectural Security Program (ASP) included the collection of baseline and follow-up data (two follow-up surveys) on the four experimental Cabrini-Green buildings which received physical design changes and four similar control buildings in Cabrini-Green which did not participate in the program. Comparison between experimental and control groups (and a third category called non-experimental which included all non-ASP buildings from Cabrini-Green and Stateway Gardens) were compared using 2-way analysis of variance techniques. In addition the study collected and analyzed more detailed time series data (1974-1977) and compared trends before and after program implementation for experimental, non-experimental and the control groups.

The study also included a process evaluation of program implementation, analysis of materials and architectural design used in the ASP program, program descriptions of HIP, ASP and other crime reduction efforts undertaken at Cabrini-Green during the study period.

VARIABLES

Independent

Components of the High Impact Program:

- Architectural Security Program
- Court Security Fencing Program
- Prevention and Treatment Program

- Management Outpost Program
- Administrative Assistance and Development Program

Dependent

- Crime Impact Index
- Crime rate (verified crime index and non-index crimes)
- Location of crime
- Victimization rates (household survey data)
- Resident attitudes: fear of crime, reporting of crime, services offered by housing development, and satisfaction with living environment
- Resident turnover
- Vandalism and cost of repairs

Unit of Analysis

- Survey respondent
- Housing development (Cabrini-Green and Stateway Gardens)
- Experimental, Control and Non-Experimental Groups

OPERATIONALIZATION OF VARIALES

Independent Variables

- *Architectural Security Program*--This treatment included:
- enclosure of lobbies and.limitation of access
- placing new locks on doors, stairways
- installation of intercom systems
- electronic surveillance devices in elevators, lobbies and hallways
- presence of security personnel in lobbies

- *Courtyard Security Fencing Program*--This treatment included:
- Coordination of social and education services to support new physical changes

- Development of Youth Service Bureau
- Establishment of Youth Shelter House
- Safety Education Program
- Women's Defense and Crime Prevention Programs

Dependent Variables

- *Crime Impact Index*--This composite index consisted
  of responses to eleven household survey items includ-
  ing crime, fear of crime, vandalism and others.

- *Crime Rate*--This variable was measured through the
  use of archival data (verified crime reports and
  case reports) collected by the Chicago Police Depart-
  ment for the years 1974 through 1977. Crime data
  for all index and non-index crimes were converted
  into rates per 1,000 residents. In addition crime
  data from the FBI's Uniform Crime Reports were
  obtained for the 15 largest cities and the eight
  cities participating in the High Impact Program.

- *Location of Crime*--This variable was measured through
  the household victimization survey and dichotomized
  into "inside" and "outside" location.

- *Victimization rate*--This variable was measured through
  the household victimization survey (Attitude and
  Perception Surveys) as residents were asked whether
  they had experienced a crime committed against them
  during varying time periods. These data were col-
  lected prior to program implementation (Summer 1976),
  during the first follow-up survey (Fall 1976) and
  during a second follow-up survey (Summer 1977). The
  rate was expressed as the overall frequency of crimes
  per 1,000 respondents by type and by location.

● *Resident attitudes*--fear of crime, reporting of crime,
services offered by housing development, and satis-
faction with living environment--Each of these var-
iables was measured through the baseline and follow-
up household surveys.

--Attitudes toward fear of crime was operationalized
through the following questions:
1. Does respondent feel safer with new lobby?
2. Is respondent fearful in various locations?
3. Is respondent concerned about personal safety?
4. Does respondent believe crime is the biggest
problem?
5. Has respondent perceived a change in personal
safety?
6. What are respondents' reasons for not going
out after dark?

--Attitudes toward reporting of crime were measured
by the question--Does respondent think reporting
crime is worthwhile?

--Attitudes toward services were measured by the
respondents' rating of their satisfaction with
the assistance provided by the Resident Safety
Aides program, and the other specific management
services.

--Attitudes toward residents' satisfaction with the
living conditions were measured through the archi-
val data on the number of move-ins and move-outs
and the following questions:
1. What was respondent's expected length of stay
and expected reason for moving?
2. Does respondent believe quality of life is
improving?

3. What is respondent's level of satisfaction with life (Ladder scale)?
4. What does the respondent like most/least about the development?
5. Respondent's evaluations of development as a place to raise children?

- *Resident turnover*--This variable was measured through the use of archival data provided by the Chicago Housing Authority for all Cabrini-Green buildings and Stateway Garden buildings. Data were provided for the years 1974-1977.

- *Vandalism and cost of repairs*--This variable was segregated into expenses for elevator repair (above general service contract) and expenses for all other repairs necessitated by vandalism. This variable was measured through the use of archival data from the Chicago Housing Authority.

SAMPLING

The household survey used a stratified random sample of youth and adults in the selection of residents in the Cabrini-Green experimental (ASP) building, the non-experimental Cabrini-Green buildings, Stateway Gardens, and the neighborhood surrounding Cabrini-Green. The author selected the neighborhood around Cabrini-Green with the goal of assessing whether HIP was displacing (moving) crime from Cabrini-Green to nearby neighborhoods.

The sample was stratified into the following groups:

- Cabrini-Green Leaseholders
- Cabrini-Green Youth (12-18)
- Stateway Gardens Leaseholders
- Stateway Gardens Youths (12-18)
- Neighborhood Leaseholders and Homeowners

STATISTICAL METHODS USED

　　Trend Analysis -- The author analyzed the time series
data by fitting the exponential function to determine if a
significant trend was present.

　　Descriptive statistics -- The author presented much of the
data on the variables in frequencies, percentages figures,
graphs and means

　　The authors used the following decision rules for
determining whether the differences found were to be con-
sidered significant:

　　--Verified crime rate:
　　　1. When there is a net decrease in the experimental
　　　　 group but not in the control (or non-experimental
　　　　 group).
　　　2. When the rate of change in the experimental group
　　　　 is plus or minus 10 percent greater than in the
　　　　 control group (or non-experimental) group.

　　--Case report rate:
　　　1. When there is a net decrease in the experimental
　　　　 group but not in the control (or non-experimental
　　　　 group).
　　　2. When there is a net decrease in the experimental
　　　　 building that is at least double the decrease in
　　　　 the control (or non-experimental) buildings.

　　--Vandalism:
　　　1. When there is a net decrease in the experimental
　　　　 buildings but not in the control (non-experimental)
　　　　 buildings.
　　　2. When the rate of change in the experimental build-
　　　　 ings is plus or minus 10 percent greater than in
　　　　 control (or non-experimental) buildings.

--Attitudes of residents:
Five percent level of significance used in the analysis
of variance as decision rule.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Variables

In general the operational definitions are narrative
descriptions of the action oriented strategies implemented to
reduce crime and the fear of crime and improve residents' sat-
isfaction with the quality of life in Cabrini-Green. They do
not lend themselves to precise quantification.

Although the descriptions of programmation activities are
quite good, several problems should be noted. First, the au-
thors' attempt to operationalize the strategies as separate
and discrete variables is problematic. The five major compo-
nents of the High Impact Program were implemented during the
two-year period of the study. Even though the authors describe
the programs as separate variables and attribute certain changes
in dependent variables to certain independent variables, there
is no way that the impact evaluation technique employed can
separate out the effects of each independent variable statis-
tically.

The author did not report information on either the relia-
bility or validity of the survey instrument. For many items
such as victimization this presents no problem. However, such
a complicated variable as fear of crime is probably not measur-
ed by the survey questions with either a high degree of relia-
bility or validity. The "crime impact index" is also question-
able. In order to develop the "crime impact index" the authors

summed possible unrelated items. Summing responses requires unidimensionality and cardinality. Unidimensionality can be tested. Cardinality is most unlikely in this case since the responses to survey items are of the agree-disagree type, and therefore ordinal in nature.

Other dependent variables were measured by the Chicago Housing Authority or the Chicago Police Department. Their measurement was likely to be reasonable and was beyond the control of the evaluators.

APPROPRIATENESS OF THE RESEARCH DESIGN

The use of a non-equivalent control group design was appropriate when used carefully. Several problems arise with regard to the authors' use of data. It appears that archival data on crime were available for 1974. The study, however, treats 1975 crime data as the baseline for crime and treats the 1976 survey data as the base line for all variables measured by the survey. Since the schedule reported on page five shows that the first treatment activity started in July 1975, the more appropriate pre-program base line data would be for 1974 rather than 1975 or 1976.

Given this "timing" problem and several limitations noted below, the research design was appropriate to evaluate the overall impact of the High Impact Program. Among the limitations of the design is the fact that a black box pre-post impact eveluation approach can not reliably separate out the individual impacts of various strategies implemented simultaneously.

A more important potential problem with the application on the non-equivalent control group design to the Cabrini-Green evaluation is the non-comparability between the treated and untreated housing units.

APPROPRIATENESS OF THE SAMPLING PROCEDURES USED

The stratified random sampling plan for residents of Cabrini-Green and Stateway was appropriate. The authors' weighting of the subsamples of the survey using comparative weights so that each is representative of a single actual population was also appropriate.

APPROPRIATENESS OF STATISTICAL METHODS

The authors' use of descriptive statistics was adequate. Decision rules for determining whether observed differences were significant were not based upon sound statistical principles. For example, data presented in Table 1 were used to support the finding that "The decrease in the verified index crime rate at Cabrini-Green between 1975 and 1977 may be related to the High Impact Program". However, when AIR reanalyzed the data using regression analysis to test the slope differences among the Cabrini-Green, Stateway Gardens and Chicago data reported in Table 1, the reanalysis showed no differences among the three groups.[*]

This reanalysis shows clearly that since the rate of decrease is the same among the three groups, there is no evidence in Table 1 of an effect on crime by the High Impact Program. The main difference between the approach used by AIR in the reanalysis and the authors' approach is that the rate of change is defined by regression analysis as the amount of decrease in crime from one year to the next. In the authors' approach, the rate of change is defined as the amount of change divided by the base year rate. The authors' approach will favor (show more positive results) for the groups which begin

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[*]The authors chose, for a variety of reasons, not to use regression so as to be consistent with the first year's evaluation.

with lower crime rates. As Table 1 shows Cabrini-Green had a lower crime rate than either Stateway or the City of Chicago. In addition, the authors' approach ignores information of 1974 and 1976 in assessing program impact.

A problem with the analysis of variance is that the authors failed to present sufficient information such as the degrees of freedom, the sums of squares, means, etc. to allow for a complete evaluation of their use of this method. The general finding that the decreases in crime and fear of crime were larger for the experimental groups than for the control or non-experimental groups might be due to the scale differences along the different parts of the scale. A monotone transformation of the scale might change "the significant interaction effects to be non-significant."
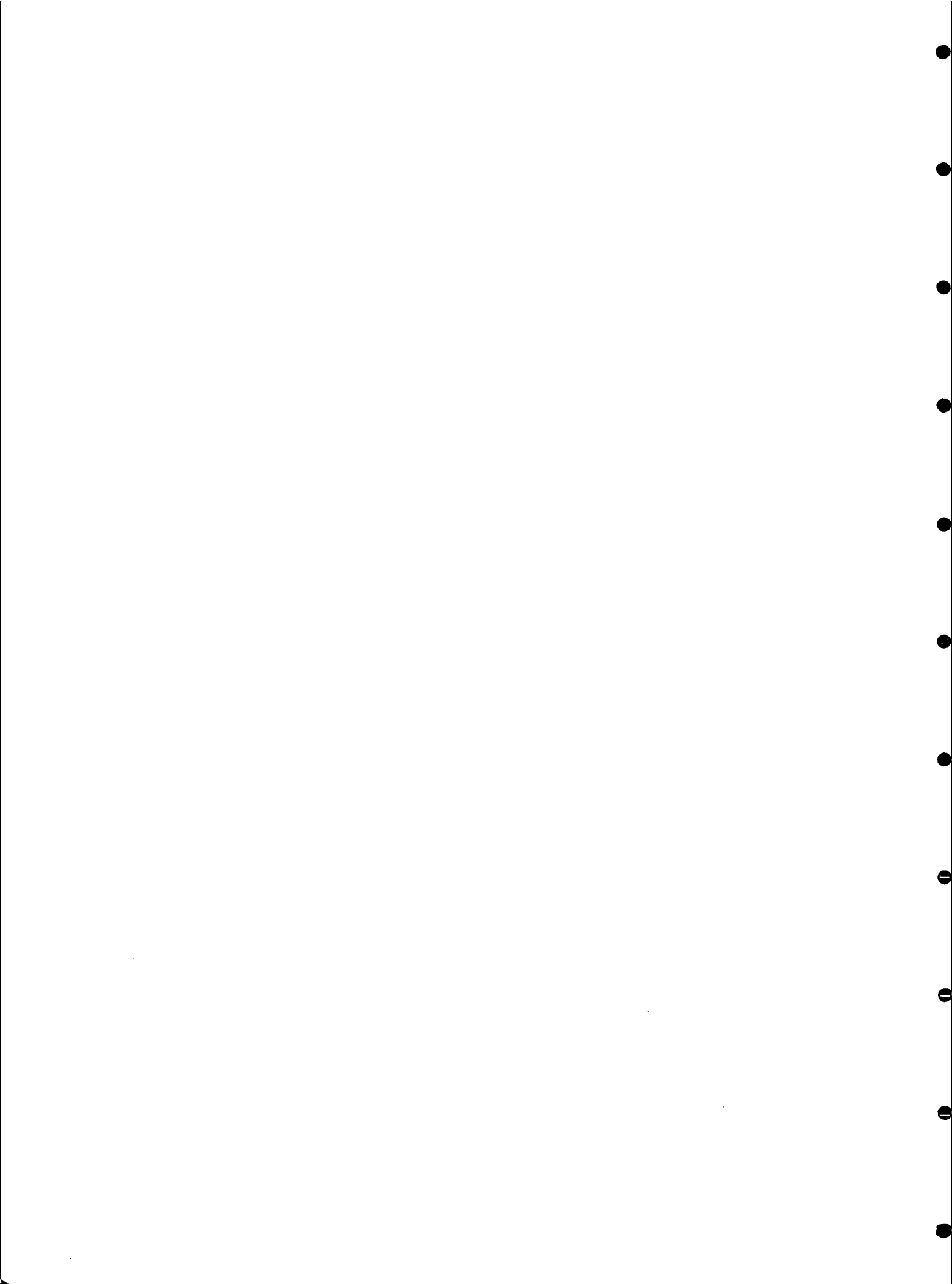
CONCLUSIONS

First year report major findings:

- Residents in the four experimental buildings

    - feel safer with the new lobbies
    - feel safer in the apartments, the hallways,
      lobbies, elevators and on the grounds (day and
      night)

- Victimization rates improved (declined) more in the
  control group sites than in the experimental sites.

- A smaller percentage of crimes appear to be occurring
  inside the experimental buildings.

- There was an increase in the number of residents in
  experimental buildings who stated that:

    - their personal safety was getting better
    - it was worthwhile to report a crime

- Vandalism expenditures declined at a greater rate in
  experimental buildings than in control buildings.

- The crime rates for index and non-index crimes declined
  at Cabrini-Green and in the control group units.

Second year report major findings:

- The decrease in the verified index crime rate at Cabri-
  ni-Green between 1975 and 1977 and the decrease in
  assaults, robberies and index theft may be related to
  the High Impact Program (HIP).

- HIP was not related to changes in rape and burglary.

- The victimization rate increased for the control
  group relative to the experimental group.

- Occupancy has increased in the experimental group rela-
  tive to the control group.

- Index and non-index crime rates decreased more in the
  experimental than in the control buildings and may be
  related to the Architectural Security Program.

- Interior crimes decreased in the experimental building
  while increasing in the control buildings and may be
  related to the Architectural Security Program.

- Verified crime rates in experimental buildings decreased from 1975 to 1977 for homicide, rape, robbery, burglary and theft, while the number of assaults increased. Victimization surveys show an increase in robbery and assault and a decrease in rape, burglary and theft in the experimental buildings.

- Victimization surveys for control group buildings show a decrease in all types of crime.

- Total vandalism costs were lower for experimental buildings than control buildings.

- Surveys show that the presence of security personnel and improved security accounted for more than one-half of the reason for residents' increased feelings of safety.

- There was a significant difference in the reduction of fear in elevators in experimental buildings as compared to control group buildings, althouth elevator cameras did not appear to contribute significantly to the reduction. The decrease in fear may be attributable to the Architectural Security Program. (ASP)

- There was a significant decrease of fear of crime in lobbies in the experimental buildings which appears to be attributable to the ASP.

- Fear of crime in the hallways decreased more in the control buildings than in the experimental ones.

- The Architectural Security Program appears to be the most cost-effective component of the High Impact Program in reducing crime rates.

DISCUSSION OF CONCLUSIONS

The data presented in the report clearly showed that the High Impact Program had some effect on verified crime rates, victimization rates, fear of crime measures and residents' attitudes concerning satisfaction with the quality of their lives at Cabrini-Green. The research design did not allow the author to separate out the discrete impacts of the several strategies (independent variables) on the dependent variables. Therefore, whenever one particular strategy was given credit for a decrease in the dependent variable, the reader must be aware that this was the authors' viewpoint, and not a finding supported by the data. Second, whenever the authors used the term "significant" the finding should be interpreted with great caution. The authors' decision rules for determining "signigicance" was not based on accepted statistical principles. The authors' approach in evaluating change over a year rèlative to the base period artificially inflates the apparent effects of the program. Regression analysis controls for this and AIR's reanalysis showed clearly that a major finding of the report--"the decrease in the verified index crime rate at Cabrini-Green between 1975-1977 may be related to the High Impact Program"-- is not supported by the data. Similar findings presented in the First Year Report were unsubstantiated. For example, the authors reported that the crime impact index had the largest drop among Cabrini-Green experimental residents. Yet, the first statistic reported in Figure 10 was not significant. Also, the finding that "the lobby designs appear to be working well and experiencing minimum problems" was unsubstantiated.

A more basic concern is the validity of the pre-post nature of the design given that the pre-data represent a period not before implementation but during implementation. Certainly it would have been preferable to have had data from 1973 and or 1974. This appears to be another example of where the evaluators were called in after the program started and had to make the best use of limited data.

Finally, in order to evaluate each finding presented in the report extensive reanalysis would have to be undertaken. Such an effort is beyond the scope of this assessment. The study is important because it represents the most thorough evaluation of a crime reduction program in public housing. The study which was well thought out, designed and implemented reveals the inherent problem of ascertaining the effect of physical design strategies on crime or crime prevention behaviors when those strategies are only one part of a large socially oriented crime reduction effort. Clear assessments of causal antecedents becomes almost impossible. Although one gains knowledge with regard to what happened, the research sheds little light on how or why each strategy either contributed or did not contribute to the overall impact observed.

URBAN CRIME PATTERNS

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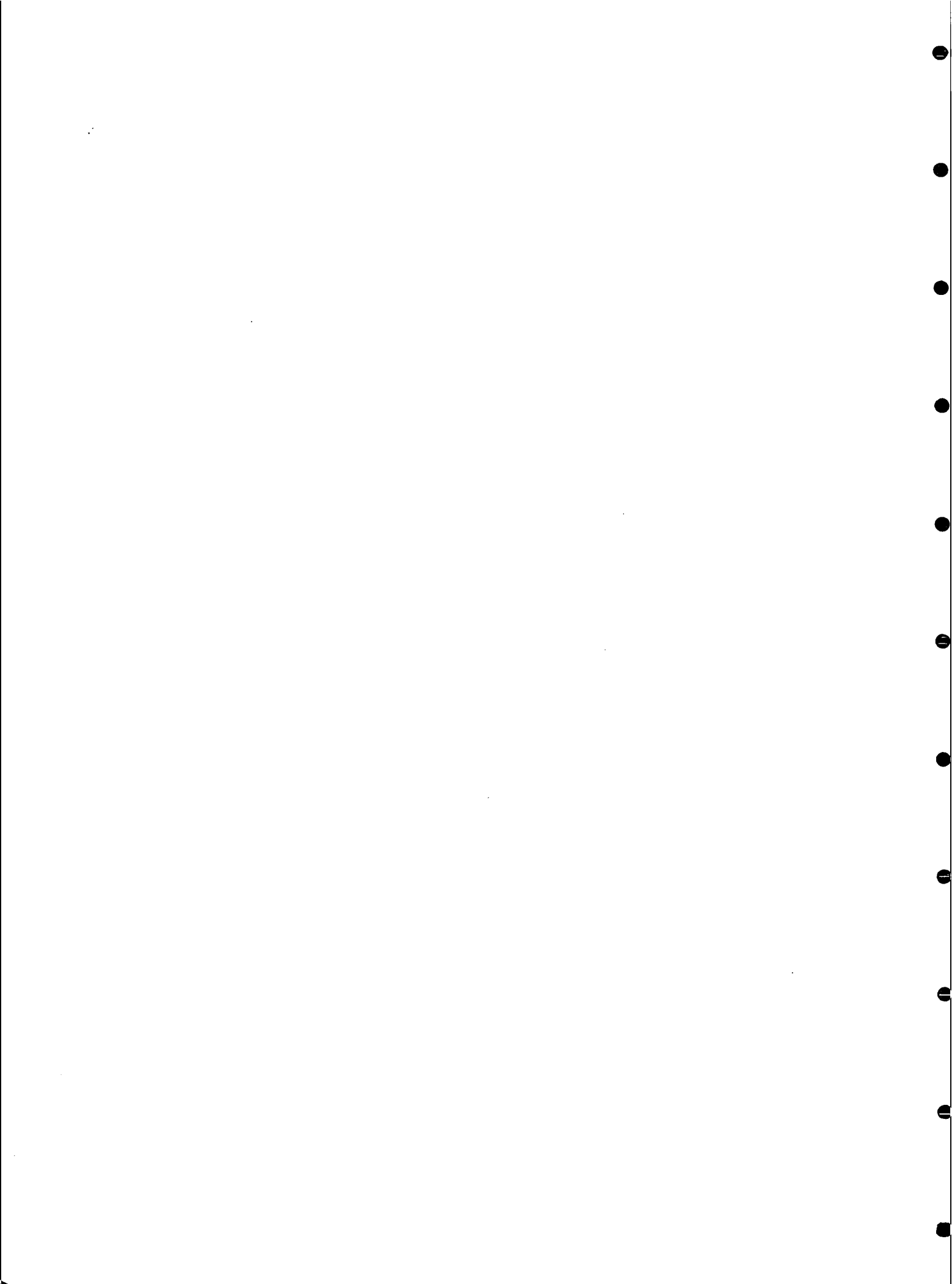
STUDY OBJECTIVES

The purpose of the study is to develop and test a measure of crime that takes into account not only the number of offenses in an area, but also opportunities and the number of offenders who live in an area.

RESEARCH DESIGN

The author developed a new measure of crime rates that takes into account the number of criminal (environmental) opportunities present in an area. Based on the methodology used in the development of this "new crime occurrence rate," the author analyzed archival data from the St. Louis Police Department and computed the crime occurrence rate for each of the 128 census tracts in the city. The twelve crime rates developed by the author (one for each major type of crime, with an appropriate corresponding definition of environmental opportunity) were compared with standard crime rates and their inter-relationships were analyzed. In addition, the twelve crime-specific rates were correlated with criminal offender rates (rate of crime per offender living in area) and three social area variables (social rank, urbanization, and segregation). The study was exploratory and did not include hypothesis testing.

VARIABLES

Independent

- social rank
- urbanization
- percentage of Black population

Dependent

- crime-specific occurrence rates

Other Variables Discussed

- standard crime occurrence rates
- crimes cleared by arrest in 1960
- criminal offender rates

Unit of Analysis

- census tracts (n = 128)

OPERATIONALIZATION OF VARIABLES

Independent

Social Rank -- Operationalized at the census tract level through an index based on the average educational and occupational levels of the residents.

Urbanization -- Defined by an index based on the fertility ratio, proportion of single-family dwelling units, and the proportion of women in the labor force.

Percentage of Black Population -- Operationalized according to the percentage of Blacks in each census tract.

Dependent

Crime Rate -- The denominators of the crime-specific rates were not counted directly, but were estimated by various methods. The business-residental land-use ratio was used as a base for business robbery, non-residential burglary, and grand larceny. The number of pairs of persons given by $N(N-1)/2$ was the base for criminal homicide and aggravated assault. The amount of space devoted to parking was a base for auto theft. The number of square feet of streets was used as the base for highway (street) robbery. The resident population was the base for the miscellaneous robbery. The number of resident females was the base for the forcible rape. The number of occupied housing

units was the base for residential burglary. Residential and
non-residential burglary were further divided into day and
night crimes. Auto theft was divided into permanent retention
and joy-riding. "The 23,349 Index Crimes the police recorded
as occurring in the City of St. Louis in 1960, along with the
various risk-group measures, were allocated to the 128 census
tracts of the City." Data were compiled and tabulated by the
Crime Research Center of the St. Louis Metropolitan Police
Department.

Other Variables Discussed

   Standard Crime Occurrence Rates -- Computed for the twelve
index crimes according to the frequency of the crime in a cate-
gory divided by an estimate of the number of people (opportuni-
ties) residing in each census tract.

   Criminal Offender Rates -- The operational definition is
not given.

   Crimes Cleared by Arrest in 1960 -- Adapted from St. Louis
Metropolitan Police, The Police Record: 1959-1961.

STATISTICAL METHODS USED

   Descriptive Statistics -- The author presents frequencies
and medians for both standard and crime-specific rates, as well
as normally calculated crime rates and base rates. In addition,
the author presents the number of index crimes that occurred in
1960 in St. Louis, the percentage cleared by arrest in each
category, and the ranking of selected census tracts according
to rates of non-residential night burglary.

   Correlation -- The following correlations were performed:
(1) Kendall's tau, between crime-specific and standard crime
occurrence rates, (2) intercorrelations among crime specific

rates, (3) correlations between criminal offender rates and crime-specific occurrence rates, (4) correlations between crime factors and crime occurrence and criminal offender rates, and (5) multiple and partial correlations between crime specific occurrence rates and social area variables.

Factor Analysis -- The author used factor analysis, a varimax solution with orthogonal rotation, to determine which factors explained the relationships found among crime variables.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Most of the independent variables appear to be validly measured. The denominators used to develop rates for business robbery, miscellaneous robbery, rape, and highway robbery appear to be appropriate denominators for specifying rates for these crimes. Other crime-specific occurrence rate calculations may be invalid for the following reasons:

(1) The amount of parking space, which is used by the author as a basis for calculating auto theft rates, could have been improved substantially by taking into account the hours of greatest frequency for this crime. While a commercial center may have a larger percentage of space for parking, fewer automobiles would be present in such an area in the evening and night, when risk is the greatest.

(2) The author's rationale for using pairs of persons $[N(N-1)/2]$ for criminal homicide and aggravated assault assumes that both the offender and the victim are from the same census tract, which might not be the case.

(3) The number of occupied housing units as the basis for calculating residential burglary rate does not take into account the percentage of unoccupied housing units that are targets for residential crimes such as the theft of utility items (refrigerators, washing machines, etc.) and vandalism.

Criminal offender rates were never explicitly defined by the author, though she correctly raised several problems inherent in measuring this rate. We have assumed that the rate was based on the number of persons arrested who reside in that area. The measure of this variable is biased to the extent that police concentrate on an area and arrest a higher percentage of the actual number of resident offenders who are arrested in other parts of the city. In addition, it can never be assumed that the police have an accurate count of the number of offenders who live in an area.

APPROPRIATENESS OF RESEARCH DESIGN AND STATISTICAL METHODS

The design is appropriate for an exploratory study. The statistical methods used also appear to be appropriate, except that the variables used in the study might not be independent, since some of the variables shared the same base for the denominator. For example, if X and Y are the crime frequencies for two categories and Z is the basis for them, the derived variables $U = X/Z$ and $V = Y/Z$ might be correlated simply because they have the same base, Z. This problem is rather serious, but the author did not address it.

CONCLUSIONS

The author reports that the analysis of crime occurrence rates based on environmental opportunities specific to each crime category indicates the following:

- Targets in central business districts are not the most intensively exploited in the city, nor are exploited targets entirely limited to neighborhoods in which the offenders live.

- Familiarity between offenders and their targets is evidenced by the exploitation of particular types of targets in offender neighborhoods.

- Targets in areas of high social rank adjoining areas with large numbers of offenders appear to provide abundant opportunities for commercial crime.

- Variables other than social rank, urbanization, and racial demography must be considered in order to explain the occurrence of forcible rape.

DISCUSSION OF CONCLUSIONS

All offender data are conditional on arrest and cannot be generalized to the unarrested offender population. Further, though each of the conclusions is supported by the data, several conclusions are based on weak operational definitions. A major contribution of the study is the author's innovative operational definition of crime. Defining crime as crime per opportunity is an important tool in the analysis of the relationship between crime and the built environment.

CRIMINAL'S AND NONCRIMINAL'S PERCEPTIONS
OF URBAN CRIME
AND
THE CRIMINAL'S IMAGE OF THE CITY AND
URBAN CRIME PATTERNS

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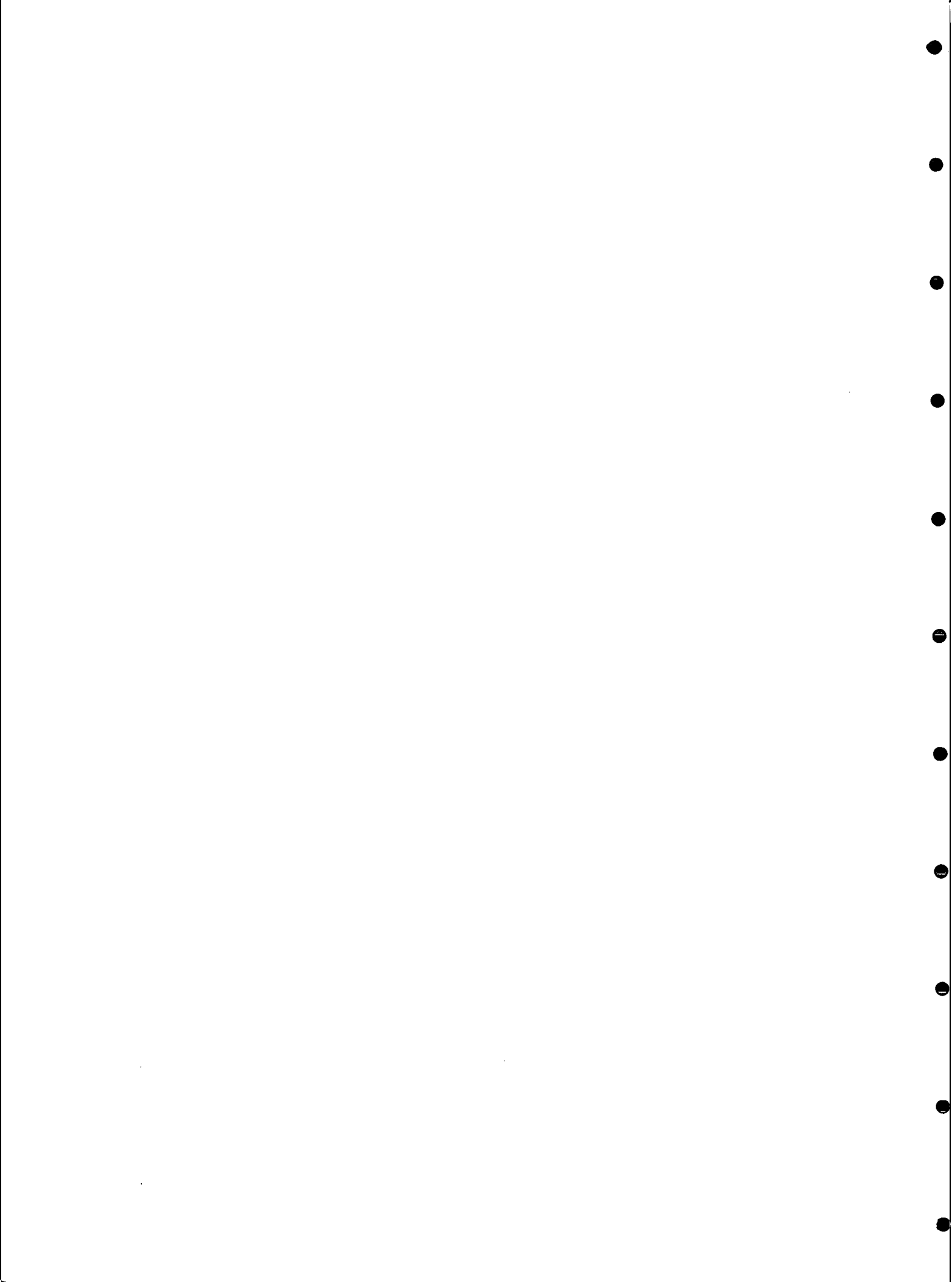
STUDY OBJECTIVES

The purpose of the studies was to answer the following questions.

- What is the general character of criminals' evaluations of areas within the city and do their evaluations differ from noncriminals' evaluations of the urban milieu?

- How are criminals' evaluations of different places related to their choice of locales for committing offenses?

- Do criminals have a better perception than noncriminals of the actual incidence of crime in their city?

RESEARCH DESIGN

The studies consist of two pre-experimental components. The first component compares evaluations of specific neighborhoods by the race (black, white) and by criminal status (criminal, noncriminal) of a sample of respondents. The second component correlates the number of crimes in an area with criminals' evaluation of the area.

A sample of approximately 160 persons was selected and asked to respond to a set of bipolar seven point scales in reference to fifteen neighborhoods or areas of the city. These areas were presented to the respondent by name and with detailed maps for identification assistance. Each respondent filled out a questionnaire prepared by the authors. This aspect of the study utilized a repeated measure design between the factors—race and criminal experience, and within the factor-areas. There were fifteen dependent measures included in the questionnaire.

VARIABLES

Independent Variables

- Race

- Criminal experience

- Factor scores of evaluation of neighborhood where crimes had been committed

Dependent Variables

- Semantic differential scales

- Number of property crimes in an area committed by the sample criminals selected for the study

Unit of Analysis

- Principal component analysis--area of city (n=15)*

- Regression analysis--area of city (n=15)

OPERATIONALIZATION OF VARIABLES

Independent Variables

- Race--black, white

- Criminal experience--defined as whether a respondent had been sentenced to a correctional institution for property crime

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*Based on private communication between Tet Motoyama and Dr. Hill, 14 September 1979.

Dependent Variables

- Number of property crimes in the area --is based on police archival data and accumulated as an index of criminal behavior specific to the sample of respondents and fifteen study areas.

- Semantic differential scales--the author used fifteen bipolar discriptor scales with seven categories of ordinal scaling. They include the following descriptors -- (1) extremely, (2) very, (3) slightly, (4) neutral, (5) very, and (7) extremely.

SAMPLING

The sample of 83 criminals who committed offenses in Oklahoma City was drawn from three of the state's correctional institutions. No further detail is provided on their method of selection. The authors also state that a structured sample of noncriminals was drawn from Oklahoma City in order to match the criminals in residence, age, sex, race and census tract of residence.

The sample of fifteen geographic areas was selected across a range of low to high socioeconomic status levels and were recognizable by name to the average resident. No further detail is provided on the method of selecting the fifteen areas.

STATISTICAL METHODS USED

Descriptive Statistics--The authors report the means and standard deviations of the three scale scores by criminal experience and by race.

Principal Component Analysis--The authors performed this analysis on the correlation matrices (covariance) of semantic

differential scales. The correlation matrix was computed for each combination of race and criminal experience by taking means across subjects for the areas and semantic differential scales. The correlations were computed taking the area of city as a unit.[*] It should be noted that principal component analysis is not a factor analysis. Morrison states that the "principal-component [analysis] is merely a transformation rather than the result of a fundamental model for covariance structure" (1976, p. 302). The objective of the principal-component analysis is to derive a set of weights in order to summarize the data.

Multiple Regression--The author developed a predictive model for the number of crimes by area using the factor scores from the criminal's evaluations within each racial subgroup as the independent variables. These factor scores were developed through principal component analysis of the questionnaire results.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Independent Variables

The operational definitions of race and criminal experience are straightforward and adequate.

Dependent Variables

The operational definition of the number of property crimes is straightforward and adequate, although one potential

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[*]Based on private communication between Tet Motoyama and Dr. Hill, 14 September 1979.

problem may exist. The measurement of this variable is similar to sampling from a finite population where observations are negatively correlated. Since the number of criminals was fixed to 83, and the crimes committed by those criminals were used, the measurement of this variable was negatively correlated among areas; i.e., if one area has more crimes than average, other areas must have less than average.

The semantic differential scale is a well established procedure. However, there are questions with respect to this study regarding the validity and reliability of the items based on the factor scores extracted. The reliabilities of the factor scores should have been estimated.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research designs employed in both studies are appropriate and can meet the stated objectives.

APPROPRIATENESS OF THE SAMPLING PROCEDURES

The sampling procedures of individuals appear to be appropriate. There are generally recognized problems in developing a representative sample of criminals and a properly matched control group which the authors address in the study. The sample size of the study areas in the city (n=15) was too small to perform multivariate analysis (see below).

APPROPRIATENESS OF STATISTICAL METHODS USED

Principal Component Analysis--The use of this method in this study is problemmatic because the number of variables (semantic differential scales) and the number of observational units (area of the city) were both fifteen. This causes the sum of squares and cross products generated by this data base to have only fourteen degrees of freedom (fifteen areas minus one), a number smaller than the number of variables. Anderson

shows that when the degrees of freedom are less than the number
of variables, the sum of the squares and the cross product
matrix do not have a density (1958, p. 159). Also, when three
"factors" are extracted, there are 45 parameters (15 x 3) being
estimated. This is three times the number of observations.[*]

The assumption that the authors must make in order to
take the means across the subjects is that there are no inter-
actions between "subject" and "area" and "subject" and "scale."
This assumption should have been tested by the authors. An
analysis of variance model given below would provide an ade-
quate test for these interactions.

$$Y_{ijk} = M + Scale_i + Scale \text{ x } Subject_{ik} + Area_j +$$
$$Area \text{ x } Subject_{jk} + Scale \text{ x } Area_{ij} + Scale \text{ x } Area \text{ x }$$
$$Subject_{ijk} \text{ (Error)}$$

An alternative analysis would be a "multimethod - multi-
trait type analysis of 225 x 225 matrix (15 x 15).

In order to meet fully the study objective of comparing
the evaluations of areas between criminals and non-criminals,
the structural analysis of covariance and correlation developed
by Joreskog should have been used rather than the principal
component analysis. Joreskog's method has the ability to com-
pare parameters from different populations simultaneously. The
principal component analysis method has no such capability.

Other difficulties with the principal components analysis
include the limited nature of the 'control' variables (age,
sex, race and residence) and the failure to report (or possibly

---

[*] The authors disagree with this comment on the basis that: 1)
Their intent was to provide descriptive data which allows them
to have the number of variables exceeding the number of cases.
2) The authors had no intention of generalizing from the sample
to the universe. The authors' response, however, does not re-
solve the problem of the small sample size (n=15). Based upon
the reviewer's experience, even the 15x1 vector of random numbers
can fit the principal components analysis reasonably well for
this sample size.

conduct) tests of significance for the subgroup differences in
the factor structures.   These limitations leave open the ques-
tions: (1) Could the similarity in the factor structure between
criminals and non-criminals be due to similarities in the two
groups in other important variables?; and   (2) To what extent
does random measurement error (unreliability) mask subgroup
differences?[*]

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[*]The authors disagree with this comment on the basis that:
1) Question (1) and (2) are self-contradictory.
2) Question (1) misses the point of the findings where the
intention was to indicate the similarity and not to explicate
the sources.
3) Measurement error can not mask "subgroup differences in
light of the striking similarities across and striking coherence
within [the] subgroup factor structures."

Although the authors emphasized similarities, it should be noted
that those factors were orthogonally rotated.   Therefore, even
though the interpretation of similarities among subgroups is
reasonable, those factors from different subgroups do not share
a common reference axes.   Figure 1 explains this point graphic-
ally.

Figure 1

An Example of Orthogonal Rotation
and Common Axes

| Black factors after rotation | White factors after rotation | Black and white factors in the common axes |
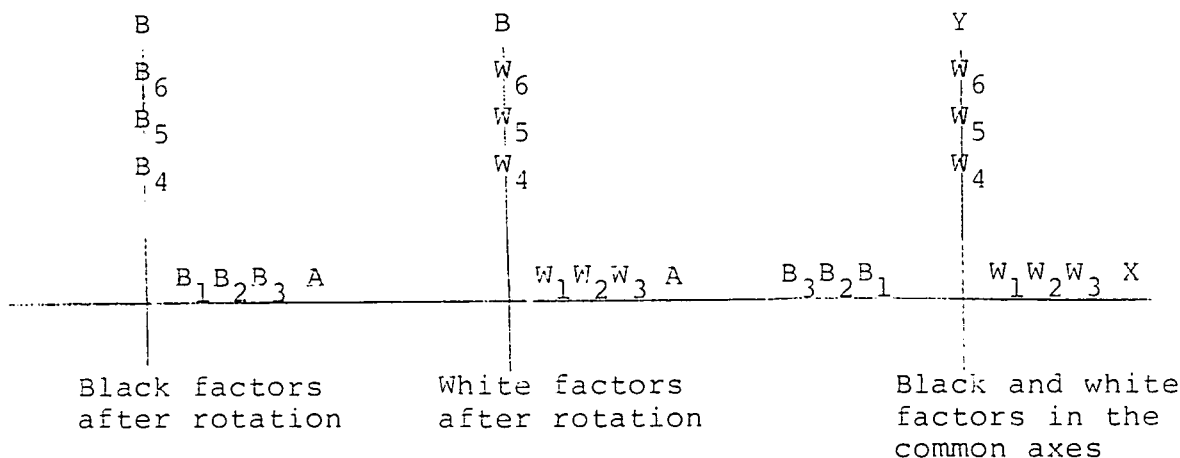
Furthermore, even though subgroups differed in the factor
structure, if there were measurement errors, those differences
would be watered down and would not be detected.   In light of
the fact that there were only 15 observational units, it is
hard to interpret those factors.

Multiple Regression Analysis--It is reasonable to use the principal component analysis to reduce the number of the predictor variables. This is particularly effective for prediction. It should be pointed out that the authors could not use the whole set of semantic differential variables since the number of predictor variables and the number of observational units were equal. The interpretation of weights obtained from this analysis, however, would be difficult when the objective is to use them for interpretation rather than prediction.

As mentioned in the variables section, there were negative correlations among the dependent variables. It is not clear how this negative correlation will alter the result upon reanalysis. Such reanalysis is beyond the scope of this review. If the covariances among the observations could be obtained, these could have been used in the general linear model rather than through ordinary least squares.

CONCLUSIONS

The authors report:

- Both criminals and non-criminals view the aspects of the social phenomena of crime similarity.

- There are differences in the semantic structures of criminals and non-criminals and it is possible to interpret them.

- There is a demonstrated linkage between a criminal's perceptions and his behavior.

DISCUSSION OF CONCLUSIONS

The conclusions appear to be overdrawn, although they have significant exploratory values. The limiting factor of this research is the small sample size (n=15).

THE ENVIRONMENT AND BURGLARY VICTIMIZATION

IN A METROPOLITAN SUBURB

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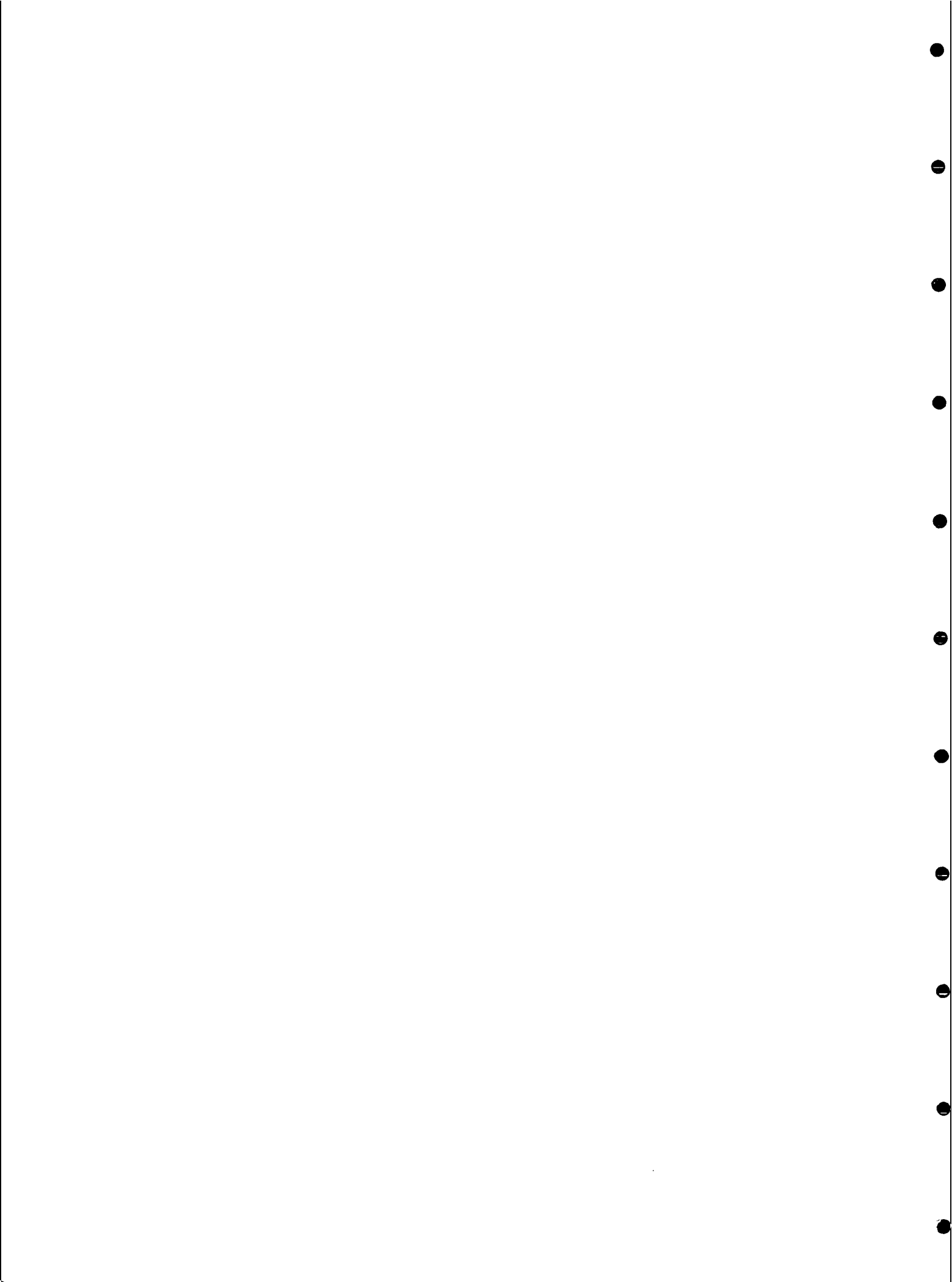
STUDY OBJECTIVES

The study sought to determine the environmental features that accompany high vulnerability to residential burglary. The study investigated the association between high vulnerability and seven environmental factors:

- number of entries to residential unit
- availability of lighting
- number of places of concealment close to building
- presence of a dog
- amount of auto traffic
- amount of foot traffic
- differences of residential unit from surrounding buildings by type, condition, or distance from sidewalk
- occupancy level.

In addition, the study sought to determine if environmental factors were more powerful than five social factors in explaining individual burglary victimization rates. The five social variables were:

- amount of territorial behavior in neighborhood
- social isolation from one's neighbors
- lack of children in household
- amount of social cohesiveness in neighborhood
- reputation of area as a target for a variety of crimes.

RESEARCH DESIGN

Three groups of residences were selected to serve as a sample. Two of the three groups were selected from police files on the basis of their frequency of victimization. Members of one group had been victimized twice during the five year period preceding the study, while members of the other group had been victimized once during the first quarter of 1976. The third group was selected according to residential proximity to the first group. Information on household-specific and environmental factors was obtained from the occupants through a self-administered question-

naire and from checklists filled out by researchers who visited individual homes. The authors compiled the data and conducted analyses of variance and regression to investigate the relationship between victimization rate and environmental and social factors.

The objectives of the study were explicitly stated in hypothetical form. The hypotheses were treated, however, in a more exploratory manner than as a basis for testing for specific significant differences. The methodology employed can be referred to as a pre-experimental, one-shot case study.

VARIABLES

Independent

- seven environmental factors
- five social factors
- housing type

Dependent

- number of burglaries

Units of Analysis

- households in a selected suburb.

OPERATIONALIZATION OF VARIABLES

Independent Variables

Environmental Factors:

- Entry options, including (1) the number of exterior doors, (2) number of windows, (3) presence of sliding glass doors, (4) presence of glass in other exterior doors, and (5) presence of special locks on the doors.

- Lighting was operationalized through respondents' answers about (1) strength of lighting in rear of building, (2) presence of lights for each entrance on front, side, and rear of building.

- Degree of concealment available was operationalized through (1) respondents' answers to ease of concealment, (2) a research assistant's observation of presence and condition of fences, and (3) a checklist of trees and shrubberies compiled by observation.

- The presence of a dog

- Presence of foot traffic was operationalized by: (1) responses to questions concerning the number of students that passed the house, and (2) maps to determine if the number of blocks necessary to walk to the nearest elementary or junior high school or the nearest park.

- Presence of automobile traffic was operationlized through: (1) use of maps to determine the number of blocks to the nearest freeway entrance, (2) traffic counts compiled by the city government, and (3) the use of maps to determine the number of blocks to the city's entertainment complex.

- Differences from the surrounding buildings was operationalized by observational data that included rating the physical condition of the building and yard and comparing it to the surrounding buildings and yards.

- Occupancy was defined as the estimated number of persons living in the household.

Social Factors:

- Social isolation from one's neighbors was operationalized by: (1) respondents' answers to Likert-type four item questions on personal compatibility, and answers to other questiongs regarding (2) degree of contact with neighbors as defined by frequency of entertaining, level of assistance, and the extent to which there was a sharing of interests with neighbors, (3) the existence of good relations with teenagers in the area, and (4) estimates by respondents of the numbers of their friends that lived within a mile.

- Social cohesiveness was operationalized through: (1) responses concerning whether disagreements among neighbors were easily solved, (2) length of time of residence of neighbors, and (3) whether neighbors were able to organize in order to solve common problems.

- Territorial behavior was operationalized through responses to questions such as whether residents watched neighbors' homes for intruders or had their own homes watched by neighbors.

- Reputation as a "good target" was measured through resident interviews based on the number of criminal incidents in individual households.

- Lack of children

Housing Type:

- Single family, duplex, triplex, or apartments.

Dependent Variables

- Number of times a household has been burglarized, based on self-reporting (victimization survey).

Unit of Analysis

- Household (n = 346).

SAMPLING PROCEDURES

The households were selected according to a sampling procedure that was non-random. All residents (households) who had been victimized twice or more during the five year period, as determined from police records, were called and, if contacted, were surveyed. A second group in the sample were persons who had been victimized once during the first three months of 1976. A third group of the sample was selected on the basis of residential proximity to the households burglarized two or more times. No further description of the method used to select this third group is given by the author.

STATISTICAL METHODS USED

Analysis of variance -- This statistical method was used to test the relationship between the dependent variable, the number of burglaries, and the environmental (independent) variables.

Multiple regression -- This statistical method was used to test the relationship between the number of burglaries and a series of independent variables, including social and physical variables. In total, the relationships between 22 independent and dependent variables were tested.

Factor analysis -- This statistical technique was used

in analyzing the questionnaires in order to develop clusters
of items representing different aspects of the social variables.

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Environmental variables were measured directly and
indirectly through a combination of checklists answered by
researchers and questionnaires filled out by residents. The
only environmental variable measured directly by researchers
was entry options. The operationalization and measurement of
this variable seem correct within the limits of human record-
ing error.

Lighting was measured indirectly and based on the
subjective response of residents to questions such as, "How
strong . . . ?" and answers to questions on whether entrances
were lighted. Although the author did not check either the
reliability or validity of the measures for this variable,
the quality of the operational definition is reasonable, given
the combination of objective (whether entrance lighted or not)
and subjective responses used.

The degree of concealment available was measured by two
objective indicators, plus one subjective response by resi-
dents. The quality of the operational definitions is, as was
the case above, limited, because the author did not attempt
to check either the validity or reliability of the measure-
ments. The addition of three types of measures into a conceal-
ment score was not discussed, but would seem to represent a
very difficult methodological problem.

- Foot traffic was measured indirectly, and the quality
  of the operational definition (distance from school
  of park) is low.

- Automobile traffic was assessed by several measures, some direct and others indirect. The existence of objective measures (traffic counts, city estimates, etc.) add strength to the operational definition, while indirect measures, such as distance from the entertainment complex, weaken the measurement effect.

- Assessment of differences between respondents' buildings and surrounding buildings was based on researcher's subjective judgment (good, fair, dilapidated). Given that the researchers had easy-to-interpret guidelines, the measurement of this variable is probably adequate.

- Amount of occupancy at home was operationally defined as a linear function of the number of persons living in the household. This operational definition is less adequate than direct questioning of residents on this matter. Since the author does not state the basis for using number of residents, there is no support for operationally defining this variable in the manner used. This definition is probably low in reliability and validity.

The quality of the operational definitions of social variables varies according to the depth of the research and the combination of sources used to develop the measure. Again, the author did not perform the necessary tests to check either the validity or reliability of these variables.

- Social isolation appears to be well defined since the measure is based on a composite of several related questions and scales derived from questionnaire results.

- Neighborhood social cohesiveness and territorial behavior are also adequately defined and measured, based on responses to related questions.

- Reputation for being a good target -- The quality of this measure is low, because it is based on the number of crimes in which respondents had been victimized. The author fails to show that the answer to the latter question represents adequately the area's "reputation."

APPROPRIATENESS OF RESEARCH DESIGN

The research design, supported by more adequate operational definitions, measurement techniques, and sample

selection procedures would be appropriate for investigating the relationships among various environmental and social factors and the incidence of burglary. When variables such as these in such quantities are used, however, preliminary analysis of correlations among these variables and the reliability and validity of their operationalization must be performed before their effects on the dependent variable are investigated.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The author acknowledges that the sampling procedure resulted in a biased sample, with single-family houses sampled far in excess of their percentage of burglaries. The author did not explain why this unorthodox sampling procedure was used. The sampling procedure, drawing heavily from households that had been previously burglarized, may have been used to reduce the percentage of non-burglarized households that inevitably results from random sampling. It appears that selection of houses within each of the three groups was not random. Therefore, the sample is biased and the generalizability of the findings is limited.

Analysis of variance -- Although the author does not discuss how the analysis of variance was performed, it can be inferred from the results that one-way ANOVA's were performed for three housing types. The use of ANOVA in this study raises several concerns. First, the scaling of the study's independent variables that were used in the ANOVA model was not clear. No information was provided on what the levels of these variables were or how they were constructed. In addition, the author did not present any statistics, such as means or mean square errors.

The author failed to employ higher factor ANOVA's such as two-way or three-way ANOVA's. It would also have been appropriate and useful to use the three groups of housing

types as independent variables and perform one-way ANOVA on
environmental and social variables to see if there are any
systematic differences among housing types.

Multiple regression -- It appears that the author did
not pay adequate attention to the scaling distributions and
the mutual relations (correlations) of independent variables
tested in the regression model. In addition, there was no
information on the way that the variables were selected as
"important," though one might infer that the author used the
standardized beta (β) weights. In general, there were too
many independent variables tested in the model. Since the
author had an N of approximately 55 and used more than 10
variables in her model, the author violated the standard rule
that one should have a 30:1 ratio of N to parameters tested.
The use of too many independent variables creates very
unstable beta (β) weights and leaves the reader with very
little confidence that the author can, on a sound statistical
basis, reject the null hypothesis that the variable is not
important (β = 0).

CONCLUSIONS

The author reports:

- Support was found for the hypothesis that environmental
  features can be involved in producing high individual
  vulnerability.

- For single family houses, higher burglary rates were
  associated with the presence of places where a person
  could conceal himself next to a door or window, or
  where there appeared to be a low occupancy, or where
  there was heavy auto and pedestrian traffic.

- For duplexes and apartments with concealment areas,
  heavy traffic, and/or surrounded by single family
  homes, there was a higher victimization rate.

- Reputation as a good target is most often a precondi-
  tion for burglary victimization.

DISCUSSION OF CONCLUSIONS

The first three conclusions were based on possibly weak statistical methods and measurement techniques applied to the independent variables.

The final conclusion was based on a regression equation that included far too many independent variables to have adequate explanatory power. As stated above, the operational-ization of the variable "reputation as a good target area" was inadequate and raises serious doubts as to its validity. This final conclusion has not been "proven" in this study. Further, other conclusions in the study appear to be over-drawn.
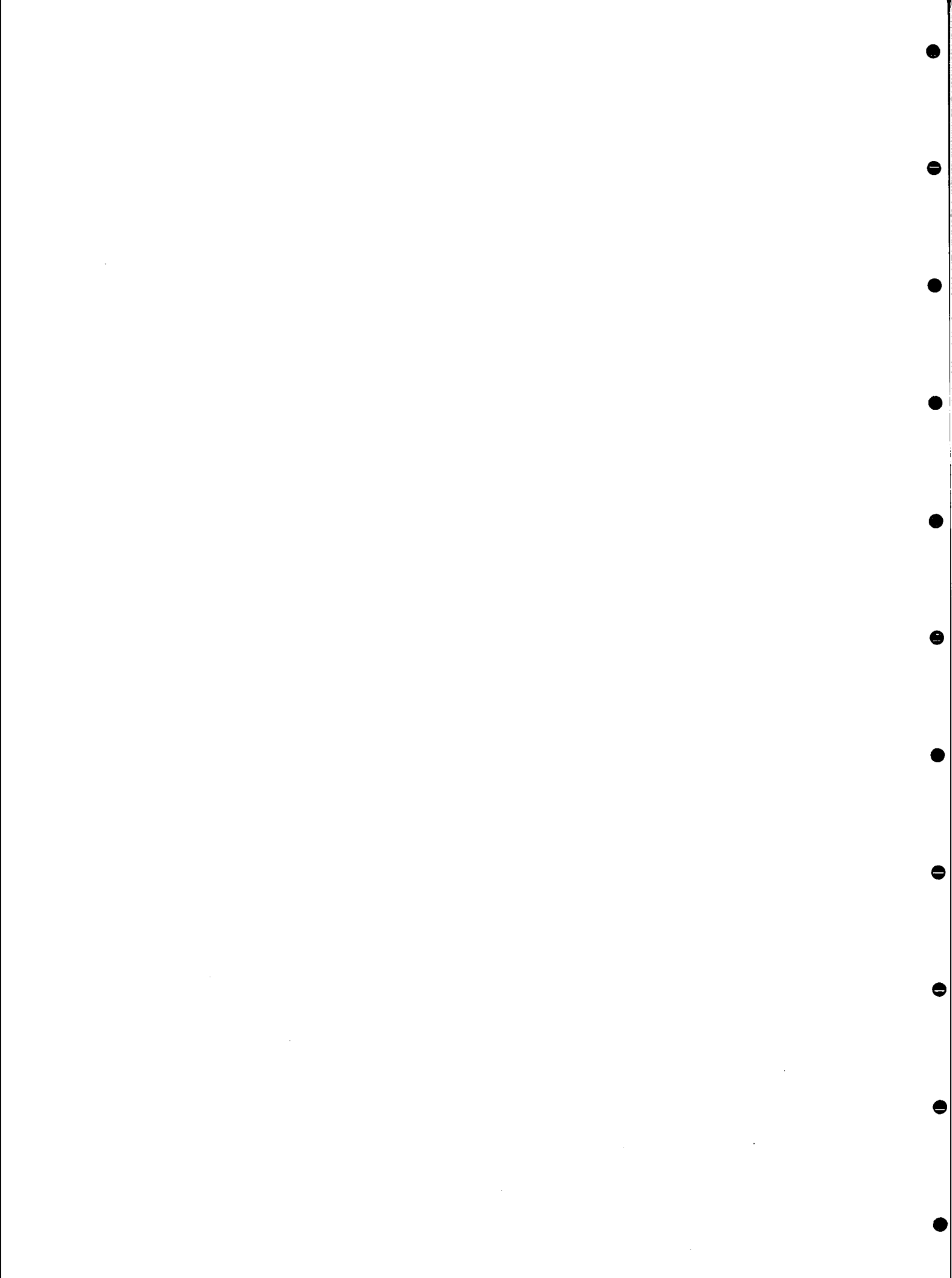
REDUCING RESIDENTIAL CRIME AND FEAR:
THE HARTFORD NEIGHBORHOOD CRIME
PREVENTION PROGRAM

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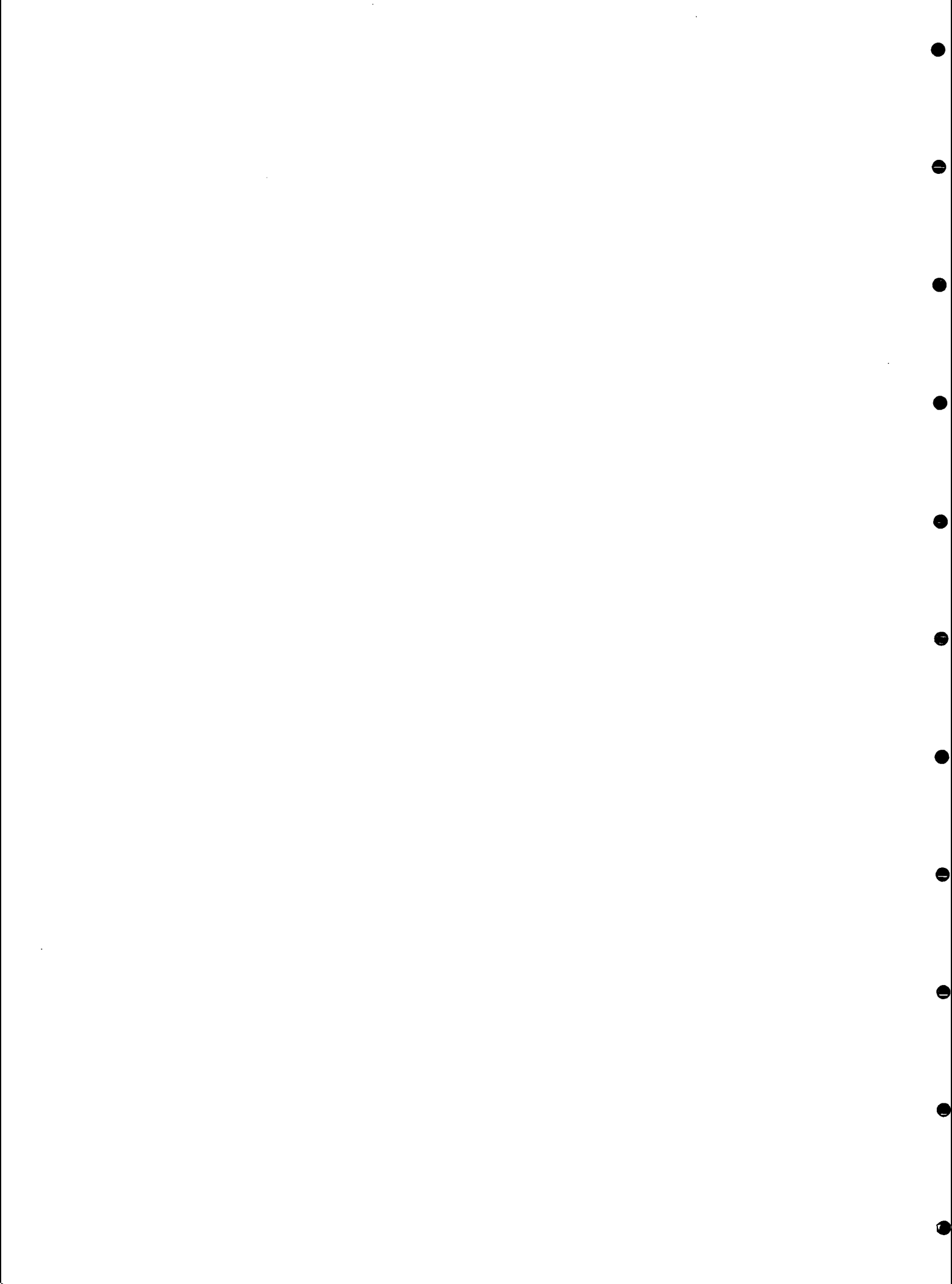
STUDY OBJECTIVES

The study is an evaluation of the LEAA-supported Hartford Anti-Crime Demonstration Program. The full program was implemented in the northern half of Asylum Hill, a neighborhood in Hartford. In the southern half the police and community components were implemented. The research and demonstration program was based on the premise that "there is a direct correlation between the design and functioning of the residential physical environment and stranger to stranger crimes of opportunity such as burglary and street robbery." A study of the crime problems was undertaken by a team of urban designers, survey research specialists and criminal justice personnel. Their study gathered information to link criminal activity with physical and social attributes of the neighborhood. Based on the analysis of the crime problem, the program team developed a unique range of social, physical design and policing strategies designed to reduce crime and the fear of crime among neighborhood residents. The three major components of the demonstration program were:

- closing and narrowing streets
- instituting neighborhood police patrols
- creating and encouraging neighborhood organizations to undertake a broad range of activities to reduce criminal activities.

The study consisted of a process evaluation of program implementation as well as an evaluation of program impacts. The overall objectives of the evaluation were: (1) measure the success/failure of the program in reducing crime and the fear of crime, (2) gain a better understanding of the relationship between the physical environment and crime-related behavior, and (3) identify specific strategies that appear to be effective in reducing crime. In addition, the study attempted to determine whether the program displaced crime from North Asylum Hill to surrounding areas.

The research design included an analysis of data collected prior to the experiment, during its implementation, and after its completion. The process evaluation collected and analyzed qualitative data on program inputs, police activities, physical design changes, and the individual assessments of the program of thirty community leaders. The impact evaluation collected and analyzed quantitative data derived from:

- citizen surveys in 1973, 1975, 1976, and 1977
- archival police data on crime, arrests, and offender characteristics
- traffic counts in 1975, 1976, and 1977 (vehicular and pedestrian)
- questionnaires given to police officers

The impact evaluation was designed to test the following hypotheses:

1) Crime rate is a product of the linkage between offender motivation and opportunities provided by residents, users and environmental features.

2) Crime rate for a specific offense can be reduced by lessening opportunities for that crime to occur.

3) Opportunities can be reduced by:

   a) increasing surveillance capabilities
   b) increasing neighborhood's attractiveness to residents
   c) decreasing fear producing features
   d) increasing citizen involvement in crime prevention and other neighborhood activities
   e) improving police-citizen relations

4) Reducing criminal opportunities will reduce fear of crime. The reduced crime and fear of crime will mutually reinforce each other.

The evaluation was essentially a pre-post research design that collected and analyzed data on a broad range of behavioral and attitudinal measures representing the hypothesized effects of the program. Baseline data were collected and used as a

benchmark by which to measure the impact of the demonstration program.

Data on the entire city, south Asylum Hill and areas surrounding Asylum Hill were collected to serve as control data. Data were collected over a four-year span. Data on South Asylum Hill reflected police and resident oriented programs, but no physical changes. Data on areas surrounding Asylum Hill helped measure displacement and investigate hypotheses dealing with unplanned changes in that part of the city.

Finally, the demonstration effort took place in a "real world" setting where many activities were beyond the control of the researchers and may have influenced the behavior and attitudes of the residents.

VARIABLES

Independent

- physical design of North Asylum Hill
- police activities
- anti-crime activities undertaken by residents and community organizations (involvement in activities and surveillance operations).

Dependent

- burglary rate
- robbery/pursesnatch rate
- resident perceptions and feelings with respect to crimes
- pattern (location) or robberies
- car theft rate
- mailbox theft rate
- other theft from premises
- fear of crime
- traffic patterns

- use of neighborhood space by residents
- residents' relationships to neighborhood and neighbors
- relations between police and citizens
- territorial behavior of residents
- police response to questionnaire
- police record data

Units of Analysis

- individual respondents
- areas of the city

OPERATIONALIZATION OF VARIABLES

Independent

In general, the independent variables represent action-oriented treatment variables that were individually described, but not subject to precise quantification.

Physical design of North Asylum Hill -- Operationalizing this variable included the following strategies:

- Elimination of several through streets in the neighborhood by blocking their entrances, creating cul-de-sacs, narrowing entrances, and changing two-way streets to one-way streets. A total of eleven changes in public streets took place.
- Creation of better definition of space by adding strategic landscaping, enclosing and upgrading open and porous spaces, and constructing entrance ways and mid-block treatments.

Police activities -- Operationalization of this variable included the following strategies:

- Permanent assignment of men to particular geographic area of the neighborhood
- Decentralized command

- Development of a formal relationship between resident and police
- Improving the information available to police regarding patterns of crime

Anti-crime activities undertaken by residents and community organizations -- Operationalization of this variable included the following strategies:

- Formation of neighborhood community organization
- Pursuit of anti-crime activities as they evolved from interests/perceived needs of residents

Dependent

Burglary rate -- Rate per 100 households is measured through the use of victimization surveys conducted in 1973, 1975, 1976, and 1977. The variable is measured at the city-wide level and for the North Asylum Hill neighborhood, as well as for surrounding areas.

Robbery/pursesnatch -- Rate per 100 residents is measured through the use of victimization surveys. The variable is measured at the city-wide level, for North Asylum Hill, and for surrounding areas.

Pattern (location) of robberies -- This variable is divided between "residential" and "main" streets.

Car theft rate -- Measured similarly to burglary rate.

Mail box theft rate -- Measured similarly to burglary rate.

Other theft from premises -- This variable includes all thefts from premises not involving breaking and entering and is measured similarly to the burglary rate.

Fear of crime -- This variable is operationalized through three kinds of questions asking residents about crime. (Residential burglary, street robbery/pursesnatch): 1) how big a problem it was -- big, some, almost no problem; 2) their likelihood of being a victim -- 0 = no possibility, 10 = extremely

likely; 3) how worried they were about crime -- four point
ordinal scale.

Traffic patterns -- Automobile traffic is measured by
actual car counts made by machine in 1976 and 1977. This
variable is also operationalized through the citizen survey
question relating to the perceived change in daytime vehicular
traffic. (Three point ordinal scale -- heavier, about the
same, lighter).

Pedestrian traffic -- Measured by actual counts by obser-
vers in set locations in Asylum Hill in 1975, 1976, and 1977.
Pedestrians were classified by age, sex, and race. This vari-
able is also operationalized through the citizen survey ques-
tion relating to the perceived amount of pedestrian traffic
in front of home. (Four point ordinal scale -- a lot, some,
a few, almost none).

Residents' use of space -- Measured through three survey
questions:

1) Frequency with which residents walked somewhere in
   their neighborhood. (Five point ordinal scale --
   almost daily, few times a week, once a week, less
   often, and never).

2) Percent of residents who like to use the park.

3) Mean number of days in the past week spent outside
   around the house.

Residents' relationships to the neighborhood and neighbors --
Operationalized through the citizen survey in which they were
asked such questions as (1) whether they thought the neighbor-
hood had changed for the better or worse or stayed the same
in the preceding year, (2) whether they thought it would be a
better place to live in five years, and other similar ques-
tions.

Relations between police and citizens -- Operationalized
through questionnaires given to the police and citizen surveys
regarding how much respect each had for the other, expected

willingness of the other to give assistance, and a series of questions regarding the perceptions of relations between groups.

Territorial behavior of residents -- Operationalized through a series of survey questions concerning whether neighbors watched over each other's houses, ease of stranger recognition, and others.

Police perceptions of performance -- Operationalized through responses to questions about their job, about the area and about their perception of crime. Also operationalized through archival police data regarding number of arrests in target area.

STATISTICAL METHODS USED

Descriptive Statistics -- The report presents raw data, percentages, means, standard deviations, and scaled data in reporting the results of the survey and archival data analysis.

EVALUATION SECTION

APPROPRIATENESS OF THE OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Independent Variables

The nature of the independent variables -- physical design activities, resident and community organization efforts to reduce crime preclude rigorous measurement. The study describes clearly the activities (treatments) which were put into place in Hartford.

Dependent Variables

Most of the dependent variables were measured through the victimization survey. They are subject, of course, to measurement errors. Yet, there is no information in the final report or background materials with regard to the reliability or validity of each item. The data presented in the tables of

the report indicate that many of the dependent variables were measured through single items rather than composites of several items. Single item responses tend to have lower reliability than a composite variable with several items.* Other variables such as vehicular traffic and pedestrian traffic appear to be measured reliably. Vehicular traffic was measured by a machine, while pedestrian traffic was measured by at least six observers.

The archival crime data, discussed extensively in the appendix to the final report, may be unreliable (at least inconsistent) due to two factors mentioned by the authors:

- During the study period a new police chief was installed and a new uniform crime reporting procedure developed.

- The recording procedure became computerized.

APPROPRIATENESS OF THE RESEARCH DESIGN

The study design was appropriate for evaluation of the overall (combined) effects of the treatment strategies implemented in Hartford.

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*The authors disagree with the comment on the reliability and validity. They stated that:

1) There were multiple items "that related to the individual perceptions and emotional responses to crime...[and] the replication of tests of the impact of the program on these related, but not identical, items is a sound approach to construct validation."

2) Second, "the replication of items over time, showing stable, meaningful patterns (e.g., the "fear" measures) were another significant body of evidence regarding item reliability." However, this reply seems to attest more relevant to the stability of findings rather than the psychometric properties of the variables.

3) Third, The authors used an explicit model to guide the the study. The authors pointed out that model testing, including interviewing and dependent variables is relevant to the construct validity assessment.

APPROPRIATENESS OF THE SAMPLING PROCEDURES USED

The sampling procedures were appropriate and the sampling design was developed with care. The authors appropriately weighted the estimates derived from the unproportional samples which were drawn from different areas of the city.

APPROPRIATENESS OF THE STATISTICAL METHODS USED

While the authors correctly weighted the raw data to correct for different probabilities of selection, the "N's" presented in the report are the actual raw numbers of cases. The authors state that use of "the raw number of cases ... [is] the appropriate base for calculating statistical significant." This may not be correct.

The weighting procedure may have produced unbiased estimates. However, the standard error of the estimates should have reflected the weighting used. When one applies the raw numbers to the weighted estimates, hypothesis testing may be based on incorrect standard errors of the estimates and therefore result in a biased test.*

The statements in the report regarding the "significance" of changes due to the demonstration program are based on Tables A6 and A7 in the appendix. Tables A6 and A7 present the approximate sampling errors of the percentage results from varying size samples and can serve as a basis in forming confidence intervals around the percentage obtained. The tables present information on four sets of percentages (from 30% to 70%; 20% or 80%; 10% or 90%; 5% or 95%. Whenever there are two categories of a variable (X) analysis of the percentage

_____

*The authors disagree with this comment on the basis that:
 1) The weighting simply serves to equalize probabilities of selection and does not affect the number of independent observations.
 2) The "weighted N" has no meaning in the calculations of statistical reliability. Note the issue we have raised here is regarding the appropriateness of computing the standard error of estimates (statistics) computed by the authors and not the reporting of N.

of the responses in one category is sufficient to summarize
the data since the other percentage figure is simply 100% - X.
In this situation (two categories) Table A7 -- the sampling
error of differences at .95 probability -- can be used to test
for significant differences among them. However, when there
are three or more categories as in this study, using Tables
A6 and A7 as a method of testing for significant differences is
inappropriate. A variable which has K (4) categories has K-1
(3) degrees of freedom and its data cannot be summarized in a
percentage of one category.

For example, the authors stated that "One of these three
measures showed a statistically significant change in a posi-
tive direction between 1976 and 1977; more North Asylum Hill
residents said they walked somewhere in the neighborhood almost
daily (Table 5.14)." In this table there were five categories --
1) almost daily; 2) few times a week; 3) once a week; 4) less
often; 5) never. Yet they "summarize" the data by comparing
only one category "almost daily" and determine that there has
been a statistically significant change. Yet in at least
three of the four other categories of responses, there is
clearly no significant change reported.

In order to assess whether a variable with five categories
changes significantly from one period to the next we expect
that it is appropriate to use chi-square or some other analytic
technique to analyze all of the categories simultaneously.*

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*The authors disagree with this comment. They stated that:
    1) Chi-squares test 'disregards ordinality.' We believe this
reply to be incorrect. See, Goodman and Kruskal (1954, 1959,
1963, 1972) discussing the measure of association for cross-
classifications in the journal of American Statistical Assoc.
    2) "The standard way to treat ordinal scales so that they can
be subjected to t-test is to transform them into a 1, 0 distri-
bution by dichotomozing them." We believe this reply also to
be incorrect since dichotomization does not result in the suffi-
cient statistics. (See the above discussion in regard to the
degrees of freedom and 'Discrete Multivariate Analysis' by
Bishop et al. which provides an excellent example of the problem
associated with combining categories (e.g., in this study those
who did not walk almost daily are based upon the combination of
four categories). The log-linear model would be a better method
for analyzing the data than the one used by the author.

AIR reanalyzed the data in Table 5.14 for 1976 and 1977 and obtained no significant difference. This reanalysis is subject to our earlier criterion of using weighted data while the "N's" were the actual sample size. In any case, this reanalysis illustrates the problem with the significance tests used in the report.

The authors estimated the rates of burglary and robbery/pursesnatch of the North Asylum Hill in 1977 and compared those estimates to the obtained rates. They used three methods for the estimation. One was to assume that the rate in 1977 was the same as the one in 1976. The second was to project an expected rate from the 1973, 1975, and 1976 North Asylum Hill data. The third was to use city-wide data to obtain the trend and to apply the trend to the North Asylum Hill. Although the first method used by the authors may be reasonable and have no standard error of the estimate, this cannot be verified since the study did not have 1976 city-wide data. The other two methods used extrapolation with very few points. This results in a large standard error of estimate. Note that if three points were used to estimate the trend, there would be only one degree of freedom associated with the error mean square. This would result in a large t-value. In sum, if the authors had formed the confidence intervals for their estimates of the 1977 rates, the intervals might have included the obtained rates. It seems that the authors formed the confidence intervals of the obtained rates but did not form the confidence intervals of the estimates. Also, if there had been more data points (which was probably beyond the control of the authors) regressions might have been used. With this small number of data points, it is not clear whether or not the estimation procedures were appropriate.

CONCLUSIONS

- Burglary rates in North Asylum Hill declined (42 percent) from 1976 to 1977 while increasing in the

city as a whole and for control areas where there was no demonstration program.

- Robbery rates in North Asylum Hill decreased (27 percent -- from a rate of 5.1 per person to 3.7) from 1976 to 1977 while increasing in the city as a whole and for control areas where there was no demonstration program.

- There is no evidence of geographic displacement of burglary from North Asylum Hill to adjacent areas.

- There was a significant decline in the fear of burglary. There was no significant decline in the fear of robbery. There was no statistically significant increase from 1976 to 1977 in the degree of safety felt by persons in North Asylum Hill when they walked alone.

- Vehicular traffic was reduced through narrowing streets and other physical design changes.

- There was a decrease in the rating by residents of their likelihood of being a burglary victim.

- There was an increased use of streets and parks by residents.

- Team policing led to a substantial increase in the number of arrests for burglary and robbery.

- Based on the report of police officers working in the area, police-citizen relations were significantly improved from 1975 to 1977. Based on survey responses from residents the high ratings of police-citizen relations which residents gave in 1975, did not improve during the test period.

- Relationship between police activities and the physical environment changes did not develop as intended. Police believed that physical design changes impeded patrol efforts and were of no significant help in their efforts to prevent crime and apprehend criminals.

- Resident oriented strategies led to more housewatch agreements, the perception by residents of greater ease in recognizing strangers.

- Measures of neighborhood cohesion and commitment to the neighborhood did not improve during the test period.

- The process of implementation provided evidence that the physical design strategies made the crucial difference between presence and absence of impact.

- Due to the short term nature of the evaluation the central hypothesis -- that physical changes provide a catalyst for fundamental changes in the way residents use their neighborhoods and relate to one another -- "has not yet been tested."

DISCUSSION OF CONCLUSIONS

Comparisons of the 1977 burglary and robbery rates with the 1976 rates may be an appropriate measure of the past program changes in crime rates. One should use the comparisons of the 1976 projected (predicted) rates with the 1977 actual rates with caution since the projected rate is based on the linear extrapolation of only three data points (1973, 1975 and 1976). See above.

Although the 1977 data provide some indication of the relative crime rates pre and post program completion, it should be noted that the program was implemented over a four year period 1973 - 1976 while the "evaluation period" measured the change from 1976 to 1977 (actual and projected) rates. It cannot be said with any degree of certainty that the change from 1976 to 1977 was the direct result of the crime reduction demonstration program. The time frame allowed for the evaluation, data limitations and the real world nature of the demonstration program are such that one possible intervening conditions might have had significant effects on the crime rates during the entireperiod.

The conclusion that "there is no evidence of geographic displacement of burglary from Norty Asylum Hill to adjacent areas" was qualified by the authors. Robbery did increase more than was expected in South Asylum Hill. The authors state this may or may not be evidence of displacement since they were not certain that robbery had gone down in North Asylum Hill.

The conclusion that fear of crime was reduced significantly from 1976 to 1977 may be overstated. The number of persons saying crime was a big problem in 1977 was 31 percent, a 15 percent decrease from the 46 percent level in 1976. But, the rate was only 35 percent in 1975 and only 21 percent in 1973. Fear of crime dropped from 1976 to 1977 in South Asylum Hill as well during this period and from 1975 to 1977 fear of crime dropped for the city as a whole even more than it did in North Asylum Hill. This sheds considerable doubt regarding 1) the decline was significant in a statistical sense and 2) attributable to the demonstration program itself. The fear of robbery data do not show statistically significant declines in the North Asylum Hill area.

The conclusion that "physical design strategies among all of the strategies employed made the crucial difference between the presence and absence of program impact" is supported in two ways by the authors. First, the authors state that: "With the exception of the increase in police arrests, none of the positive impacts on the neighborhood...occurred until the physical changes had been completed." In response to this it may be that the data are not showing the effects of physical design strategies, but the lagged effects of the social and police strategies, which may take longer than a few months to have an impact.* The second piece of supporting evidence that the physical design changes were a necessary, if not sufficient, element of the crime prevention program is that crime for South Asylum Hill did not decrease where only social and policing strategies were implemented.

The crime reduction found, as the authors noted, represents short run (eight months) changes in the crime picture. The

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*The authors pointed out that police and social strategies were implemented a year before any changes were found in crime data. They point out that a one year time lag is longer than one would expect if the strategies were successful.

short run nature of the study (which was beyond the control
of the authors) cannot answer the question whether the physical
design changes will continue to have their observed effect in
the long run. This is clearly asknowledged by the authors in
the final report. They recommend a reevaluation of the demon-
stration program now that several years have passed since the
physical design changes were completed.
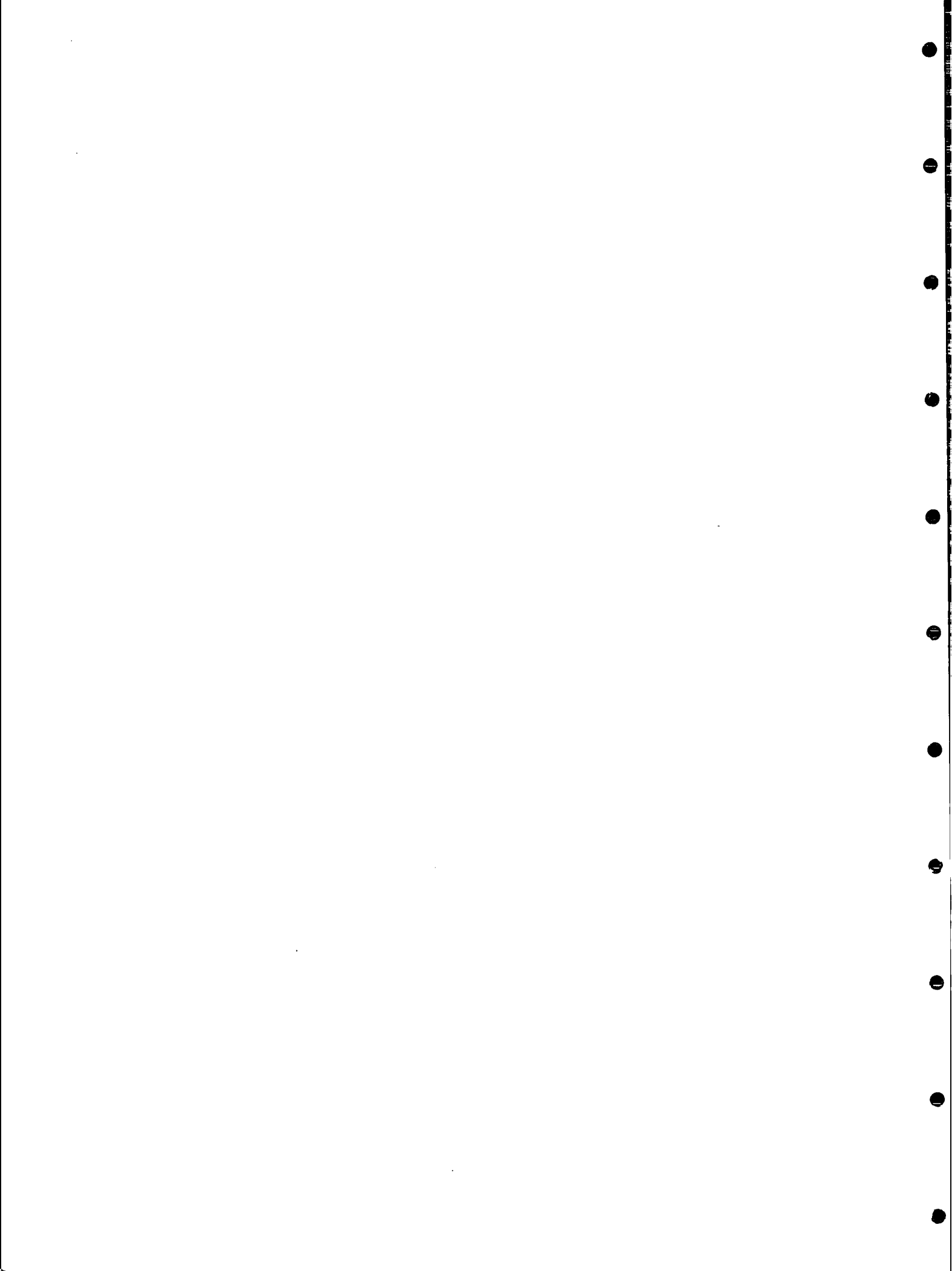
COMMUNITY BY DESIGN: A STUDY OF MODERATE INCOME

FEDERALLY-ASSISTED HOUSING DEVELOPMENTS

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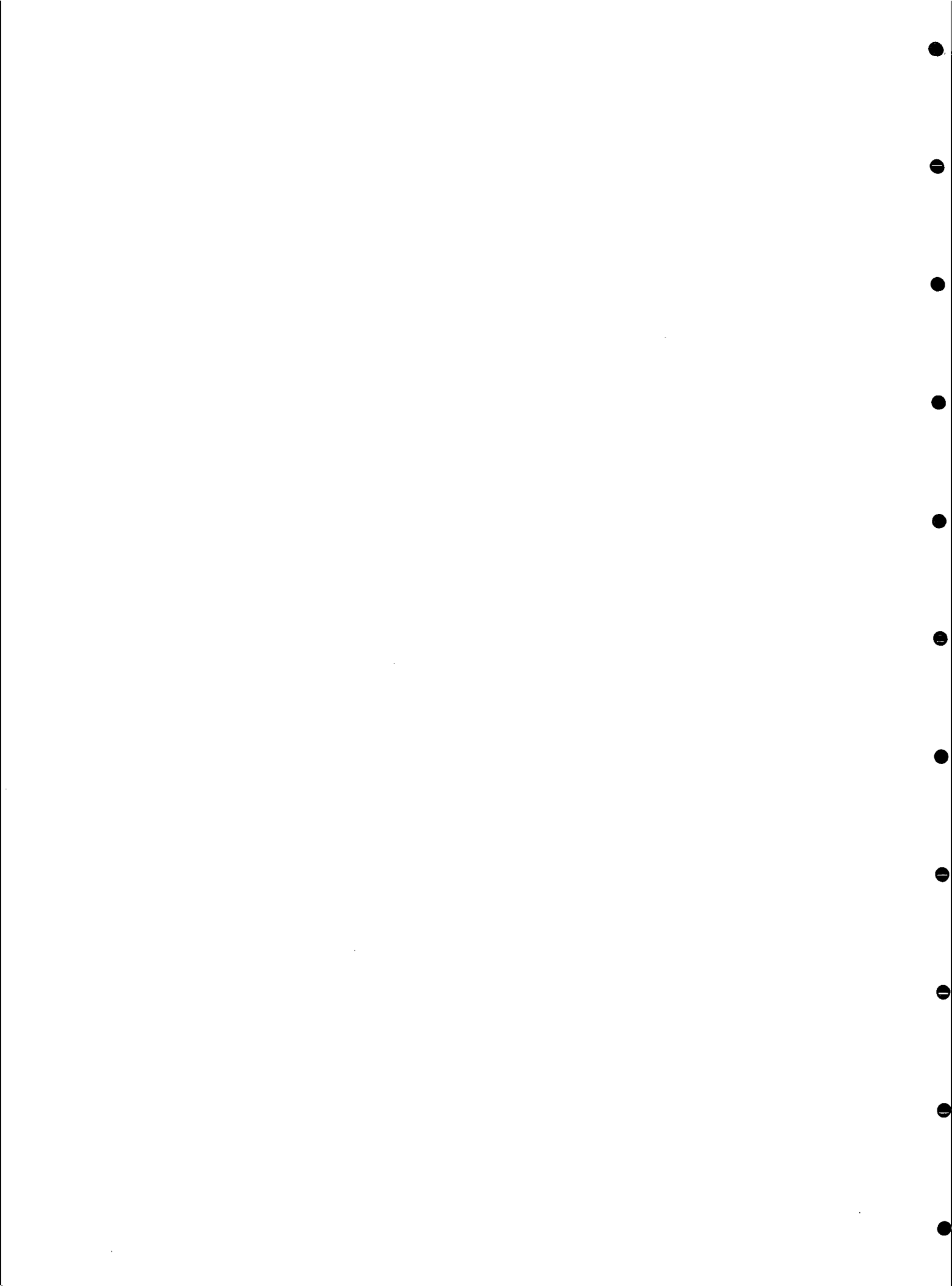
STUDY OBJECTIVES

The research reviewed below examines the different ways
in which the physical, social, and organizational characteris-
tics of moderate income, federally-assisted housing develop-
ments encourage and/or discourage various forms of community
activity and community sentiment on the part of residents.
The research is presented in the author's Ph.D. thesis, and
the review below is based on her analysis of the effect of
physical factors on crime related behaviors.

RESEARCH DESIGN

The study consists primarily of a household survey of
1,615 residents who live in 35 moderate income, federally-
assisted housing developments. The housing developments
selected were distinguishable in their physical design and
the social characteristics of their residents. The survey
instruments included both the fixed choice and open-ended ques-
tions. Empirical analysis was conducted on the fixed choice
items through the use of path analysis and analyzes the effects that
site characteristics and intervening variables have on various
types of community activity and sentiment.

VARIABLES

Independent

Encuring site characteristics:

- number of apartments per floor
- percentage of households receiving AFDC
- percentage of households age 20-35
- racial homogeneity
- age homogeneity
- percentage of families with minors
- family homogeneity

- economic homogeneity
- age of residential complex
- whether site is co-operative

Intervening

- existence of tenants' association
- friendship/kinship
- acquaintances
- use of shared space
- experience in trying to solve common problems
- victimization rate
- instability of site (turnover rate)
- perceived problem of safety
- perceived quality of maintenance

Dependent

- level of resident attachment
- level of resident responsibility
- level of perceived influence over management
- level of social cohesion

Units of Analysis

- individual respondent (n = 1,615)
- housing sites grouped by building type (n = 43)
  (Housing developments with two types of buildings
  were treated as two sites [units].

OPERATIONALIZATION OF VARIABLES

Independent Variables

Number of apartments per floor--defined "as the number
of apartments sharing the area that is adjacent to the apart-
ment entry." This variable was measured through resident in-
terviews and site visits.

Racial homogeneity--housing sites were dichotomized into homogenous sites (those which has less than 30 percent black or more than 75 percent black), and non-homogenous sites (all others). This variable was measured through resident interviews.

Economic homogeneity--housing sites were dichotomized into homogenous sites (where less than 30 percent or more than 69 percent have real incomes of more than $5,500) and non-homogenous sites (all others). This variable was measured through resident interviews.

Family homogeneity--housing sites were dichotomized into homogenous sites (percentage of households with minors is less than 40 percent or more than 74 percent), and non-homogenous sites (all others). This variable was measured through resident interviews.

Age homogeneity--housing sites were dichotomized into homogenous sites (where either more than 60 percent or less than 25 percent of heads of household are 20-35), and non-homogenous sites (all others). This variable was measured through resident interviews.

All other independent variables measured through resident or manager interviews in a straightforward manner. No explanation necessary.

Intervening Variables

Data were gathered on the intervening variables through the survey of moderate income, federally-assisted housing residents (respondents) who were paid to participate and managers. The operational definitions are given below. (The questionnaire is included in the Appendix of the study.)

- Existence of tenants' association--yes/no

- Friendship/kinship--Respondents were asked:
  (1) how often they get together with close
  friends and close relatives in the development,
  and (2) how many close friends they have in
  the development. Responses were measured
  on 7 and 10 point ordinal scales respectively.

- Acquaintances--Respondents were asked: (1)
  how many families in the development could
  be counted on in an emergency, (2) how many
  families were there where the respondent knows
  at least one adult by name, and (3) how often
  casual conversations are held with other resi-
  dents. The responses were measured on 10, 10,
  and 5 point ordinal scales.

- Use of shared space--Respondents were asked
  two questions concerning activities in the
  areas shared by residents both witnin and out-
  side of the building. The variable relating
  to "outside of building" was defined as the number
  of "yes" responses regarding whether the respondent
  participates in any five activities in shared
  space areas. The other variable concerning the
  inside of the building was defined as the number
  of positive responses regarding whether the respon-
  dent did any of four activities in five indoor
  shared-space areas.

- Experience in trying to solve common problems--Re-
  spondents were asked whether tenants work together
  in solving common problems and whether individual
  respondent participates in these activities.

- Victimization rate--Respondents were asked about
  their victimization experience during the pre-
  ceding twelve months.

- Instability--The author collected data on turn-
  over rates from interviews with moderate income,
  fedearlly-assisted housing development managers
  or housing records.

- Perceived problem of safety--Respondents were
  asked a question concerning the safety of the
  project.

- Perceived quality of maintenance--Respondents were asked a question concerning their subjective assessment of maintenance in their moderate income, federally-assisted housing development. Their responses were recorded on a five point scale.

Dependent Variables

- Attachment--Respondents were asked: (1) what feelings tenant would have if he/she had to move, (2) what attitude they have toward living in the development (i.e., good or bad place to live), (3) how non-residents perceive the development, (4) how willing respondent is to move out of the development. Responses were measured on 5 point ordinal scales.

- Resident responsibility--Respondents were presented with three hypothetical situations in which criminal activity was taking place, and for each situation the respondent was asked how likely a resident in the development was to take specific action to intervene. The responses were measured on a 5 point interval scale ("very likely" to "very unlikely.")

- Perceived influence over management--Respondnets were asked a single question on this issue and their responses were measured on a five point scale.

- Social cohesion--Respondents were presented with several hypothetical situations in which responsible outside groups were not able to solve a problem in the development. Respondents were asked whether they thought residents would do something to help the situation. In addition, residents were asked to assess the level of social cohesion on a three point scale.

SAMPLING

The 1,615 persons interviewed in public housing developments in Newark, St. Louis, and San Francisco were selected through a stratified probability sample. The sample was stratified by (1) city, (2) building type, (3) percentage of low income residents, (4) percentage of one parent families, (5) size of development, and (6) proximity to public housing.

The six stratification variables were combined to form a sampling matrix. The 35 housing developments used in the study were placed into 30 different strata in the matrix. The number of interviews to be obtained within a stratum of the matrix was proportional to that stratum's share of the total number of occupied units across all developments.

To draw the sample, names and addresses of residents obtained from each development were organized and placed into the thirty strata. From the list of names in each stratum, sub-samples of five households were drawn to produce that stratum's allocation of sample households.

The author then sought to interview either a male or female head of household for each household selected. Therefore, the sex of the person to be interviewed was determined randomly, with interviewers instructed to ignore the sex designation in those households where there was only one head of household. Only respondents who had lived in the housing development for nine months or more were interviewed.

The author also weighted the sample. She explains that the weighting factor assigned to the stratum determined how heavily each case, or respondent, in that stratum would contribute to the results. The weight was determined by the differences found between the number of households in that stratum sampled and the true population of households in that stratum.

STATISTICAL METHODS USED

Factor Analysis -- The author used this method to create composites. A total of 17 items was included in the factor analysis, with analysis performed on respondent level data using orthogonal Varimax rotation and principal factoring with iterations.

Descriptive Statistics -- The author provides descriptive statistics regarding the resident population and selected housing characteristics.

Path Analysis -- The author used path analysis to analyze the causal relationships among the independent, intervening and dependent variables at the site level.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE ITEMS

The items in the resident questionnaire were well thought out. However, the composite scores were not constructed properly. The author states on p. 93 that "Each of the items in this index was weighted according to its loading on the first factor." This is problematic. First, factor analysis is usually performed on the correlation matrix which reflects standardized scores and not raw data. Therefore, the scalings are different from those of raw data. Second, there is no theoretical justification to use factor loadings as the weights of composite scores of factors. The weights are given by the transpose of the factor loading matrix post multiplied by the correlation matrix of the observed variables. This is not how the author obtained the weights.*

A second problem rests with the variable "use of shared space." The author formed this composite variable as a result of combining two non-linear variables -- inside use and outside use. It is not clear how this non-linear composite term

---

*According to the author, weights were so close in magnitude that "the practical effect was comparable to assigning equal weights" and the error "does not have serious consequences for the study's results or conclusions."

behaves when there are measurement errors associated with the
two variables. Therefore, the validity of the composite term
is questionable.*

With regard to the other variables the author's operational
definitions are adequate. The measurement techniques applied
to the terms are appropriate.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design based upon the household survey is
appropriate for the objectives of the study.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

Since the unit of analysis is the site, the sample size
of 43 is very small relative to the number of variables under
consideration. In addition, the method of stratified prob-
ability sampling used by the author is not well described.

APPROPRIATENESS OF STATISTICAL METHODS

Factor Analysis -- The factor analysis was performed on
the wrong correlation matrix. Since the author selected sites
as the unit of analysis, the between covariance matrix or the
correlation generated from the means aggregated to the site
level, should have been used for the factor analysis. When
the total sample was used (after weighting) the correlation

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*The rationale of the non-linear composite is stated in page 101
of the report. The author disagrees with our interpretation
of the effect of the non-linearity. In addition, the author
pointed out that "the use of space variable does not play
an important part in the study's conclusions," and "it does
not appear that what the reviewers call a problem has serious
consequences for the results derived from the path analysis."

matrix reflected the total covariance matrix which was the
weighted sum of the within and between covariance matrices.
If the within covariance matrix was dominant and had a different
structure from the between covariance matrix then the resulting
factors based upon total covariance will reflect not only the
site differences but also respondent differences. This is
inappropriate since it is the site differences which represent
the focus of the study.*

Further, when the factor analysis was used, the author
relied more heavily on the theoretical considerations than the
actual results of the data analysis. Even though theory pre-
dicted two factors based upon items F1, F2, F3, F8 and F9
(number of casual conversations with other residents, number
of families upon whom one could count on in an emergency,
number of families where you know at least one adult resident
by name, amount of visitation with other residents, and number
of close adult friends and relatives) the data analysis per-
formed by the author did not support the prediction. In
response to this the author did not modify the theory, but

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*The author disagrees with this comment on the basis that:
    1) There is no theoretical reason for "believing that
the causal processes operating at the individual level are
different from the causal processes operating at the site
level." Also, 2) if there were consequences of the error,
"the supposed error operated in the conservative direction."

    It should be noted that the assumption of homogeneity
(causal processes being similar) is stronger than hetero-
geneity and should be examined carefully. The direction of
bias, however, cannot be determined since pathological examples,
such as the total correlation having a different sign from
the between correlation, can be constructed. The author has
presented a strong logical case for her position that the
bias is in a conservative direction.

rather defined the two social interaction composites according
to the theoretical interest.*

   Path Analysis -- Path analysis based upon regressions
does not seem to be appropriate to analyze the relationship
among so many variables. Figure 2.1 shows that there are 65
parameters in the initial model which is far greater than the
number of sites (n=43).** If one takes into account the mea-
surement errors of composites the number of parameters will
increase substantially. In addition the estimation procedures
used by the author are not capable of testing the model as a
whole. The result of the evaluation of the model might be
quite different from analysis based on methods such as Jöreskog's
which tests the model as a whole.***

CONCLUSIONS

   The author reports a large number of conclusions. Those
that follow are the ones in which the built environment figured
as an independent variable.

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* The author disagrees with this comment on the basis that
"the two forms of social interaction proved to have different
effects on both fear of crime and community attachment... [and]
the deicsion to maintain the distinction was not only correct
but allowed some important differences to emerge." Note
that there is a plausible alternative interpretation of these
differences between the two composites. The total correla-
tion was the wrong correlation to be used and these two
composites might be reflecting the two different factors in
the between correlation matrix.

** The author points out correctly that if a parameter is iden-
tified, it can be estimated.

*** The author disagrees with the use of Jöreskog's method on
the basis that it is "far more risky than path analysis"
because 1) it assumes large sample sizes and 2) is more
susceptible to specification error." While true, there still
remains the question of how good is the model used by the
author.

- The number of apartments per floor had a negative impact on most aspects of community activities and sentiments, including residents' use of space, attachment, and sense of cohesion.

- The number of apartments per floor had direct positive effects on turnover rate, on perceived safety, on the perceived quality of maintenance, and perceived influence over management. Number of apartments per floor, the only physical design factor studied had no direct impact on social interaction among residents with regard to solving common problems, or the level of acquaintances, or the level of friendship kinship. It was found that residents of high-rise sites are more likely to form a tenants' association than are residents in low-rise sites.

- The size of the apartment grouping was found to have a direct negative effect on residents' sense of cohesion: "the larger the group of apartments, the lower residents' sense of cohesion, through its effect on the formation of a tenants' association and the effect that it has on promoting tenants' associations and experiences in trying to solve common problems. The greater the number of apartments that are grouped together, the more likely it is that a tenants' association will be formed and that residents will attempt to solve common problems together. This contributes to a strengthened sense of cohesion."

DISCUSSION OF CONCLUSIONS

The author's conclusions, as reported above, are supported by the data analysis. The problems discussed above limit somewhat the confidence that one can have in the conclusions drawn from the study.

The study was not designed to investigate the relationship between physical design factors and crime related behaviors. It touched upon this topic area and employed an analytic technique which has been used in crime-environment studies. For these reasons the study merited review. It's finding that the number of apartments had a direct negative impact on perceived safety is a contribution to what is known today regarding the relationship between crime and the physical environment.
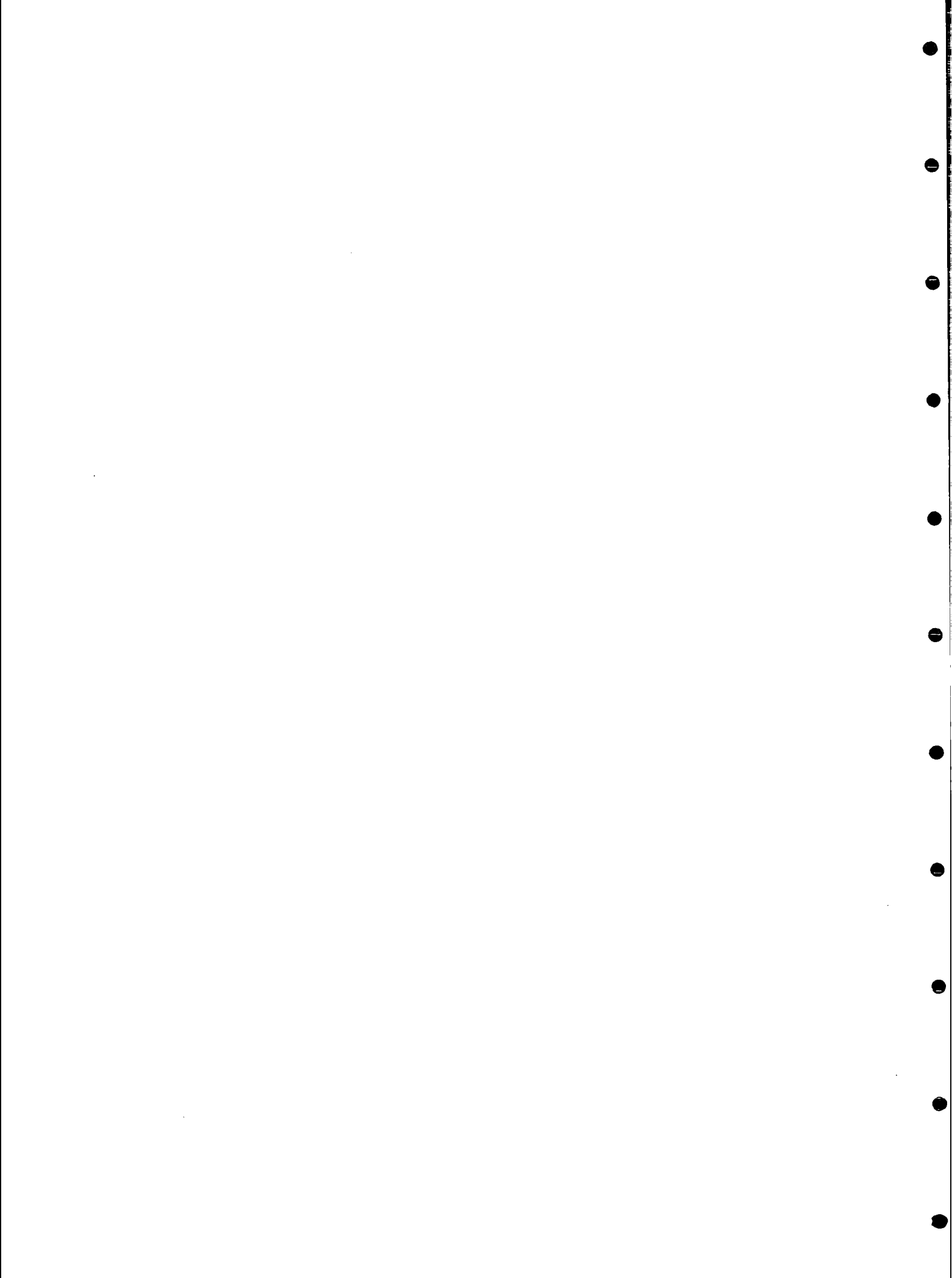
DEFENSIBLE SPACE MODIFICATIONS IN ROW HOUSE COMMUNITIES

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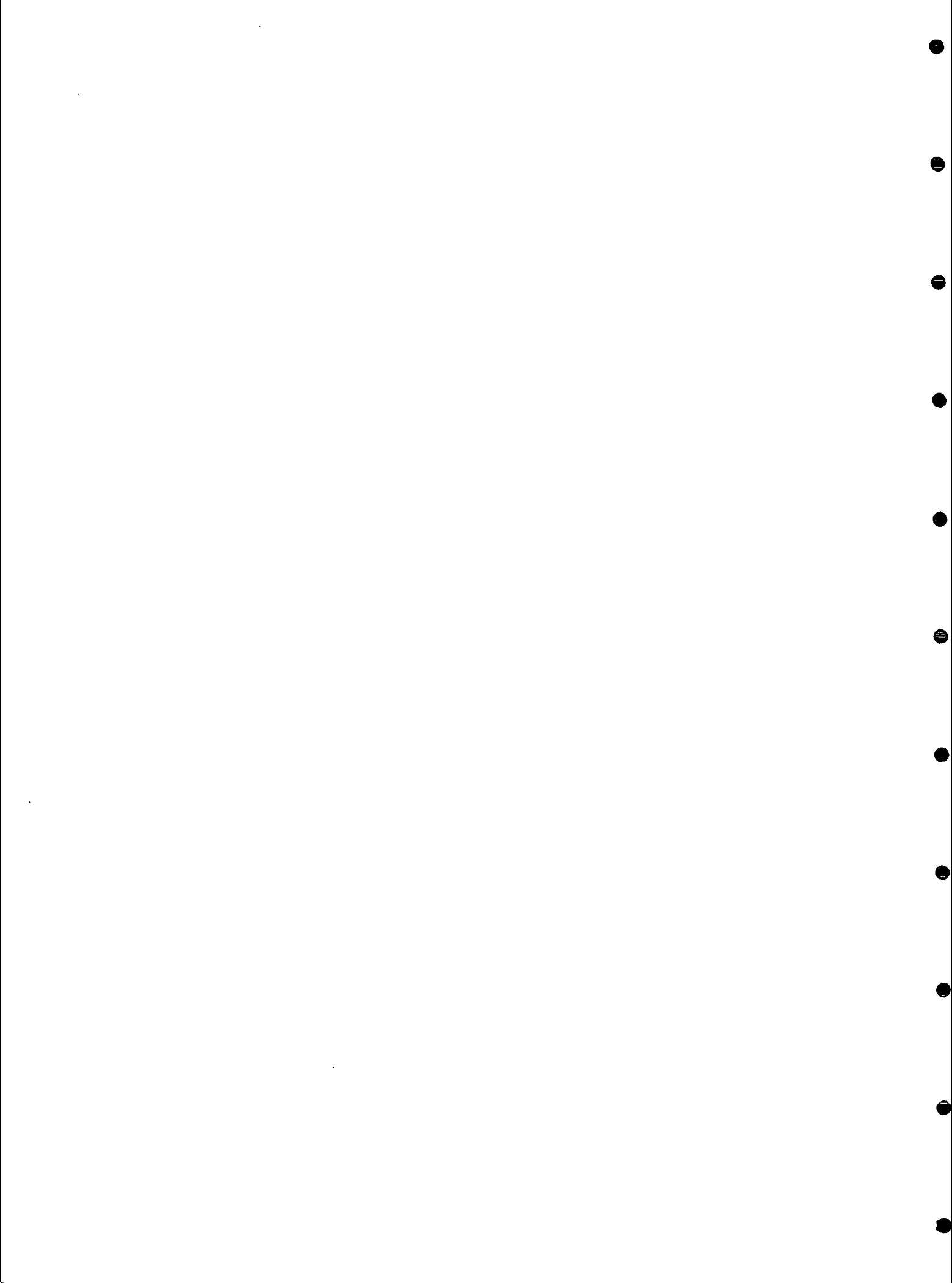
STUDY OBJECTIVES

The purpose of the study is to evaluate the effects of physical design changes made to selected public housing developments in New York City. The changes were based on "defensible space" principles developed by Oscar Newman. The study analyzes the results of physical changes in terms of their effects on crime levels, resident satisfaction, resident feelings of security, and the maintenance of the physical environment.

The authors state that the purpose is "to assess the value of defensible space principles as a heuristic method for reducing crime and vandalism, improving the quality of maintenance, and increasing resident satisfaction in public housing."

RESEARCH DESIGN

The study began as a pre-post evaluation of physical design changes made at Clason Point Public Housing Development in New York City. The study was later expanded to include three additional public housing development study sites. One of the additional study sites, Markham Gardens, also received physical design changes based on defensible space guidelines. The changes undertaken at Markham Gardens were different from those made at Clason Point. The two other study sites, located in Baltimore and Washington, did not receive physical design changes. Although they did not match the two experimental sites in population characteristics, they were used in the study as a comparison group because they matched the experimental sites with regard to physical variables. In a separate section the study, analyzing archival crime (impact) data, the authors use data from three developments surrounding Claron Point as a comparison group.

Thus, the research design represents a combination of pre-post analyses, quasi-experimental design, and case study approaches relying on structured observations and management responses to survey questions. The authors collected data from a variety of sources to

gather baseline and post-modification evaluative data. Extensive
baseline data were collected through resident surveys on a variety
of psychological characteristics: (1) alienation, (2) isolation,
(3) personal space, (4) crime and victimization, (5) neighboring
(visitation with fellow residents), and (6) surveillance. Similar
data were collected through surveys at Markham Gardens after the
modifications took place, and at the two "comparison" sites. (No
pre-modification interviews took place at Markham Gardens.) Open-
ended interviews were also held with management and staff person-
nel at all developments.

The authors also developed a grounds inventory form to collect
baseline and evaluative data on the physical appearance and use of
the grounds. Premodification and postmodification data were collec-
ted at Clason Point and Markham Gardens, and similar inventories
were conducted at the comparison sites. The inventories collected
data on the housing development as a whole and on a sample of front
yards and back yards.

The authors also relied on structured observations of resident
behavior to evaluate the effects of the modifications. Trained
observers visited the experimental developments "every six weeks"
to collect data on activity locations and to allow for comparisons
to be made between the hypothesized effects and the observed beha-
viors in the areas where physical changes were made.

Finally, the authors analyzed archival crime data obtained from
the New York Housing Authority. Data were collected for the period
1965-1974 for Clason Point and three surrounding buildings that con-
stituted a "comparison group." Data on the type of crime, location,
time of day/year, and offender characteristics were collected.
Crime data were collected from Markham Gardens for the 18 months
prior to the change in order to compare its premodification crime
rate with that of Clason Point.

The study represents, therefore, a combination of research
strategies and methods and relies on a variety of data sources.
In addition, the study uses a broad range of analytic techniques

which are described in the statistical methods section of this review. Hypotheses are stated and tested by the authors.

VARIABLES

Independent

- Modification vs. non-modification
- Clason Point modifications
  - -- physical changes to apartment exteriors
  - -- physical changes to outdoor space in front of apartments
  - -- physical changes to back yard area
  - -- physical changes to public paths and activity area
- Markham Garden modifications
  - -- similar to Clason Point, with some exceptions (see next section -- Operationalization of Variables).
- Pre and post treatment

*Dependent**

- Use of space
- Neighboring and sociometric behavior
- Safety
- Treatment of the environment -- grounds inventory
- Preferences (attitudes) regarding physical design changes
- Behavioral observations
- Crime levels
- Environmental evaluation
- Assessment of management
- Attitudes toward project

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*The authors disagree with this section of variables and suggested using the titles of chapters as the names of variables.

OPERATIONALIZATION OF VARIABLES

Physical Design Changes: Clason Point

- Apartment exteriors -- Cement and stucco facing was added to apartments to provide insulation, variation among apartments, and decrease stigma through making the units more attractive.

- Outdoor space in front -- Front paths were widened and curbing installed to mark boundaries between path and lawn, and discourage use of lawn as pathways. Curbstones were placed on borders of the lawns.

- Back yard area -- Fencing was installed to divide areas into semi-private clusters, limit non-resident rear door access, and direct pedestrian activity to the front areas.

- Public paths and activity areas -- Paths were widened, lights were installed, benches and play equipment were added to create several small play areas and one central play area.

Physical Design Changes -- Markham Gardens

- Apartment exteriors -- No changes were made to the pseudo brick facing already in place.

- Outdoor space in front of apartment -- Front paths were widened, curbing was installed along paths and border of lawns, and lighting was added.

- Back yard area -- High fences were placed to form clusters of semi-private zones with gates leading to public streets.

- Public paths and activity areas -- Small recreation areas were created in the clustered back yards.

Dependent Variables

- Use of space -- Survey questions and structural observations were used to collect data on leisure activities, use of outdoor areas, and extent to which residents "personalized" interior and exterior spaces.

- Neighboring and sociometric behavior -- Survey questions and structural observations were used to collect data on visitation, number of neighbors known, assistance between neighbors, and other collective activities. Five-point scales ranging from "never" to "very often" were used.

- Safety -- This variable was operationalized by (1) asking residents to rate the safety of the project as a whole and for five specific zones, and (2) asking residents to designate on a map the areas of the project they believed to be safe or dangerous.

- Treatment of environment -- Grounds inventory score. Each project was evaluated through systematic observation and scoring on such factors as (1) cleanliness, (2) maintenance and condition of lawn, (3) personal plantings, (4) boundary markings, and (5) environmental props.

- Combinations of ratings were compiled through separate questionnaires for (1) nighttime, (e) daytime, or (3) general.

- Crime levels -- This variable was measured through archival data and survey questions.

- Resident feelings of satisfaction with the environment -- This variable was measured through survey questions.

- Managers' assessments of modifications -- This variable was measured through survey questions.

- Preferences (attitudes) regarding physical design changes -- Survey questions asked residents to compare one physical design change to another by marking an "x" by the preferred change. Twenty-six pairs of changes were given to Clason Point residents; 21 pairs to Markham Garden residents. (Changes were: paving, lighting, fencing, play area, facing, and curbing.) Two other items were added to pairing -- having an extra bedroom, having bushes and trees. The preference responses were used to "derive an interval scale reflecting the value to the residents of each change in relation to the oher changes.

- Environmental evaluations -- Five point ratings on six items. However, composites were not created.

- Assessment of management -- Five point ratings on two items, administration and maintenance.

- Attitudes toward project -- Assessment of the project as a home. Proprietary feelings, sense of belonging, relationships with neighbors, and acquaintanceship were measured by questionnaire items by rating or yes/no responses.

SAMPLING

Sampling at various levels were used in the study. There were two experimental developments -- Clason Point and Markham Gardens (New York). There were two comparison group developments. First, two developments -- Cherry Hill (Baltimore) and Berry Farms (Washington, D.C.) served as a comparison group for Clason Point and Markham Gardens. The authors report that these developments do not represent "satisfactory control counterpart(s)," since tenant characteristics were different in these complexes from the experimental group. These developments were selected since neither had defensible space design changes, and one "would have the same problems of maintenance and fear of crime," while "the other would have relatively few such maintenance and security problems". A second group of developments which surrounded Clason Point -- Bronxdale, Monroe, and Soundview -- served as the comparison group for Clason Point in the analysis of archival crime data.[*]

Samples of residents were interviewed in each of the experimental sites and two of the comparison sites. At Clason Point, samples of 81 residents (1970), 57 residents (1972), and 120 residents (1974) were interviewed. Forty-eight individuals of the 1970 group and 30 individuals of the 1972 group were visited again in 1974. The 1970 sample was non-random, allowing no more than three persons per building to be selected, which resulted in 95 responses. Problems with the sampling procedure in the 1970 sample led, however, to the authors' using 81 responses, only those from women. In 1972, there were 43 follow-up interviews and 61 new household visits, and when the men were deleted, a total of only 57 women were left for analysis. Other 1974 samples of residents at the housing developments studied included 90 heads of household (9 move-ins and 6 spouses) at Markham Gardens, 77 persons at Cherry Hill, and 64 persons at Berry Farms.

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[*]The authors disagree with considering these developments as a sample.

STATISTICAL METHODS USED

- Descriptive statistics.

- Responsiveness of neighbors -- Percentages of respondents answering "very likely...very unlikely" (five point scale) with table comparing responses across four developments.

- Victimization data are presented in frequencies and percentages (percentage of persons victimized) for the four housing developments by total and by five types of crime.

- Perceived change in crime problem -- Raw frequencies and percentages of respondents answering "better," "some," or "worse" regarding change in crime pattern. Reasons (categories) are presented also with frequency and percentage responses in each category.

- Comparisons of resident ratings of environmental attributes and proprietary feelings of four projects represented as a mean response on five point scale.

- "T" tests -- This test of significance was used to test for differences in residents' rating of different environmental zones on a safety/danger scale (in general and at night only). This test was also used to determine whether responses to "neighboring" questions differed significantly among housing developments.

- Correlation -- The authors measured the level of association between demographic characteristics and safety ratings at Clason Point and Markham Gardens. In addition, the authors measured the level of association between demographic characteristics and resident "responsiveness" scale results for Clason Point and Markham Gardens.

- Analysis of variance -- For "in general" and "at night" safety ratings.

EVALUATION SECTION

QUALITY OF THE INSTRUMENTS USED TO COLLECT DATA

The Structured Interview -- The authors describe the procedure used in the structured interview process (Appendix E), but no information is given regarding either the validity or reliability of the variables measured by this instrument.

The Unstructured Interview -- The authors describe the merits of the unstructured interviews and the consistency of their results with the structured interviews. It appears that the two instruments were sufficiently comparable to provide an appropriate mix of close and open ended answers to related questions.

*The Grounds Inventory Form**[*]* -- The authors discuss the reliability (inter-rate reliability) of the grounds inventory scores in Appendix 7.4 (page 294), but the method of estimation used by the authors to assess reliability is not appropriate for that purpose. The following model is used: Score = Grand Mean + Rater Effect + True Score + Error. The model is closely related to the randomized block design, and the rater's bias is not part of the error. This model would be perfectly appropriate if the comparisons made were based on data taken at different times using the *same rater.* Whenever different raters are used in comparing data collected at different times, rater bias should be calculated separately as part of the error of measurement. The correct model is: Score = Grand Mean + True Score + Error. It appears that this model will result in a lower reliability estimate than that given by the authors.

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*The authors disagree with this comment on the basis that the method used was derived from R.L. Ebel, "Estimation of the reliability of ratings," _Psychometrika_, 1951, 16, 407-427 and represents an accepted statistical practice for correlating ratings from different raters. The authors also stated that they "constructed a yard by rater matrix and calculated the sum of squares for between yards, within yards, and residual." The authors suggest that their method appears to be the "...model the reviewers state we should have used."

The model used by the authors was not the one recommended by the reviewer. The reviewer recommended to take "within yard" used by the authors (which is the sum of square doe to the rater difference) to be included in the error term. If the authors had this sum of squares due to rater difference, they could have tested for the difference using analysis of variance. In sum, the authors stated on page 296 of the study and in response to this review, "It appears that the role of individual differences between judges...is not a major factor..."

The Behavioral Observation Technique -- The authors report inter-judge reliability in the form of percentages of agreement among raters on four items. These percentages are not sufficient to guarantee the reliability suggested by the authors. First, two judges coded the categories while walking together. This reduces the "independence" of the raters if these raters communicated implicitly or explicitly. Second, if the four items are independent, the agreement between the two raters as a whole will be:

$$(.95) \times (.89) \times (.81) \times (.92) = \underline{0.63}.$$

Further, the authors themselves recognize the inherent weaknesses in the use of behavioral observation techniques to measure the variables in question. Many of the problems associated with the method are discussed in Appendix E, (pages 579-582).[**]

Paired Comparison -- In the paired comparison, one must transform the data from the raw proportion (percentage) of preference to the "z" score. The scale value of the item is derived from the linear combination (usually equal weights) of these "z"-transformed scores associated with the item. In the section comparing the preferences of residents of Markham Gardens and Clason Point (Table 9.1, page 357), there are two missing values in Item 3 and one missing value in Items 2 and 5. Since the transformation itself from proportion to the "z" score

[**]The authors disagree with the estimation of agreement presented in the review on the basis that "...four values in question are expressed as percentages, not correlation coefficients." They go on to state that it is not accepted statistical practice to average four percentages through cross multiplication. The reviewer did not recommend averaging four percentages through cross multiplication. The reviewer suggested computing the probability of two raters agreeing on all of the four items assuming the independence of the responses to the four item. This suggestion is not related to the correlations. The authors cite two publications from which their method was derived. W.H. Ittleson, et al, "The use of behavioral maps in environmental psychology," in Environmental Psychology, New York, Holt, Rinehart and Winston, 1970 and L.G. Rivlin and M. Wolfe, "The early history of a psychiatric hospital," Environment and Behavior, 1972, 4, 31-71.

is not linear (the proportion ranges from 0 to 1.0, while "z" ranges from negative infinity to positive infinity), the missing values might severely affect estimation of the scale of values. Thus, the table may not be valid because of the bias introduced into the paired comparisons by these missing values.[*]

APPROPRIATENESS OF THE RESEARCH DESIGN

The study represents an intensive evaluation of the effects of various crime reduction strategies at Clason Point. Several attributes of the study limit its generalizability. The two developments used as a comparison group were actually quite different from the experimental group. The two developments that were given "defensible space" treatments differed in many important respects, including the quantity and quality of treatments received. In addition, since the treatments were given to the development, the unit of analysis of the study is the development. The study of only two developments per group is too small to provide generalizable results.[**] (Please see following page for Footnote).

[*]The authors disagree with this comment and responded by saying that "The derived scale was calculated following procedures in J.P. Guilford, Psychometric Methods, which includes recommendations for deriving estimates with missing data." The authors accept the assumption that the normal deviate can serve as the interval separating two stimulus items, especially with instances of missing data. The reviewer does not accept the assumption. In any case, the concern expressed by the reviewer is that there is bias introduced by the missing values since the transformation is non-linear. Missing values at around .5 have different effects on the estimation from those caused by missing values which are at the extreme points. Since Clason Point had missing values while Markham Gardens did not, the possible bias may influence the interpretation of the results. The authors also stated that "scale estimates with complete data would be different, but the rank order and degree of differences between stimulus items would be affected only marginally."

The other, smaller section of the research design analyzed crime data for Clason Point and three surrounding housing developments. The comparisons of four developments does not produce generalizable results, since the research design does not take into account the differences in the four developments or collect data on other variables that may be causing the differences in crime rates -- e.g., policing levels, rehabilitation efforts, resident turnover, etc.***

(Footnote from previous page)

**The authors disagree with this comment for three reasons. First, "the unit of analysis is not the housing development, but the resident." Second, "the experimental design was revised and the notion of control groups was abandoned." Third, the authors stated that the design was as strong as it could be given the constraints of not locating an adequate control group and having defensible space modifications take place in only two developments.

    In response to the authors, it is our contention that when the resident is considered as the unit of analysis, the only effect the authors can demonstrate is the difference between or among the developments since the developments were taken as the fixed effect by the authors and the residents were nested within the developments. Since four developments were different to begin with, the logic of taking the resident as the unit of analysis does not lead to the evaluation of defensible space related physical changes.

    The relative effects of the case study approach as elaborated by the authors leaves open the question of the peculiarities of each housing development as opposed to the treatments received.

***The authors agree that the findings are not generalizable, but for different reasons. The authors stated that "the reduction of crime at Clason Point could not be clearly attributed to the defensible space changes because the quarterly absolute frequencies from the period 1965-74 portrayed a general lessening of frequencies suggesting the existence of five year cycles."

APPROPRIATENESS OF THE SAMPLING PROCEDURES USED

The selection of the developments was constrained by several important factors beyond the control of the authors. The resulting study of four developments does not allow for generalization, due to the size and nature of the sample. The sampling of interviewees was non-random in 1970 and 1972, but was random in 1974. The authors oversampled various sub-broups, which was appropriate. It appears the non-random nature of the samples did not bias the results of the study significantly.

APPROPRIATENESS OF STATISTICAL METHODS

Descriptive Statistics -- The descriptive statistics employed are appropriate.

T-Tests -- The authors report t-tests for all possible pairs of groups. A t-test requires, however, that the pairs be independent. The data on the pairs tested are not independent, and the alpha levels may be significantly different from those reported. It would have been better to use such multiple comparison procedures as Tukey's "Honestly Significant Difference" or the Student-Newman-Keuls method, since the alpha level would then be protected.*

Analyses of Variance -- F-value and the degrees of freedom are reported on page 142, but the degrees of freedom figure does not correspond with that reported in Table 5.2 (page 143). Further, Tables 7.3-, 7.31, and 7.32 show the analyses of variance where the sums of the squares add up to (equal) the total sums of squares, even though the samples had unequal sample

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*The authors state that reported t's were byproducts of computer outputs and the specific t-tests were *a priori* tests. Further, the authors state that multiple comparisons were not made, and procedures such as Tukey's are therefore inappropriate.

sizes in cells. In order to have obtained this result, the authors must have fitted the model sequentially, and taken the sequential sums of squares as their statistics. There are other, probably superior ways to fit the models (see Speed, Hocking, and Hackney, "Methods of Analysis of Linear Models with Unbalanced Data," *Journal of the American Statistical Association*, 1978).

CONCLUSIONS

The authors report:

- There is a notable reduction in burglary, robbery, and petit larceny at Clason Point after the modifications.

- Vandalism doubled at Clason Point after the physical design changes.

- Housing Authority violations were 24.6% lower after the modifications.

- The geographical pattern or location of crimes in the Clason Point development was different after the modifications.

- Clason Point was rated safer by its residents than comparison group developments.

- Residents of various socio-economic groups viewed the projects similarly in terms of the safety of specific areas.

- The number of safe places identified by residents increased sharply at Clason Point from 1972 to 1974. The perceived safety of the entire project has increased markedly as the number of dangerous areas decreased sharply.

- The reasons given for increased feelings of safety are not directly related to the physical design changes, except for lighting.

- New York residents (Clason Point and Markham Gardens) showed a greater inclination toward questioning strangers (a measure of territoriality).

- There was no statistically significant difference in the "responsiveness of neighbors" found in the four developments.

- Residents have experienced more crime in comparison projects (Berry Farms and Cherry Hill) than in experimental projects.

- One third of the Clason Point residents thought the crime problem had gotten worse, one third thought "better", and one third "the same." At Markham Gardens, 54% thought "better," while 27% thought it had gotten worse. At Berry Farms, 62% thought "better," while 21% thought it had gotten worse. At Cherry Hill, only 14% thought "better," while 43% thought it had gotten worse.

- Of those suggesting that crime problems had gotten better, 36% stated (13 persons) that the modifications were responsible. The same number of people had no explanation. At Markham Gardens, 36% stated that police patrols breaking up drug traffic were most responsible for reduced crime. At Markham Gardens, only 2% (1 person) attributed the "better" crime situation to physical design changes.

- Residents at Clason Point gave it a higher rating on environmental attributes than Cherry Hill residents gave their project (which was second), Markham Garden (third), and Berry Farms (fourth).

- Ratings of administration and maintenance of Clason Point by residents improved from 1970 to 1972, but did not improve from 1972 to 1974.

- Residents of Clason Point and Cherry Hill rated their projects high as a good place to live. Markham Gardens was in between, and Berry Farms was low.

- Residents at Clason Point and Cherry Hill had an equally high sense of proprietary feeling toward their apartments, while Markham Gardens and Berry Farms were equal with one another, but below the level of the others. Pre-post comparison at Clason Point shows that while 43% felt that their residences were their property in 1970, 73% felt that way after modifications.

- In 1974, Cherry Hill residents had the highest percentage of respondents reporting close friends, with Berry Farms next, Clason Point a distant third, followed by Markham Gardens. The pre-post test shows that neighboring activity did not increase after the modifications at Clason Point.

- The number of acquaintances that residents had at Clason Point did not increase significantly after the modifications (pre-post comparison).

- Based on the grounds inventory, there was little change in any of the dimensions (cleanliness, lawn condition, plants score, etc.), and these changes did not clearly show improvements in the post-modification period. In addition, residents at Clason Point did not report a larger number of changes that they had made to their lawns after modification. Fewer residents participated in the maintenance of public places after the modifications.

- Based on behavioral observations, it was found that most of the pedestrian traffic was channeled to the front of the buildings at Clason Point and Markham Gardens -- more so than at the comparison projects.

- From the structured interviews, the study found that residents at Clason Point used the back yard more often. This contradicts the findings from behavioral observation, which found that people use the front yards as often as the back yards.

- The physical changes preferred by residents most was outdoor lighting. Curbing was the least preferred.

- At Clason Point, 80% of the residents said there was something that they especially liked about the modifications. At Markham Gardens, only 47.5% answered positively.

- At Clason Point, 17% reported having bad experiences with the modifications, while at Markham 56% stated that they had had bad experiences. Further, nearly one half the Clason Point Residents stated that things should have been done differently, while 82% of the Markham Garden residents expressed this feeling.

- The modifications are responsible for positive changes in residents. People are safer, feel safer, are more satisfied with the project as a place to live, and are doing more to improve their environment.

- There was a decrease in crime in Clason Point after the modifications -- with the number of felonies decreasing by one half during the evening and night-time hours.

- At Markham Gardens, there is reason to infer a positive change in residents' perceptions of safety.

- The modifications had the desired effect in improving the image of the community and increasing resident satisfaction with their housing environment.

- The modifications had only a marginal influence on relations among neighbors because the elements of a cohesive community were already present.

- No demographic variables were strongly correlated with resident assessments of physical, social, or managerial characteristics of the environment.

- The creation of clusters had no effect on the residents in their behavior and attitudes toward one another.

- New lighting is highly recommended for future modification programs. "In our opinion (it) contributed considerably to reduction of crime at night and to residents' sense of safety, particularly on the front paths."

- Curbs and fences had the desired positive consequences, particularly in reducing crime and fear of crime and improving maintenance.

- Resident involvement in the planning of physical design modifications, plus the continued contact between the architect and the contractor are essential to the success of physical design modifications.

DISCUSSION OF CONCLUSIONS

The conclusions are generally supported by the data analysis. They are not generalizable to other types of environments, due to the limited number of sites evaluated. Further, the mixed results of the study raise serious questions regarding the overall effectiveness of the physical design modifications. Both approaches used -- the case study and the use of comparison developments -- shed little light on what works, how, and why. The study is descriptive, but does not have the analytic power to show how specific physical design changes can lead to changing human social behavior which will, in turn, reduce crime and fear of crime.

EVALUATION OF THE MINNEAPOLIS

COMMUNITY CRIME PREVENTION DEMONSTRATION

PROGRAM

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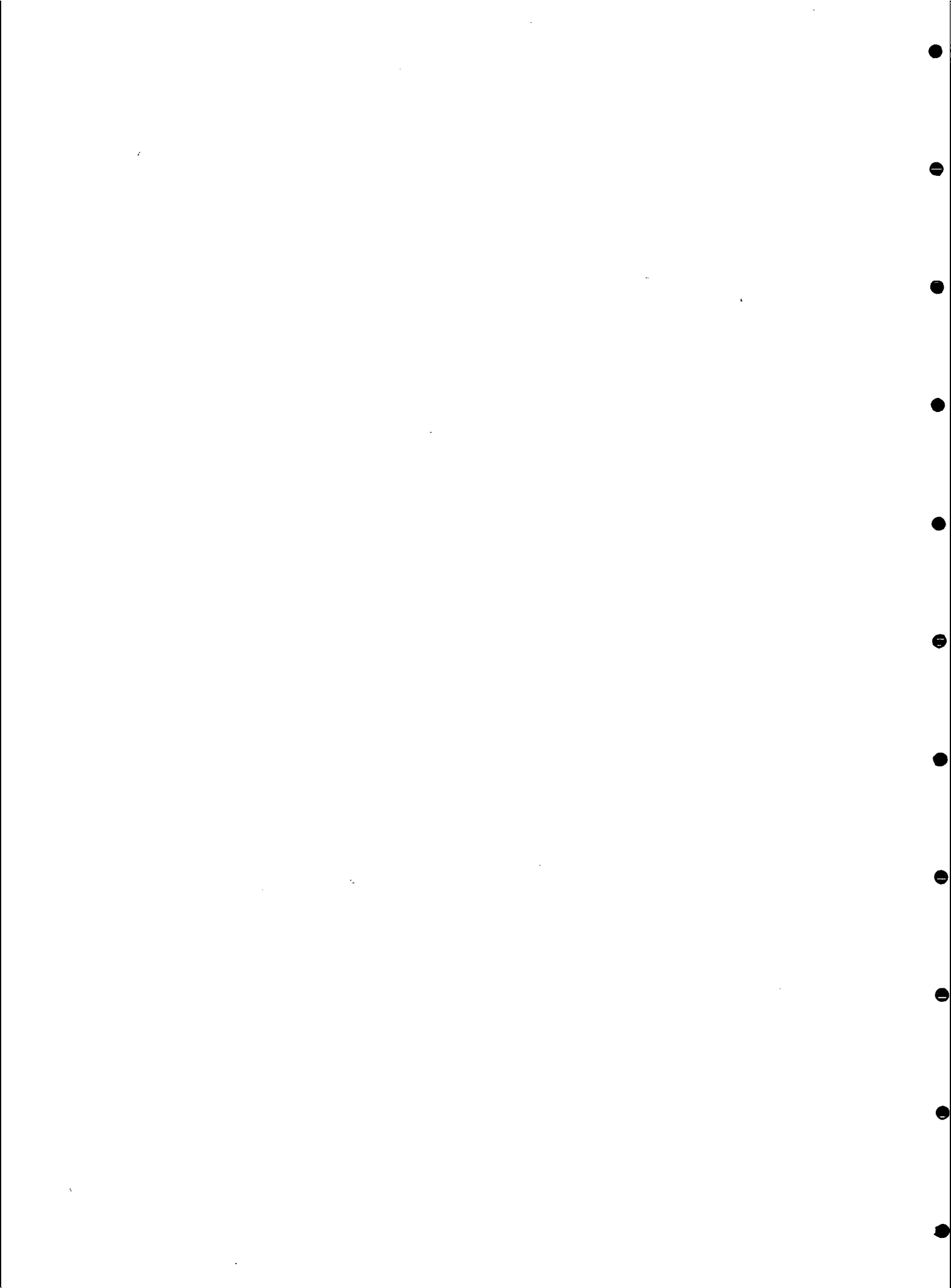
STUDY OBJECTIVES

This study includes both a process and an impact evaluation of a crime prevention demonstration program implemented in three residential neighborhoods in Minneapolis Minnesota. This program had two specific goals -- (1) to reduce crime; and (2) reduce the fear of crime.

The thrust of the project effort was, through community organization, to reduce criminal opportunities. Specifically it was hypothesized that more concerned, aware citizens would take those kinds of actions (reporting suspicious characters) that increase the risks of apprehension to potential criminals. Only peripherally were physical design strategies undertaken.

RESEARCH DESIGN

Various crime reduction strategies were implemented in three residential neighborhoods, including police and citizen group strategies, home security strategies, and physical design changes. The process evaluation described all inputs into the program and analyzed the planning and decision making processes employed. The impact evaluation utilized a pretest/post-test design with a regular control group and a displacement control group. Both archival crime data and survey data were gathered and analyzed through various statistical tests.

Data sources for the study included:

- Descriptive information from logs kept by the neighborhood staffs, including information on staff activities, block club meetings, Operation I.D., and premise security participants.
- Survey data collected from residents living in each

demonstration neighborhood. Three separate surveys were administered during the course of the project: (1) personal interviews of residents (initial and follow-up), which examined citizens' attitudes toward crime, their neighborhood, home security, police, victimization, collected demographic information; (2) a telephone survey; administered to residents who participated in the premise security survey; and (3) surveys of block club members from each neighborhood to examine their perceptions of the crime prevention program.

- Archival crime data were collected from the Minneapolis police records for 1975 (baseline data) 1977 and the first five months of 1978 for each of the three demonstration areas, the control areas, and city-wide rates, all compiled from the Minneapolis Police Department. National level data were collected from the Uniform Crime Report.

VARIABLES

Independent

- Community organizing activities

- Physically oriented crime reduction activities

- Home (premise) security strategies

Dependent --For Process Evaluation

- Resident Involvement

- Target hardening

- Awareness of crime prevention techniques

- Cooperative interaction between police and community

--For Impact Evaluation

- Reported crime rates

- Victimization

- Fear of crime

OPERATIONALIZATION OF VARIABLES

Independent Variables

Operationalization of independent variables was based on the implementation of strategies in each of the three residential demonstration areas.

Community Organizing Activities--The primary intent of these activities was to achieve greater involvement of residents and businesses within each neighborhood. The major strategy for residential organizing involved the formation of block clubs, in which crime prevention activities were organized and explained. Commercial organizing made use of local existing business associations as well as the creation of new ones, through which information about crime prevention activities could be disseminated.

Direct Crime Prevention Activities--The following strategies and activities were implemented in the demonstration neighborhoods:

- Landlord responsibility--Renters were advised concerning the minimum requirements of landlords to provide security for dwellings.

- Premise security surveys--These surveys were conducted by the Minneapolis Police Department upon request by residents. A total of 266 residents had premise security surveys and were eligible for a subsidy some of the recommended changes.

- Operation I.D.--Private property was engraved with a nationally identifiable number. Engravers and identifying stickers were made available to block club members with actual engraving being done by the resident.

Willard-Homewood

- A T-street to be changed to an L street

- New lights to be installed in alleyways

- Traffic modifications, including an east-west street to be made one-way, and traffic diverters to be placed in other areas to control the direction of traffic.

- Several alleys to be barricaded

Hawthorne

- Traffic diverters designed to reroute traffic without limiting access to the neighborhood.

Lowry Hill East

- Diverters planned to create a pedestrian walkway

- High sodium vapor lights for the blocks adjoining the walkway

Dependent Variables--Process Evaluation

- Resident involvement - This variable was measured by--
  1) the number and percentages of blocks whose residents were organized by the program;
  2) the number and percentage of blocks participating in the Neighborhood Watch Program;
  3) the average number of persons attending community crime prevention meetings;
  4) the average number of households represented per community crime prevention meeting;
  5) the number of premise security surveys requested;
  6) the number of premise security serveys conducted; and
  7) the number of operation identification units requested and conducted.

- Target hardening - This variable was measured by "yes-no" responses to the following questions asked during a

telephone survey:

1) Did resident make changes recommended during security survey?
2) Would resident have made the changes had no subsidy been involved?
3) Was resident aware of security problem prior to the security survey?
4) Do the residents who made the security improvements feel more confident as a result of the changes?
5) Does resident who has not made recommended security changes intend to make them?
6) Did person participate in the operation identification program?

- Awareness of crime prevention techniques--This variable was measured in the post-test of the victimization survey which included an assessment of residents' knowledge of key crime prevention strategies.

- Cooperative interaction between polic and community--This variable was measured through responses to the following questions asked in the 1976 and 1978 surveys.
  1) Rating by citizens of the Minneapolis Police Department (5 point scale - excellent to very poor)
  2) Rating by citizens of individual treatment by the police (4 point scale - very well, fairly well, not so well, no contact)
  3) Rating by citizens of how police treat people in Willard-Homewood (Same rating as #2 above)

Dependent Variables--Impact Evaluation

- Reported crime rates --
  1) Uniform crime report (FBI) on number of crimes in

major cities, 1974-1977.

2) Archival crime data from Minneapolis Police Department Records Division for 1974-1977.

. 3) Crime data from three "treatment neighborhoods" and their respective control areas were gathered for the period January 1, 1977 through May 31, 1978.

● Victimization--
    This variable was measured through a survey of residents asking them about crimes occurring against them during the preceeding twelve months.

● Fear of crime--
    Residents of the three treatment areas and the control areas were surveyed concerning their attitudes toward crime, home security, the police and fear of victimization. The surveys took place in 1976 and 1978.

SAMPLING

The selection criteria for demonstration and control neighborhoods in Minneapolis included:

-- The demonstration neighborhoods were to have --
    1) a "sufficient" level of crime and fear of crime;
    2) the types of crimes which could be addressed (theoretically) by a crime prevention through environmental design approach;
    3) readily available crime and environmental data;
    4) strong support for and interest in the demonstration program by community decisionmakers;
    5) ongoing or planned programs which would be supportive of CPTED efforts;
    6) support by residents and potential participants of an evaluation; and

7) typical physical and demographic characteristics.

Residents

About 400 randomly selected residents were surveyed from the three demonstration areas, forming the sample for the attitude and victimization survey. Persons who had participated in the premise security survey conducted by the Minneapolis Police Department comprised the sample for the follow-up on the implementation of security measures. The third sample was randomly chosen from block club members to examine their perception of crime prevention.

STATISTICAL METHODS USED

Descriptive statistics--Most data from the resident surveys are presented in tabular form showing frequencies and corresponding percentages.

Difference of difference of proportions--(DDP)test-- This test was computed for all crime categories, and measured the pre-test/post-test change in crime rates. Comparisons were made between each demonstration and its control area and for each demonstration area and its respective displacement area. The DDP test was also used to analyze survey findings to determine whether there were significant changes in the respondents' answers after the demonstration program

Analysis of Covariance--This method was employed as the primary analytic method for disaggregated crime data (pre/ post-test). This analysis incorporated a measure of "an opportunity rate" -- the number of victimizations in relation to the actual number of opportunities present. The number of opportunities was measured as the number of homes, cars, etc. while victimization rates represent the number of residential burglaries, auto thefts, etc.

Z *approximation* - Several variables from the survey data were analyzed based on Z approximation given by:

$$Z = \frac{P_1 - P_2}{\sqrt{P_{pooled} \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The operational definitions of the independent variables were dictated by the descriptions of the treatments which the experimental neighborhoods received. Those descriptions appear adequate given the limitations and non-uniformity of treatments across neighborhoods.

The dependent variables in the process evaluation are based upon surveys and project records. The validity of the measures of target hardening is questionable, since the number of premise security surveys is small relative to the number of opportunities in the demonstration neighborhoods. The dependent variable of fear of crime was not measured adequately. There was no summary index developed in this study for this variable. The items which were supposed to measure fear of crime should have been combined and examined for internal consistency. The sensitivity of crime and victimization variables should have been explored. (See statistical methods section). Also, the authors' use of reported crime is problematic. No attempt was made by the authors to exploit the information in their community surveys on victimization to "correct" for the well-known underreporting of crime. Further, in calculating the crime rates per 1,000 opportunities, it is unclear whether the authors have assumed that the number of opportunities is fixed during the entire study period.[*]

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[*]The authors state that they did not use a fixed number of opportunities for a three-year study period.

From the equation on page 138, it appears such an assumption is made (e.g. $N_1=N_2$ and $N_3=N_4$). Yet, there is no overriding reason to assume that over a three year period the population (persons) at risk remains constant. In fact, the authors themselves acknowledge the large amount of mobility within some of the neighborhoods. It is possible that some means, not reported in the evaluation, were employed to cal- ₃ culate the at risk population for each of these years. If so, information should be more prominently presented.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design was appropriate for the objectives of the study. The evaluation design sought to measure the "inputs" of the program -- a very difficult task given that "community organization" was the major treatment of the demonstration effort. The impact evaluation was designed to take into account spill-over effects by selecting both a comparison neighborhood and a displacement neighborhood. In addition the authors avoided the fault of many researchers by weighting each crime by the relevant at risk population.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling of the treatment, comparison and displacement neighborhoods appears to be well designed. However, the control groups have widely divergent (lower) burglary rates than the treatment groups. This could pose significant problems since the principal observation that should be compared in the analysis of the security surveys and operation

identification programs is the residential burglary rate. The
authors could have justified their selection of the particular
sites even when the wide discrepancies between some averages
are found by providing a test statistic for the difference in
means. The sampling procedures for surveys of residents appear
adequate given the limitation noted by the researchers that
only residents of the demonstration neighborhoods (and not the
control neighborhoods) were surveyed. Although there was no
control group the surveys do provide attitudinal data on
changes within the treatment group.

APPROPRIATENESS OF STATISTICAL METHODS USED

● *Descriptive statistics*--The use of descriptive statistics
is generally adequate. However, the descriptive statistics
used in the analysis of crime rate changes appear to refer
only to the level of crime in each community and not the rates
per persons or establishments at risk. If this is so, as is
apparently the case from inspection of Table v.6 - v.9, then
the subsequent comparisons of this analysis with the results
of the covariance analysis should be qualified. Even if <u>level</u>
of crime in each community were used, it would have been
useful if the authors had presented some idea of how large a
change in crime is needed to call the change significantly
different from zero.

● *Differences of differences of proportions*--There are
several problems associated with the authors' use of this
statistical test. First, the equation given on page 138 does
not consider the covariance between Time 1 and Time 2. It is
very unlikely that Time 1 and Time 2 has zero covariance.
This could have been tested by taking the correlation between
the pre and post rates using all census tracts in Minneapolis.
If Time 1 and Time 2 are positively correlated, the index
based upon page 138 will be extremely conservative and is like-
ly to miss a large number of significant differences. On the

other hand, if the correlation is negative, it is not clear
how the index behaves since the denominator has the conserva-
tive estimation of the rate, but does not consider the addi-
tional variance caused by the negative covariance. Second,
the sensitivity of the rate produced by this method is ques-
tionable. It is likely that the crime has the distribution
close to the Poisson distribution where the probability of not
being victimized is the highest. Tables v.6 - v.8 suggest that
the control groups have much lower frequencies than the treat-
ment groups. Under these circumstances, usage of differences
of rates is not ideal since the rates are not sensitive
measures. Third, the authors assume, incorrectly, that the
population at risk remained unchanged between the periods. This
assumption may have been dictated by data limitations. In any
event it reduces the explanatory power of the results of analy-
sis based upon the difference of difference of proportions
test.

  • *Analysis of Covariance*--This method was used incorrectly
and clearly was inappropriate for the data set available for
the study. The authors themselves state that the model may be
inappropriate since the linearity hypothesis is rejected, there
is covariate-independent variable interaction, and the depen-
dent variable is truncated. A more fundamental problem with
the model is that it is inappropriate given the unit of analy-
sis used, the nature of the data base and the distribution of
the dependent variable.* The authors state that the unit of
analysis was "opportunity". The high degrees of freedom in the
Appendix correspond to this position. If this is the case,
the data base for the analysis does not correspond to the
Tables v.6 - v.8. It is likely that most of the dependent
variables (and pre-variables) in the data base were zero's.
Moreover, since the crimes have a Poisson type distribution,
the model of analysis of covariance is not appropriate since
the assumptions required by the model are not met in the data.

---

*The authors disagree with the reviewers that the unit of
analysis was wrong for ANOCO.

As an alternative to the analysis of covariance used by the author, several suggestions are listed below.

1) Obtain a large series of observations on the tracts to statistically sort out <u>trend</u> changes and cyclical changes in crime rates. Time-series techniques are well known for this task, but additional insights could be gained by using pooled--time series--cross section regression.

2) Try using regression techniques by exploiting the information from the demographic variables used in the cluster analysis. An equation like the following could be estimated:

$$C_t = \alpha_o + \sum_{i=1}^{n} \alpha_i X_i + \beta C_{t-1}$$

where C_t is crime rate in period t

C_{t-1} is crime rate in period t-1

X_i's are n independent demographic variables (assumed time invariant)

α_i's are the coefficient on X_i's

In the absence of the CCP, one would expect that for each crime the β's are the same for the different communities (the differences among communities have presumably been taken into account by controlling for the X_i's). To estimate the effect of CCP, one partitions the sample between tracts included and those not included in the CCP. Separate regressions are performed and the pooled samples are subjected to another regression at which time a Chow test is conducted to test whether or not location in a tract <u>ceteris paribus</u> results in lower crime. The same type of analysis could be performed for spillover communities.

Importantly, β is the effect of prior crime on current

crime. If crime rates were generally falling, then a fall in crime during the period of the CCP could not be appropriately attributed to the CCP. Adding previous crime level permits a control for this variation.

• Z *approximation*-- This method is the same as a chi-square test with one degree of freedom without correction. Therefore, if the questionnaire items have greater than two categories (such as Yes-No) for responses, this index should not be used. The later tables in the report V.19-26 show that the Z approximation is associated with each category of responses for the given item. For these multiple response questions, the authors should have used chi-square with more than one degree of freedom.

• *Further analysis of the residential survey*-- A number of variables of theoretical interest are contained in both the survey in 1976 and the followup in 1978. Although the researchers claim little confidence can be placed in the victimization variable because of the low incidence of victimizations in any given sample, the technique described below could be applicable even to small samples. For example, let Z be a vector of variables including both personal characteristics of the respondent and demographic variables reflecting characteristics of the neighborhood. Let P_i^K be the probability that event K occurred. The event could be a victimization, or it could be a response to the question of whether one used security locks on one's windows. If the answer was no $P_i^K = 0$, if yes, then P_i^K would be equal to one.

The equation:
$$P_i^K = f(Z, \beta)$$

is estimated using probit analysis for both the 1976 and 1978 periods and a Chow test is performed to test the difference in the effects of β on P_i^K during the two periods.

There was a wealth of information collected from the resident survey questionnaire, yet little of this information was exploited in order to provide a sophisticated test of the effectiveness of the residential demonstration program.

CONCLUSIONS

The authors report:

Process Findings

- The desire to increase involvement within the residential and commercial elements of the community appears to have met with mixed results.

- Neighborhood Watch was rated by block club members as the most important part of the Community Crime Prevention Program.

- There was great difficulty in implementing the premise security surveys.

- Inadequate door and window security was the problem most often identified in surveys of homes.

- In terms of the total number of residential units in each neighborhood, very few premise security surveys were undertaken.

- Only one physical change of a minor nature was actually implemented during the course of the demonstration year. After the end of the first year, two traffic diverters were put into place with one being removed soon thereafter.

- The process of physical design changes was blunted by the political process, the failure of coordination, etc.

- Temporary traffic barricades were vocally opposed by local residents who considered them unsightly.

Impact Findings

- Results provide no clear cut answer to questions concerning program impact upon crime due to the time period for evaluation being too brief.

- Crimes decreased significantly more in one neighborhood than its control neighborhood, but did not decrease significantly in either of the other neighborhoods.

- The findings on fear of crime levels were inconstant- as there was a statistically significant increase in the number of persons in each neighborhood who had thought crime had decreased from 1976-78.

- Data from victimization surveys (which do not meet satisfactory confidence levels) suggest that residents' perception of personal victimization declined from 1976-78.

- Positive attitudes toward the police did not increase significantly during the demonstration - study period.

DISCUSSION OF CONCLUSIONS

The process evaluation findings appear to be supported by the data. They report the difficulty of implementing physically oriented crime reduction strategies in residential settings. To the extent that the program tried to reduce crime through making changes in the physical characteristics of the built environment, it was nearly a total failure. The physical changes never took place. Thus, the impact evaluation is not

a study of how physical changes can reduce crime. It is a
study of how security surveys and neighborhood organizing can
reduce crime. The findings show mixed results and the reviewers,
in agreement with the authors, do not place much confidence in
the proposition that all of the findings of the study are di-
rectly attributable to the CPTED treatment strategies. The
statistical problems outlined above in addition to the incon-
sistent treatments received by the three neighborhoods prevent
one from drawing hard conclusions on treatment effectiveness
based upon the impact data. In sum, this study sheds little
light on the nature of the relationship between the built en-
vironment and crime and crime prevention behaviors and does
not provide generalizable knowledge in assessing the relative
effectiveness of the many strategies which fit under the CPTED
label.

FACTORS INFLUENCING CRIME AND INSTABILITY IN URBAN HOUSING DEVELOPMENTS: REPORT OF THE SECOND PHASE

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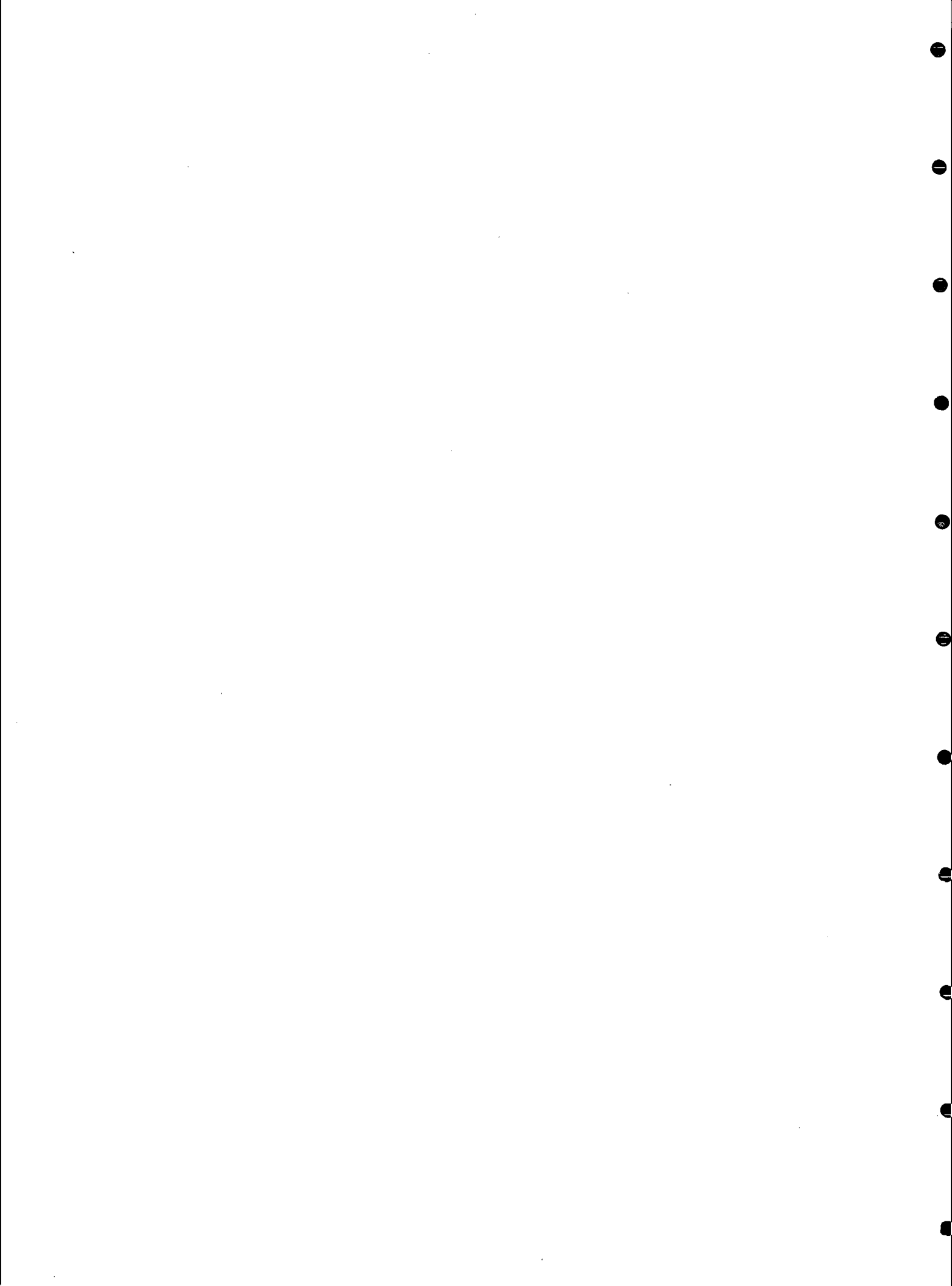
STUDY OBJECTIVES

The major objective of this study was to gain a better understanding of the dynamic interrelationships between crime rates and instability (turnover) experienced in moderate and low income housing developments. The study specifically addressed the following questions:

- What are the factors that contribute most to high crime rates, vandalism, and fear in residential developments?
- Can housing management policies help to reduce crime rates, instability, and abandonment?

The study analyzed household surveys, archival and observational data on physical attributes of the housing development, data on the socio-economic characteristics of the residents, on friendship and neighboring patterns, and housing management policies in order to assess their relationships with the dependent variables -- crime and instability.

RESEARCH DESIGN

The authors collected and analyzed data from 63 low and moderate income housing sites in three cities based on a "defensible space" causal model developed through Newman's earlier work. The sources of data were:

- 2,655 resident interviews
- 37 interviews with housing development managers and/or their assistants, who were responsible for 53 housing sites
- 9 interviews with police officers who were responsible for the areas where 58 of the study sites were located
- archival data maintained by the housing developments
- archival data maintained by local and regional housing agencies
- site visits by the research staff to all study sites.

VARIABLES

Independent

- Building size
- Measure of accessibility
- Percentage of low income/AFDC residents
- Teen/Adult ratio
- Whether building was a cooperative
- Level of police service
- Level of guard service

Intervening

- Rent collection procedures
- Use of space by residents
- Social interaction level
- Actual control of space

Dependent

- Burglary rate
- Personal crime rate
- Fear
- Instability

Unit of Analysis

- Site (n = 63)

OPERATIONALIZATION OF VARIABLES

Building size -- This variable was measured through observational data collected on site visits and analysis of site plans and blueprints. The variable is made up of two components. First, buildings were classified into one of four types and assigned a value of 1, 2, 3, or 4. The four types of building were: rowhouse, galleria type of walk-up, other walk-up, and highrise. Second, the authors counted either the number of

apartments sharing an entry or, in the case of outdoor stairways, they counted the number of units sharing a stairway. The two components of the variable were standardized and summed to form the composite variable -- building size.

Accessibility -- This variable measures the vulnerability to intrusion for various types of housing structures. With regard to rowhouses, accessibility was measured in terms of numbers of ground floor windows in front and back. For high-rise buildings, accessibility was measured "in terms of the design and condition of the building's common ground floor entry and exit doors." Walk-ups were rated on the following criteria: visibility of individual apartment doors, the design and condition of common entry and exist doors, and the design of windows. All criteria were measured through site visits, observations and analysis of site plans and blueprints. For each type of housing unit, a standardized rating system was developed, with 0 = accessible, and 3 = inaccessible.

Percentage of Low Income/AFDC Residents -- This variable was measured through the resident surveys using two data items -- mean estimated real income of households, and percentage of one parent, female-headed families on welfare (AFDC).

Teen/Adult Ratio -- This variable was measured through the resident surveys and represents the ratio of 10-20 year olds to adults living in the housing development.

Whether Building was a Cooperative -- This variable was measured as a dichotomous (yes/no) variable through interviews with managers. A cooperative is a residential unit where the residents own their apartments.

Police Services -- This variable was measured through interviews with police. The composite index was based on police officers' estimates of the nature and frequency of police patrols in or around a housing site.

Security Guard Service -- This variable was measured through combining data from the managers' interviews and resident interviews. The composite index is a measure of the "presence and nature of the security guard service at a site."

Intervening

Rent Collection -- This variable was measured through managers' interviews and based on an index of such factors as number of rent-delinquent households, number of days before rent is considered delinquent, etc.

Use of Space -- This variable was measured through resident interviews and based on an index of two scales. Residents were asked the nature and extent to which they used private areas and the extent to which they used outdoor spaces. The index represented the sum of the standardized scores on these two (private and non-private) scales.

Social Interaction -- This variable was measured through the resident interviews based on a composite index representing six data items assessing the nature and frequency of social interaction and a sense of belonging among residents. Data such as number of close friends, frequency of contact, feeling of "belonging" were collected and standardized.

Control of Space -- This variable was measured through resident interviews. A composite index was formed based on "five items...that refer to the perceived likelihood that other residents would intervene in suspicious or criminal situations occurring outside their apartments."

Dependent

Burglary Rate -- This variable was measured through the resident interviews and represents a composite of two data items: (1) frequency counts of burglaries during the previous

12 months, and (2) frequency of attempted burglaries. The rate represents the number of incidents per 1,000 residents.

Personal Crime Rate -- This variable was measured through the resident interviews and represents a composite of two items: (1) frequency counts of robberies during the previous 12 months, and (2) frequency counts of assaults during the previous 12 months.

Fear -- This variable was measured through the resident interviews and represents a composite of eight data items, including "perceived safety of certain areas [five point scale -- safe to unsafe]; estimated likelihood of being burglarized [five point scale -- very likely to very unlikely]; comparison of crime in development to crime in surrounding area; and estimate of the change in crime."

Instability -- This variable was based on several sources -- resident interviews, housing agency archival data, and manager interviews. The composite index was based on standardized scores for: (1) turnover rate (number of households moving out during one-year period); (2) vacancy and abandonment rate (number of non-rentable apartments divided by total apartments); and (3) residents' desire to move (one question, five point scale for response during resident interview.)

SAMPLING

Study Sites -- Three cities were selected according to the following criteria:

- medium size (population 250,000 - 750,000)
- geographical distribution
- building type
- percent AFDC occupants
- cooperation of housing agencies.

In each city, all moderate income, federally-assisted developments that were more than two years old as of April 1976 and whose tenancy was less than 60% elderly were selected. The authors also stated: "To spread the number of interviews across more sites and to increase the number of high rise, low income sites, San Francisco public housing projects were added to the study." Whenever a development consisted of more than one building type, each of the building types was considered to be a separate site. The site was taken as the unit of analysis.

Residents -- The sample of residents was obtained based on a stratified probability sample. Six stratification variables created 216 strata, only 45 of which were represented by the study. The number of interviews to be obtained within each stratum was proportionally allocated so that the number of inter-views obtained in any stratum would be proportionate to that stratum's share of the total number of occupied units. The residents who had lived in the housing development longer than nine months were randomly selected within the stratum.

STATISTICAL METHODS USED

Path Analysis -- Using the site as the unit of analysis, the parameters in the models and the "total direct effects," "total indirect effects," "non-causal component," and "total association" were estimated using ordinary least squares esti-mation procedures. The two charts on the following pages pre-sent the causal model and path coefficients developed in the study.

Descriptive Statistics -- Many of the data were presented as frequencies, percentages, or raw data describing the charac-teristics of the study population and the measures of independ-ent, intervening, and dependent variables.
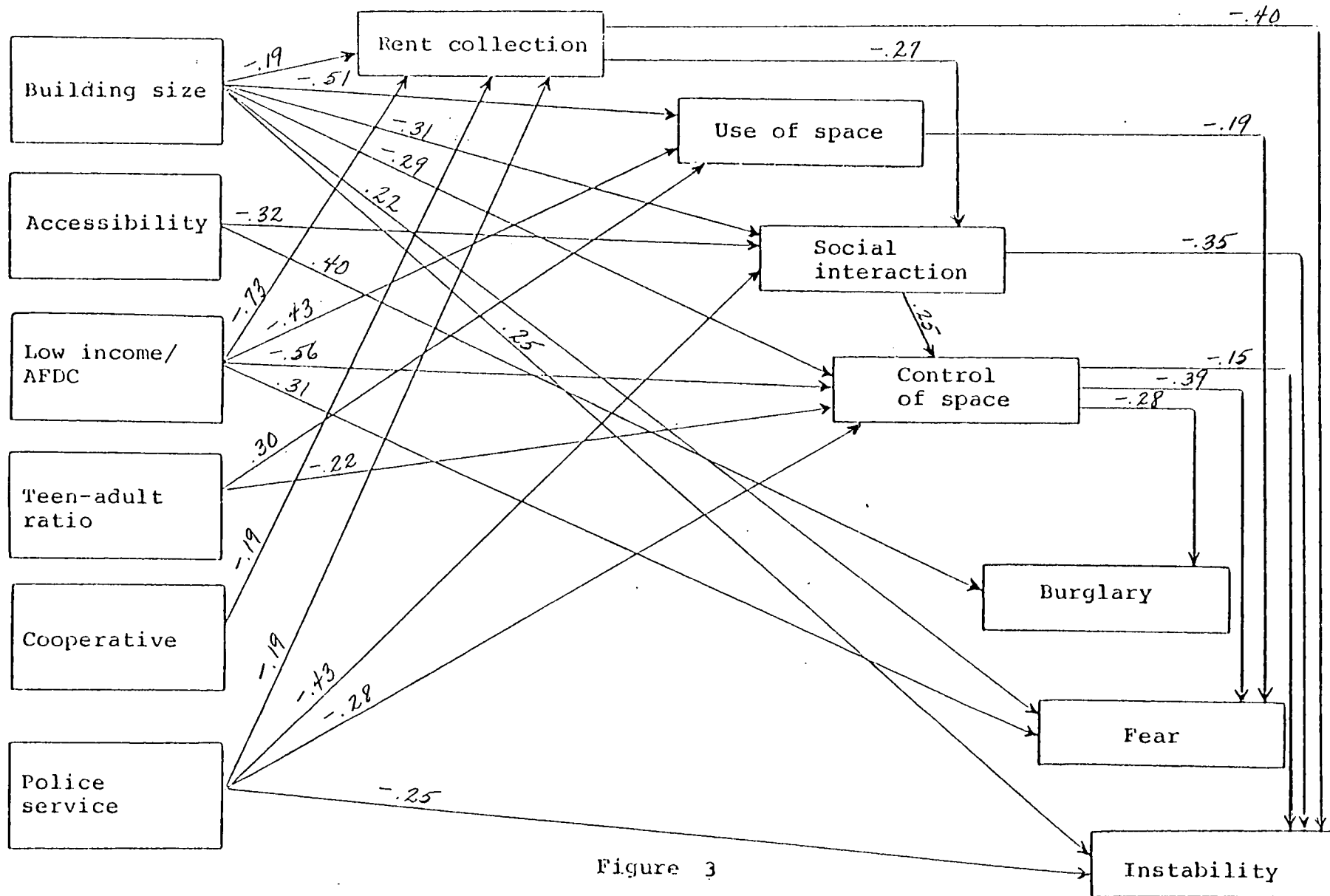
Figure 3

Major Effects of Characteristics of Housing Developments
on Burglary, Fear, and Instability
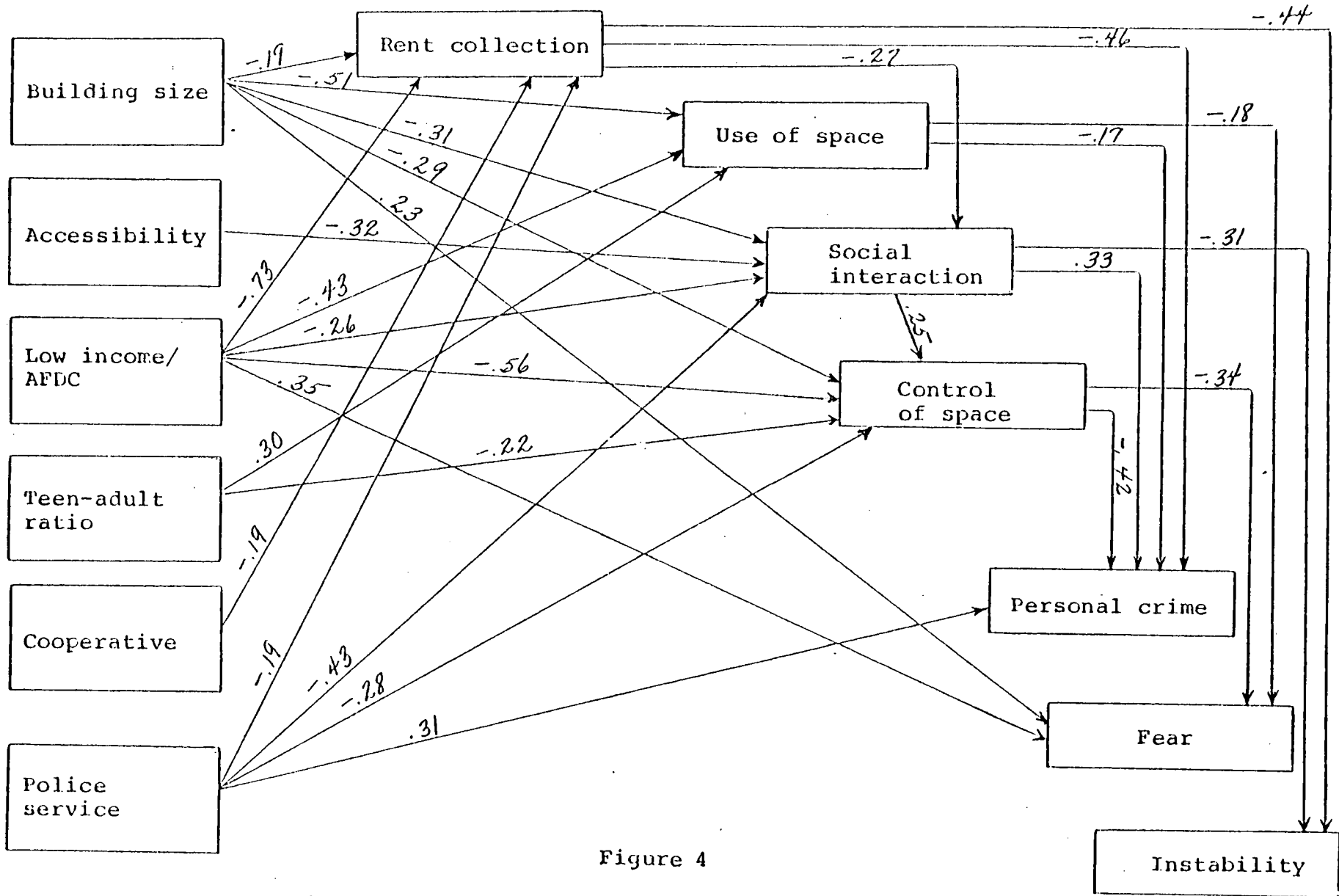
Figure 4

Major Effects of Characteristics of Housing Developments
on Personal Crime, Fear, and Instability

CONCLUSIONS

The authors report:

- Burglary rates are "primarily determined by the accessibility of buildings and apartments."

- Personal crime rates are not significantly affected by accessibility of buildings and apartments.

- The higher the number of low income/AFDC persons and the higher the teen/adult ratio, the higher the personal crime rate.

- "The more frequently police patrol, the higher the rate of personal crime."

- Building size significantly affects both fear of crime and community instability.

- "Community instability is determined by building size, accessibility and [number of] low income/AFDC [persons].

- Accessibility has a moderate effect on community instability.

- "Building size does have significant effects on both use of space and control of space."

- "Guard service has virtually no effect on crime, fear, or instability."

- "Low control of space is a precipitating factor in causing burglary, personal crime, fear, and instability."

- "Although the overall (total) effect of building size on crime is not large, building size does show important indirect effects on both forms of crime [burglary and personal] and on fear through control of space."

- "Residents' use of space transmits effects from building size both to personal crime and fear of crime."

- "The larger the building, the less frequently residents interact and, in turn, the lower the rate of personal crime."

- "The greater the accessibility of buildings...the lower the social interaction among residents. Social interaction, in turn, affects community instability; thus, accessibility affects instability through social interaction. Accessibility also affects instability through burglary."

- "The greater residents' control [over space outside their apartments] is, the less severe the problem, whether it is burglary, personal crime, fear, or instability."

- "The higher the proportion of low income and AFDC families, the lower the sense of control, and as a result, the higher the rate of burglary and personal crime, and also the higher the fear of crime."

- "Low income/AFDC also has positive effects on personal crime and fear of crime through residents' use of space."

- "The higher the proportion of low income and AFDC families, the lower the social interaction among residents [and the lower the control over space], and this in turn contributes to a high level of instability."

- "Use of space and control of space are important links from building size, low income/AFDC and teen-adult ratio to each of the crime-oriented variables -- burglary, personal crime, and fear -- but not to community instability. The less residents have extended their domain of concern, the higher the crime and fear of crime."

- "Neither the rate of personal crime nor the rate of burglary has any sizeable effect on residents' fear of crime."

- "The direct effect of personal crime on instability is also small and negative (-.09), although the direct effect of burglary on instability is of moderate size and positive (.16)....The effect of fear on instability is of moderate size, but negative (-.13)....Crime, fear, and instability appear to be fairly independent of each other when the effects of the independent and intervening variables are partialled out."

- "Residents' fear of crime is related to burglary, and to a greater extent, to personal crime, but not because crime causes fear, but rather because both crime and fear of crime are caused by a common system."

- "Community instability is related to burglary and to fear of crime, but not because burglary or fear causes instability, but rather because burglary, fear, and instablity are all caused by a common system."

- "Two physical design variables, building size and accessibility, and two social variables, low income/ AFDC and teen-adult ratio are the major determinants of crime, fear, and instability."

- "The higher the level of social interaction, the higher the crime rate."

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS

Use of Composite Variables

Many of the variables used in the study are composite
variables. The creation of composites is a sound approach
to increase the reliability of variables. In reviewing the
manner in which the composites were developed, attention was
paid to three issues: the unit of analysis used, the coding
of variables, and the scaling properties of the variables.
In most cases, the authors used the correct unit of analysis,
properly coded the variables, and employed reasonable scaling
techniques in the development of composites. The study in
general shows an unusually high degree of methodological
care paid to the development of indexes. In some cases,
however, the creation of the composite is lacking in one of
these areas. Most of the resulting problems are primarily
of technical interest. A few have implications for the
validity of the analysis, and are discussed below.

Unit of Analysis for Developing Composites. The data
set used in the research has a hierarchical structure. Data
were collected at several levels--residents, individual
housing sites, housing developments (composed of one or more
sites), housing managers and police. The composites were
constructed using this data set through analysis of the
correlation among individual variables. Composite variables,
then, represented combinations of variables that were highly
correlated empirically.

For composite variables based on resident level data,
the authors formed correlations by using the individual
respondent as the unit of analysis. These variables included

key variables such as "use of space," "control of space," "fear of crime," and "social interaction." But the primary statistical method used in analyzing the data was path analysis, and it used the housing site as the unit of analysis. The inconsistency of forming the composites based on correlations calculated at the resident level while analyzing the composites at the site level threatens the meanings of these composite variables.

The problem falls into the family of artifacts covered under the "ecological" and "individualist" fallacies, around which an extensive literature has developed.[1] The correlation between two variables can and frequently does change drastically, even when the same data are used, depending on the unit of aggregation and, in turn, the size of the item correlations affect the index's reliability. As the authors' correctly point out, "...errors of measurement can badly bias the estimation of (path) coefficients" (3-2), and consequently they required a Cronbach alpha of at least .70 before using a composite. But, because they used individual data, it is not ensured that their composites would have met their own criterion had a consistent procedure been used whereby the correlations were based on the site--the same unit of analysis employed in the path model.

Whether this issue is important or trivial cannot be determined without secondary analysis. It is worth raising because the analysis in the study relies on a path model, and the interpretation of path models is extremely sensitive to the magnitudes of bivariate relationships within the model, and those relationships are in turn extremely sensitive to measurement error. In other words, the potential problem is not limited to the composite variables in question. If they are "bad"--have high measurement error, or are measuring

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[1] For examples, see M. Doggan and S. Rokkan (eds.) *Quantitative Ecological Analysis in the Social Sciences* (Cambridge: MIT Press), 1969.

relationships that would not apply to the site-level unit of aggregation--then the path coefficients that are directly or indirectly linked to them also are suspect.

Two other variables--police services and rent collection-- were based on 9 interviews with police and 37 interviews with managers. The report does not make clear whether the 9 police officers rated each housing development individually, or whether each officer simply made one rating for all of the developments in his jurisdiction. Assuming that each officer rated each development individually (the most favorable assumption) the correlations used to develop the composite variable "police services" were based on these individual ratings. The problem with using correlations based even on this preferred procedure is that the correlations reflect differences among developments but not differences among the site levels that were the unit of analysis. In addition, the development-level data will inevitably contain informa- tion based on the officer's perceptions and the methods for patrolling his entire jurisdiction, and will not be restricted to a development or site specific basis.

If, on the other hand, the nine officers did not rate each development independently but rather gave "average" responses for all of the developments within their jurisdic- tion, the correlations reflect an even higher degree of irrelevant jurisdictional-level information.

A similar problem exists with the manager-level data and in particular such variables as rent collection and guard service. The 37 managers did not respond for each site, but rather responded only for each development they managed.

Coding of Variables: Inflated Item-Correlations. The authors provide high correlations among component variables as evidence of the reliability of the composites, and most of

these high correlations do represent strong evidence that the composites are reliable. In the following cases, however, the coding of the component variables appears to have arti- ficially inflated the estimated reliabilities.

The first instance of this is a composite variable for "building size." It was created by combining the component variables, "building type" and "number of units per entry." Building type was coded from 1 (rowhouse) to 4 (highrise). Apart from scaling issues, this coding scheme produces con- founding: All rowhouses are constrained to have the same value on both variables, and a sample with a significant num- ber of rowhouses will inevitably produce a correlation between them. The estimate of statistical reliability is inflated. Note that the combined score may still conceptually be an accurate representation of the relative size of buildings. But the citation of reliability coefficients to support the strength of the measure should be discounted.

Second, the authors were sometimes faced with the need to treat an answer that was really "not applicable" as having a value. In some cases, this produced plausible codes--as in the coding of 0 when a respondent could not use a guard service because none was available, and guard service is treated as an independent resource variable. In other cases, however, as in the "use of space" variable, this procedure produced anomalies that are extremely hard to interpret--as in the case when, if a person had no patio, use of patio was scored as 0. In the development of the composite, the effect is again to inflate the estimate of reliability. More importantly, in the interpretation of the "use of space" variable, confusion exists between being unwilling to use space and lack of opportunity to use space. Specifically: one of the key defensible space relationships that the analysis supports is a negative relationship between building size and use of space (path coefficient = -.51). If high rises tended

to have no patios, this relationship is largely or wholly
artificial, because of the "0" code for respondents with no
patio, which was then used as one of two subscales that
formed the "use of space" composite.

    Scaling Problems. The only significant scaling problem
involves one of the key variables in the analysis: accessi-
bility. Different sets of indicators were used for rowhouses,
walkups, and high-rise units. The logic of the need to
apply different indicators is persuasive. It does mean,
however, that quite different situations are equated for
coding purposes. Thus, for example, a score of 1 (scale is
from 0-3) for a rowhouse means that the front windows face
the street, and the grounds area next to the back windows
are enclosed by a symbolic barrier. A score of 1 for a
highrise means that building has common front and secondary
exits, and that these exits were originally equipped with
locks. For a walkup, a score of 1 is not possible, because
the original scale ran from 0 to 4, and the scores were
divided by 1.33 to provide a common range with the scores
for rowhouses and highrises. The closest analog, a score of
.75, means that the walkup possesses one of five character-
istics (visibility of apartment doors, front common entry
with locks, front door kept locked, inaccessibility of front
windows, inaccessibility of back windows).

    The reason for the procedure is not at issue; the
authors wanted to compare apples with oranges, and applied
an imaginative solution. But to use the scales as data for
regression coefficients, then to use those coefficients in a
path model, puts a burden on the procedure that scaling
procedures of this sort are not designed to bear. Along
with the usual faith that the ordinal scale is sufficiently
close to an interval scale to justify use in a regression
equation, the analysts must also assume that the three
different ordinal measuring sticks were capturing common
magnitudes of "difference in accessibility" across building
types.

Whether the indicators are valid operational measures of the underlying thing-to-be-measured is an issue that we will not address in detail. Most of the indicators have a plausible rationale. They are subject to questions, as are any attempts to operationalize complex social phenomena, but the answers to the questions are necessarily subjective.

The exception is the variable labeled "rent collection." In its presentation as an intervening variable, it is said to be "an indicator of management ability to provide adequate services, since without the necessary operating funds, management would be unable to provide day-to-day maintenance or emergency services" (p. 4-18). In the discussion of anticipated causal relationships, it is stated that "The inability to provide services, as measured by poor rent collection, is expected to minimize residents use of area outside their apartments, to increase their fear of crime, and to increase the consequent instability of the site" (p. 1-19).

The issue is whether high-rent collection has such a regular, strong relationship with ability to provide management that it can be used as a proxy measure. The four items in the index (local definition of "delinquent" in rent payment, usual proportion of delinquent households, proportion delinquent last month, and aggregate delinquent rent money) give no reason for assuming such a correspondence. That rent collection is *correlated* at some level with management ability to provide services is plausible; that it *measures* ability to provide services is a much stronger assertion that is not defended.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design relies exclusively on path analysis to test Newman's Defensible Space model. Given that decision, the research design for collecting and analyzing the survey, observational, and archival data is appropriate. The elements in the design and their rationale are laid out in detail, and permit the reader to follow easily the reasoning behind the design. The choice of path modeling as the analytic approach does have the disadvantage of exposing the authors to criticism on the many grounds that make social science path models vulnerable.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling of developments and cities represents a reasonable compromise between the ideals of randomization and the realities of doing field work that requires the cooperation of many actors at the local level. The procedures for selecting residents for the victimization survey were also appropriate. The major problems associated with sampling were not procedural, but the choice of sample sizes. A number of the variables in the analysis rely on stable estimates of site-level means for phenomena that have a low probability of occurring.

This is most conspicuously a problem for two of the central dependent variables in the analysis: incidence of burglary and incidence of personal crime, computed for each site as the mean of the self-reports by the interview sample. For both the burglary and personal crime variables, it appears that the site-level estimates are extremely unstable for a substantial number of the sites.

We may begin with the estimated mean and standard deviations for the 63-site sample, expressed as an annual rate per 1000 residents. They were:

	Mean	S.D.
Burglary	260.9	184.2
Personal crime	44.4	43.2

The variance in both cases is high. The 95 percent confidence limits are 238.6 to 283.2 for a burglary, and 31.7 to 57.1 for personal crime.

A major reason for the variance lies in the sample sizes at the individual sites, combined with the infrequent occurrence of the phenomenon being measured. The median interview sample size was 34. Fourteen of the sites (22%) had samples of 9-19 persons. If we assume for purposes of argument that the true burglary rate in fact was 260.9/1000 (the grand mean) and the true personal crime rate was 44.4/1000, then the small samples are very likely to produce inaccurate scores for any given site. By way of illustration: The closest that a sample of 20 could come to a true personal crime rate of 44.4/1000 is to draw exactly one victim, yielding an estimate of 50/1000. But, assuming a Poisson distribution (assumption of a binomial distribution produces essentially the same results), the probability of that happening in a sample of 20 is only .365. In 41 percent of the cases, a sample of 20 will draw *no* victims, despite a true victimization rate of 44.4/1000. In 22 percent of the cases, the sample will draw two or more persons, overestimating the true rate by large factors. Even with a sample of 34, the median sample size for the study, the measurement error will be large. No victims will be drawn in roughly 22 percent of the sites; while in about 19 percent of the sites three or more victims will be drawn, leading to an estimate of the personal crime rate that is at least double the true rate.

As sample sizes increase, error variance decreases; as the true frequency of incidence increases, error variance decreases. But the greater accuracy of the estimates for sites with large sample sizes does not mitigate the effects of the many sites with small samples, because the correlation treats every observation equally. A large number of those observations were bound to be "wrong" by a wide margin.

APPROPRIATENESS OF THE STATISTICAL METHODS USED

Expectations and Results

Validation of the Total Model. The authors explicitly stated their prospective model at the outset. It was a very broadly specified model: All seven independent variables were hypothesized to have a direct causal impact on all of the eight intervening and dependent variables. Including the additional relationships specified among the intervening and dependent variables, the model contains a total of 83 predicted causal relationships. Given the way that the model was operationalized (replication, substituting personal crime for burglary on the second run), they gave the model a chance to produce 106 different coefficients. According to Tables E.2 and E.3, the authors found that 32 (30%) of them were actually found to be significant, using an alpha level (probability of Type I error) of .15.

The authors used an alpha of 0.15 for each test in order to guard against the possibility of *not* detecting an effect of the independent variable on the dependent variable. The use of this test for a model with 106 path coefficients means that one must expect that approximately 16 of the coefficients would be incorrectly found significant when they are in fact zero (106 x .15 = 15.9). Further, 5 of the original 32 significant results were in the wrong direction--that is, were statistically significant, but showed a result

opposite to the one predicted by defensible space theory.
From this perspective, something on the order of 16 to 21 of
the 32 results have to be discounted, leaving perhaps 11 to
16 of the original 106 predicted relationships--without any
way of knowing which of the 32 they may be. If the criterion
is statistical confirmation of the theoretical model as a
whole, the results from this work did not provide good fit.

The more salient point is that the path model itself
can be argued to be a poor operationalization of Newman's
defensible space model; inspection of the original path
model suggests that the number of predicted relationships
could have been pared substantially. We therefore turn to
the key variables involving the built environment.

The Observed Relationships and Defensible Space Theory.
The study provides evidence supporting 14 relationships that
have been important components of defensible space theory.
Path coefficients are given in parentheses. When the
coefficients differ in the personal crime and burglary repli-
cations, both are shown with the burglary model first.[1]

```
Increased building size causes decreased use of space           (-.51)
Increased building size causes decreased social interaction     (-.31)
Increased building size causes decreased control of space       (-.29)
Increased building size causes increased fear of crime     (+.22, +.23)
Increased building size causes increased instability        (+.25, NS)
Increased accessibility causes decreased social interaction     (-.32)
Increased accessibility causes increased crime              (+.40, NS)
Increased use of space causes decreased fear of crime      (-.19, -.18)
Increased use of space causes decreased crime                (NS, -.17)
Increased social interaction causes decreased instability  (-.35, -.31)
Increased social interaction causes increased control of space  (+.25)
Increased control of space causes decreased crime          (-.28, -.42)
Increased control of space causes decreased fear of crime  (-.39, -.34)
Increased control of space causes decreased instability     (-.15, NS)
```

---

[1]See Procedural Issues below on the replication of the model.

The same analysis failed to support 12 relationships that have been equally part of the defensible space theory. (The bivariate correlations are shown, since the path coefficients were not part of the model.) According to the results of the path model,

```
Increased building size does not cause decreased personal crime        (-.04)
Increased accessibility does not cause decreased use of space          (-.12)
Increased accessibility does not cause decreased control of space      (-.45)*
Increased accessibility does not cause increased personal crime        (+.02)
Increased accessibility does not cause increased fear of crime         (+.36)*
Increased accessibility does not cause increased instability           (+.40)*
Increased use of space does not cause increased social interaction     (+.45)*
Increased use of space does not cause increased control of space       (+.29)*
Increased use of space does not cause decreased burglary               (+.01)
Increased use of space does not cause decreased instability            (-.31)*
Increased social interaction does not cause decreased burglary         (-.11)
Increased social interaction does not cause decreased fear of crime    (-.27)*
Increased social interaction causes increased personal crime           (+.12)
```

Two points can be taken from this exercise, with very different evaluative implications. From one perspective, it can be argued that we are seeing a very weakly validated defense of defensible space theory--if one is to attach a causal interpretation to the relationships that supported the theory, then consistency insists that one attach signif- icance to the absence of the many other relationships that "should" have been observed as well.

From another perspective, the "nonsignificant" set of relationships are generally supportive of defensible space theory. In 7 of the 13 cases (see the asterisks), the bivariate relationships were statistically significant beyond the .05 level, in the direction predicted by the model, and could have been part of the path model given other, plausible specifi- cations of it. In 4 of the other 6 cases, the nonsignificant correlations were at least in the right direction.

---

*Statistically significant beyond the .05 level as bivariate relationships.

There is no objective balance we can strike between these two perspectives. Our judgment is that the overall structure of the data is supportive of the relationships predicted by defensible space theory, but that the path model as developed tends to obscure rather than to reveal that fact.

Magnitude of Effects. To this point, the metric we have been using is the standardized regression coefficient, and all the statements about significance or lack of it have centered on the question of whether an observed relationship is different from 0. The next question is whether the difference is important.

To answer it, the path coefficients must be translated back into metrics that are interpretable. In the case of the variables comprised of composite indexes, this is nearly impossible. Fortunately, the two ultimate dependent variables-- burglary and personal crime--were originally expressed in the interpretable metric, "annual incidence per 1000."

The starting point is the set of direct and indirect effects that the study causally attributes to the two built-environment variables:

	Burglary		Personal Crime	
	Direct	Indirect	Direct	Indirect
Building size	-.11	+.07	-.09	+.20
Accessibility	+.40	+.03	-.01	-.01

The authors themselves put the next step in translation concisely, using building size and burglary as an example: "The total effect of building size on burglary is -.04: an increase of one standard deviation unit in building size

will produce a decrease of .04 standard deviation units in burglary rate when the effects of other independent variables on burglary are held constant." (p. 5-7)

Employing the means and standard deviations of the burglary and personal crime variables discussed earlier, the expected changes in crime (expressed in annual incidence per 1000) produced by a 1 standard deviation in building size and accessibility would be:

	Burglary		Personal Crime	
	Direct	Indirect	Direct	Indirect
Building Size	-20.3	+12.9	-3.9	+8.6
Accessibility	+73.7	+ 5.5	-0.4	-0.4

And these changes would represent the following percentage changes in the estimated rates of victimization:

	Burglary		Personal Crime	
	Direct	Indirect	Direct	Indirect
Building Size	-8%	+5%	-9%	+19%
Accessibility	+28%	+2%	-1%	- 1%

In other words, the -.04 path coefficient linking building size with burglary translates into a predicted 3 percent drop in burglary rate if building size is increased by 1 standard deviation.

Without pursuing the analysis, the substantive interest of the results can be limited sharply: even granting all of the assumptions of path modeling, accepting the structure of this specific model as accurate, ignoring reciprocal caus- ation, assuming that all the variables accurately capture the constructs at issue; in short, accepting the numbers at

face value, it could reasonably be argued that the only two results large enough to be of importance are the *direct* relationship of accessibility to burglary and the *indirect* relationship of building size to personal crime. And those two relationships, which point to 28 percent and 19 percent increases in crimes per 1 standard deviation increase in accessibility and building size, are based on dependent variables that are known to have very high measurement error because of the small sample sizes (median = 34) that were used to measure the frequency of rare events. The upshot is that the magnitude of the effects of the built environment on crime, direct and indirect, are generally modest (if one accepts the numbers at face value) and unstable (in light of the measurement error associated with the crime variables).

For all except the crime variables, the magnitude issue cannot be addressed. Composite variables have advantages in terms of reliability, but using them also sacrifices interpretability. When standardized scores are employed, interpretability vanishes. Standardized scores have a mean of zero and a standard deviation of 1, no matter what the original variance may have been. When examining the path coefficient linking, say, accessibility and social interaction (-.32), the reader cannot work backwards to the separate indicators and decide whether -.32 means that a very large increase in accessibility produces very slightly altered social interaction, or vice versa, or neither. Lacking a sense of what "high" or "low" means for either variable, knowing only that the meanings and the ranges are very different, the -.32 has very little content for deciding on policy implications. Statistical association is highly important for theory-building (which the study focused on) but is not relevant to policy without estimates of magnitude of changes.

One-Way Causation. The authors explicitly state the
reasons for employing a recursive model, and note some of
the anomalies that were created thereby. The major problem
involves police services. The path model is constructed
based on the assumption that police services are an inde-
pendent variable, leading to path coefficients that say

> Increased police services cause decreased rent
> collection
>
> Increased police services cause decreased social
> interaction
>
> Increased police services cause decreased control
> of space
>
> Increased police services cause increased personal
> crime

There is no danger that readers will draw these con-
clusions from the path model; but using police services as an
independent variable in this manner affects the estimates
of other path coefficients that the study does treat in a
causal manner. As it turns out, however, the impact of using
police services as an independent variable produced conserva-
tive results. Omitting police services altogether or using
it as a dependent variable would have strengthened the re-
ported relationships of use and control of space to personal
crime. It would have substantially attenuated one of the
theory-contradicting results in the existing model (which
showed a significant positive relationship between social
interaction and personal crime).

Separation of the Burglary and Personal Crime Models.
The authors ran the analyses twice, once using burglary as the
crime variable and again using personal crime as the crime

variable. This procedure produced anomalies such as relation-
ships (e.g., building size and instability) that are "signifi-
cant" in one run and not in another. The normal and preferred
procedure would have been to use both variables in the same
model.

*Failure to Use the Estimated Reliabilities of the
Composites in the Statistical Analysis.* The authors com-
puted the estimated reliabilities of the composite variables,
but did not use them in the analysis of the data. A prefer-
able procedure would have been to replace the diagonals of
the correlation matrix (1.00) with estimated reliabilities.
This correction for measurement error would have shown the
authors that several of the variables such as "rent collection"
and "low income/AFDC" were measuring the same thing. The
reliability of rent collection was 0.65 whereas its correla-
tion with low income/AFDC was -0.70. The effect of not
incorporating the estimated reliabilities is that the authors
proceeded with analyzing data without an important check on
the quality of their model. Given the reliabilities reported
in the study, it is extremely likely that incorporation of
the estimated reliabilities would require modifications in
the model and lead to altered findings.

Analysis of the Hierarchical Structure of the Data.
The data set used in the research has a hierarchial structure
whereby the residents were nested in the sites, sites were
nested in the development, developments were nested in the
managers and police, and managers and police were nested in
the cities. In addition, building types were not completely
crossed with cities (for example, Newark did not have row-
houses where St. Louis did not have highrises). In short,
the data base has a very complex structure. But the model
used in the analysis is unable to incorporate this structure.
When the unit of analysis is fixed at the site level, signi-
ficant and nonsignificant findings at the site level might be

the result of higher level factors. For example, a relation-
ship attributed to the building size may be partially re-
flecting the differences among cities because the building
type and cities are not completely crossed. The full extent
to which the hierarchial structure of the data has actually
influenced correlations is unknown. Detailed secondary
analysis far beyond the scope of this review would be neces-
sary to understand all of the potential ramifications of this
problem. An alternative, and, in our view, preferable
procedure would have been to have explored the hierarchial
structure of the data base before computing the correlation
matrix for the path analysis. The methodology employed leaves
open a real possibility that the findings reported not only
reflect the relationships at site level, but are also con-
founded by other higher level factors.

CONCLUSIONS

This is one of the largest, most ambitious attempts to
validate defensible space theory. Its data base is a rich
source of information about many of the key variables in that
theory.

If the focus is on the ultimate measures of crime and
fear of crime as they relate to the built environment, the
study offers very weak evidence that the built environment
is a major factor. On the other hand, the study contains
evidence that supports some of the key relationships among
the built environment and use of space, control of space,
social interaction, and instability, which defensible space
theory says underlie an ultimate relationship with crime.

There are two major obstacles in teasing more out of the
data. The first is the early conversion of the individual
data points into composites that have no interpretable metrics.
Without supplementary breakdowns that enable the reader to

know what it means when a variable like "social interaction" or "control of space" changes by (for example) .25 of a standardized score, the presentation leaves open basic questions about the size and meaningfulness of the statistical relationships that exist.

The second obstacle is the reliance on the path model. Given the nature of the research situation, this study represents a careful attempt to apply the data to a path model. But even under the best of circumstances, path models in the social sciences carry a very heavy load of assumptions. When the variables are conceptually as soft as the ones in this study; when so many of the within-site sample sizes are so small; and when the measurement problems are so difficult; no amount of care can get around the replicability challenge. Whether the issue is the model as a whole or the crime-related specific relationships within it, the stability of the results is low and the likelihood that a replication would reveal coefficients of similar magnitude is remote. Given the problems discussed in this review, even the signs of some of the lesser "significant" relationships would be vulnerable.

These comments do not negate the study's value as a step toward the refinement of defensible space theory. It should be emphasized as well that the continuing potential of the existing data base is great. Additional analyses to supplement the path model could resolve many of the uncertainties we have discussed, and possibly provide important new insights as well.

DEFENSIBLE SPACE: CRIME PREVENTION THROUGH URBAN DESIGN

AND

ARCHITECTURAL DESIGN FOR CRIME PREVENTION

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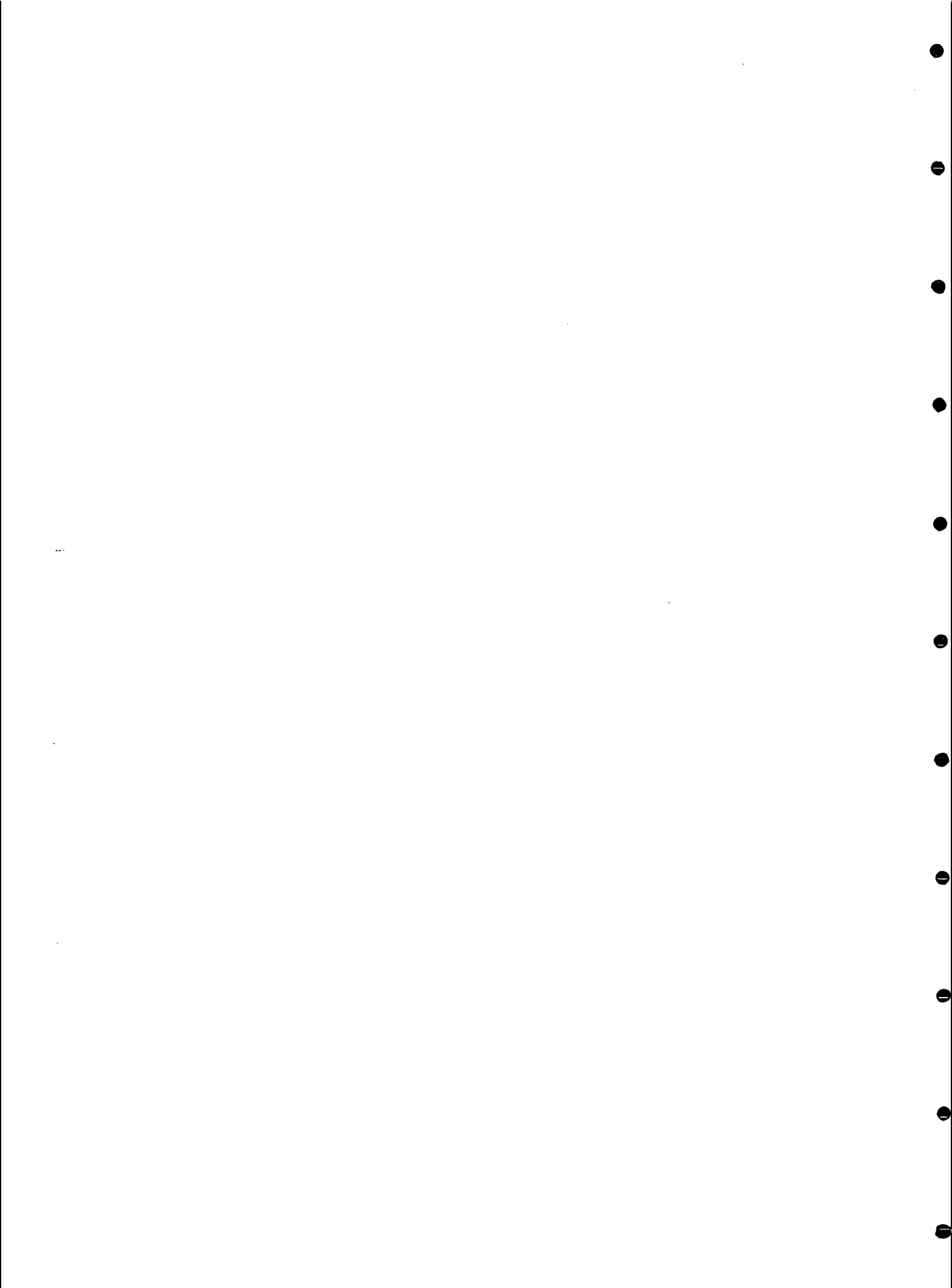
INTRODUCTION

The books *Defensible Space* and *Architectural Design for Crime Prevention* discuss several research and demonstration efforts conducted under the supervision of Oscar Newman, President of the Institute for Community Design Analysis. For the purposes of this review, we have taken the various studies in the two books and divided them into three groups. The first set of studies includes the author's investigations of defensible space hypotheses based on architectural and crime data from over 100 public housing developments in New York City. The second group focuses on Newman's comparison of the Van Dyke and Brownsville public housing projects. The third group consists of the study reported in *Architectural Design for Crime Prevention* based on a survey of 425 public housing residents from seven developments in New York City. A discussion of the research efforts in both books is presented below.

OVERALL STUDY OBJECTIVES

The author states that the studies have three major objectives: (1) to outline some of the crime related problems created by the built structure of urban housing, (2) to isolate those facts that influence the attitudes and behavior of persons living in that housing, and (3) to provide recommendations for improving architectural design of both new and existing residential structures.

The author presents and, to some extent, tests a series of hypotheses on the relations between crime and physical attributes of the urban residential environment. These hypotheses are:

(1) *Territoriality* -- The physical (built) environment can create perceived zones of territorial influence that encourage tenants to adopt proprietary attitudes and to employ "potent territorial prerogatives" that can act as a natural and important crime deterrent.

(2) *Natural Surveillance* -- The physical (built) environment can provide surveillance opportunities for residents that can contribute significantly to securing the environment for "harmonious activities" and reducing fears and anxieties concerning criminal victimization. Improved surveillance opportunities function most effectively as a crime deterrent when they are provided in the context of subdivisions of residential areas (the "privatization" of space) for which the individual considers himself responsible.

(3) *Image and Milieu* -- The physical (built) environment can influence one's perception of a residential complex's "uniqueness, isolation, and stigma." These perceptions can contribute to making a given environment vulnerable to criminal activity.

FIRST SET OF STUDIES

RESEARCH DESIGN

The author relies on archival crime data from the New York City Housing Authority, data from the New York Police, and tenant and building characteristics data to investigate the relationship between physical variables, crime rates, and the locations of crimes within more than one hundred housing authority complexes. The hypothesis is that there is a positive correlation between the extent of crime and such variables as building height, number of persons using a lobby entrance or elevator, the extent of interior public space hidden from view, and other surveillance-related factors. In addition to using the archival data, the author also conducted interviews of public housing residents, but the data from these interviews is not reported in *Defensible Space*. The research design can be classified as pre-experimental.

SOME OF THE VARIABLES USED IN THE STUDY

- building height
- project size
- building type
- territoriality
- surveillance opportunities
- crime rate
- felony rate
- robbery rate
- location of crimes
- public housing residential complexes

OPERATIONALIZATION OF VARIABLES

Building Height -- Three distinct methods are used to define building height operationally:

(1) When the author investigated the relationship between crime rate, building height, and project size, buildings were divided into two groups -- those of six stories or less and those of more than six stories. (*Defensible Space*, p. 28)

(2) When the author investigated the relationship between felony locations and building heights, buildings were divided into three categories -- three stories, six and seven stories, and thirteen stories and over.

(3) When the author investigated the relationship between felony and robbery rates and buildings heights, buildings were divided into five categories -- four stories, six stories, seven or eight stories, thirteen or fourteen stories, and over sixteen stories.

Project Size -- For all analyses, the author divided projects by size into two categories -- 1,000 units or less, and more than 1,000 units.

Building Type -- The author divided the buildings into
three categories -- single loaded corridor, double loaded
corridor, and cluster corridor. Single loaded corridors have
apartments only on one side of the hallway. Double loaded
corridors run the full length of the building with apartments
on both sides. Cluster corridors do not run the length of the
building, but provide access to a limited number of apartments
in a specific area of the building. (*Defensible Space*, pp.
71, 93).

Surveillance Opportunities -- The author states that sur-
veillance capacity is:

> ...the ability to observe the public areas of one's environ-
> ment and to feel continually that one is under the observa-
> tion of other residents while on the grounds of the projects
> and within the public areas of building interiors.
> (*Defensible Space*, p. 78)

Surveillance opportunities are operationally defined in two
ways: (1) distance from the street, and (2) quality of lobby
visibility. Two methods of categorizing and measuring sur-
veillance were employed by the author:

(1) The author collected data on housing projects and
placed them in three categories -- (i) those projects with
buildings facing the street and within fifty feet of it, (ii)
those projects facing the street, within fifty feet of it, and
with good lobby visibility (large window area), and (iii) those
projects with less than thirty percent of the buildings facing
the street and within fifty feet of it.

(2) The author collected data on housing projects and
placed them into three categories according to the quality of
lobby visibility from the outside primary door -- (i) good
entrance definition, good visibility, (ii) one good rating,
one poor rating on entrance definition and visibility, and
(iii) two poor ratings. No further explanation was given of

how good or poor ratings of entrance definition and visibility
were arrived at.

Territoriality -- The author does not define territorial-
ity operationally. He states that territoriality is a protec-
tive attitude held by a resident toward the residential complex
in which he lives. This attitude can be stimulated by physical
design attributes such as: (1) the use of real and symbolic
barriers to subdivide space into public, semi-private, and
private areas, and (2) the allocation of smaller numbers of
apartments to entrances or hallways, as well as other design
features.

Although the author does not operationally define territor-
iality, he uses a surrogate physical design feature as a mea-
sure -- the number of families sharing a hallway -- in place
of measurement or definition. He divides public housing pro-
jects into three groups -- 2-5 apartments per hallway, 6-8,
and 9 or more -- and then compares data on the number of crimes
committed in these groups.

The author suggests, two other surrogate measures of
territoriality: building height and project size. (Defensible
Space, p. 71). The author also discusses a number of mechanisms
that he hypothesizes will promote territoriality:

- the subdivision of housing developments in order to
  define zones of interest for particular buildings

- the creation of boundaries that define a series of
  increasingly private zones in the transition from
  public street to private apartment

- the incorporation of features and facilities that
  define zones of influence according to occupant needs

- the significance of "number" in the subdivision of
  buildings and housing projects.

Image and Milieu -- No empirically oriented methods were used to define operationally or to measure the factors that the author discusses under the terms "image and milieu."

Crime Rate -- This variable includes archival data on total felonies, misdemeanors, and "offenses" (disorderly conduct, vagrancy, etc.) that occurred in 1969. Crime rate represented the number of crimes per 1,000 population in each housing project.

Felony Rate -- Total number of felonies per 1,000 population.

Location of Felonies within Housing Project -- This variable included the following categories:

(1) Interior private spaces (apartments)

(2) Interior public places -- lobbies, elevators, stairs, social areas, and roofs (included as "interior" presumably because they are reached through the interior of the building).

(3) Exterior spaces: project grounds.

SAMPLING PROCEDURES USED

For much of his analysis, the author uses a sample of 100 housing projects in New York City where data were readily available. For his analysis of the relationship between the number of crimes committed in hallways and the number of apartments per hallway, the author uses 140 public housing projects. (*Defensible Space*, pp. 27, 69) The only information given on the selection process is that the 100 projects met the following criteria: (1) the projects were composed of uniform buildings, and (2) the project had to be seen as an entity separate from the surrounding community. (*Defensible Space*, p. 27).

STATISTICAL METHODS USED

Descriptive Statistics -- The study provides raw data, means, standard deviations, and calculations of the percentages of crimes occurring in specific types of locations in the housing projects.

Analysis of Variance -- The author performed two-way analysis of variance of projects by building height and type with regard to measures of crime.

The following statistical methods were described, but not otherwise referred to or explicitly applied in the text:

Multiple Regression Analysis -- The author states that he used stepwise multiple regression analysis to measure the relationship between 10 physical variables (independent) and several dependent variables -- number of crimes, crime rate, and locations of crimes. The author states that he also used this technique on a combination of physical design and social variables and the same set of dependent variables, and on fifteen social variables and the same set of dependent variables.

Trend Analysis -- The author states that he used trend analysis in the following manner: Housing projects were grouped according to specific physical variables and comparisons were made across these groups for particular crimes in particular types of locations. This analysis was used to help identify physical environment/crime relationships as candidates for further statistical testing.

Now we turn to a review of the Brownsville-Van Dyke compara-
tive study reported in *Defensible Space*. Before providing a
detailed evaluation of the operational definitions, measurement
techniques, research designs, and statistical techniques used
throughout *Defensible Space* and *Architectural Design for Crime
Prevention*, we review the empirical study found in Chapter
Four of the latter work.

RESEARCH DESIGN

The Brownsville-Van Dyke study involved the comparison of
two public housing residential complexes in terms of physical
characteristics, tenant attitudes, and crime rates. The two
complexes were similar in social and economic characteristics
of tenants and location. The study was conducted through site
visits, tenant interviews, and the collection and analysis of
archival data from the New York City Housing Authority.

VARIABLES

Independent

- Physical design characteristic variables (composition
  of buildings, percentage of ground-level space coverage).

Matching

- Social and economic characteristic variables regarding
  tenants, size and composition of development.

Inferred Intervening

- Surveillance opportunities
- Perceptions of territoriality

Dependent

- Crime incident variables
- Maintenance and repair variables

Unit of Analysis

- Housing projects

OPERATIONALIZATION OF VARIABLES

Independent

- Composition of buildings: Defined by maps, illustrations, pictures, height of buildings in stories.

- Percentage of ground-level space coverage: Defined by the measure of the percentage of ground covered by buildings in the project.

Matching

- Social and economic characteristic variables of tenants. This set of variables includes:

  -- total population

  -- average family size

  -- number of children (minors)

  -- percent of population Black

  -- percent of population White

  -- percent of population Puerto Rican

  -- percent on welfare (AFDC)

  -- average number of years resident in project

  -- percent of families with two wage earners

  -- number of children grades 1-6

  -- number of move-ins 1967-1969

All the above variables were measured through data collected from the New York City Housing Authority records.

● Tenant statistics. This set of variables includes:

-- race   -- sex of head of household

-- source of income   -- age of head of household

-- assets   -- number of children under 21

-- revious housing   -- residence at last address

All the above variables were collected from a one-fifth sample of move-ins from 1967 to 1969.

● Size. This set of variables includes:

-- total size of development in acres

-- total number of buildings

-- floor area ratio

-- average number of rooms per apartment

-- density (number of persons per acre)

These data were obtained from New York City Housing Authority project physical design statistics.

Intervening

● Territoriality -- This variable was not operationally defined, except through tenant interviews. No empirical or objective definition is provided.

● Surveillance Opportunities -- Newman explains this variable according to: (1) the position of entrances in relation to the street, (2) the relation of apartments to corridors, (3) the number of windows facing entrance and grounds, (4) visibility of elevator from street, and (5) ease of visual access by police, motorists, or pedestrians. This variable does not enter into the research design, since it is never operationally defined.

Dependent

● Crime incidence: This set of variables includes the following, all measured in terms of rate per thousand population:

-- total incidents   -- number of robberies

-- total felonies   -- number of miscellaneous mischief

-- misdemeanors and offenses

These data were collected from New York City Housing Authority Records, 1968.

- Maintenance and repair: This set of variables includes:
    -- number of maintenance jobs of any sort (work tickets)
    -- number of maintenance jobs excluding glass repair
    -- number of non-glass jobs per unit
    -- number of full time maintenance staff
    -- number of elevator breakdowns per month.

These data were collected from New York City Housing Authority project managers' bookkeeping records.

SAMPLING PROCEDURES USED

The two housing complexes were selected because they were substantially different in physical design characteristics, while the socioeconomic characteristics of the residents and the locations of the complexes were similar. No information is given on the size or type of the sample of tenants from the resident population.

STATISTICAL METHODS USED

The comparison of the two residential complexes did not include any statistical tests. The study presents only descriptive statistics, percentages, frequency distributions, raw data, and crime rate, from which the author drew his conclusions.

THIRD SET OF STUDIES

Now we turn to a review of the empirical study found in Chapter Four of *Architectural Design for Crime Prevention*. (Chapter Five also presents and analyzes empirical data, but that study is also reported in *Defensible Space* and is reviewed above.)

RESEARCH DESIGN

The study consists of a survey of tenants who live in seven public housing projects in New York City. The study is

descriptive and exploratory and does not test hypotheses or manipulate variables.

VARIABLES

Independent

- Housing development
- Location within the building
- Building height
- Resident characteristics

Dependent

- Fear of crime
- Neighbors' willingness to accept delivery of package

OPERATIONALIZATION OF VARIABLES

Independent

- Housing development -- Highbridge, Bronxdale, Breukelen, Edenwald, Gravesend, Hammel, Throgg's Neck.
- Location within building -- halls, elevators, stairs, entrances. All were listed on the survey form where the respondents were asked to rate their fear of crime in each of the areas.
- Building height -- This variable was trichotomized into 3 stories, 6-7 stories, and 10 or more stories.
- Tenant characteristics -- (1) Age: Grouped into four categories -- under mean, over mean, over 60, and under 30. It is not clear from Appendix D whether the age was asked by surveyor or estimated. (2) Rate: white, Black, Puerto Rican.

Dependent

- Fear of crime -- This variable was measured through the survey on a 1 (safe) to 5 (unsafe) scale as the respondent was given the instruction: "Rate your fear of crime in the following areas."

- Neighbors' willingness to accept delivery of package --
  This variable was measured through the survey in response
  to the following question: "Which doors in your build-
  ing could you knock on to accept the delivery of a
  package the next day?"

SAMPLING PROCEDURES USED

A total of 425 residents were selected at random and
surveyed in the seven housing projects. The seven projects
were chosen, since they received modernization funds from HUD.

STATISTICAL METHODS USED

Descriptive Statistics -- Survey results are reported as
percentages and means.

*QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS*

The starting point in assessing the quality of the operational definitions is Newman's set of independent variables. Although the Appendix of *Defensible Space* includes a vast array of physical and social variables, the text discusses only a lesser number of several physical variables that were operationally defined. These include building height, project size, project type, percentage of land covered by housing project buildings, and number of apartments per hallway.

- Building Height -- The standard measure used is the number of stories, and this can be expected to be reliable. The author uses such a wide variety of groupings and categories, however, that comparability of measures across various tests becomes impossible. In some tests, building height was divided into two categories, while in others three to seven categories are used. The categories selected depended on data availability. In the multiple regressions project size was a continuous variable.

- Building Type -- The only typology used in the analysis of variance is that of corridors (single, double, or cluster), and this represents a serious weakness in the study. The author obviously collected sufficient data to differentiate public housing projects along a number of physical design dimensions, but he failed to use this information.

- Number of Apartments per Hallway -- The operational definition is straightforward.

- Locations within the Building -- The operational definition is straightforward and the use of terms such as halls and elevators produces reliable and valid indicators of the location within the building.

- Age and Race -- The measurement of these variables, though not explicitly outlined in the study, is expected to be reliable and valid.

Intervening Variables

The author's research design in *Defensible Space* (discussed
in detail below) implies that there are several intervening
variables that logically lie between the independent (physical
and social) variables and the dependent (crime-related) variables.

- Surveillance Opportunities -- The quality of the opera-
  tional definition of this term is quite low. Although
  two empirical methods were used to quantify this
  variable, the validity and reliability of the measure-
  ment techniques employed are questionable. Certainly,
  the number of surveillance opportunities available
  within a given residential environment is a function
  of many physical variables and activity patterns within
  housing project grounds, lobbies, hallways, social
  areas, and so forth. To develop a valid measure of
  the "surveillance opportunity potential" of these
  areas, the variability of activity patterns over seasons,
  times of day, etc., would have to be taken into con-
  sideration. The operational definitions supplied by
  the author are too simplistic, relying on such factors
  as: (1) whether a given percentage of project buildings
  face the street, (2) whether the buildings are within
  50 feet of the street, and (3) whether there is "good
  entry lobby visibility" (which is itself never opera-
  tionally defined). The Appendix includes some addi-
  tional data that may be helpful as a starting point
  in developing a valid and reliable composite index or
  scale to define "surveillance opportunities" opera-
  tionally, but as it stands the author's use of this
  variable as an explanation of crime rates and crime
  locations is conjectural and not empirically supported.

- Territoriality -- This term is never operationally
  defined. Although the author hypothesizes that the
  existence or non-existence of certain physical features
  affect territoriality, these hypotheses are not tested.
  Further, no independent measures of this phenomenon or
  attitude are provided. Therefore, none of the author's
  research as explained in the text serves to show how
  territoriality can be quantified with sufficient validity
  or reliability to merit inclusion in an empirical
  study. The author has defined territoriality impression-
  istically and has then assumed its usefulness as an
  explanatory factor.

- Image and Milieu -- Neither of these terms is operationally
  defined or quantitatively measured, and therefore their
  effect on crime cannot be effectively demonstrated.

Finally, though these possible intervening variables may be operationally defined, explained, or further developed through analysis of Newman's interview or other data, it remains the case that those data are not reported or analyzed in the text of *Defensible Space*.

Dependent Variables

In general, the dependent variables, including total crime rates, felony rate, robbery rate, total misdemeanors, felonies and offenses, and the locations of crimes are appropriately defined in the study, though one would want to know more about the quality of the reporting and recording mechanisms of the New York City Public Housing Authority Police before accepting the data at face value. It is possible that the data are not accurate and that systematic reporting biases exist and seriously affect the quality of the data. Failure to identify public housing projects with poor crime reporting mechanisms weakens the data base. The author fails also to explain in *Defensible Space* why he used data on only 100, 133, or 140 housing projects (depending on the analysis undertaken) out of the 169 housing projects that there were in New York City during the year used as a base (1969).

In the empirical study in *Architectural Design for Crime Prevention*, the operational definition of "fear of crime" is problematic. The survey asked respondents to rate particular locations with regard to the fear of crime associated with each. The survey reporting form is inconsistent with this instruction, however, since it records the answers on a five point scale from 1 (safe) to 5 (unsafe). Further, this variable was measured through only one item on the questionnaire, which may result in a lower reliability than would have been achieved with the use of several complementary questions. This was beyond the author's control since he was allowed to add only a limited number of questions to an already existing

survey. The operational definition of "neighbor's willingness to accept delivery of a package" was also measured through one item on the questionnaire. The item that asked, "How many doors...could you knock on?" may or may not have been understood fully by the respondents. With only one item, there is no check on the reliability or validity of the variable as measured by the author.

APPROPRIATENESS OF THE RESEARCH DESIGN

Defensible Space and *Architectural Design for Crime Prevention* present not one or two formal research designs, but rather a variety of methodologies, statistical tests, and a broad range of hypotheses, theories, and conclusions. These are discussed individually below.

Brownsville-Van Dyke

Many people have commented on the Brownsville-Van Dyke study, which is a variation of the "static group comparison" type. The research design is based primarily on the following premise: Since the two public housing projects being compared are "similar" in tenant characteristics and location and different in physical characteristics, the variations between them in crime rates, crime patterns, and crime locations are functions of the differences in physical characteristics. This premise has received three general types of criticism. First, Hillier (1973) states that there were important differences in drug use and possibly in financial assets between the two resident populations. Second, because the study concerned only two projects, one may not be able to generalize Newman's findings to apply to the more than ten thousand housing projects that exist in this country. Third, this type of research design has little power to ascertain cause-effect relationships (even if the variables were

operationally defined with accuracy, precision, and reliability).
Therefore, it does not yield an adequate base of knowledge to
ascertain why there are certain relations between physical
design attributes and crime rate and crime locations.

Other Studies Reported in Defensible Space *and* Architectural
Design for Crime Prevention

The related set of analyses, methodologies, comparisons,
and "hypothesis testings" presented in the text of *Defensible
Space* (exclusive of the Appendix) is vulnerable to two basic
criticisms. First, these approaches do not form, in any
sense, a single research design capable of testing hypotheses
or explaining the empirical relations between and among the
various independent, intervening, and dependent variables.
Second, the approaches taken allow the author to gloss over
critical assumptions on the behavior and decision-making
processes of offenders without offering empirical data support
his contention that defensible space characteristics affect
offender perceptions and behavior. A formal research design
would have identified key parts of the defensible space theory
that require formal operationalization, supporting data, and
hypothesis testing. No such model is presented, and the internal
validity of the research effort in *Defensible Space* is ques-
tionable. With regard to the empirical study found in Chapter
Four of *Architectural Design for Crime Prevention*, there is
no formal research design, other than the collection of explora-
tory data from public housing tenants through resident surveys.

APPROPRIATENESS OF SAMPLING PROCEDURES

In various places in the study, Newman notes that data
come from 100, 133, or 140 housing projects. Since data avail-
ability guided the selection there may be a bias due to the
sample. The scope of the study did not provide for primary
data collection. Therefore, the sampling used by the author
appears to be the best approach possible.

Sampling in the Brownsville-Van Dyke study has two major
faults. First, the small sample size is a great threat to the
external validity of the study. Second, to the extent that *all*
possibly significant crime inducing or deterrent factors were
not matched (such as management as policing policies, crime
reporting policies, the existence of youth gangs, etc.), the
comparison is simply not sufficient to draw any reliable
conclusions on the effect of physical characteristics on crime
rates. With regard to the sample of 425 residents in seven
housing projects reported in *Architectural Design for Crime
Prevention*, no information is given on how the tenants or pro-
jects were selected. It is enough to say that the 425 residents
should have been selected randomly, and the seven projects
should have been selected according to a random, stratified, or
other formal sampling procedure.

APPROPRIATENESS OF STATISTICAL METHODS

Analysis of the use of various statistical methods used in
Defensible Space and *Architectural Design for Crime Prevention*
has revealed several important weaknesses.

Analysis of variance -- F-tests were not reported for the
ANOVA's conducted on the data presented on pp. 28 and 72
(project size, building type, and height in relation to crime).
Since the sample sizes within the cells are not equal, the
design is not orthogonal. Whenever a non-orthogonal design is
used, it is important to specify exactly what null-hypothesis
is being tested and by what method. (See Speed, Hocking, and
Hackney, 1978, *Journal of the American Statistical Association*,
pp. 105-112).

The analysis of the relation between building height and
crime, where Newman divides public housing projects into those
with six stories or less and those with more than six stories
may be subject to grave objections to its internal validity.

Table 2 on p. 130 suggests that the elevator accounts for 17% of the total felonies, misdemeanors, and offenses. Since it is likely that all buildings with more than six stories have elevators, while a significant portion of those with six stories or less do not have elevators, the rate of crime may be lower in buildings with fewer stories simply because that group includes those without elevators. This is only one of the many alternative, plausible explanations that could be studied further in an attempt to understand the hypothesized relationship between building height and crime rates.

Descriptive statistics -- Newman relies heavily on descriptive statistics. His use of these statistics ignores the argument presented above that the presence of the elevator, rather than the number of stories, may be a primary contributor to crime.

The data that Newman presents on surveillance, summarized in Tables 9, 10, and 11 (pp. 84-85), do not provide a basis for hypothesis testing. The factors defining the group (good/poor visibility, etc.) are operationally defined in the Appendix. These tables alone and without variance information are not sufficient to support any conclusions on the relationship between surveillance opportunities and crime rates. In both books, Newman relies on descriptive statistics, but those are generally weak and insufficient because the author does not present enough information. For example, the mean without the variance and range does not summarize data, since it lacks necessary information about the distribution.

Trend analysis -- Although this method is only mentioned in the Appendix, several points are worth noting. First, the specific variables originally used to form the groups might cause a bias in the final analysis, such as regressions, particularly if these variables are included in the regression

analysis. If the trend analysis was used to define cut-off points and form groups for ANOVA, that would amount to manipulation of the data to conform to the hypothesis. Since "t" tests were mentioned (p. 232), we assume that grouping took place using only two groups. If more than two groups were formed, "f" tests should have been used. There is no standard theory that guarantees the author's statement that, "This trend analysis enabled us to more accurately select those relationships for which statistical testing would be useful." If two groups that the author created are from the two extremes of the distribution of the physical variable, this method may mislead the analysis, since the middle part of the distribution might change the relationship between physical and crime variables.

Correlation matrix and stepwise multiple regression analysis -- although these methods are only mentioned in the Appendix, several points are worth noting. First, if the significance level reported in Table A6 ($\pm.2701$) is correct, then the number of cases used for calculating the correlations in the matrix must be between 52 and 57 (with d.f. between 50 and 55), and not the 133 projects that one is led to believe from the conceptual model. Second, while an N of 133 would probably be sufficient for a regression model containing 12 variables, it is not very likely that the estimates in a model with 12 variables and 57 (maximum) cases would be stable. The sample which represents all of the projects in New York for which data needed for the regressions were available was too small for statistically valid conclusions to be drawn concerning the relationship among physical and social variables and robberies. Finally, the scale properties of many variables are weak, and this may result in non-linear relationships, rather than the additive linear model used in the regression analysis. For example, "visibility of elevator from outside" on p. 220 has a range from zero to six, zero standing for

"no elevator" and six standing for "cannot tell from drawings."
Even when those extreme points are converted into missing data,
there remains a scaling problem, with four as "fully visible"
and five as "mixed." In addition, the problems of validaties
and reliabilities of variables seriously affect the relation-
ships and may result in a model different from that which could
be obtained by reliable and valid variables.

POWER RELATIVE TO THE OBJECTIVES OF THE STUDY

Because of the small sample size of two in the Brownsville-
Van Dyke study and the limitations of the operational defini-
tions and hypothesis testing in the other areas of research,
the power of the research designs is very low.

OTHER QUESTIONS

The author obviously collected a broad range of data and
performed a variety of statistical tests that were not incor-
porated into the text of the study. Further, the brief
references to this information in the Appendix are of little
value to one seeking to criticize the study on methodological
grounds.

CONCLUSIONS

The author reports many conclusions throughout the study
and summarizes them in the last chapter. Some of the major
conclusions are:

- Crime rises with building height, until a leveling
  off occurs at approximately 13 floors.

- Larger housing projects experience higher crime rates
  by fostering feelings of anonymity, isolation, and
  impersonality.

- Physical design characteristics can play an important part in reducing crime through fostering territoriality, natural surveillance, and positive image and milieu.

- High rise projects experience higher rates of crime within their buildings and interior public spaces than do low rise buildings.

- Public housing projects with fewer apartments per hallway have a lower rate of crime committed in hallways.

- Twice as many residents of low rise (three stories) developments rated their buildings as safe or fairly safe (32 percent to 16 percent of residents in low and high rise developments respectively.

- Residents feared stairs and elevators more than lobbies or halls. Stairs were the most fear producing, lobbies the least fear producing.

- Number of people who stated that all persons on their floor would accept a package (neighboring) was more than twice as great in low rise units than in high rise units. But the number of people who stated that no one would accept delivery was the same for low and high rise.

DISCUSSION AND CONCLUSIONS

As mentioned in the evaluation of the dependent variables, the finding that crime rises with building height may not accurately describe the observed phenomenon. Table 2 (p. 31) of *Defensible Space* shows that felonies and robberies often occur in elevators. Assuming that residents of the first floor do not use elevators, the number of target people is low for a low-rise project. If the researcher uses the crime rate per 1,000 population as a standardized measure across projects, then it should be recognized that this denominator includes a much higher percentage of "non-target" persons (non-elevator users) than is found in high rise buildings. To the extent that low rise buildings have more non-target people, the relative crime rate (controlling for elevator usage) is under-estimated for low rise projects compared to high rise projects. For example, if the housing project has 300

residents in a three story building (100 per floor) with 30 crimes per year in the elevator, the correct crime rate per 1,000 population is $30/200 \times 1,000 = 150$ crimes and not the gross measure of $30/300 \times 1,000 = 100$ crimes. This example shows that there is a problem in the denominator used to derive the crime rate. Further, analysis of Table 2 shows that many crimes are closely associated with specific locations. This suggests that it would be useful to analyze crime rates in public housing using a denominator which reflects the number of opportunities available to the offender.

The conclusion that larger housing projects experience higher crime rates (by fostering feelings of anonymity, isolation, and impersonality) is both supported and not supported by the data. Two analyses of variance show somewhat contradictory results. Analysis of variance for project size by building height shows that projects with populations greater than 1,000 experienced higher crime rates. However, there is no valid or reliable measure of anonymity, isolation, or impersonality in the study. Therefore, there is little research-based evidence presented in the study to support this conclusion.

The conclusion that physical design characteristics can play an important part in reducing crime rates through territoriality, natural surveillance, image, and milieu is not supported by the data presented in the study. None of these causal factors was measured with reliability or validity.

The other two conclusions listed above are supported by the data. One cannot, however, generalize from these particular findings to say that either conclusion provides generous support for the principles of "defensible space" as developed by Newman.

In sum, the statistically reliable conclusions that one can legitimately draw from the studies regarding the ability

of architectural design to create "defensible space" and to reduce crime and fear of crime are limited, since no adequate operational definitions of "defensible space" are provided. The building height appears to have a significant effect on robbery rate as does the variable percent of population receiving welfare. However, much further refinement beyond what is presented in the book *Defensible Space* is needed in order to use this term as a sound, empirically based concept. These studies cannot be said to show empirically that "defensible space" is a factor that can be created or has the power to reduce crime rates in public housing. This research represents an exploratory undertaking in the field. It has served as a catalyst to much of the recent study in the crime-environment field.
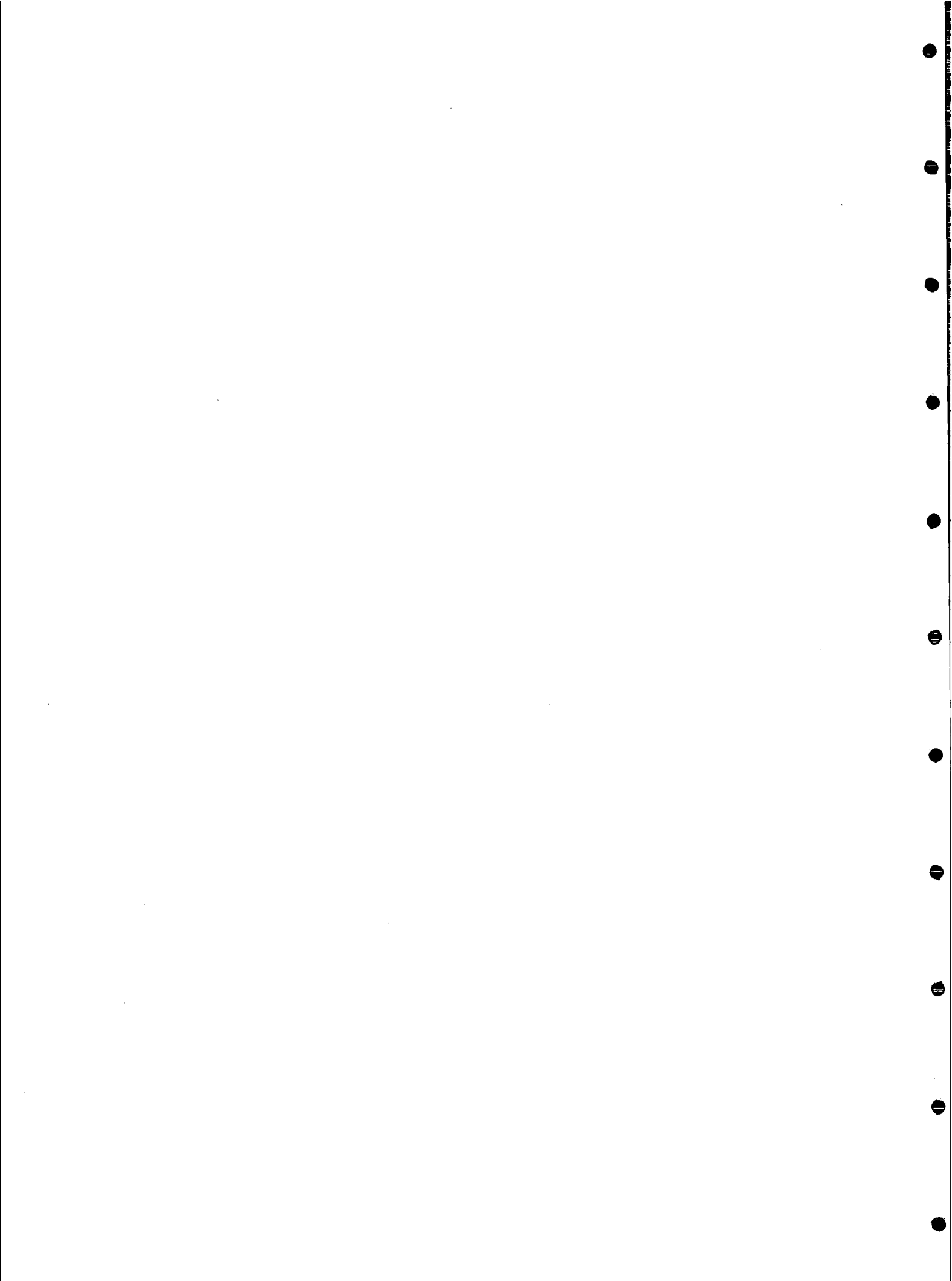
SPATIAL AND TEMPORAL ASPECTS OF CRIME
IN CLEVELAND, OHIO
AND
SPATIAL DYNAMICS OF CRIME

Author:

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Peter Hartjens

* These two studies are reviewed separately. We review *Spatial and Temporal Aspects* in its entirety. With regard to *The Spatial Dynamics of Crime*, AIR conducted a review and assessment of Chapter 5 only. This is the only chapter focusing specifically on the relationship between physical characteristics of the built environment and crime related behavior.
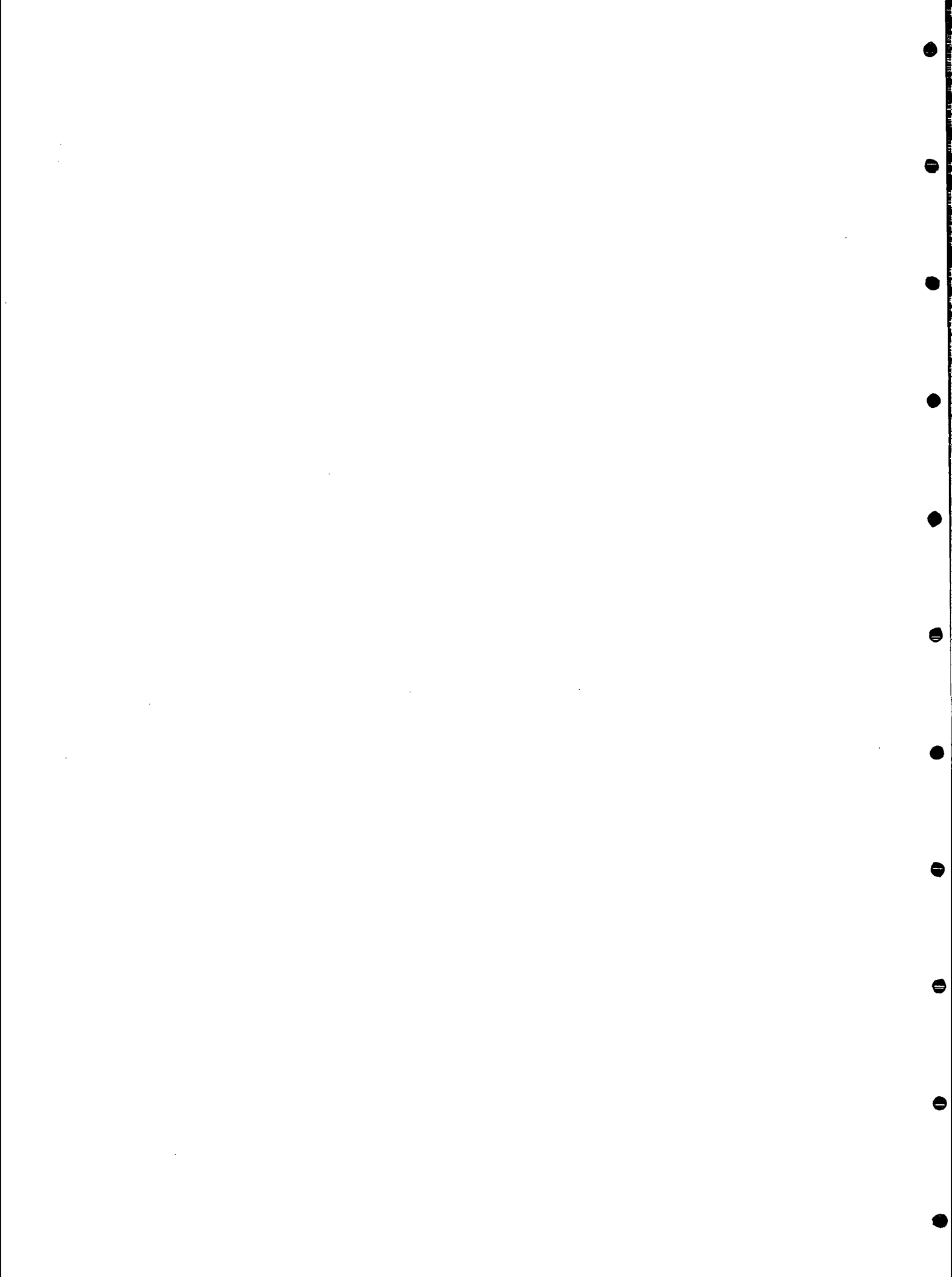
Spatial and Temporal Aspects of Crime in Cleveland, Ohio

STUDY OBJECTIVES

The purpose of the study is to compare certain aspects of crimes that took place within 27 public housing developments. The author explores the relationships between architectural features, resident characteristics, and crime.

RESEARCH DESIGN

The author collected crime incident data from 27 major public housing developments operated by the Cuyahoga Metropolitan Housing Authority over a 24-month period ending in March 1975. He used analysis of variance to test for relationships between housing types and crime and between demographic groupings and crime. The research design provided for consideration of temporal fluctuations. Spatial analysis of crime incidents was carried out through the use of maps and contingency coefficients. The research design was essentially pre-experimental and exploratory, with few specific hypotheses tested.

VARIABLES

Analysis of Variance
    Independent
- housing type
- demographic type

    Dependent
- crime incidents

    Unit of Analysis
- public housing development

Temporal Comparisons
    Independent
- demographic group
- time of day of offense

- month of year of offense

Dependent

crime incidents

Unit of Analysis

- public housing development

Spatial Considerations

    Independent

- income level (high, medium, and low) of census tracts

    Dependent

- movement of offender from census tract of origin to crime site (destination)

    Unit of Analysis

- individual offender

Multivariate Analysis

    Independent Variables

- persons per family
- single person "families"
- two-adult families
- one-parent families with children
- two-parent families with children
- number of children 0-5 years old, 5-12 years old, 12-18 years old
- number of "other adults"
- number of persons over 62 years of age
- number of persons less than 62 years of age
- number of disabled, single persons
- number of veterans

    Dependent Variable

- crime incidents divided into ten categories

    Unit of Analysis

- public housing development

OPERATIONALIZATION OF VARIABLES

Analysis of Variance

    Independent Variables

        Housing Type -- Divided into four categories: (1) row

houses, (2) three story walk-ups, (3) highrise apartments, and (4) mixed unit developments.

Demographic Groups -- Three clusters of demographic variables related to known aspects of crime (Cho, 1974), including (1) percentage of children 12-18, (2) percentage of one parent families with children, and (3) percentage of total population.

Dependent Variables

Crime Incidents -- Number and type of crimes reported to the Housing Authority during the two-year period studied.

Temporal Comparisons

Independent Variables

Demographic Group -- Same as above.

No other operational definitions are given for independent variables in this part of the study, but all the variables used are straightforward.

Dependent Variables

Crime Incidents -- Same as above.

Spatial Considerations

No operational definitions are given -- all variables are straightforward.

Multivariate Approach

Independent Variables

No operational definitions are given -- all variables are straightforward.

Dependent Variables

Crime Rate -- Two groups: one is divided into the following categories, based on the number of *crimes per resident* -- homicide, assault, disorderly conduct, robbery -- and on the number of *crimes per dwelling unit* -- grand theft, burglary, vandalism, miscellaneous incidents, and service incidents.

SAMPLING

The crime data analyzed by the author consisted of nearly the universe of crime incidents and service incidents reported to the Housing Authority during the 24-month period ending in March 1975. The sample of 27 public housing developments in Cleveland represents the public housing units previously identified by the author as high crime risk areas.

STATISTICAL METHODS

Analysis of Variance -- The author tested the hypothesis that reported crime is related to design type and demographic characteristics of the tenant population. The author reports a correlation ratio statistic (E^2), and an unbiased correlation ratio for both independent variables.

Descriptive Statistics -- The author reports percentages of crimes in various crime, temporal, and spatial categories.

Contingency Coefficient -- The author uses contingency coefficients in his analysis of the travel from an offender's starting point (census tract) to the census tract of the offense (import-export matrix). The author defines contingency coefficient as:

$$\text{Square root of} \quad \frac{\text{chi-square value}}{n + \text{chi-square value}}$$

where the chi-square is a Pearson chi-square. (See *Spatial Dynamics of Crime*, p. 151).

Canonical Correlations -- These correlations are made between the ten crime categories (criteria) and all twelve predictor variables used.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

In many cases, the variables used by the author are straightforward and the lack of an operational definition does not detract from the study, but several other key variables are not defined adequately. For example, the three demographic variables used in the analysis of variance (percentage of total population, percentage of one-parent families with children, and percentage of children aged 12-18) are not well defined, since the author failed to report either the source of the data or the equations used to derive the values. Percentage of total population is not explained at all. The general demographic grouping is questionable for two reasons. First, it is based on poorly defined variables. Second, the grouping was based on the visual appearance of demographic characteristics on a triangular graph, rather than on more formal cluster analysis. The triangular graph is somewhat misleading, since the direction from zero to one hundred imposes a certain relationship among the observations *a priori.*

APPROPRIATENESS OF RESEARCH DESIGN

There is no explicit research design, except for analyzing the data collected from the public housing authority in a variety of ways. The evaluation of the statistical methods is given below.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

If the inferences made refer to the 27 housing developments in the study, these developments form the universe or population. The generalizability of the findings beyond the 27 developments is limited, because of the lack of random sampling.*

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*The author comments that random sampling was never intended and he was only concerned about crime within the public housing units. If random sampling was not intended, the results should not be generalized.

Analysis of Variance -- The author failed to report F-ratio and means. AIR recomputed the F-ratio (which is defined as the sum of the squares between groups divided by the sum of squares of the total) for the first analysis, where the correlation ratio was 0.24. F = (0.24/3) / (0.76/23) = 2.42.* The critical value of F with three and 23 degrees of freedom is 3.03 at the .05 level. This recomputation shows that the F test was non-significant at the .05 level. The author stated that the relationship *was* significant at the .05 level. An important mistake made by the author is shown in the following quotation: "To begin testing with these four major design types, crime rates were handled essentially as nominal variables and an analysis of variance was performed" (p. 177). To perform an analysis of variance properly, the dependent variable should be of an interval or, minimally, an ordinal scale.** In the analysis presented here, there are only two variables -- design type and crime. Design type is a categorical variable and, since crime rate is considered nominal, there are no variables at the interval or ordinal level.

The second analysis investigating the relationship between demographic groups and crime incidents is significant at the .05 level. The interpretation of this finding is troublesome, since the demographic groupings were not well defined.

Descriptive Statistics -- The author failed to report the data in tables. More important, the presentation of percentage figures throughout the article tells the reader little without the presentation of total numbers.

Canonical Correlation -- The sample size (n = 27) is too small for this type of analysis, given the number of variables involved (n = 22). In order to test this statement, AIR generated

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* The author states that his recomputation resulted in the same value. The reviewer used the formula given by Hays (*Statistics for the Social Sciences*, 1973, 2nd ed., page 684).

** The author disagrees with this comment.

37 sets of 27 observations for 22 variables from the normal distribution with a mean of zero and a variance of 1 through a random number generator. Therefore, the 22 variables were independent. The 37 sets were then used for Canonical correlation analysis with 10 criteria and 12 predictors. The results showed that the range of the first eigenvalue (R^2) was 0.99863 to 0.8668, and the fourth eigen value was from 0.75156 to 0.52714. The implication of this is that the author's reported result can be explained largely by the large number of parameters in the model relative to the number of observations. Therefore, it is improper to interpret the "factors" in these data, because of the instability of the parameters. Multivariate techniques cannot be used when the number of variables approximates the number of units in the sample.

CONCLUSIONS

The author reports:

- It is suggested that demographic groups were stronger in terms of statistical significance than architectural types in their association with cirme levels.

- There is a tendency for offenders to move from a higher income census tract to commit a crime in a lower income census tract. There were significant differences in terms of export and import of property crimes.

- Four significant canonical factors emerged when the criterion and predictor sets were analyzed simultaneously.

DISCUSSION OF CONCLUSIONS

Further research is needed on the composition of the demographic groupings used by the author, and on alternative methods for creating such groups, before confidence can be placed in the validity of statistically significant relationships found using this variable.

The conclusions on offender travel require further analysis. Without the two-way tables from which the chi-squares were computed, it is difficult to find support for such a conclusion, since the high contingency coefficient might be the result of large diagonal values or the large number of empty cells. The result is also conditional on the offender being arrested, so that his or her residence can be determined. By considering only arrested offenders, the author may be using an offender group that is less competent than the norm.

The author's use of canonical correlation was shown to be improper because of the smallness of the sample size. Therefore, we have no faith in the statistical significance found through the use of this statistical method in the present study.

Finally, one can have little confidence in the results of the study, except for the one way analysis of variance reported in the research. The problem researched is complex and requires the use of a large number of variables. Therefore, in order to generate sufficient power, many more observations are necessary.

Spatial Dynamics of Crime - Chapter Five

Urban Ecological Aspects of Crime In Akron

STUDY OBJECTIVES

The purpose of the study was to investigate the relation-
ships between location of crime and a broad range of social
and physical environmental factors. The study takes into
account socioeconomic, demographic and land use characteristics.

RESEARCH DESIGN

Using canonical factor analysis the author analyzed the
crime rates for various crimes for 94 census tracts using 39
predictor variables. Factors were developed to summarize
the variables.

VARIABLES

Independent

- Distance from the commercial core

- Thirty-nine predictor variables (see attached)

Dependent

- Crime rates for major crimes (nine categories)

Units of Analysis

- Census Tract (N = 94)
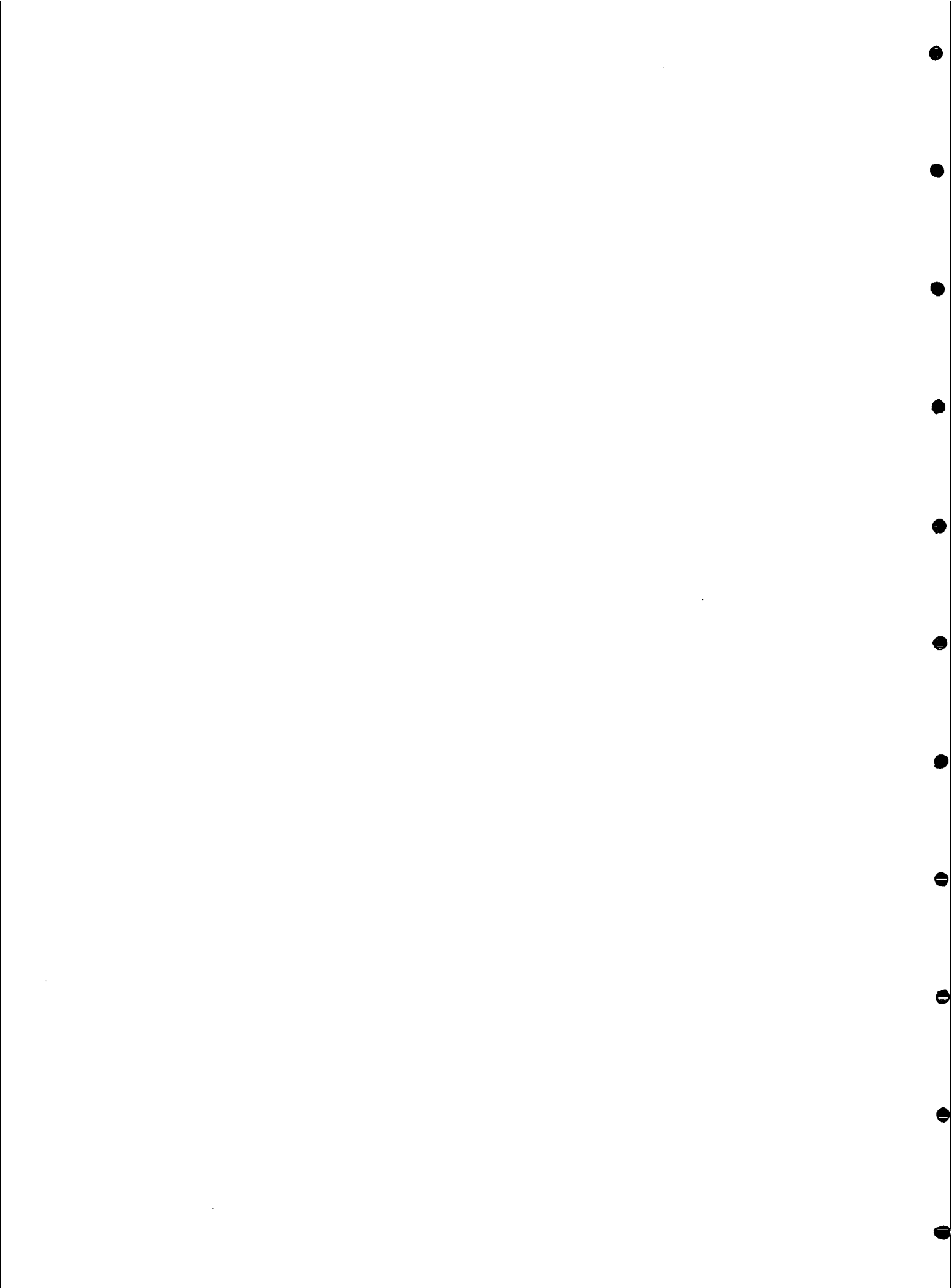
Table 10

SOCIOECONOMIC VARIABLES

Variable	
1	Population Change--1960-1970
2	Net Residential Density--1970
3	Percent Residential Structures Built Before 1950
4	Percent Units Lacking Some or All Plumbing--1970
5	Percent Dwelling Units Vacant
6	Percent Dwelling Units Owner Occupied
7	Percent of Tract in Commercial Land
8	Percent of Tract in Wholesale and Manufacturing
9	Percent of Tract in Expressways, Streets, and Alleys
10	Percent Same Households as in 1965
11	Percent of School Enrolled Population in High School
12	Percent 16 to 21 Not High School Graduates and Not Enrolled
13	Median School Years Completed
14	Percent of Work Force Not Commuting by Auto
15	Percent Male Labor Force Over 16 Unemployed
16	Percent of Female Labor Force Over 16 Unemployed
17	Percent Males Employed Blue Collar
18	Percent Females Employed Blue Collar
19	Percent Families With Annual Income Less Than $5,000
20	Percent Families With Annual Income $5,000 to $9,999
21	Percent Families With Annual Income $10,000 to $14,999
22	Percent Families With Annual Income $15,000 to $24,999
23	Percent Families With Annual Incomes Over $25,000
24	Percent Families Below Poverty Level
25	Median Income
26	Percent Population Under 5 Years Old
27	Coefficient of Change Under 5 Years--1960-1970

Table 10 (cont'd.)

SOCIOECONOMIC VARIABLES

Variable	
28	Coefficient of Change Age 5 to 9 Years--1960-1970
29	Coefficient of Change Age 10 to 14 Years--1960-1970
30	Percent Population 15 to 19 Years of Age
31	Coefficient of Change Age 15 to 19--1960-1970
32	Coefficient of Change Age 20 to 24--1960-1970
33	Percent Population 45 to 64 Years of Age
34	Coefficient of Change Age 45 to 64--1960-1970
35	Percent of Population Over 65 Years of Age
36	Coefficient of Change Age 65--1960-1970
37	Percent Negro--1970
38	Coefficient of Change Percent Negro--1960-1970
39	Coefficient of Change Percent Negro--1950-1970

OPERATIONALIZATION OF VARIABLES

Independent Variables

- Thirty-nine predictor variables were self-explanatory and not further defined by the author.

- Distance from commercial core--Although this variable was not operationally defined, it is expected that the reporting of distance in terms of miles represents the lineal distance from the commercial core to the location of the crime.

Dependent Variables

- Crime rates were developed for homicide, rape, armed and unarmed robbery, aggravated assault, larceny, residential and non-residential burglary and automobile theft. Each crime category was defined based on the Uniform Crime Reports. Data used in the study are the Summit County Crime Information System.

Census data were used to develop crime rates which represent the number of personal crimes per 1,000 population, the number of residential units per 1,000 dwellings and the number of armed robberies per 1,000 commercial buildings.

SAMPLING

The author used the universe of census tracts (ninety-four) and the total number of major crimes for which he had data. The sample of 39 predictor variables was the result of eliminating 10 from an initial set of 49 socioeconomic variables from census tapes.

STATISTICAL METHODS USED

Descriptive statistics -- The author summarized much of
the data with means, percentages, graphs, plots and computer
generated maps showing the level of crime through color varia-
tions on the map.

Canonical analysis -- The 39 perdictor variables formed
10 factors. Analysis was performed assessing the relationship
between the dependent variables and the predictor variables.

Regression analysis -- The author assessed the relation-
ship between the frequency count of crime and the distance
from the commercial core.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS

Variables

The independent variable, distance from commercial core,
was not defined fully. Such distances can be measured in
several ways and the term commercial core, itself, was never
operationally defined. The predictor variables used in the
canonical analysis were straightforward and did not require
detailed operational definition.

The author recognized the measurement problems in develop-
ing crime rates. The author used two kinds of indices, fre-
quency counts and rates per 1,000 persons, dwellings or
commercial burglaries. The author then correlated all variables
(frequency counts and rates) in order to determine which index
was more valid. The author's efforts to develop a valid crime
rate appear to be appropriate.

APPROPRIATENESS OF THE RESEARCH DESIGN

The design is adequate given the two data sources. Most of the data analyzed by the author involved socioeconomic characteristics. The design could be used with a data base predominately composed on physical design characteristics.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The author's selection of 49 predictor variables was never explained in the study. The reduction of this number to a final set of 39 variables appears to be valid on the reasons given for dropping 10 variables.

APPROPRIATENESS OF STATISTICAL METHODS

Descriptive statistics and maps are appropriate for summarizing the data. However, it appears that the canonical correlations were performed incorrectly. Canonical analysis is not factor analysis and the weights derived should not be interpreted as defining factors. Table 10 lists 39 predictor variables. It can be seen that the sum of variables 19-23 should add up to 100 percent. Therefore the matrix of predictor variables is not of full rank and the covariance matrix of the predictor variables cannot be inverted. This results in the failure of canonical correlations. Even though the singularity problem was solved, the ratio between the sample size and the number of variables was too small to obtain a stable result. For the four canonical correlations, the author estimated $(39 + 9) \times (4) = 192$ parameters which is much greater than the number of census tracts in Summit County.

The author did not explain clearly the use of cluster analysis. In addition the regressions were not reported fully. Even though the study reports the regression slopes, some of

them might not be significantly different from zero. For
example, figure 33d suggests that the high slope value was
caused by the one point which was over 400. If this outline
is eliminated, the slope value will shrink and possibly be
non-significant.

CONCLUSIONS

The author reports the following conclusions regarding
the relationship between the built environment and crime
related behaviors.

- Percent of the census tract composed of expressways,
  streets and alleys have factor loadings that were
  correlated highly with the crime rate and suggests
  greater accessibility on the part of offenders leads
  to higher crime rates.

- Percent of census tract of commercial land has factor
  loadings that were correlated highly with the level
  of non-residential burglary.

- Net residential density has factor loadings that were
  correlated highly with the crime level.

- The percentage of dwelling units without complete
  plumbing facilities has factor loadings that were
  correlated highly with crime levels.

- The percentage of census tract land in wholesale and
  manufacturing uses has factor loadings that were
  correlated highly with crime levels.

- Poor housing and population density combined have
  factor loadings that were correlated highly with the
  level of rape in an area.

- Variables which depict areas of urban transition have factor loadings which are correlated highly with murder rates.

DISCUSSION OF CONCLUSIONS

These conclusions represent elements of the relationship between poverty status and crime (lack of plumbing) and the urban nature (net residential density, expressways, percent of commercial land, wholesale and manufacturing land use, poor housing and population density) of the crime problem in the Akron, Ohio area.

The urban ecological approach used by the author was able to sort out the complex relationships between a large number of variables and levels of various crimes. The analysis undertaken combines variables of a physical and social dimension. Use of this approach focusing on physically oriented variables should be considered as a possible method of assessing the crime-physical environment relationship on census tract, city-wide or county-wide area.

Therefore, in spite of several limitations found in the author's use of statistical methods, it appears that some confidence can be placed in the findings. Several physically oriented variables were found to correlate highly with more than one type of crime. The author does not state that he has proven a causal relationship between physical factors and the crime rate. That was not the purpose of the study. Rather, this study and its conclusions represent a basis upon which future research can build in order to investigate more closely the crime-environment relationship.
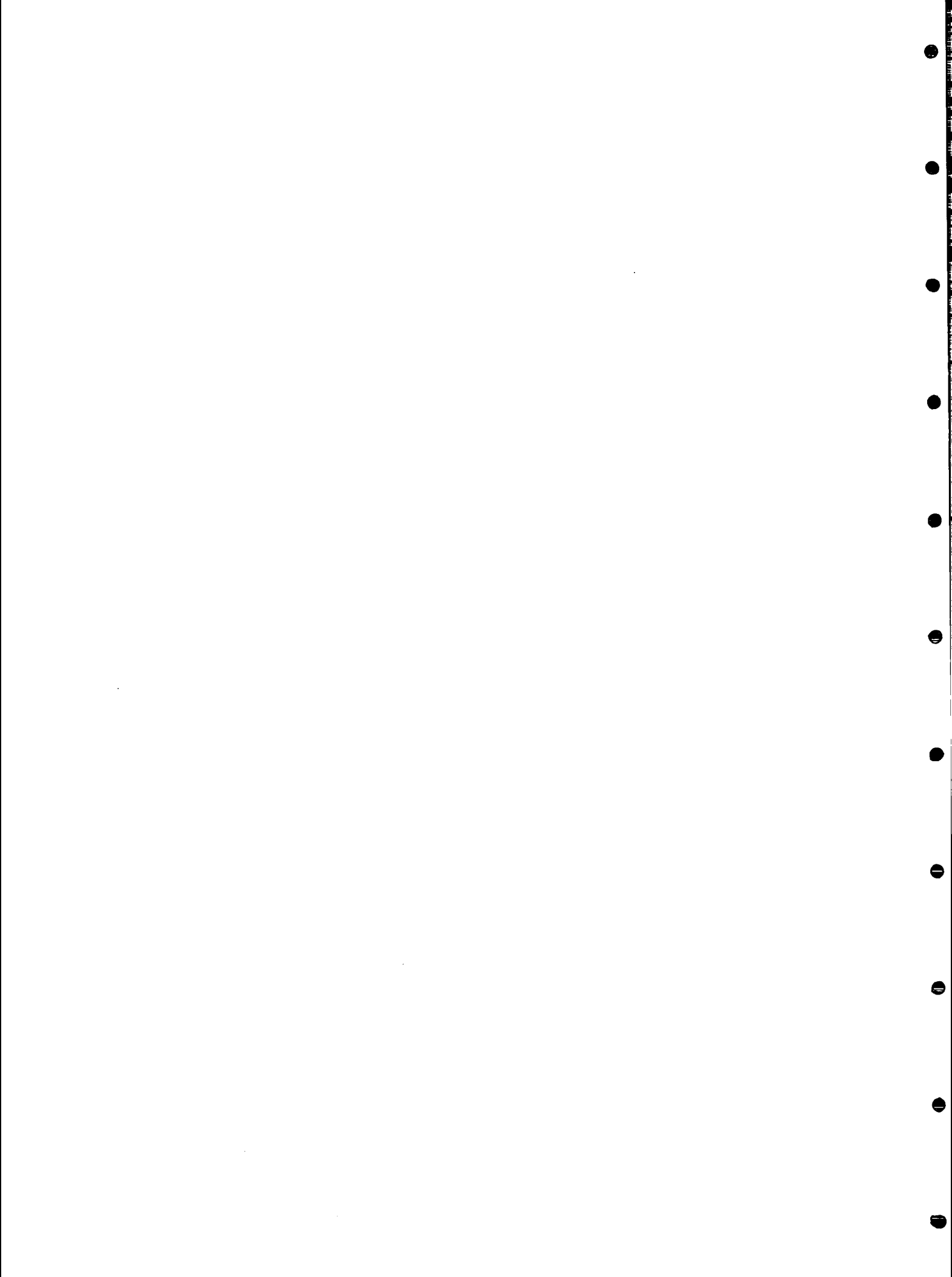
EVALUATION REPORT: TARGET HARDENING

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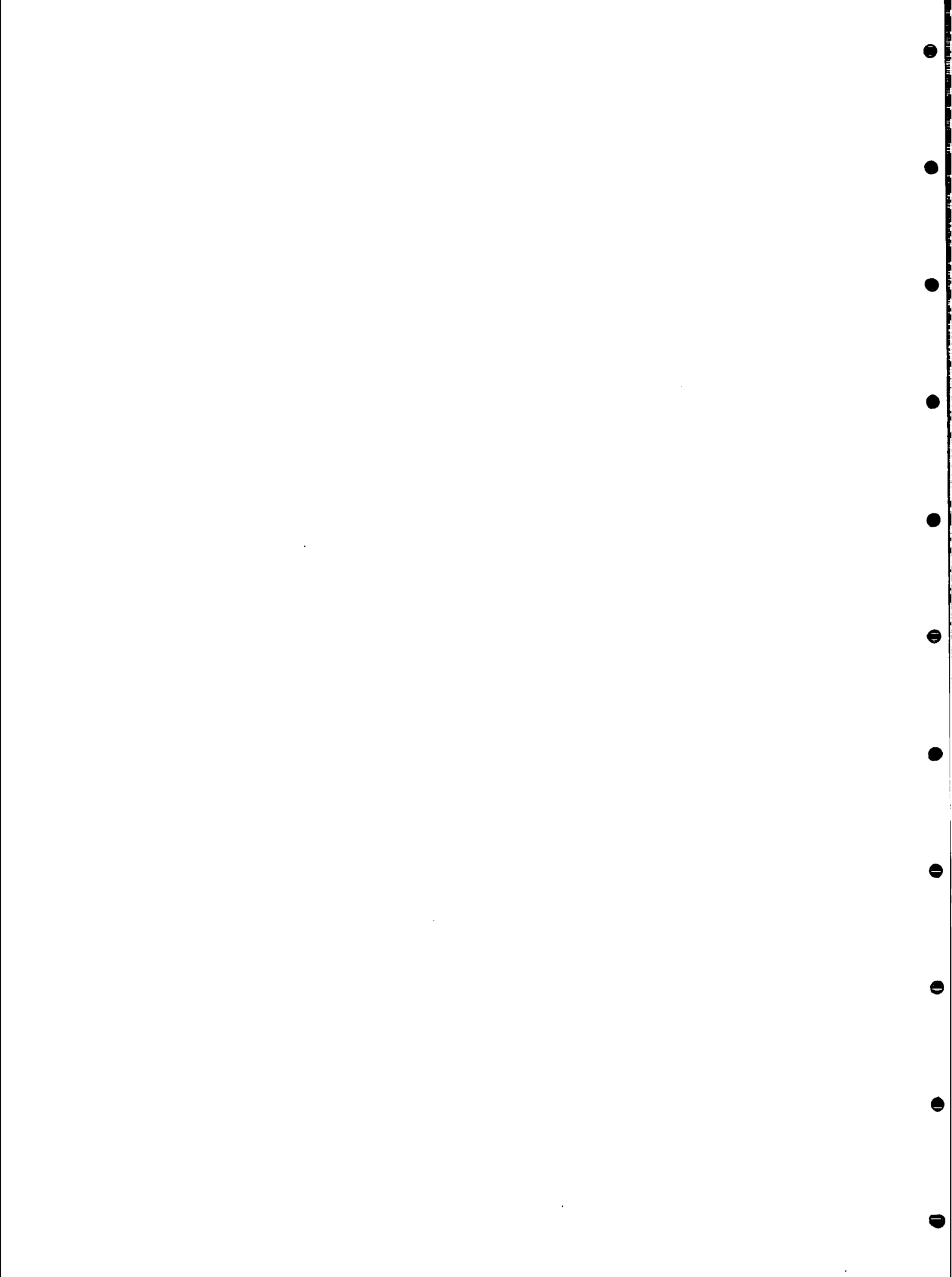
STUDY OBJECTIVES

The primary objective of the study is to evaluate the impact of a target hardening project carried out in four public housing projects. The evaluation examined the following areas of impact:

- The impact of target hardening on the burglary rate at the hardened sites

- The displacement effect of hardening on burglary rates in non-public housing units near the hardened sites

- The impact of hardening on the modes of entry used by burglars at the hardened sites

- The impact of hardening on the arrest rate for burglaries committed at the hardened sites

- The displacement effect of hardening on the rate of robbery and vandalism at the hardened sites

The evaluators sought to test the assumption that target hardening would reduce reduce the burglary rate, force burglars to use more conspicuous modes of entry and, thereby, increase the probability that the burglar would be seen and more easily identified to the police. If this did in fact occur, the authors expected there would be an increase in the number of burglaries cleared through arrest.

RESEARCH DESIGN

Four public housing projects in the City of Seattle, Washington, were the subjects of a target hardening effort. All housing units in the four projects were hardened over the period July 1974 and May 1975. The impact of hardening was evaluated on the basis of data collected from the Seattle Police Department, the Seattle Housing Authority (SHA), and a series of victimization surveys conducted at the hardened

sites and in non-public housing units located in the same census tracts as the hardened projects.*

The evaluation of the treatment effects was based on comparisons of pre- and post-hardening crime rates for the hardened sites, adjacent non-public housing, and the City of Seattle as a whole. The design is similar in form to a pre/post experimental design. However, because of the possible shifting of crime from the treatment sites to adjacent areas such as non-SHA housing, one cannot consider non-SHA housing as an appropriate control group. Thus, the design is a one-group, before/after study with comparison groups, but no real control groups.

VARIABLES

Independent Variables

- Target hardening

Dependent Variables

- Burglary rate at SHA housing projects
- Burglary rate within adjacent non-SHA housing
- Burglary rate within the City of Seattle
- Mode of entry used by burglars
- Percentage of burglaries cleared by police arrest
- Robbery rate at SHA housing projects
- Vandalism rate at SHA housing projects

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*Footnote: Victimization data based on surveys were reported in the study. However the authors said that they were not used in the analysis because of problems associated with its collection.

Units of Analysis

- SHA housing projects (N=4)
- Monthly burglary rates in these four projects

OPERATIONALIZATION OF VARIABLES

Independent Variable--Target Hardening

Target hardening consisted of:

- Installation of exterior solid case doors or structural reinforcement of existing doors

- Installation of one-inch deadbolt locks on exterior doors

- Pinning of sliding glass windows limiting opening to less than nine inches

- Construction of short walls to prevent exterior access to interior door latches

All units in the four housing projects were hardened through these measures. However, "hardening" was expected to have a substantial impact after 67 percent of the units in each project had been hardened. The authors considered the independent variable "hardening" as being operational after 67 percent of planned activities had been completed. Post program data were collected at that time.

Dependent Variables

Burglary rate at SHA housing projects--This variable was measured for both pre- and post-target hardening periods through the use of archival data collected by the Seattle Housing Authority and the Seattle Police Department (SPD).

The rate was expressed as the number of burglaries and attempted burglaries per 100 households per year. Two rates were computed, based on SPD data and SHA data, for each of the four housing projects.

Although all rates were expressed in terms of annual number of burglaries per 100 households, the tables presented indicate that data were collected for periods of between 12 months to 24 months pre-hardening, and between 15 months to 24 months post-hardening. Thus, presuming that all rates were standardized to annual rates, some of the indices reflect up to two years of experience, whereas others reflect only one year of experience.

Burglary rate within adjacent non-SHA housing--This variable was measured using archival data from the Seattle Police Department. The rate was computed for both pre- and post-hardening periods and was expressed in terms of the number of burglaries and attempted burglaries per 100 households per month. "Adjacency" was defined as all non-SHA housing in the same census tract(s) as the targeted SHA housing. Two of the sites were located wholly within a single census tract. One site was located in two census tracts and one was located in three census tracts.

Burglary rate in the City of Seattle--This variable was measured for a period of 12 months using archival data from the Seattle Police Department. A rate was computed for both a pre and post-hardening period. The length of these periods is not specified, but the total period does not exceed 12 months. The rate is expressed as the number of burglaries or attempted burglaries per 100 households per year. The city-wide data includes the experience of the four housing sites. However, the small size of the housing projects relative to the entire city leads one to expect that inclusion did not significantly affect the city-wide burglary rate.

Mode of entry used by burglars--This variable was measured for both a pre- and post-hardening period. Data where available were drawn from Seattle Police Department records. The length of the periods (pre- and post-hardening) is not specified in the report. However, the variables were measured for 250 pre-hardening burglaries and 132 post-hardening burglaries committed in SHA projects. The report indicates that these do not represent all of the burglaries committed during these two periods, due to the police records' failure to include these data on all reports.

Entry modes were characterized by the site of entry: door vs. window, and the means of access:

- Broke glass
- Forced entry
- Glass or frame removed
- Lock opened with a pick or key
- Door/window was not locked

The variable was measured as the number of burglaries where a particular mode of entry was reported.

Percentage of burglaries cleared by police arrest--This variable was measured for both pre- and post-hardening periods. Pre-hardening data were drawn from six months prior to hardening. Post-hardening data were drawn from a 12-month period. Data were drawn from Seattle Police Department records. The variable was measured for reported burglaries committed at the hardened SHA sites, surrounding non-SHA housing, and the city as a whole. The variable was operationalized as the number and percentage of burglaries for which a suspect was arrested by the police.

Robbery rates at SHA housing projects--This variable was measured for both a pre- and post-hardening period. The data analyzed were from SHA records only. The pre-hardening period

was five months. The variable was operationalized as the number of robberies reported per 100 households per year.

Vandalism rates at SHA housing projects--This variable was measured for both a pre- and post- hardening period, 12 and 5 months respectively. Data were gathered from SHA records. The variable was expressed as the number of vandalisms reported per 100 households per year.

SAMPLING

The four SHA housing projects selected represented the universe of garden apartments in Seattle in large scale public housing. All other data were collected from existing records and represent the universe of cases for the evaluation period.

STATISTICAL METHODS

Significance of Difference between Means--The paired "t" test was used to determine the significance of the difference between the following sets of means:

- The mean monthly difference between burglary rates prior to target hardening and after target hardening for

  - all SHA housing
  - individual SHA housing projects
  - adjacent non-SHA housing
  - the city as a whole

- The mean annual rate of robbery and vandalsim in SHA housing before and after target hardening

The measure was used to test changes in burglars' mode of entry from pre- to post-hardening periods, and changes in the percentage of burglaries cleared from a pre- to a post-hardening period. The measure was used to test the level of association between the pre-hardening burglary rate and the mean monthly difference between rates pre- and post-hardening.

Descriptive Statistics--The report includes frequencies and percentages on the mode of entry used by burglars, pre- and post-hardening. Frequencies on monthly burglaries in SHA housing are included in an appendix.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

- The operational definition of target hardening is developed in terms of the physical changes made at the housing sites. However, because "hardening" was defined as being operational after only 67 percent of the units were actually hardened, the variable only indirectly represents physical changes to all housing units. The failure of the evaluators to specify whether the 67 percent cut-off point refers to all of the units in the four housing projects, or to the percentage in each of the four units further obscures the validity of the variable. Conceivably, if the post-hardening period began when 67 percent of all the housing units had been hardened it is possible that a substantially lower percentage of units in any one project had actually been hardened at this point. Given the normally staggered schedule of hardening activity, this possibility is likely. The report noted that two of the projects had been completely hardened by the date that the post hardening period began.

- Burglary rate is operationalized as the rate of burglary after 67 percent of the units had been hardened. The rate does not distinguish between those units that were hardened and burglarized and those that were not hardened and burglarized. The variable also does not take into account the effect of the hardening process on the behavior of burglars and residents. Inasmuch as hardening activities were being carried out while data were being collected, there is at least the possibility of a confounding effect as burglars might display greater reluctance to commit crime and residents might be more active in their surveillance or other self-protection behavior while targets are being hardened.

- The use of census tract boundaries to define adjacency of housing would have been more acceptable if the number of households was relatively constant for each of the four sites. However, since two of the sites were located wholly within one tract and the other two were located in two and three tracts respectively it appears that the number of households contained within the boundaries of the areas studied varied. This raises the further problem of determining what proportion of the total population in any given tract was located in the sites themselves.

- A question can be raised about the comparability of the pre- and post-hardening periods used in computation of percentage of burglaries closed by arrest. The evaluators fail to report length of the two periods. However as a whole increased from 6800 in the pre-hardening period to 12,484 during the post-hardening period, suggesting that the post-hardening period was significantly longer than the pre-hardening period.

- In all other respects that variables are direct and adequate measures of the phenomena under examination.

APPROPRIATENESS OF THE RESEARCH DESIGN

The design is appropriate to address some, but not all, of the objectives of the study. As a test of the effectiveness of target hardening at the public housing sites the design is appropriate. As a test of the effect of displacement or a comparison of burglary rates at the sites and in adjacent housing the design is flawed. In order to test for displacement effects the design would be required to control for the effect of increases or decreases that would have occurred in surrounding housing in the absence of the target hardening project. The lack of a control site for the non-SHA housing prevented the evaluators from directly assessing displacement effects.

Similarly, the lack of a control site for the SHA housing
(i.e., other, non-hardened SHA housing) limited the evaluator's
ability to determine the effect of hardening at those sites.
Because the authors hypothesized a displacement effect, the use
of non-SHA housing cannot be used as a control. If displace-
ment was occurring, this would serve to enhance the measured
impact of hardening when compared to adjacent housing.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The selection of the four sites was appropriate.

APPROPRIATENESS OF STATISTICAL METHODS

Significance Tests--The use of the mean difference (D)
for the paired "t" tests is questionable. In order to use
this method, the following model has to be assumed. (AIR
developed model)

$$Y_{ij} = T_i + M_j + e_{ij} \quad with \; i=1, \; 2 \; and \; j=1,2...12,13...15$$
and where $T_i =$ *treatment,* $M_j =$ *month effect,* $e_{ij} =$ *error.*

Data presented by the authors shows that the additive model
$(T_i + M_j + e_{ij})$ may be incorrect. The data show that during the
pre-hardening period, November and December $(Y_{1,14}$ and $Y_{1,15})$
had high crime rates while the post-hardening period, November
and December $(Y_{2,14}$ and $Y_{2,15})$ do not show higher crime rates
than other post-hardening months. The differences may either
be due to random error or the possibility of an interaction
effect where the treatment influenced the month to month
variation (seasonal structure). The computation of the paired
"t" test by the author was found significant at the .05 level
with a two-tailed (non-directional) test. However, further

analysis shows that the crime data from two months, November and December, had a large influence on the mean and standard deviation of difference scores. AIR analyzed the data deleting these two data and recomputed the paired "t" test. Based upon 13 observations with a $\bar{D}$= 1.67769 and SD of 2.9849, the resulting "t" value was 2.0264 with 12 degrees of freedom. This value is non-significant for a two-tail (non-directional) test at the .05 level, but is significant for a one tail (directional) test at this level. This result, which exhibits less support for the hypothesis than that found by the authors shows that the interaction effect violates the assumption using the paired comparison. (The model assumes no interaction between treatment and month). The appropriate analytic approach might be to use analysis of variance with month as a unit of replication, site as the block and pre-post as the treatment. This approach will result in the error variance from month to month within site and condition. Inspection of the distribution of error variances would then suggest modifications in the model or transformations in the data.

Correlation Coefficient--The computation of correlation violated the assumption of random sampling since SPD and SHA data from the same site were used. Also the author's interpretation of the high correlation was wrong. The "floor effect" (which is due to the minimum value which a variable can take) will decrease the value of a correlation coefficient rather than increase it as the author suggests. The main reason for the difference score being correlated so highly with the pre-hardening rate was because the difference score was also based upon the prehardening rate (See Table 8). For example, let X_1 be the pre-hardening burglary rate and X_2 be the post-hardening burglary rate. The difference score is

X_1-X_2 $(D=X_1-X_2)$. The the correlation between D and X_1 will be computed as follows:

$$\text{Cov } (D, X_1) = \text{Cov } (X_1-X_2, X_1) = \text{Var } (X_1) - \text{Cov } (X_2, X_1)$$
$$\text{VAR } (D) = \text{VAR } (X_1) + \text{VAR } (X_2) - 2 \text{ COV } (X_1, X_2)$$
$$\text{Correlation } (D,X_1) = (\text{Var } (X_1) - \text{Cov } (X_2, X_1) / \sqrt{\text{Var}(X_1) \text{ Var } (D)}$$

If variances of pre- and post-data were equal and they were uncorrelated, the correlation coefficient of D and X_1 was $(1 - 0)/ \sqrt{2} = 0.707$. Therefore, the correlation between the pre-hardening burglary rate and the mean differences found by the author of .80 might be the result of random fluctuation rather than being attributable to the floor effect as suggested by the author.

Chi-Square--The computational method used in Table 11 for the chi-square test is unclear. There are two possible ways to compute chi-square with one degree of freedom from Table 10 in the study. AIR's recomputation using both methods showed chi-square values not equal to those reported. With regard to analysis of the data on changes in burglars' mode of entry, a log-linear model would have been better than ordinary chi-square contingency table analysis.

CONCLUSIONS

The authors report:

- Three of the four housing projects showed siginificant decreases in burglaries after hardening was completed as indicated by both SHA and SPD reports. The fourth project showed no significant change.

- Burglary is not being displaced on non-SHA housing to a measureable degree

- Housing at the hardened SHA sites showed a significantly greater reduction in burglary than the city as a whole. Moreover, hardened SHA housing showed a

reduction in burglary rates at a level that ap-
proached significance when compared to adjacent
non-SHA housing.

- Two of the individual sites showed a significantly
  greater reduction, and two sites showed no dif-
  ference when compared to adjacent housing.

- Changes in forced entry are primarily changes to
  more time-consuming and conspicuous modes of en-
  try, which increases the burglar's chances of
  being seen and of being perceived as a burglar
  rather than a legitimate occupant. The increase
  in the percentage of entries through unlocked win-
  dows and doors reflects the success of hardening
  in making forced entry more difficult.

- Hardened SHA sites showed a slight, but non-signi-
  ficant increase in the proportion of burglaries
  cleared by police arrest. Clearance rates for the
  city as a whole increased significantly while rates
  for non-SHA housing decreased significantly.

- There is no indication that hardening resulted in
  a displacement to other crimes in the housing
  project. Both robbery and vandalism rates decreased
  after hardening.

DISCUSSION OF CONCLUSIONS

The first four conclusions are based on a questionable
analytic technique, the paired t-test. The data suggest that
there may be an interaction effect between the hardening and
month-to-month variation (seasonal trends) in burglary rates
and that the analytic technique used as strongly affected by
changes in two of the 15 month periods examined. The ration-
ale behind the t-test as used here is heavily dependent on the
assumption that there is a persistent seasonal (monthly) ef-
fect (no interaction effect).

The conclusion that there was no displacement effects
could not be made based on the design used. The evaluators
did not adequately control or account for the relationship
between burglary rates in SHA housing and non-SHA housing.

In addition, detection of displacement would depend in part
on the number of housing units to which burglaries might have
been diverted. Failure to account for differences in the num-
ber of possible units included in the non-SHA population, and
their size relative to the SHA sites obscured the displacement
effect if any existed. The conclusion relating to changes in
the mode of entry is overdrawn and may be flawed by the use of
the chi-square measures as reported.
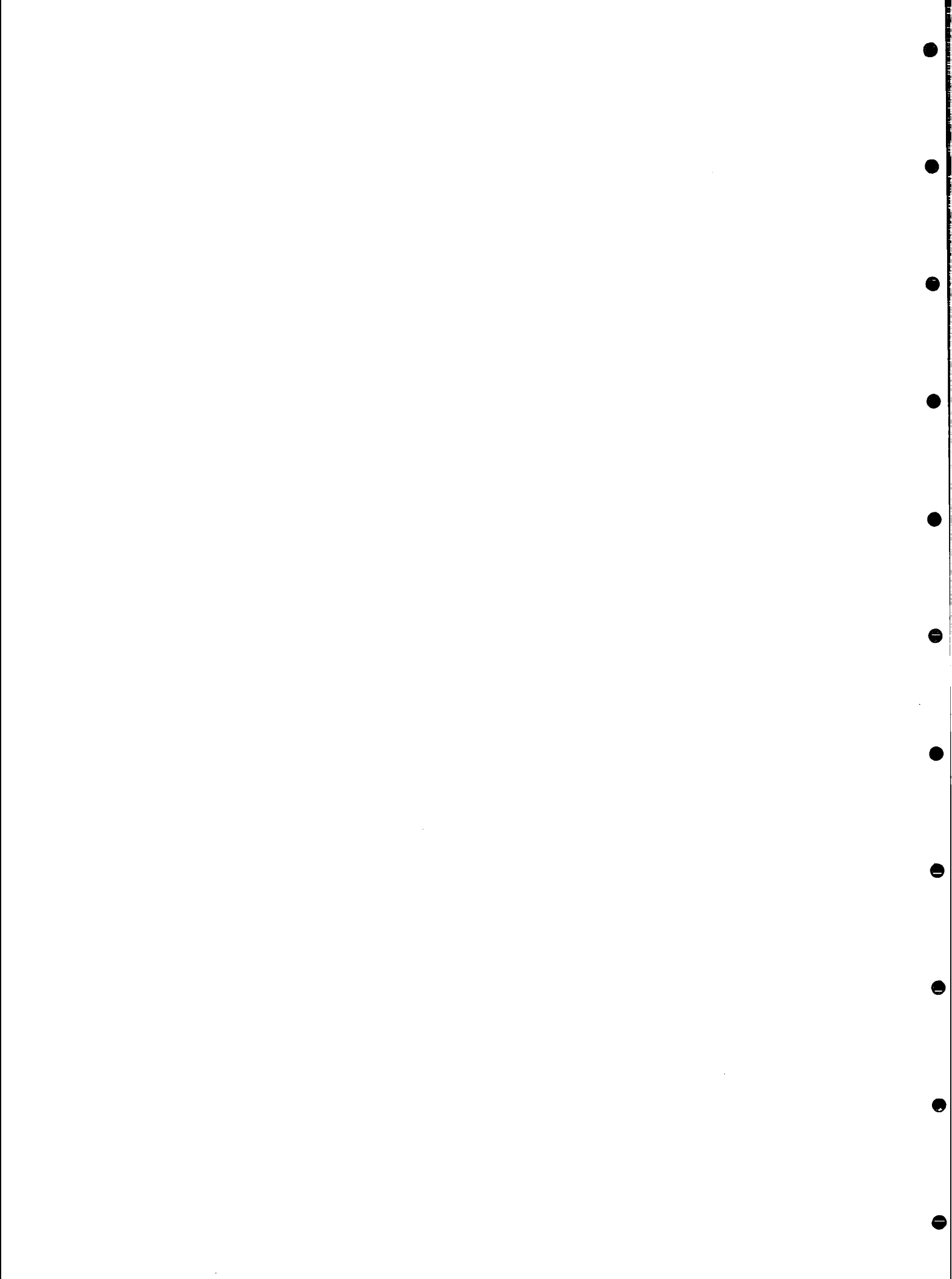
DIFFERENCES IN THE UTILIZATION OF CUES OF DANGER:
THE POTENTIAL FOR RAPE ON A UNIVERSITY CAMPUS

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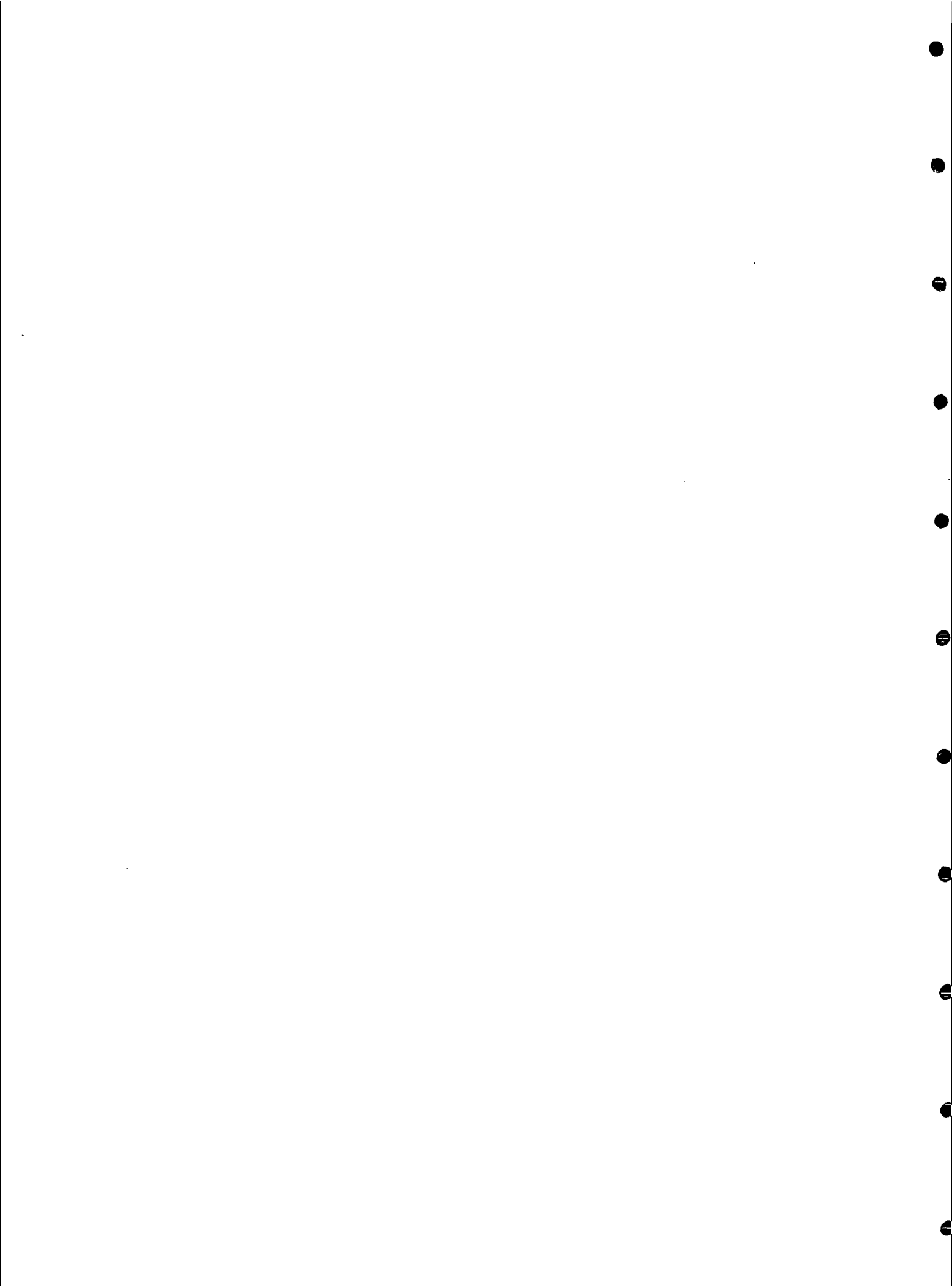
STUDY OBJECTIVES

The purposes of this study were: (1) to investigate relationships between the roles that people may assume in a given context and their capacity to use structural information contained in various behavioral contexts presented to them as cues (through photographic slides) in formulating judgments of the dangerousness of the setting, (2) to explore the utility of applying a sophisticated analytic model to the judgment process, and (3) to analyze the form and process by which danger may be recognized by groups of people in various environmental contexts.

RESEARCH DESIGN

A set of 68 photographic slides were prepared showing various locations on the University of Houston campus. The slides showed variations of at least seven structural properties hypothesized in the literature as contributors or "defeaters" of defensible space.

For the set of 68 slides, forty "which best exemplified diverse representation of the seven properties" were chosen for final review by female student subjects. These slides were selected according to the ratings of all slides by a preliminary panel of 14 female judges. The 40 slides selected were shown to three groups--17 male students and 9 police persons constituted two criterion groups, and the other group consisted of 40 college-age females. Each person rated the slides according to a five point scale ranging from very safe to very dangerous. After completing ratings on all 40 slides, subjects were asked to list the cues that they felt they might have used in making their ratings and to explain how they used the cues and reconciled conflicting cues in reaching their ratings.

The data were analyzed by the method developed by Hursh et al. (1964) and Hammond et al. (1964), based on the Brunswickian lens model.

The study design was experimental in nature, and hypothesis testing was generated through the study.

VARIABLES

Independent

- role (female, male, police)
- seven structural cues presented as stimuli in photographic slides

Dependent

- ratings
- narrative descriptions

Units of Analysis

- individual ratings of 40 slides, n's = 40, 17, 9

OPERATIONALIZATION OF VARIABLES

Independent Variables

The seven structural cues tested included:

(1) amount of lighting of the area
(2) the area's degree of natural visibility to other people
(3) presence of possible sources of concealment for attackers
(4) availability of means of communication

(5) availability of means of escape (such as
     areas usually containing people nearby)

(6) type of clothing worn by model (e.g., tight
     clothes, heels, etc.)

(7) whether model was alone or accompanied.

Each member of the preliminary panel rated the seven cues
according to a good-fair-poor scale or present-not present re-
sponse. These ratings produced an ordinal, which is conven-
tionally analyzed as an interval scale. This preliminary rating
formed the basis for the sample selection of slides and was
designed to select a group of slides that presented the stimuli
(seven cues) clearly.

Dependent Variables

Subjects rated the 40 slides according to a five point
scale of dangerousness. The scale was ordinal, but could be
and was treated as interval. Inter-rater correlations were
given for police persons and male students that attest to the
reliability of the subjects' perceptions of the cues.

A second dependent variable was the narrative accounts
given by subjects of the reasons for their ratings. No
quantification of these accounts was made, though they con-
stitute supporting evidence for the reliability of the cues
by which subjects rated the areas represented in the slides.

SAMPLING

The selection of subjects was dictated by the availability
of persons for the study. The authors recognized that the
ideal control group of subjects would consist of rapists rather
than of male students or police officers. The women who vol-
unteered were told that the investigation was a study of the
dangerousness of various campus locations.

The sample selection procedures for the seven cues were based on a review of the literature on defensible space. The sample of 40 slides was selected according to a preliminary test to determine which slides "best exemplified diverse representations of the seven cues."

STATISTICAL METHODS USED

This test used to determine the measure of association among the seven cues (n = 40), nine police officers and their mean ratings (n = 40) and 17 males (n = 40).

Multiple Regression--This statistical method determines the linear relationship between the explanatory variables and the dependent variables in such a way as to minimize the sum of the square residuals. The authors used this method to estimate the explanatory power that the independent variables (the seven cues in the 40 slides) had for the ratings given by the subjects.

Hoffman's W--This statistical method converts beta weights resulting from multiple regression analyses into a set of relative weights, $W_i = \dfrac{b_{iy} \; r_{iy}}{R^2}$). This method was used to determine the extent to which each of the cues contributed to the final ratings of the individual slides.

"Σd"--The authors define this statistic as a function of the estimated weights from two muliple regressions. Specifically, the authors used Σd to represent "the degree to which the female subjects match their cue weightings with the cue's actual ecological validity as defined by the police and male subjects' usage."

Kendall's W--This statistical method is used to measure the degree of similarity among two or more sets of rankings using ordinal level data. The authors used this statistical method to analyze the consistency of cue usage patterns within each of the groups ranking the 40 slides.

"*T-test*"--The authors use this statistical method to ana-
the differences between the female subjects' non-linear use of cues and the male students' or "potential assailants'" non-linear use of cues.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The groupings and explanations of the subject types were well-defined. The stimuli used in the research--the seven cues represented in the slides shown to the subjects--were not, however, explored fully. The slides were chosen based on a preliminary review by a 14 judge panel, but the authors did not report the interrater reliability of their assessments. In addition, the dimensionality of the cues, which, if explained, would shed light on the internal validity, should have been thoroughly assessed prior to the final experiement.

The actual ratings of the cues and slides, the dependent variables, were adequately defined, as were the product of measurement techniques that yielded ratings of reasonable reliability. The validity of the procedure used in obtaining the ratings seems to be reasonable, since only two persons (three percent) misunderstood the instructions.

APPROPRIATENESS OF RESEARCH DESIGN

The structure of the research design may be appropriate for explaining the relationship between physical cues and perceptions dangerousness. In this application, however, there is not sufficient evidence for the internal validity and reliability of the cues for one to have much faith in the precision or meaning of the stimuli. In addition, the research design does not investigate the relationship between actual danger and physical design. This limits the policy implications of the study. The research design can only sight into the factors and potential solutions to perceptions (fear) of dangerousness. The research design does not shed light on the physical design factors that contribute to actual crime.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

Since the study was exploratory, the limited nature of the sample of subjects does not cause any serious problem. The authors state that an ideal sample would consist of rapists. The sample of women volunteers were told that the study was an investigation of the dangerousness (as opposed to "safety") of campus locations. It is possible that the women were influenced by this instruction and reported higher fear levels than one would have otherwise received based upon a more neutral description of the study.

The selection of 40 slides from the original 68 was not based on interrater reliability, as would have been appropriate. The selection procedure employed may have favored the least reliably measured slides. The selection process inappropriately emphasized diversity of ratings and cues, rather than the similarity of ratings.

Although the study employed multiple regression, Hoffman's W, "T" tests, and correlation, only the correlations were appropriate. The application of multiple regression, as explained by Hursh et al. (1964), was inappropriate, since this analytic technique was developed for use with population parameters and not for sample statistics. The same criticism applies to the study's use of Hoffman's W. Further, the authors show a lack of understanding of the distributional properties associated with estimates derived from the sample. These estimates have a variance, and the authors' manipulation of these estimates as if they were population parameters did not take into account this variance or distribution of properties of the estimates. These criticisms rest on the assumption that the 40 slides and seven cues employed in the present study do not represent the population, but rather constitute a sample of possible locations, university students and police. With a sample size of 40, the estimated beta weights can be very unstable. Therefore, any functions of these estimates such as Hoffman's W or Σd serve to increase stability and can show misleading relationships. In addition, the interpretation of Hoffman's W as a proportion of the linear variance accounted for by the cue is questionable. Before accepting this, one would want to look further at the partial sums of squares and t-test on the beta estimate.

A further inappropriate use of statistical technique was the authors' comparison between ratings by each student and the mean of the group of which the subject was a member. This comparison is biased, as in the sample where the agreement of the police officers was considered high based on the correlation between judgments and average perceptions of the police group. The bias results from the inclusion of the

individual group member in the computation of the group average. One would expect that the two constants $Y = X_1 + X_2$ and X_1 are highly correlated, even though X_1 and X_2 may show zero correlation.

Throughout the study, the employment of multiple regression and other statistical measures was done with a disregard for measurement errors inherent in the research design. The measurement errors in ratings and cues affect all of the estimates used by the authors. It should be noted that R^2 and estimated beta weights are negatively biased and the estimates are larger than they would have been with less measurement error. Also, the author's failure to display the regression results and the standard error of the regression coefficients together with the relatively high correlation among some of the cues, makes multi-collinearity a possible alternative explanation for the finding that all groups relied on similar cues. Multiple regression could also have been used to examine the relative importance of role versus cue and to test for role by cue interactions.

CONCLUSIONS

The authors report:

- There was a significant difference in the cue utilization between the police officers and both males and females.

- All three groups weighted the same four cues most heavily.

- The cue "dress of model" was generally ignored.

DISCUSSION OF CONCLUSIONS

The first conclusion was based on inappropriate tests and also suffers from the authors use of nonlinearity the T-test to assess the non-linear use of the cues, which was not well defined. This conclusion may be overdrawn.

The second conclusion was based on Hoffman's W, a statistical technique shown earlier to be inappropriate. Therefore, the evidence supporting this conclusion, while probably existing in the raw data, does not come from Hoffman's index as used in the analysis. In addition, the authors' conclusion that the cue "dress of model" was ignored may be explained by the lack of internal validity of the cues.

Finally, the authors correctly did not suggest that one of the policy implications of their study was that physical design characteristics have an identifiable effect on crime rates. The authors did not investigate the crime-physical environment relationships. They studied the relationship between perceptions of dangerousness and physical cues abstracted through slides. It is possible that reducing fear among women on university campuses in various locations could possibly lead to increased crime as women perceive less risk and take more chances.
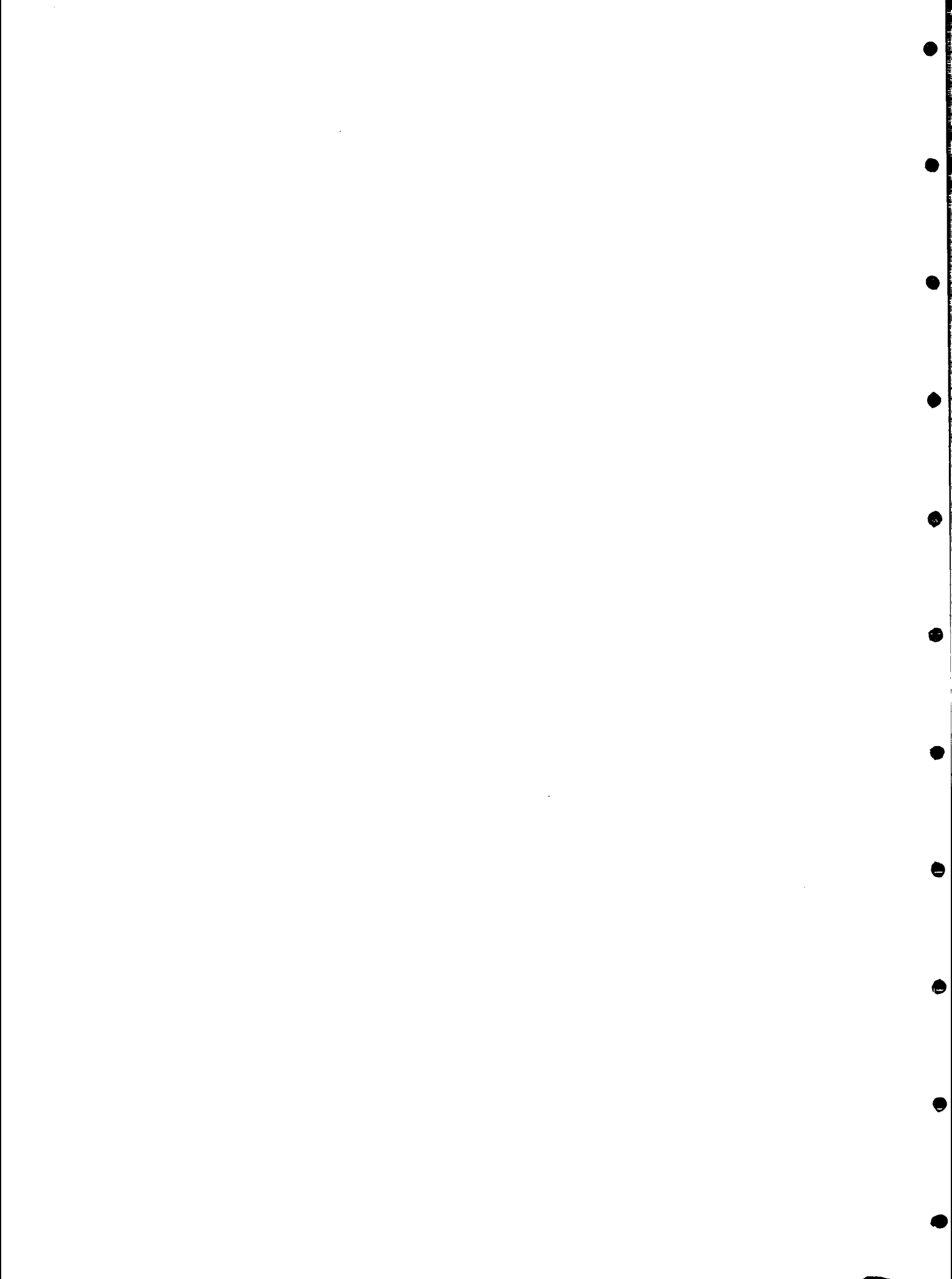
EVALUATION OF THE COMMERCIAL DEMONSTRATION
PROGRAM OF THE CRIME PREVENTION THROUGH
ENVIRONMENTAL DESIGN DEMONSTRATION EFFORT

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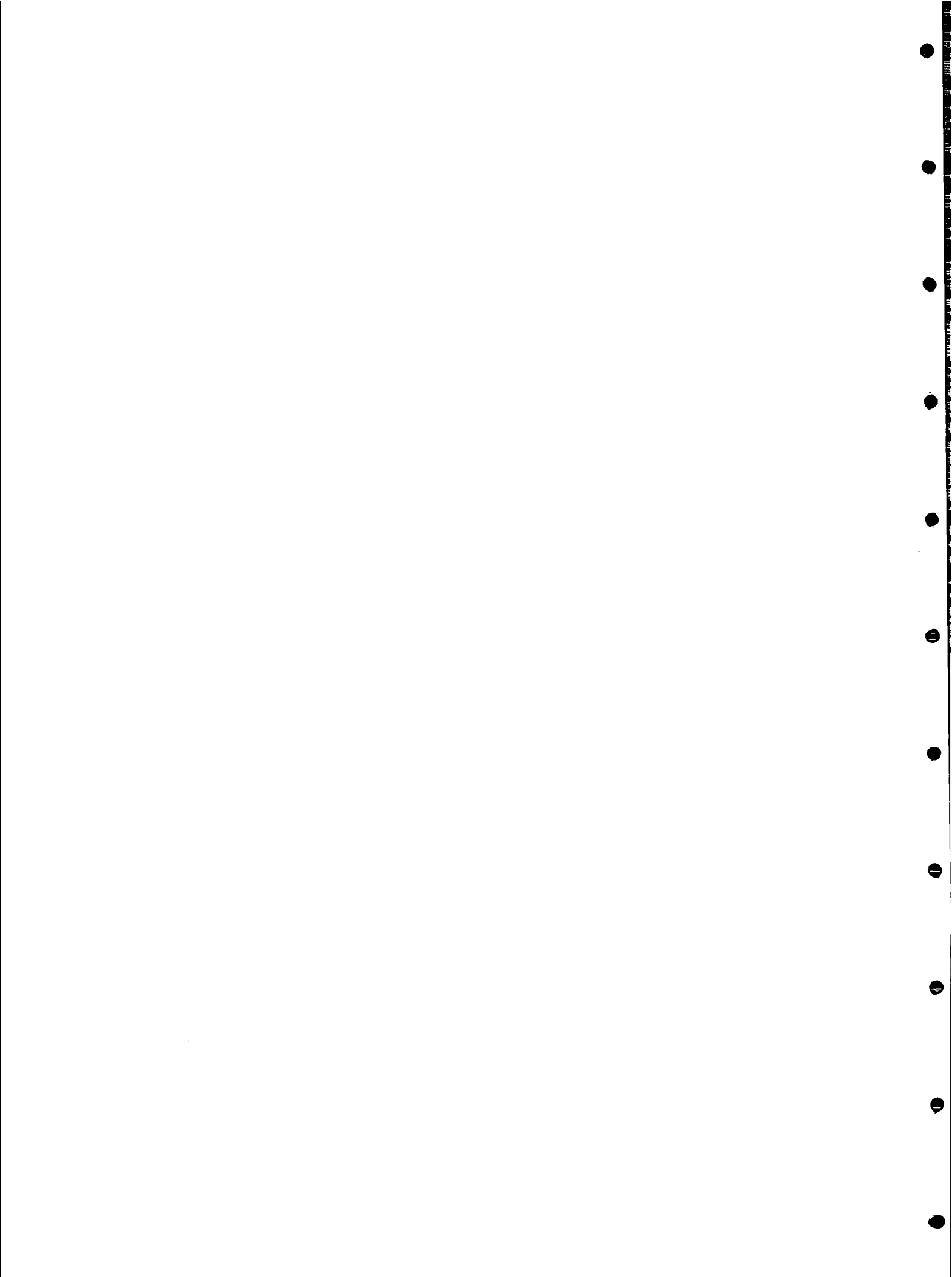
STUDY OBJECTIVES

This study described the implementation strategy of the Crime Prevention Through Environmental Design (CPTED) Demonstration in the Union Avenue Corridor (UAC) area of Portland, Oregon. The study also includes a preliminary evaluation of the results of the program.

The objectives of the CPTED Commercial Demonstration were to implement and evaluate strategies which achieved the following proximate and ultimate goals: Proximate goals-- (1) access control (decreasing criminal opportunity); (2) surveillance (increasing the capacity to observe intruders); (3) activity support (reinforcing existing activities and stimulating new efforts to promote better citizen control over the built environment); and (4) motivation reinforcement (increasing the perceived risk of apprehension for offenders and thereby increasing the costs of criminal activity relative to expected payoffs). Ultimate goals--(1) reduce criminal activity; (2) reduce fear of victimization; and (3) improve the quality of life of residents, shoppers, and employees in the area.

The process evaluation assessed the extent to which the Commercial Demonstration was a valid implementation of CPTED theory. The impact evaluation assessed first, whether the proximate goals were achieved and second whether the ultimate goals were (1) achieved and (2) could be linked in a causal manner to the implementation of CPTED strategies.

RESEARCH DESIGN

Commercial Demonstration strategies, intended to reduce crime and fear of crime and revitalize businesses, were implemented in the Union Avenue Corridor in Portland, Oregon.

Strategies included target hardening, redesign and reconstruction of the built environment, installation of high intensity lighting and assorted crime reduction publicity campaigns. The evaluation design involved the exploration of the effects of these strategies on dependent variables such as crime rates and fear of crime pre/post-tests were employed along with tests of significance.

Data sources included the following:

- Archival crime data, Portland Police Department-Crime Analysis Bureau, October 1974 through September 1977;

- Interviews with UAC businesspersons;

- Interviews with UAC residents;

- Structured observations of pedestrian activity;

- Economic data from tax files; and

- Interviews with community leaders and patrol officers.

VARIABLES

Independent

- Various crime reduction strategies including:

  - Security surveys
  - Physical design changes
  - Security services
  - Designation of "Special Days"

Dependent

- Physical environment proximate goals

- Social environment proximate goals

- Crime reduction measures

- Fear of crime measures

- Quality of life measures

OPERATIONALIZATION OF VARIABLES

Independent Variables

- The installation of new high intensity lighting and infill lighting throughout UAC.

- The redesign and reconstruction of one of the streets as a "Safe Street for People."

- Installation of bus shelters along Union Avenue.

- The creation of "Sunday Market" and "Clean-up" days.

- Residential security survey improvements.

- Target hardening.

- Commercial Security surveys.

- The organization of a business group to respond to the interests of the UAC business community.

- Establishment of a police security advisor to provide security services to UAC businesspersons and residents.

Dependent Variables

The following variables are *Physical Environment Proximate Goals*:

- *Physical security of the built environment*--The type and quality of physical security measures undertaken in the study area as part of the CPTED program was measured through interviews with residents, businesspersons, and police officers.

- *Surveillability of the built environment*--This variable was measured through interview data collected from businesspersons and residents concerning

such behavior as keeping outside and inside lights
on, and such attitudes as whether they thought the
Union Avenue lighting was sufficient or insufficient.
In addition, residents were asked how likely it
would be that an offender would be seen comitting a
crime (four scale response, from very likely to very
unlikely).

- *Potential usability of UAC built environment*--This
  variable was measured through interviews with resi-
  dents and key-persons with regard to shopping
  facilities, restaurants and parks, and the overall
  capacity of UAC's physical environment to promote
  positive usage.

- *Psychological dimensions of the built environment*--
  The aesthetic quality and degree of personalization
  of UAC's built environment was assessed by ratings
  obtained through interviews with businesspersons
  and residents (subjective). Clarity of defined
  spaces in UAC was measured through structured
  observations.

The following variables are *Social Environment Proximate
Goals*:

- *Crime prevention behavior of businesspersons and
  residents*--This variable was measured through a
  survey of businesspersons and residents investigat-
  ing the respondent's awareness of local crime pre-
  vention meetings and the extent to which the topic
  of crime was raised during neighborhood discussions.

- *Law enforcement response to suspicious/criminal
  activities*--This variable was measured through
  interviews with residents and businesspersons
  in which the respondents rated the performance of
  local police, and predicted the likelihood that
  any offender would be caught by the police.

- *UAC social networks and social cohesiveness*--This
  variable was operationalized as a measure of the
  extent to which businesses and residents of UAC
  joined together in community organizations.

- *Psychological barriers*--This variable was measured
  through the rating of UAC's reputation of a low-
  high offender's risk continium obtained through
  patrol officers' interviews.

- *Use of the built environment*--This variable was defined by the type and frequency of use of the built environment. The variable was measured through structured observations and interviews with business-persons, residents, and key persons. Judgments regarding the quality of use of the built environment were elicited during these interviews.

- *Businesspersons' and residents' identification with UAC*--These persons were asked how likely it would be that they would move from the UAC area in the next few years. Data were also collected on persons' "sense of belonging" through structured interviews.

The following variables represent *Crime Reduction Measurements*:

- *Reported UAC crime rate*--Archival data were collected for the period of October 1974 through September 1977 from the files of the Portland Police Bureau's Crime Analysis Bureau. Victimization rates of bus-inesspersons and residents were obtained through interviews.

- *Nonoffenders' perception of the UAC crime rate*--This variable was measured through resident and business-person's responses to interview questions designed to elicit their subjective views regarding the extent of the crime problem.

The following variables are *Fear of Crime* measurements:

- *Pedestrian usage of built environment*--This variable was measured through several means, including structured observations of UAC pedestrian activity level (taken from April 1977 through November 1977), and interviews with residents who were asked (1) how often they shop or eat on Union Avenue during the day and at night, and (2) how often they take night-time walks.

- *Perceptions of fear and concern for crime*--The variable was measured through interviews with businesspersons and residents of the UAC area. Bus-inesspersons were asked to provide their subjective viewpoints with regard to their own fear of being

victimized, how concerned their employees felt about
their safety, and whether they felt that fear of
crime deterred customers from using UAC businesses.
Residents of the area were asked about their fears
of burglary, assault and robbery, and whether they
carried a weapon at night. In addition, both busi-
nesspersons and residents were asked to assess the
extent to which their behavior had been affected by
the fear of crime. Data were also obtained on be-
havioral modification through the use of structured
observations.

• *UAC's reputation for safety*--This variable was
measured through ratings made on a safe-to-danagerous
continumm solicited from interviews with business-
persons, residents, key-persons, and from media
reports.

The following variables are *quality of life* measurements:

• *Financial status of UAC businesses*--Archival data
on the changes in UAC businesses net annual income
January 1971-October 1977, number of business'
opening and closing, and the overall level of com-
mercial activity were collected from the Business
License Division City of Portland. Additional data
were collected on trends in gross sales through
interviews with businesspersons.

• *Perceptions of economic vitality*--This variable was
measured through interviews with UAC businesspersons
who were asked for their rating of the UAC area's
economic health as compared to other commercial
areas of Portland. They were also asked their per-
ceptions of changes in the UAC economic vitality
since 1970. Businesspersons were also asked whether
they had plans or had considered moving their busi-
ness to another area of Portland.

• *Quality of residential life*--This variable was
measured by a series of interviews with residents,
community leaders and patrol officers in the UAC.
Interview schedules included several questions de-
signed to elicit the respondent's attitudes toward
schools, parks, yards, the general physical sur-
roundings of the area and their awareness of the
community's revitalization efforts. In addition,
respondents were asked to describe their perceptions
of what the area would be like in the future.

SAMPLING

Three independent samples (n=49, 37 and 48) of UAC businesspersons were made in 1977 although the authors provide no information as to how they were selected. Two independent, geographically stratified random samples of UAC residents (n=97 and 80) were interviewed by telephone in 1977. Key person interviews were conducted with 16 individuals with special knowledge about UAC, including business and community leaders, and patrol officers. In addition, 73 structured observations were performed in a randomly scheduled manner between 6:00 p.m. and 12:00 a.m. along a fixed route.

STATISTICAL METHODS USED

Descriptive Statistics--The majority of dependent variables are presented by the authors in the form of percentages or frequency graphs.

T-test--Significance tests for the difference between means were conducted on the following dependent variables: (1) crime measures, pre- and post-security survey; (2) length of time of operation of the businesses on vs. off Union Avenue; (3) number of white vs. number of black pedestrians in the Union Avenue Corridor; (4) businesspersons' perception of UAC compared to other areas of Portland, pre/post test; (5) trend of residents with regard to their belief that UAC had become a better place to live in the past year; and (6) assessment of the belief by residents that living conditions would become better in UAC.

F-test--F tests of significance were performed on the following dependent variables: (1) differences in gross receipts between commercial and consumer activities; (2) amount of increase of gross receipts for business located on Union vs. those off Union Avenue and 1976 vs. 1979; (3) time of interview (first and second or third series); and fear of victimization.

Pearson r--Correlations were performed to assess the relationship between such variables as (1) resident age and fear of crime in the UAC business district; (2) resident attitudes toward UAC as an improved place to live; and (3) time of day, temperature, precipitation relative to number of pedestrians.

Chi Square--Chi square tests of significance were performed on the number of store openings in adjacent areas to Union Avenue and the incidence of closings for businesses adjacent to Union Avenue.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Archival crime data from the Police Department should be reliable as long as data collection procedures did not change during the study period. However, it should be added that police archival crime data have a significant tendency to under-report the actual crime level and represent biased estimates. Due to the availability of victimization data from both the National Crime Panel Surveys (1974) and the locally collected victimization information, the reported offense data should have either been corrected for the under-reporting bias or the statistical analysis should have been appropriately qualified. A second area of potential bias in the archival data is that since police officers were directly involved in the project, the reporting habits of both the police, shoppers, storeowners and residents of the area might have been affected. Any effect of the treatment (the entire demonstration effort) will result in a bias (of unknown direction and magnitude) in comparisons of pre/post treatment data.

The economic data from the Business License Division should be valid and reliable. There is no expected inter-action effect among treatment, data collection procedures and the reported data.

Data on other variables were collected through interviews, questionnaires and structured observations. The authors failed to give any information regarding the reliability and validity of the data. This raises concern because most of the variables were defined by only one item which (1) tends to result in low reliability; and (2) provides no opportunity of checking the validity of the measure. Further, there are superficial problems with the survey questions since surveys contain a mix of "neutral" and "negative" responses. For example, when businesspersons were asked what three factors were most helpful to their operations, some possible responses were negative (i.e., bad state of the economy) while others were neutral (i.e., current insurance rates). Though not a major flaw, this example shows that the survey design was problematic.

The operational definition of fear of crime used by the authors was "use of the streets." This variable, as it is defined, is probably highly correlated with age, employment status, income, automobile ownership and race. Throughout the study, reference is made to the greater use of the streets by blacks than whites. Does this mean that blacks fear crime less? Or does it just reflect the fact that blacks are more numerous in nearby neighborhoods (outside of the study area)? Or does it mean that blacks are more likely to be offenders? Or that they have less access to private trans-portation? The analysis provides almost no insight on these important issues, and thus seriously clouds the analytic power gained by using "people on the street" as a measure of the fear of crime. The authors did correctly control for such variables as time of day, temperature and precipitation.

Curiously though, the last variable was positively correlated with the numbers on the street. Does that mean that more people are on the streets on rainy days? The authors failed to control for major holidays or days of the week, and therefore little light is shed on this unexpected finding in the data.

The operational definition of quality of life (QOL) is based, in part, on a measure of the growth in the number of local businesses. The growth in the number of businesses is much less satisfactory as an QOL indicator than either growth of sales or profits. Although this last point is more of a research design problem than a problem of definition, the authors did not isolate from or compare this growth in UAC businesses to the growth that Portland was experiencing generally.

APPROPRIATENESS OF RESEARCH DESIGN

The authors stated in the research design section of the report that they could not use non-UAC comparison groups and could only collect limited data in the UAC area. Given these constraints and other design and methodological problems that we discuss below, the research design that was employed cannot address the stated objectives of the study.

The study did not and could not control for such important disposing conditions (nonprogram treatments which probably affected the dependent variables) as the Union Avenue Urban Renewal Project and Impact Cities programs. Given the many exogenous activities occurring in the Union Avenue Corridor Area and throughout Portland, there may be tens or hundreds of factors that contributed to the falling crime rate. The central conclusion of the evaluation--that the commercial burglary rates fell as a result of the demonstration project-- is not and could not be supported with statistical integrity by the research design employed.

Many problems associated with the research design result from the fact that the study collected data from (and based conclusions on) the treatment area only. The authors report that the crime rate was declining in Portland during the study period. It is very important to know whether the crime rate fell significantly more in the area where the security surveys and other CPTED treatments took place than other areas in Portland. The research design employed does not and cannot address this vital question. The authors reliance upon other crime measures to fit the same model was inappropriate for addressing this question.

The research design does not and cannot support with confidence the finding of any causal connection between the observed decrease in residential burglary and either the implementation of commercial security surveys or the increased presence of uniformed police in the neighborhood. In order to support these stated conclusions, the authors must success- fully control for other possible reasons why this may have occurred. This possibly could have been done through analysis of crime data on other areas of the city or more in-depth data on disposing conditions in the UAC area.

Failure to analyze quality of life (QOL) data from other areas of the city also prevents the study from supporting the stated conclusion that CPTED strategies improved the QOL in UAC. For example, the authors rely on the growth of the number of businesses as an important QOL indicator. The number of businesses clearly grew during this period, but since important questions as "Did the number of businesses in UAC grow significantly greater than the relative number of businesses in other parts of the city during the same period?; than in Portland generally. Moreover, did the nature of the growth of new businesses (from commercial stores to more industrial firms) *itself*, have a dampening effect on the crime rate of the area. The authors failed to explore the

possible interaction affect between increases in businesses, growth of industrial firms in the area and the resulting relative decrease in commercial businesses on the possible reduction of criminal opportunities or net expected pay-offs. For example, it is easier to steal and pawn a color T.V. than it is to make quick money from stealing ball bearings. Thus, the research design did not provide for the rigor necessary to analyze properly the quality of life measures employed in the study.

The research design also does not and cannot support the authors' stated conclusion that street lighting reduced criminal activity and the fear of crime. The same model was used to test the effect of street lighting as that used to test the effect of the security survey. The same data are even employed. Since the research design was based on the analysis of all street crime data combined, the source of the data, the dates and location are the same for testing the effect of several individual CPTED strategies. The obvious question is given in the evaluation design, can one distinguish between the effectiveness of the street lighting program as distinct from either that of the security surveys, the actual hardening of the businesses, or the many other CPTED related strategies employed through the three-year implementation period? If the researchers would have disaggregated the street crime data (by burglary, robbery, location, etc.), the inability to distinguish between the effects of the two (three? four?) different programs would have become more transparent.

Other research design problems exist. The modified evaluation plan was established in March 1977, and the survey data for the evaluation was collected during that year. The program was implemented, for the most part, in 1975. Therefore, the evaluation does not provide comparable pre/post

data in either interviews, questionnaires or structured observations. Therefore, none of these data sources can serve as a statistical measure of the success/failure in obtaining the proximate and ultimate goals of the project. The only data that are comparable for the pre/post periods are the crime and business activity data. The crime data in this instance does not represent a desirable measure of program impact since one of the criteria used in selecting Union Avenue Corridor as a site was its having "a sufficient level of crime and fear to justify" a CPTED demonstration effort. Given this selection criterion, it is very possible that any change in the crime rate might be attributable to regression artifacts. The failure to have comparable pre/post data and the failure of the modeling effort used to estimate treatment impacts (discussed in the statistical method section below) prevent this study from providing the level of information necessary for an adequate case study.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The authors failed to report the sampling procedure used to select businesspersons. It is not clear whether the same businesspersons were interviewed more than once. The sample of residents appears to be biased in favor of older persons. The authors report that 39 percent of the residents interviewed were 60 years old or older and 17 percent were in their 50's. Even though the authors reportedly used a geographically stratified random sample, more than 50 percent of the sample was 50 years old or older. This percentage appears to be too high compared to the census data and may reveal a bias in the sampling procedure. The authors should have verified their data against the census data. It is again not clear whether the same residents were interviewed more than once.

Descriptive statistics--On several occasions the authors failed to report the total sample size when percentages were reported. In other places, Figures 7-5 and 7-6 there are inconsistencies. Some of the points in Figure 7-5 cannot be reproduced from the information in Figure 7-6.

t-test--Since time series analysis was performed and two parameters were estimated in some of the data, the degrees of freedom should be different from the number reported, 32. The analysis used in the study not only estimated three parameters of the regression model but also estimated two additional parameters associated with error terms. The authors used a one-tail test on the residential burglary analysis. However, if there is a possibility of displacement effects from commercial burglary to residential burglary, a two-tail test would be appropriate. The null hypothesis would be the treatment had no effect and the alternative hypothesis would be an increase or decrease (a difference) in the burglary rate (depending on direction, rate of displacement, etc.).

The statistical analysis of the 73 structured observations might have been based on a violation of independence. Since the people to be observed might have a tendency to use particular routes or parks, the observations might have duplicate observations on the same people. If that is the case, then the independence assumption necessary for the t-test is violated. Furthermore, the t-tests reported on pp. 7-40 and 7-41 are somewhat misleading since the authors did not specify the exact hypothesis they were testing. A t-test always tests the difference between two means. It could be pre/post means or sample and population means. Here there are no pre-treatment or population level data. What other means the

authors are using to compare against the post-program data is unclear. Possibly since these t-tests are analyzing data on the questions to businesspersons--whether business outlook was improving, and the question to residents--whether UAC had become a better place to live, the authors performed the t-test on the difference between the mean ratings given by respondents and some neutral point on the rating scale. In any case, the t-tests are unclear and very possibly inappropriate.

F-test--The F-tests reported on pp. 7-37 have the same degrees of freedom. However, it is not clear from the report whether repeated measure analysis was performed or not. The year factor can be a within factor if the same shops were used repeatedly for the years 1974-1976. If year was not a within factor, then the shape involved in this analysis should be different. The authors failed to report interaction between year and on-off Union factor.

Pearson r--The techniques used by the authors were appropriate within the limits of the sampling procedure.

Chi Square--The chi-square statistics reported on pp. 7-31 are problematic. First, the independence of the observational units was violated. That is, the authors reported that the number of businesses changed from 252 (1971) to 354 (1977). But most of the businesses were counted more than once, thus violating independence requirements of chi-square analysis.

In general, the authors failed to provide the necessary summary tables of statistics or relevant information to explain their use of many of the statistical techniques employed. Reporting of r^2 statistics or some other measure of goodness of fit could have been very helpful. Moreover, the authors' reliance on only one model to determine the effectiveness of the commercial security and street lighting treatments limited the analytic power of the study.

The following model was estimated to determine the effectiveness of the commercial security survey and street lighting:

$$C_t = \mu + \alpha t + \beta Z + \gamma X + \varepsilon$$

where

C_t = commercial burlgary in month t

α, β, γ = parameters

ε = error or residual term

$$Z = \begin{cases} 0 & \text{if } t < t^* \\ 1 & \text{if } t \geq t^* \end{cases}$$

$$X = \begin{cases} 0 & \text{if } t < t^* \\ t-t^* & \text{if } t \geq t^* \end{cases}$$

t^* = month of intervention (i.e., security survey)

Instead of relying solely on the model employed, it would have contributed to the study to assess the impacts of these treatments by directly estimating (using generalized least squares) a second order difference equation or a polynominal equation that can appropriately approximate the observed frequencies. For example, one could estimate

$$C_t = \mu + \alpha + \beta C_{t-1} + \gamma C_{t-1} + \varepsilon$$

which for suitable values of the parameters can yield oscillation as those observed in the time series.

CONCLUSIONS:

The authors report:

- On the basis of the evaluation of the Portland experiment, there is qualified support for the CPTED theory (crime prevention through environmental design).

- There was a statistically significant decrease in commercial burglary rates coinciding with and following the undertaking of commercial security surveys.

- There was a statistically significant decrease in residential burglary rates following the undertaking of commercial security surveys.

- There was no statistically significant change in commercial robbery rates following the commercial security surveys.

- The surveys brought an "inordinate visibility" of police officers and may be part of the 'treatment' contributing to lower commercial burglary rates.

- "The security surveys were not primarily aimed at reducing robbery, and thus the fact that no significant decrease in commercial robbery was observed supports the reasoning that the security surveys had an impact on the potential offender population of burglars."

- Significant reductions in both commercial and residential burglaries should be regarded as, at least partially, due to the CPTED commercial security surveys.

- "The visibility of activities associated with the installation of high intensity lighting seems to be associated with a major [35 percent] reduction in street crime.

- After implementation of the CPTED strategies nearly 40 percent of the businessmen felt crime was a major hindrance to successful business operations, and approximately 70 percent felt there had been no change in the likelihood of their becoming a victim. Also in response to the question whether they thought crime had changed since the 'early 1970's', 40 percent said they thought there was a decrease, 15 percent thought crime had increased, and 35 percent thought crime had stayed the same.

- Citizen's perceptions of UAC's crime rate support the finding that there has been a general decrease in the crime rate since 1976.

- At least some of the change in crime rates should be attributed to the CPTED revitalization efforts.

- There is no behavioral evidence (as measured by the number of pedestrians on Union Avenue) of survey data that the level of fear of crime changed or that resident perception of the crime problem changed during 1977.

- "It was judged that at least part of this improvement [in quality of life indicators], especially the renewed confidence in the area, should be attributed to the revitalization efforts."

- "The implementation of CPTED was a moderate success in the business environment and lesser success in the residential environment.

DISCUSSION OF CONCLUSIONS:

Most of the conclusions claiming that the Portland CPTED project gave support for the CPTED theory are premature. There was a decrease in commercial burglary and residential rates, while no statistically significant decrease was found in commercial robbery rates. The poor operational definitions, the limitations of the research design and the inadequate use of available statistical methods discussed throughout this review prevent one from inferring causality between treatment and result as the authors suggest. That is, since the study does not take into account many exogenous factors which may have influenced crime rates, number of pedestrians on the street, number of businesses in the area and other dependent variables, one is left with an inadequate base of information to conclude with certainty that the CPTED demonstration caused the changes. The "combined" impact evaluation of street lighting and the commercial security survey leaves the reader with no possibility of disaggregating the effects of the one from the other. The failure to have a control group also seriously limits inferences of causality.

In sum, there remains two questions after review of the Portland demonstration evaluation. First, did the demonstration program represent a valid implementation of the CPTED concept? The answer to this question is a qualified "yes", but is largely based on the ability of the vagueness of the CPTED concept to serve as an umbrella for a wide range of physical and social oriented crime prevention activities. The second question is was the theory supported or validated by the Portland program? The answer to this question is that the evaluation reviewed here does not provide the statistically reliable information to support the statement that the treatment had the intended effects.

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN:

FINAL REPORT ON SCHOOLS DEMONSTRATION

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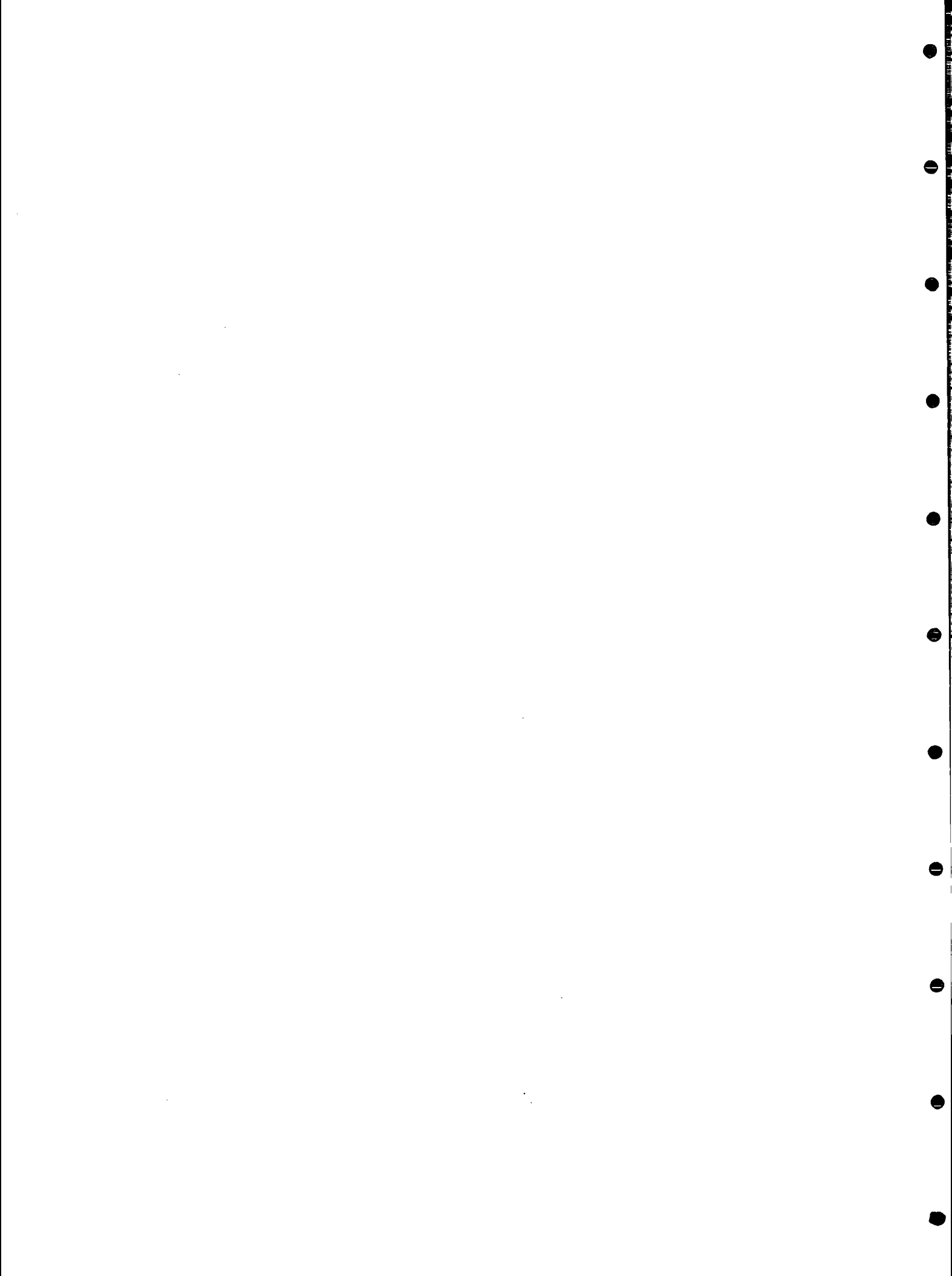
STUDY OBJECTIVES

The purposes of this study were to describe the imple-
mentation of a crime reduction demonstration project carried
out in four public high schools in Broward County, Florida
and to present a preliminary evaluation of the results of the
program. The major objective of the Crime Prevention Through
Environmental Design (CPTED) Schools Demonstration Program
was to implement and evaluate crime reduction strategies based
on the following concepts of crime reduction: (1) access
control (decreasing criminal opportunity), (2) surveillance
(increasing the possibility to observe intruders), (3) activ-
ity support (encouragement of social activities which increase
citizen and police involvement in the deterrence of crime)
and (4) motivation reinforcement (increasing the perceived
risk of apprehension for offenders, thus reducing the criminal
payoff).

RESEARCH DESIGN

Four high schools in Broward County, Florida were
selected as demonstration sites. At each site a team of
researchers collected and analyzed crime data in order to
isolate the locations where crime problems existed and
determine the social and physical strategies most appropriate
to combat crime at each location. Physical design changes
such as new construction, renovations, and landscaping, and
efforts to increase student involvement in the crime preven-
tion activities were undertaken. Since the strategies were
designed based on the particular problems associated with
various locations in each school, each school received a wide
variety of strategies. Most strategies were not implemented
in all schools.

The evaluation design was based on a subenvironmental
strategy approach in that each strategy implemented by a
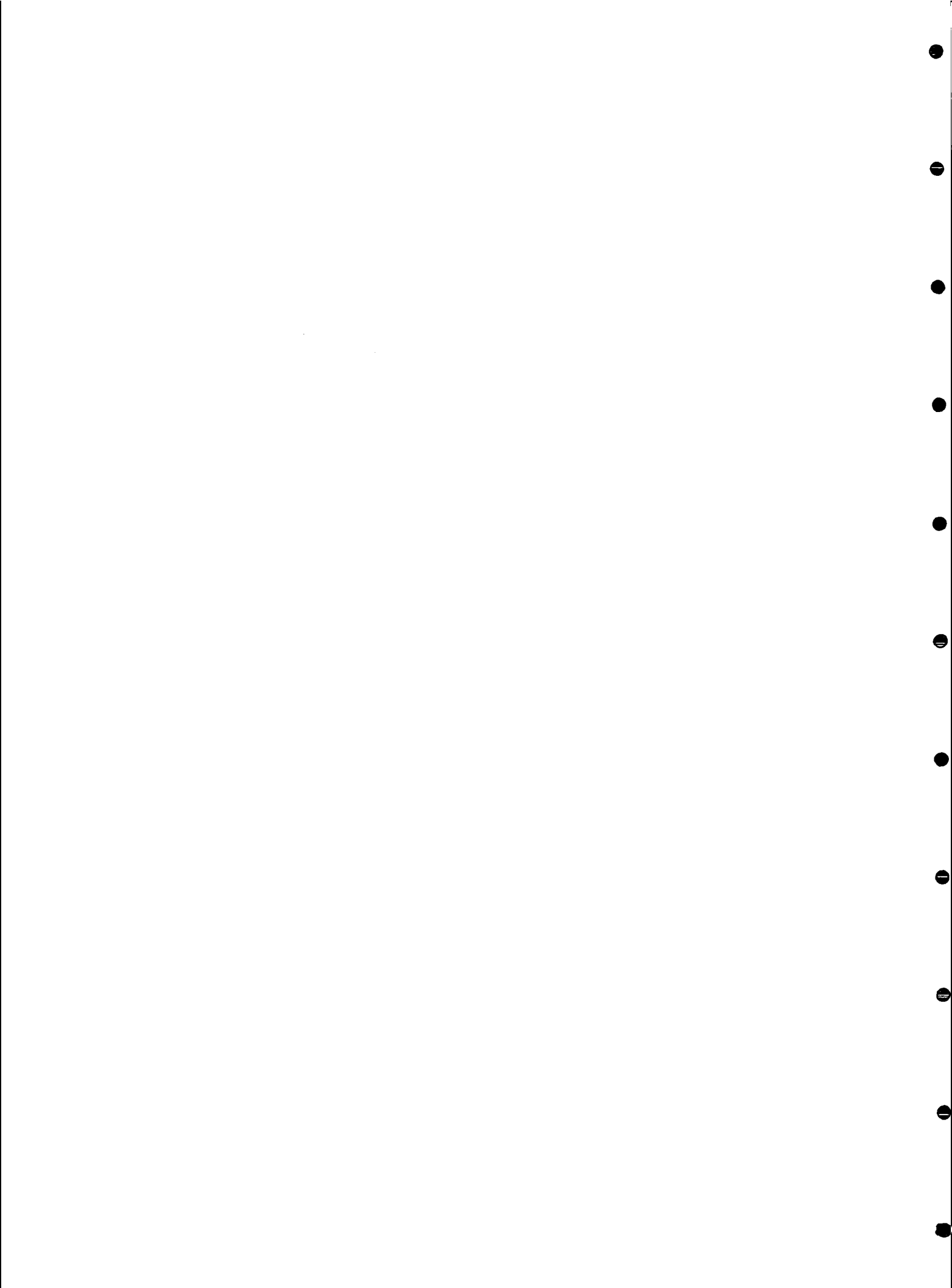
demonstration school was assessed by data relevant to that strategy and location. The design used a pre-implementation/ post-implementation comparison, both within each demonstration school, among demonstration schools, and between the group demonstration schools and all other high schools in the county.

Data sources:

- Official reports, correspondence, and files containing requisitions, bids, purchase orders, and other relevant documentation of the implementation of the physical and social strategies.

- Student victimization and attitude surveys in demonstration schools and other high schools.

- Structured observations used to monitor program implementation and to evaluate the impact of various strategies.

- Investigative reports obtained from the Department of Internal Affairs pertaining to all cases of assault, breaking and entering, extortion on buses, theft, and vandalism reported in elementary and secondary schools from 1973 to 1977.

- Structured observations based on "staged suspicious incidents" on the school grounds.

- Interviews with administrators, students, and faculty of the experimental schools.

VARIABLES

Independent

- Various physical design modification strategies in bicycle parking compounds, hallways and exterior stairways, restrooms, parking lots, school grounds, and locker rooms.

- Educational strategies.
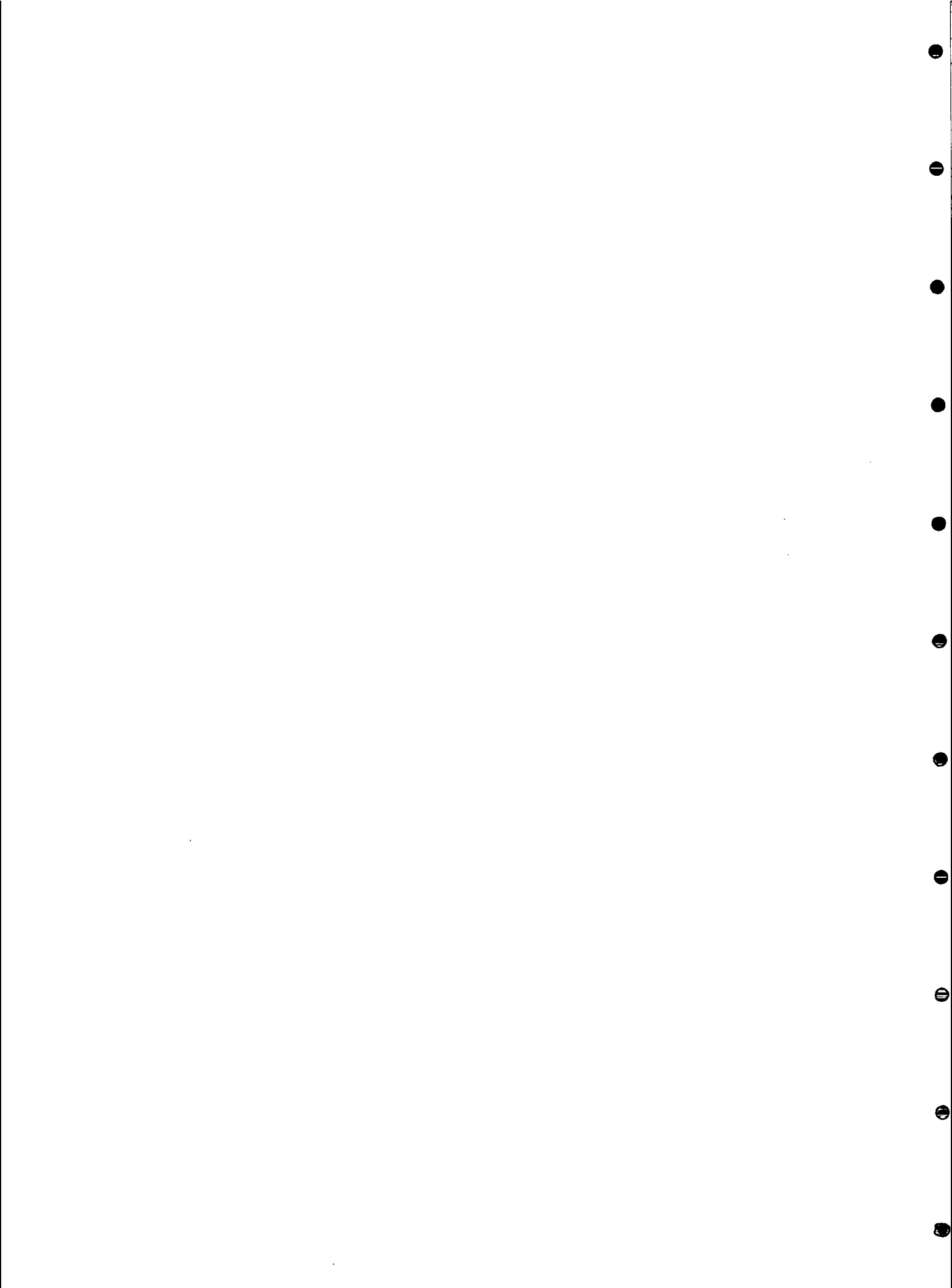
Dependent

- Student victimization rates and fear of crime.

- Student feelings concerning fear of crime and perceived safety.

- Student feelings concerning territoriality and surveillance at school.

- Student use of specific areas and surveillance opportunities in these areas.

- Student reporting of incidents.

- Reported crime incidents occurring in school or on school grounds.

OPERATIONALIZATION OF VARIABLES

Independent

Operationalization of independent variables involves the implementation of the physical design and educational strategies undertaken in one or more schools.

Physical design modifications -- These involved the modifications in the following locations in one or more of the experimental schools:

- In parking lot compounds -- installation of a fence and installation and anchoring of a bicycle rack.

- In hallways and exterior stairwells
  -- Supergraphics (multi-colored graphic designs) were designed and placed by students in corridors to define the intended functions of those spaces.
  -- A replica of the school symbol was placed between the snack bar and patio.
  -- Construction of a security office under the staircase in the main school corridor (involved building a small room with one-way mirrors on all four sides).
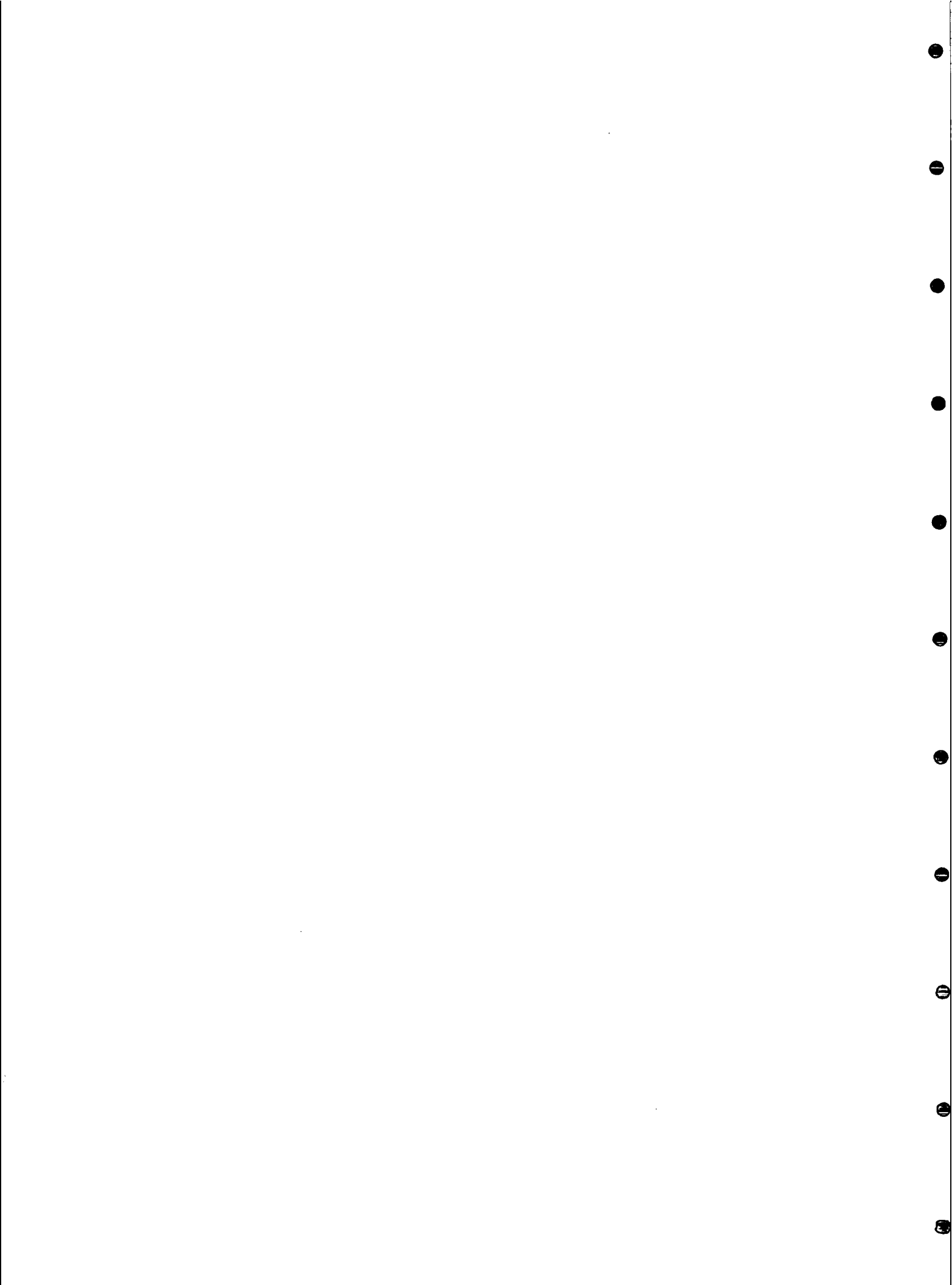
- -- Replacement of fourteen solid classroom doors that had windows.

  -- Areas were completely sealed off under exterior stairwells.

- Restrooms -- Restroom doors were locked in an open position.

- School grounds -- The following strategies were implemented on school grounds

  -- A school policing district was established, and a truancy officer and a police specialist were given space in the precinct so that truants and juvenile delinquents could be brought directly to them rather than downtown to the Juvenile Center.

  -- Bus loading zone was moved to reduce congestion.

  -- Communications -- use of portable two-way radios between security officers.

  -- Border definition and landscaping of open areas and grounds.

  -- Burglar alarms were installed.

- Locker rooms -- each row of lockers was painted one color and lockers were assigned so that all of the students in a class period had the same color locker.

- Educational strategies -- a morning workshop was held with CPTED program managers and approximately ten teachers from each of the four experimental schools, to present an overview of the CPTED program and to discuss ways to involve students in the crime prevention strategies. In addition, pamphlets describing the CPTED program and emphasizing the importance of student involvement were distributed in all four schools.

Dependent

The dependent variables concerning victimization and fear of crime were measured by surveys administered to students in Broward County schools on five occasions:

(1) Spring 1976 -- Students were asked several yes/no questions concerning fear of assault or theft. In addition, they were asked questions concerning their experiences in that year as victims of
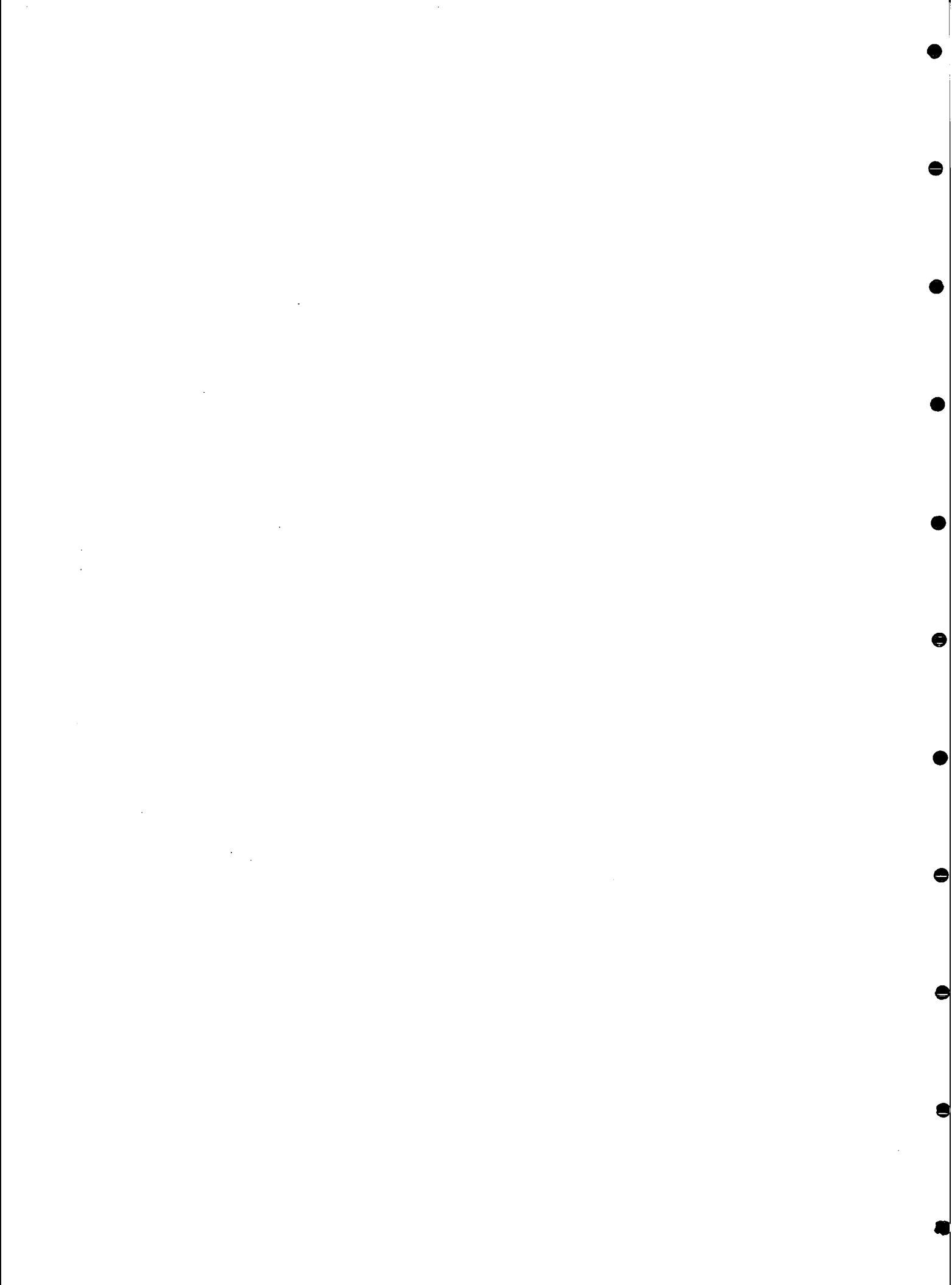
assault, theft, extortion, or other incidents
that took place at various locations in or around
school.

(2) Winter 1976-1977 -- The original survey from spring
1976 was greatly expanded for this round of inter-
views. Additional questions regarding the relative
safety of various areas in and around the school,
student perceptions regarding how often individuals
were in a certain area, student opinions regarding
how likely it is that an offender would be seen
committing an offense in a certain area, and other
"what would you do if . . . " questions concerning
the incidence of a criminal or suspicious act.

(3) Spring 1977, winter 1978, and spring 1978 -- The
basic format of nearly 90 questions was retained in
this survey with the following changes: (a) ques-
tions concerning extortion incidents and dollar
amounts of theft and extortion incidents were
dropped; (b) questions addressing fear of theft in
various subenvironments were added; (c) questions
designed to obtain overall theft and assault rates
were added; (d) responses to questions concerning
theft and assault were changed from a yes/no to a
four-point, scaled (never . . . most of the time)
response, and (e) the number of environments
investigated was changed from 13 to 9.

The dependent variables concerning student behavior were
operationalized in the following ways:

● *Student use of specific school areas and surveil-
lance opportunities in these areas* -- A structured
observational schedule was developed for monitor-
ing program implementation and maintenance and
used to assess changes in the use of different
school areas by students. The observer indicated
the number of students using an area and described
the physical design changes (features) of the area.
Specific areas monitored included patios, bicycle
parking areas, exterior stairwells, auto parking
lots, corridors, outside smoking corridors, locker
rooms, and snack bars. One observation took place
at each of the experimental schools every two weeks.

● *Student reporting of incidents* -- To assess whether
the reporting behavior of students was affected by
the introduction of CPTED strategies, a "suspicious
incident" was staged in which a male stranger
entered the parking lot and looked into cars. The
individual did not touch any of the cars or attempt
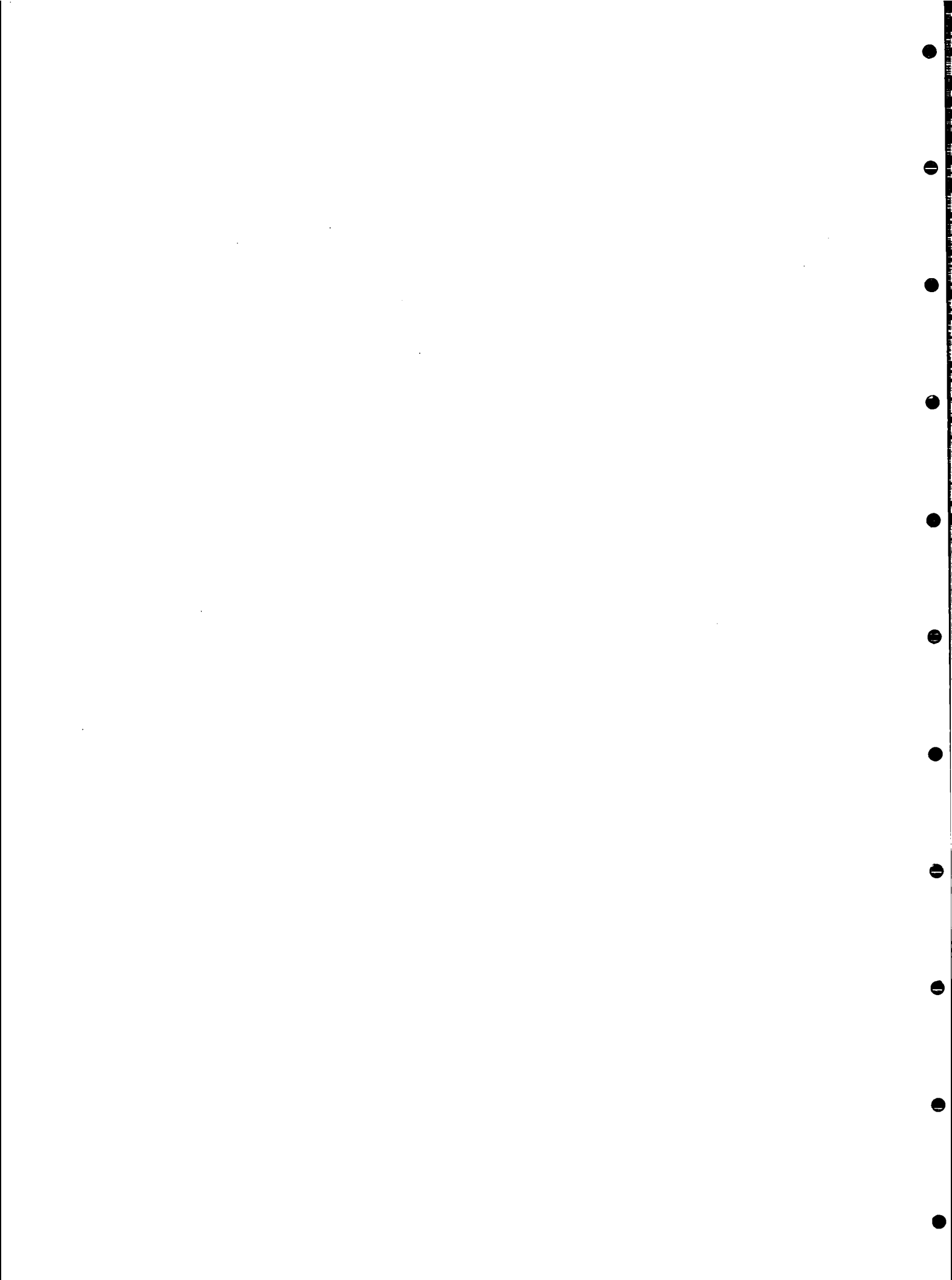
to break into them. Although the procedure was
designed so that the suspicious incidents would be
conducted at each school in the same manner, the
actual implementation varied widely from school to
school. Investigators used their judgment regard-
ing "when to escalate the situation so as to provoke
a response from students." An observer was sta-
tioned nearby to record information on the number
of students present, student characteristics, and
student actions (e.g., observation only, direct
intervention, leaving the scene to report the inci-
dent to the authorities or to fellow students).

● *Reported crime incidents occurring in school or on
   school grounds* -- Investigators' reports filed with
   the Broward County Office of Internal Affairs and
   containing data on assault, breaking and entering,
   busing extortion, theft, and vandalism cases
   reported in elementary and secondary schools from
   1973 to 1977 were used in the analysis of crime
   levels.

SAMPLING

   Schools -- The authors state that the four Broward County
high schools were selected, in part, because their designs are
representative of schools nationally in terms of "crime,
environment, and pragmatic considerations." The experimental
schools included one designed for Broward County's sub-
tropical climate, consisting of one-story buildings spread
over a large campus and connected by open, usually single-
loaded corridors. The other three demonstration schools were
two-story with double-loaded corridors and internal stairwells.
The comparison group consisted of all other schools in the
county.

   Key Persons -- A purposive, non-random sample of persons
involved in either program implementation, management, or
school affairs, were interviewed at various times during the
study to gather data on program implementation and impact.

   Students -- The first survey (spring 1976) was distrib-
uted to a stratified random sample of Broward County High
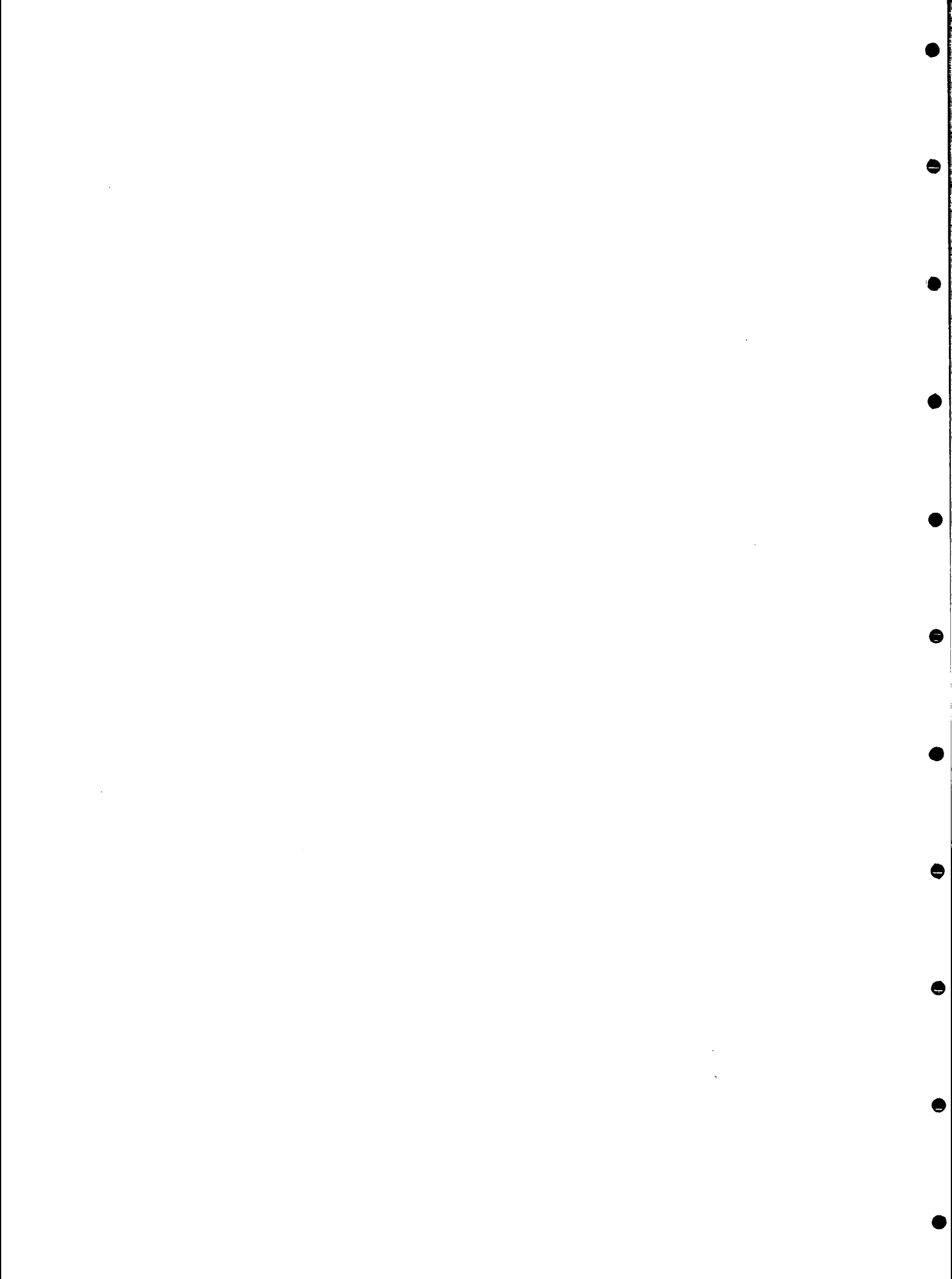
School students. The sample was drawn by computer from the enrollment files and was stratified by sex, race, and grade. The survey was distributed to a total of 4,800 students -- 400 students in each of the experimental schools and 200 students in each of the other county high schools. The 1977 and 1978 surveys were distributed to a total of 2,000 randomly selected students.

STATISTICAL METHODS USED

Descriptive statistics -- The following data were presented in the form of frequencies and percentages. No significance testing was performed on these variables.

- Reported crime data by year, crime, school, and location.

- Victimization rates and location of incidents for both experimental and the remainder of schools in the county.

- All observational data.

Analysis of variance -- Tests of significance were performed on the following relationships:

- Perceived likelihood of identifying interlopers in the hallway of experimental schools compared to control group schools.

- Pre- and post-test student ratings of teachers' surveillance of the hallways at one school.

- Perceived likelihood of identifying an interloper in the restrooms (pre-/post-test).

- Perceived likelihood that a person could steal something in the restroom without being seen (pre-/post-test).

- Access control of restroom (pre-/post-test).

- Students' ratings of the relationships between the CPTED project and crime prevention efforts of students and other adults (experimental/control groups).
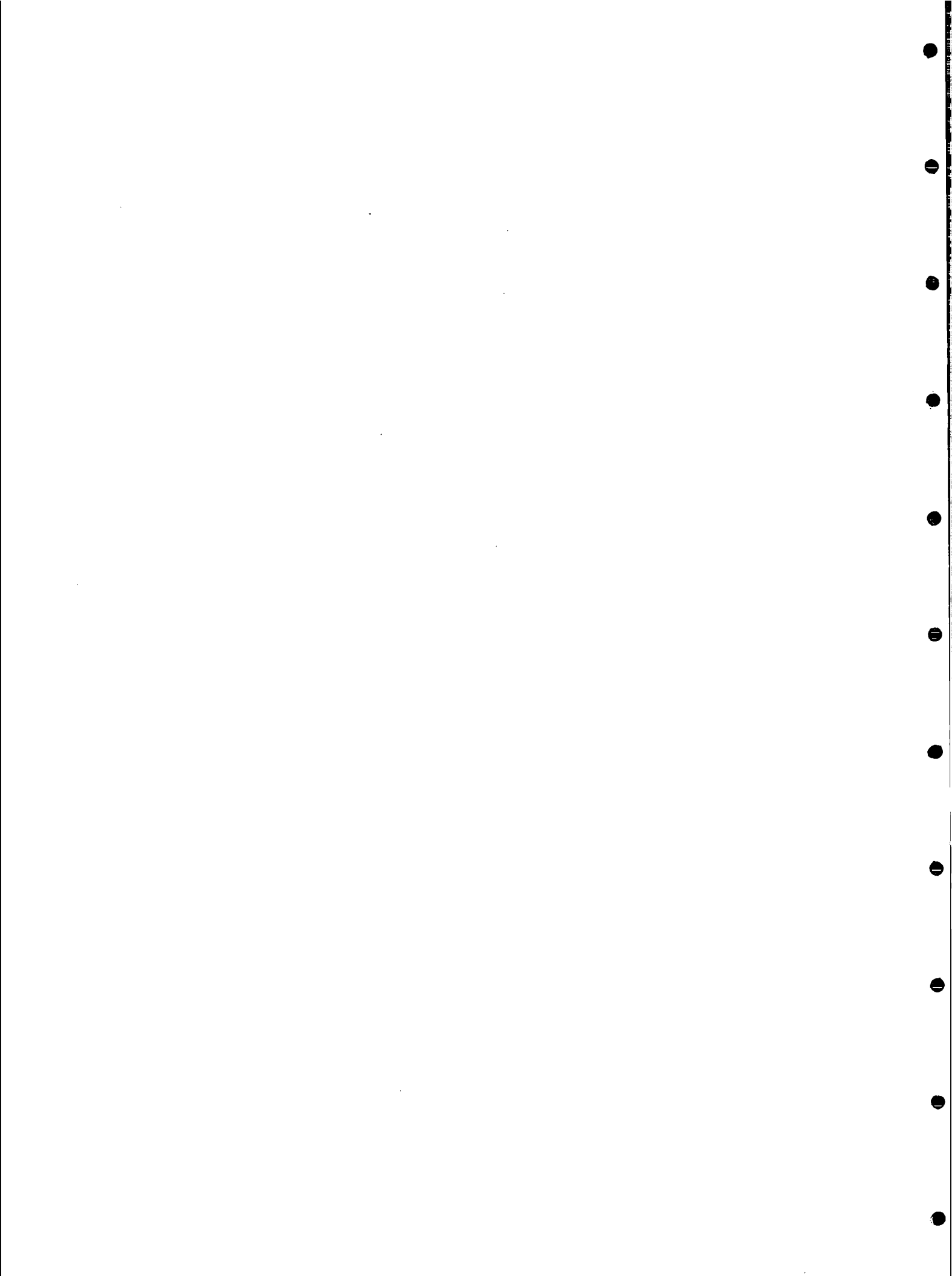
- Answers from students concerning who is responsible for committing crimes and whether they, as individuals, could stop crime (experimental/control groups).

- Change in assault rates (pre-post/post-test).

- Student judgment of safety in halls (pre-/post-tests).

- Student judgment of personal sense of safety from assault and theft (pre-/post-test).

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Variables

The authors failed to show either the reliability or validity of some of the variables used in the study. Although the authors claim that the observational data are "hard data", they did not show that those data are reliable, i.e., that the different observers would consistently rate the same environmental situations similarly. In addition, the authors also failed to evaluate the survey data before they were used in the analysis. The format of the survey (listed in the appendix) suggests that response biases might be elicited by the survey (see items 16 through 64). The survey questions presenting hypothetical situations to students can surely be expected to elicit unreliable (and unverifiable) responses.

APPROPRIATENESS OF THE RESEARCH DESIGN

The design of the demonstration effort and the design of the research and evaluation component are inextricably linked. The fact that almost all of the CPTED strategies were implemented fully after long and unexpected delays, that 58 percent of the strategies were either not implemented at all or as
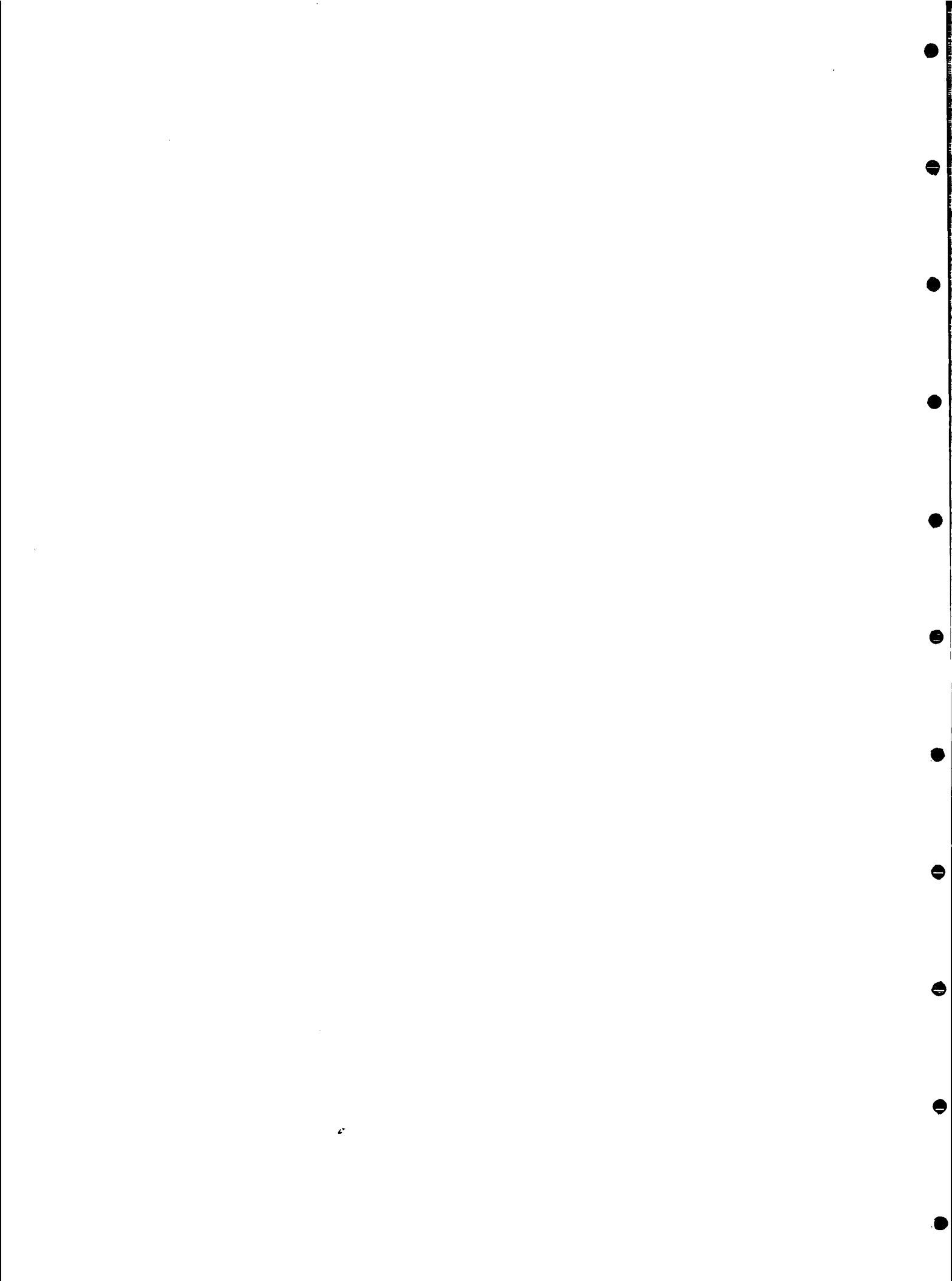
planned and that the timing of these strategies was often
out of sync with the evaluation all contribute to the weak-
nesses found in the evaluation.

The measurement of key variables was performed through a
survey that was often untimely and about which the authors had
this to say: "The quality control achieved in the collection
of these data is unknown. In addition, responsibility for
approval of the items to be included in the survey instruments
rested with the Broward Research Department, not WEI [the
evaluators] (page 6-10).

The subenvironmental strategy -- the independent evaluation
of the effect of a particular crime reduction strategy on a
particular area within the school -- has one serious design
flaw. The evaluation could not assess spillover or inter-
action effects from one subenvironment to another. Further,
inconsistencies in survey forms from one year to the next, the
failure to be able to collect and analyze data on either the
attainment of proximate or ultimate goals means that the eval-
uation report leaves unanswered many important questions.

Finally, the implementation of differing CPTED strategies
in different schools precludes one from gaining a clear sense
of what theories were put into practice, what practices had
what effects or why worked or did not work although this is in
part a failure of the demonstration effort, the effect of the
evaluation effort was very detrimental.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling of the demonstration schools was not random,
but with limited resources it was reasonable to select sites
according to predetermined criteria. The sampling of stra-
tegies, although based on a crime-environment analysis, simply
failed to include sufficiently comparable strategies in dif-
ferent schools to allow for adequate assessment of any or all
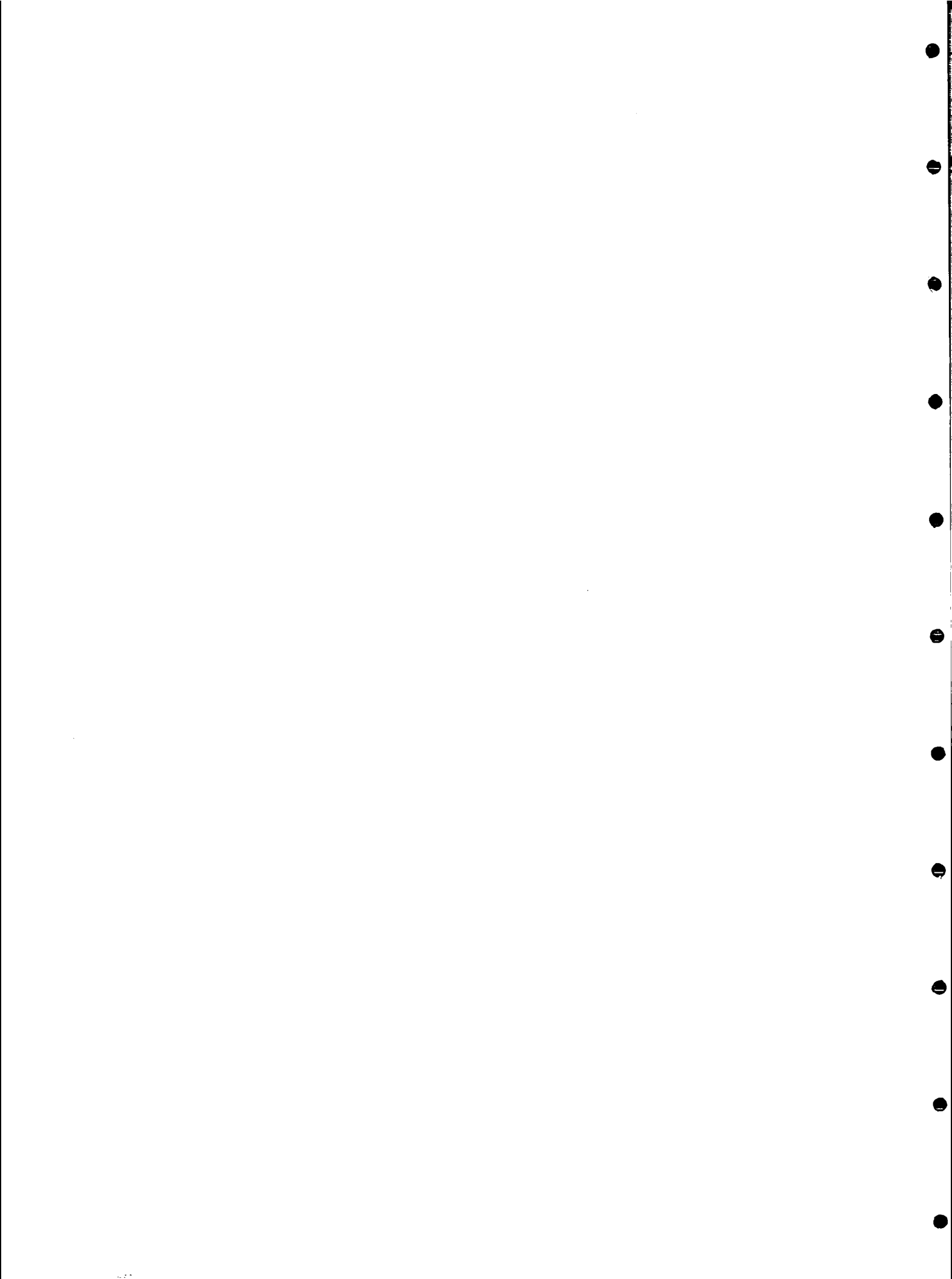
of the CPTED strategies implemented. The evaluation of a one
shot strategy to reduce crime in one subenvironment in one
school does not allow for generalizable results. The sampling
of the students appears to be adequate.

APPROPRIATENESS OF THE STATISTICAL METHODS USED

Descriptive statistics -- The authors' use of descriptive
statistics is adequate to describe the data.

F-test and z-test -- It is highly likely that these tests
were performed incorrectly. Since the students surveyed were
nested within the school, the appropriate unit of analysis for
testing for the effect of the treatment is the school and not
the individual respondent which the author used. The respondent
of the survey can be the unit of analyses for the analysis of
school differences, but not for the analysis of a treatment's
effect in a subenvironment. The authors failed to recognize
the structure of the data and failed to perform the analysis
correctly. The authors should have aggregated the survey data
to the school level. The reason for this is that the appropriate
unit of analysis is the school and not the student. In addi-
tion the control group, the 16 other schools in the county,
should have been analyzed as 16 separate control data points
and not combined.
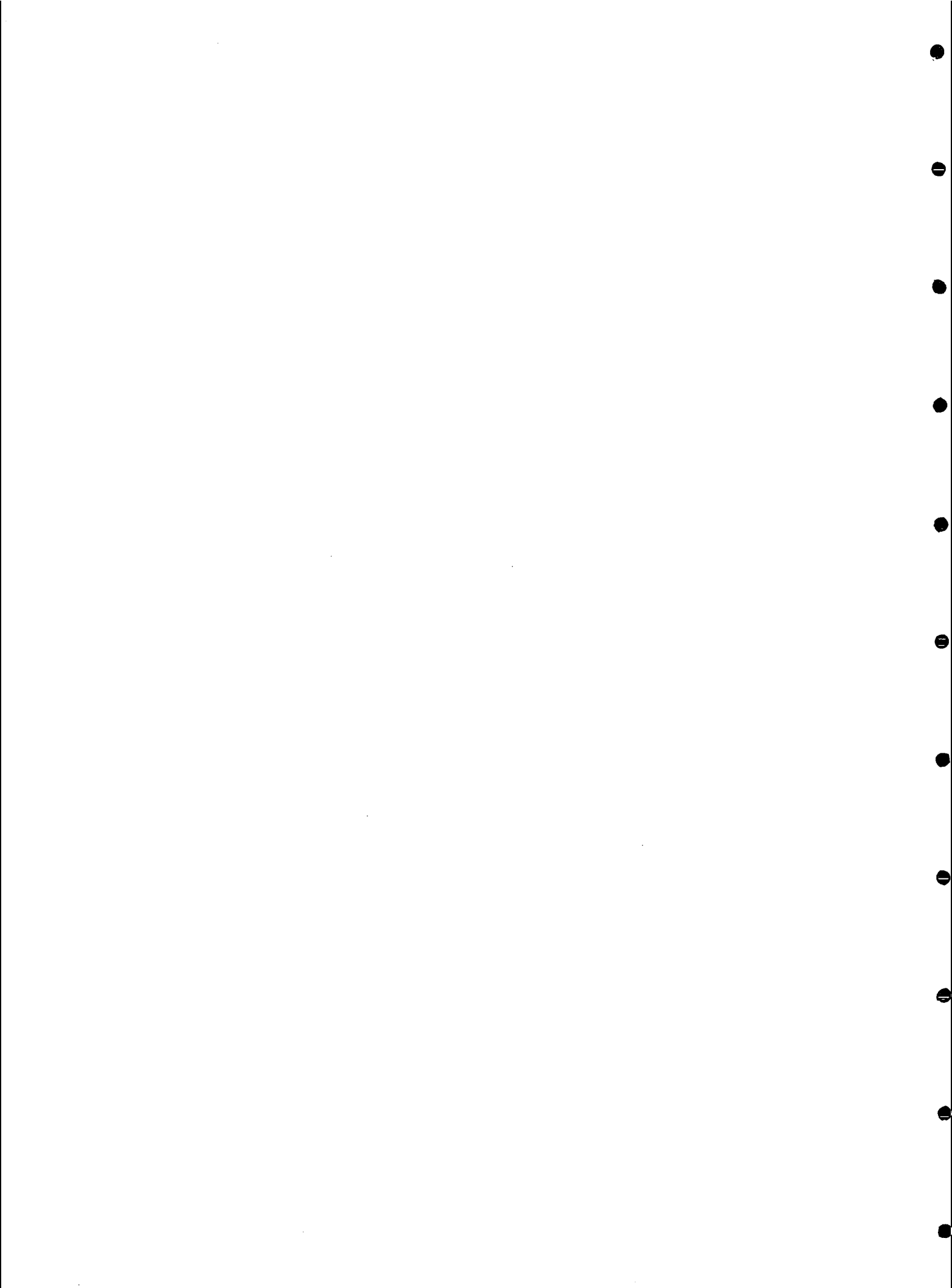
CONCLUSIONS

The authors report:

- The restroom modifications attained the ultimate goal of theft reduction.

- Restroom modifications have not reduced the students' perceived lack of safety in restrooms.

- Installation of windows in hallways resulted in no significant change in theft or assault rates. Nor in judgments of a personal sense of safety from either assault or theft.

- There was a slight post-CPTED reduction in assaults at all but one school.

- There was a reduction in theft at all project schools.

- No statistically significant pre/post CPTED changes emerged with respect to students perceptions of safety from assault or theft.

- No reliable conclusions could be drawn regarding the institutionalization of the CPTED concept.

- There was an increased student consciousness as a result of the CPTED effort.

DISCUSSION OF CONCLUSIONS

It is impossible to say with confidence that either the CPTED concept was adequately applied or the crime reduction strategies were effective based on the information included in the final report and evaluation. Virtually all of the crime reduction strategies experienced long delays. This resulted in data not being available for some pre-post tests and precluding ultimate assessment of the effectiveness of these strategies.

Many (22 of 38) of the planned CPTED strategies were either never implemented, partially implemented, or were implemented in a modified manner. To the extent this demonstration effort sought to test the feasibility of implementing CPTED based strategies, the test reveals that implementing these strategies as planned is a difficult task.

More importantly, the demonstration program itself with different strategies taking place in unmeasurably different schools and environments makes it impossible to compare statistically the relative effectiveness of the various crime reduction strategies employed. The authors attempt to maximize the explanatory power of the research by assessing separately various strategies' impact on proximate goals and ultimate goals. With the exception of the crime reduction strategy applied to restrooms, the evidence on attainment of proximate goals is unconvincing. The author's inability to provide adequate assessments of proximate and ultimate goals is due to (1) the absence of both pre-and post-test data in many instances; (2) the dubious value of the poorly implemented staged suspicious incidents; and (3) the inherent unreliability of much of the self-reported, hypothetical survey answers. The author's claim that "increased student awareness was a result of the CPTED effort" is unsupported. It could be a classical Hawthorne effect that is being observed.

Of the thirteen (13) sub-environments where CPTED
strategies took place, only three could be examined to ascer-
tain whether the CPTED strategies lead to a reduction in
ultimate goals--the reduction of crime and the fear of crime.
These included restrooms, hallways, and the overall school
environments.

The results--(1) a fall in victimization for theft and
no change in fear of theft or assault in the schools where
restrooms were modified; and (2) insignificant effects of
changes in hallways both with respect to fear and victimiza-
tion levels (except for assault) are suspect. They are based
on only one school that had a design change. Yet, when data
on the rest of the county schools are examined there appeared
to be pre-/post changes of similar magnitude in these, the
control group schools. Equally disturbing is the inability
of Westinghouse's sub-environment evaluation approach to sort
out spillover effects between the hallways and restrooms. The
sub-environments are not independent, yet no successful means
of dealing with this was made.

The overall impact assessment should be similarly qualified.
Although pre-/post-treatment comparisons were made with respect
to victimizations and fear of crime, for several of the schools
the treatment had not even been completed. Many of the spe-
cific projects had not been implemented at all at the time of
the evaluation.

Therefore, due to problems in the implementation of the
CPTED strategies and problems inherent in the research design,
the study does not successfully assess the effectiveness of
the crime prevention efforts that took place in Broward County
Schools. Little empirical support is available from this
effort that documents a causal relationship between physical
environmental factors and crime and crime prevention behaviors.

Task Three
Level Assessment

C-233
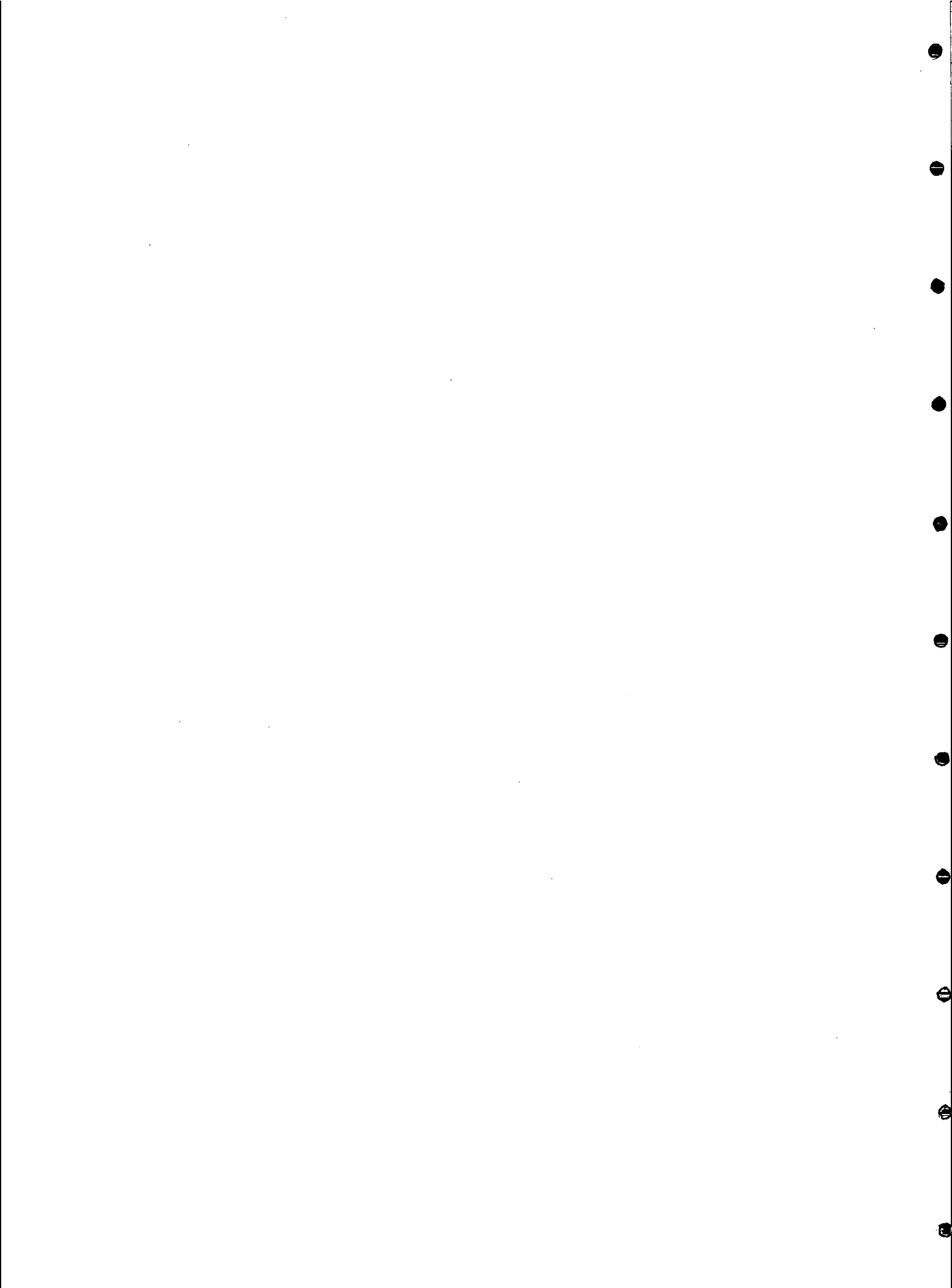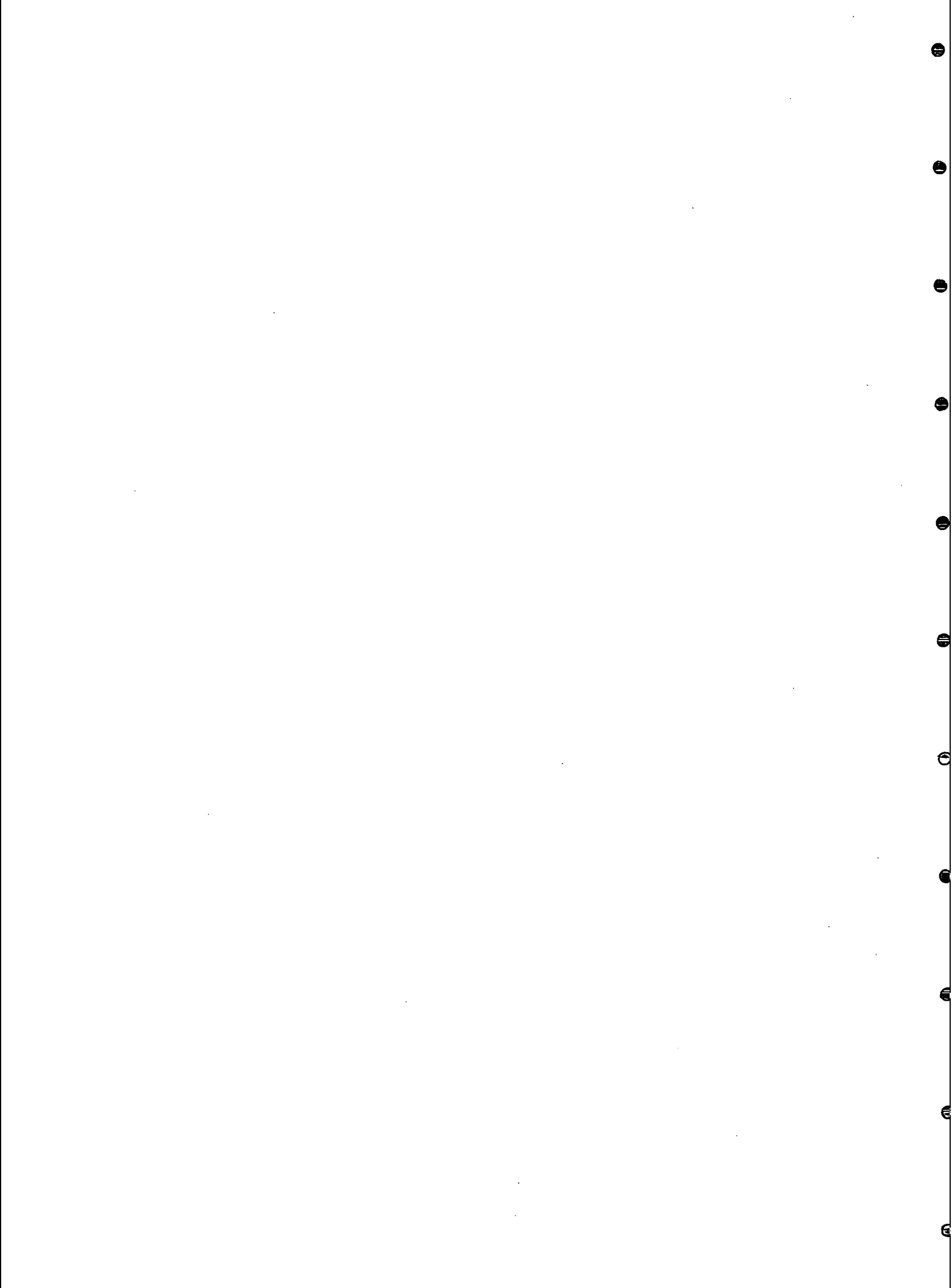
DISCOURAGING CRIME THROUGH CITY PLANNING

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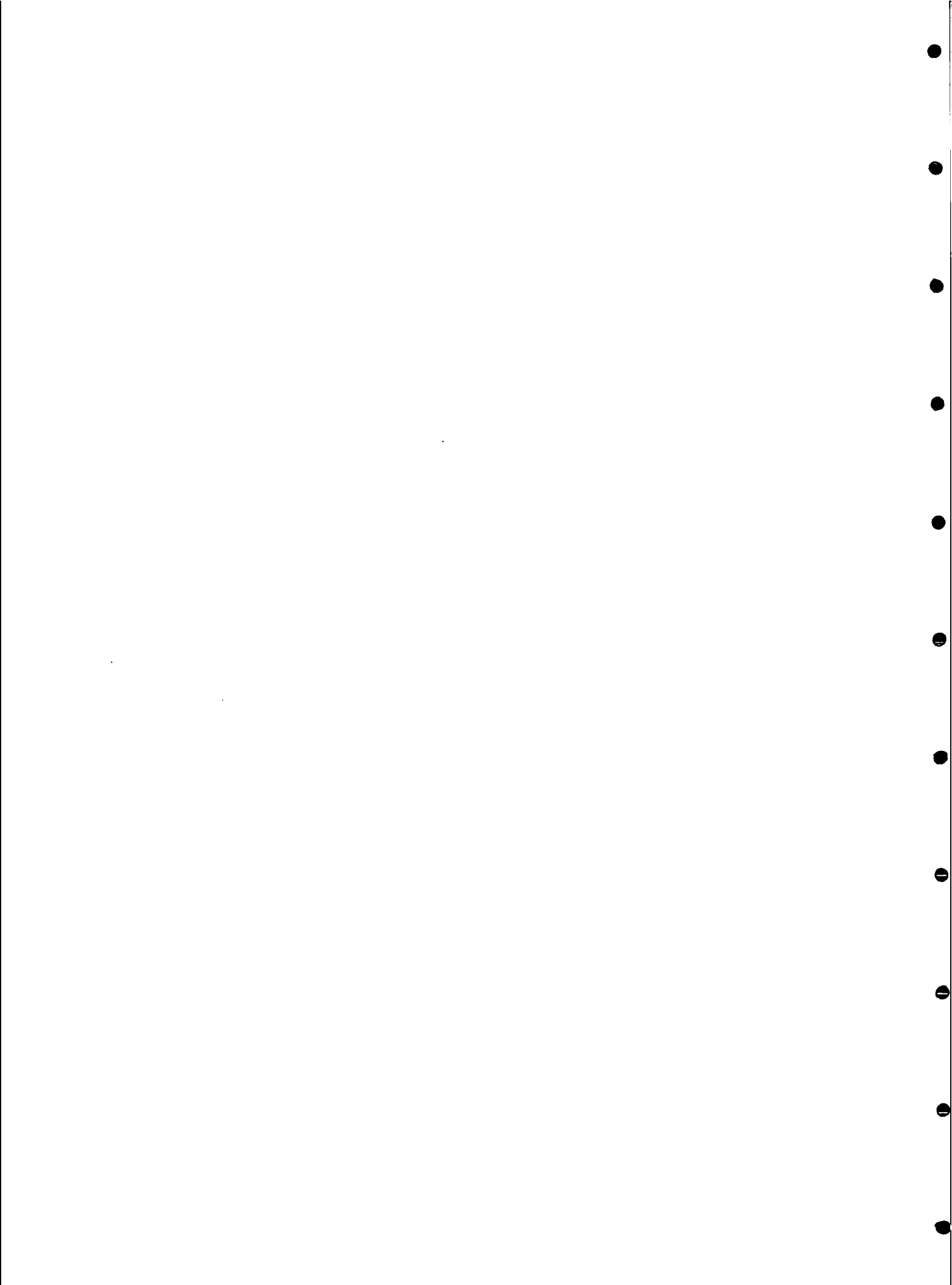
INTRODUCTION

This study is primarily theoretical, though it employs mapping techniques using empirical data. The study does not test particular hypotheses. It is reviewed here because it is often cited as an early contribution to the theoretical and empirical investigation of the relationship between crime and the physical environment.

STUDY OBJECTIVES

The purpose of this study is to investigate:

- the relationship between environment factors or physical elements of a city and crime against persons, and

- the important physical determinants of the spatial patterns of crime.

RESEARCH DESIGN

All street robberies and purse-snatchings that took place in Oakland during a six-week period were plotted on a city map to determine their locations relative to specific features of the built environment.

There was, in effect, no real, empirically-oriented design. The author acknowledges that the simple plotting of robberies and purse-snatchers *per se* does not provide an empirical test for the hypotheses that he drew from the procedure.

VARIABLES

Independent
- physical characteristics of the built environment

Dependent
- crime rates--armed robbery, purse-snatches, strong-armed robbery

Units of Analysis

- crime incidents

OPERATIONALIZATION OF VARIABLES

Independent Variables

Physical characteristics are defined as (a) commercial arteries, (b) residential areas, and other very general descriptive terms. These characteristics were in no way measured or quantified, nor was any scale developed to test empirical relationships between crime rates and physical characteristics.

Dependent Variables

Crime was operationalized by the number of robberies and purse snatches that took place in Oakland during a six-week period. The number and location of crimes were obtained from police records.

SAMPLING

No sampling procedure required, because crimes were plotted on a city map.

STATISTICAL METHODS USED

No statistical measures were used. Crimes were plotted, and based on that the author reported that most crimes occurred near commercial arteries and few or no crimes occurred in low density middle or upper income residential areas.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The operational definition of physical characteristics is too imprecise to allow any quantitative assessment of the relationship between crime and the physical environment.

The operational definition of dependent variables, using police crime statistics is adequate and strong in regard to internal validity.

Since crime data were presented as being only "for a recent six-week period," one cannot determine if that period was typical. Thus, the external validity of the critical dependent variable is questionable.

APPROPRIATENESS OF RESEARCH DESIGN

In the preface to this study, Gordon Misner states that "The paper which follows is speculative and much additional work on the subject needs to be undertaken..." (p. ii). The research design is far too simplistic to generate empirical information regarding the effects of various physical characteristics of the built environment on criminal behavior. There is, in effect, no real, empirically oriented design, no testing of an explicit hypothesis, and therefore no quantitative relationship inferred in the study. In addition, the power of the study is limited due to the inability to perform statistical tests. Further work in dividing the city into various sections and the development of a scale to quantify specific aspects of the built environment would have allowed the author to use a much more powerful research design.

CONCLUSIONS

The author reports:

- The physical environment exerts a direct influence on crime by delineating territories, reducing or defining accessibility by the creation or elimination of boundaries and circulation networks, and by facilitating surveillance by citizens and police.

- The physical environment has an indirect influence on crime settings by creating social contexts.

DISCUSSION OF CONCLUSIONS

These conclusions are not supported by the data generated by the study, primarily because of the research design and the methods used to operationalize the variables.
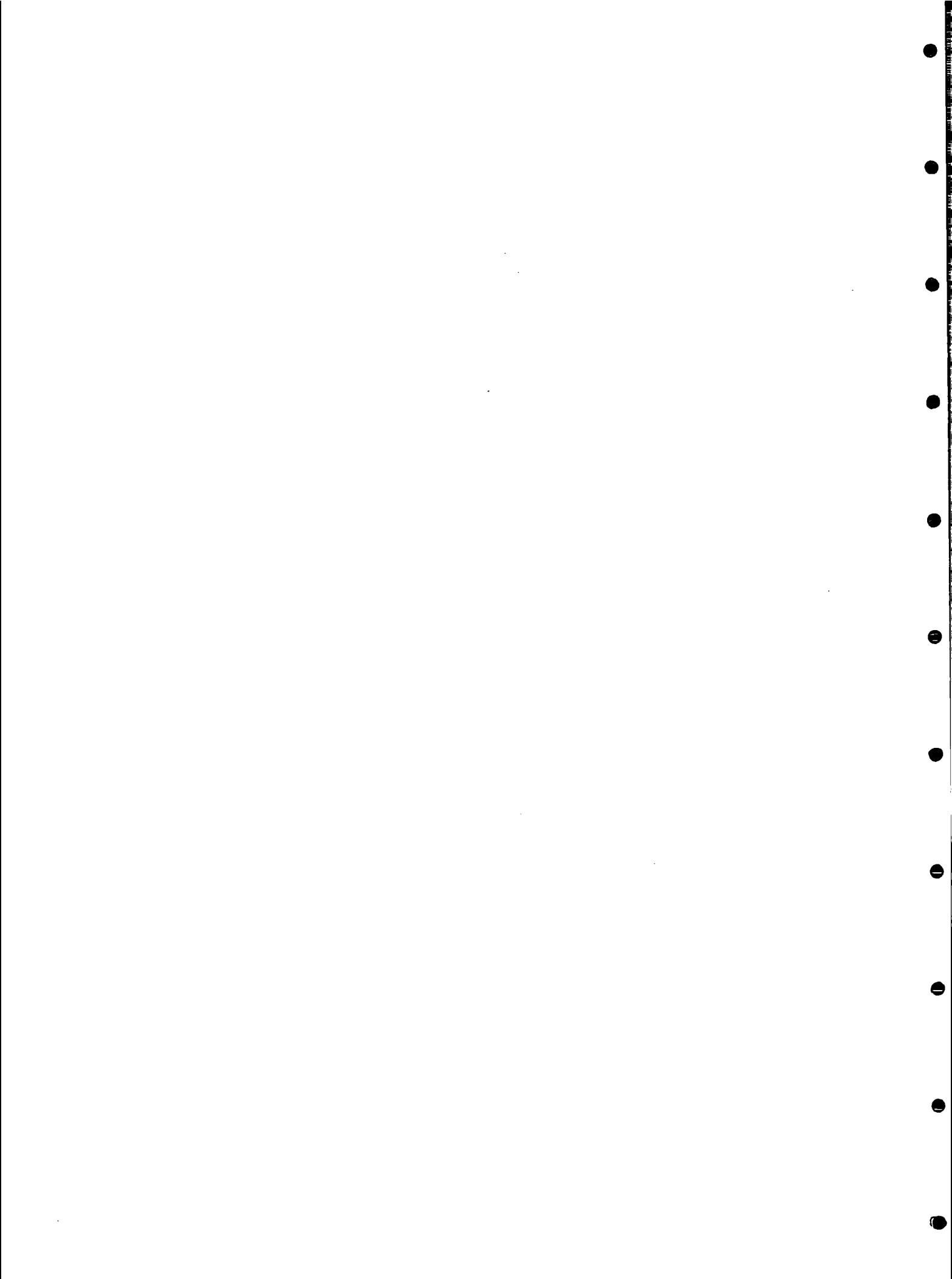
STREET TRAFFIC, SOCIAL INTEGRATION, AND FEAR OF CRIME

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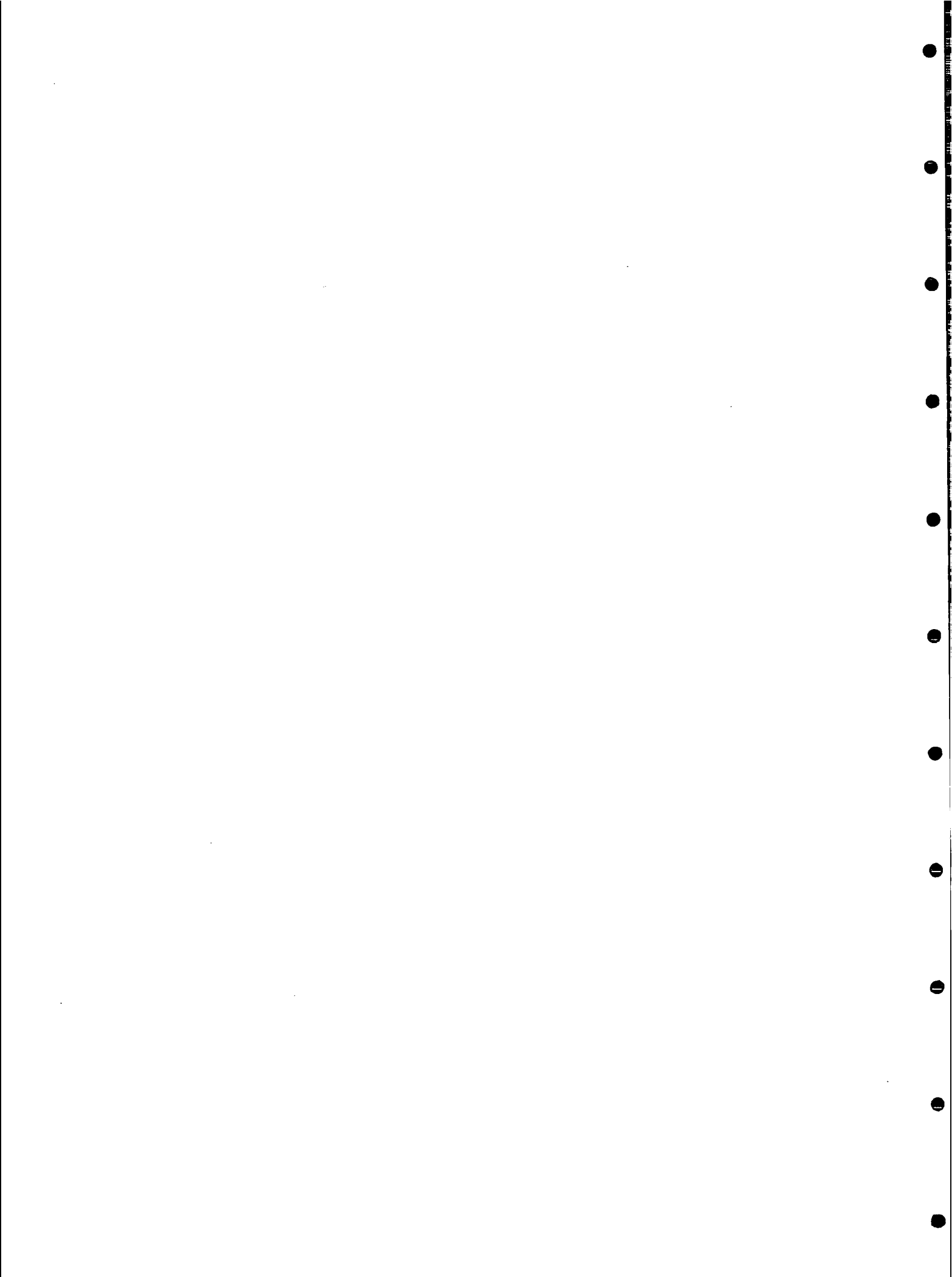
STUDY OBJECTIVES

The purpose of this study is to "assess the relative signi-
ficance and interaction between street traffic and local social
integration upon residents' fear of criminal victimization."
The authors suggest that previous studies investigating the
relationship between physical design characteristics and crime
underestimate the degree to which social variables affect the
occurrence of crime and fear of crime.

RESEARCH DESIGN

The study uses data collected from the Hartford Demonstra-
tion Program (Fowler et al., 1978). The original data source
included 556 interviews with a random sample of residents in
the experimental area, census tracts adjacent to the experi-
mental area, and the remainder of Hartford. The authors
sought correlations between perceptions of street traffic,
assessments of social integration and stability, and residents'
fear of crime.

VARIABLES

Independent

o   perceptions of street traffic
o   perceptions of social integration
o   perceptions of social stability

Dependent

o   fear of crime

OPERATIONALIZATION OF VARIABLES

Independent

Perception of street traffic was measured by asking the
respondents two questions about the number of persons usually
on their street. One question referred to daytime, and the

other to after dark. The variable was measured on a four point scale: "a lot" to "none."

Social integration was also measured by two questions. One asked respondents to evaluate their own ability to identify a person on the street as a neighborhood resident -- two point scale (hard/easy). The other asked the respondent whether he or she felt himself/herself to be a part of the neighborhood or considered it merely a place to live. Both these items were then dichotomized to differentiate the "highly integrated" respondents (can recognize strangers and does feel himself/herself to be part of the neighborhood) from the rest of the sample.

Residential stability, another indicator of integration, was measured by two additional items -- length of residence and home ownership. Respondents who both owned their homes and had lived there for two or more years were classified as being stable. The others were labelled as being more transient.

Dependent

Fear of crime was measured by an additive index consisting of five items. Three of these items were based on subjective estimates (probabilities) of victimization. Two other questions asked respondents to assess the extent to which they were worried about becoming a victim.

SAMPLING

Data from a previous study was adapted for use in this study, although the authors state that the data does not allow for generalizations to the population of eligible adults. The original sample of 556 interviews was weighted to adjust for the individual's place of residence within Hartford and the number of adults residing in the household at the time of the survey, resulting in a final sample of 14,442 respondents.

STATISTICAL METHODS USED

Kendall's Tau -- Relationships between fear of crime and perceptions of street traffic and social integration were analyzed using this method. In addition, conditional relationships between fear of crime and perceptions of street traffic were calculated according to this method.
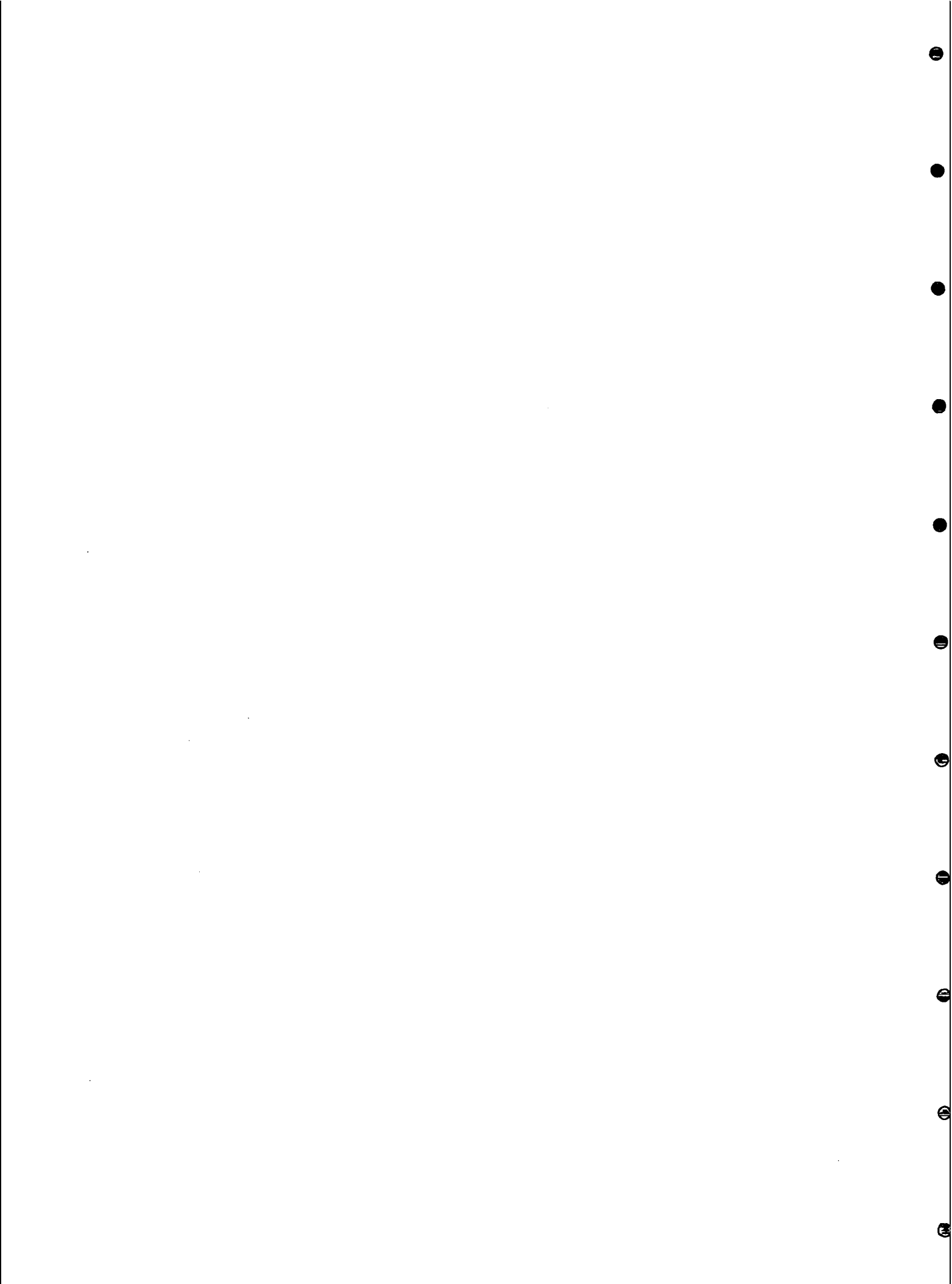
EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

All three independent variables lack validity. The authors state that perception of street traffic was used as a proxy for actual street traffic counts because more objective data were not available. To support their approach further, the authors suggest that, "Individual attitudinal and emotional states are more likely affected by subjective estimates of the number of people on the street [rather than by actual counts]." This statement skirts the issue. The stated objective of the study is to assess significance and interaction between *street traffic* and other variables. If the authors were focussing on the per- ceived volume of street traffic, the validity and reliability of these items should have been investigated. It is well known that one item (question) scales tend to have low reliability, which results in low validity. There is no evidence that respondents were using the same definitions for the various levels (scales) of street traffic under study. Terms such as "a lot" and "few" mean different things to different people. Using these terms without establishing some common framework for defining each level on the scale leaves the variable, as operationalized, open to potentially serious threats to its internal validity.

The weakness of the operationalization of social integration and residential stability as variables also lies in the way they were measured. For each of the items combined to form the social integration index, only two alternatives were offered to the respondents (e.g., "pretty easy," "pretty hard.") The lack of precision created by presenting these two options and the ambigu- ity of the possible responses make the social integration index low in analytic value. In addition, the authors state that both the items that comprise the social integration index (being able to distinguish strangers from non-strangers and whether or not the respondent felt himself to be a part of the neighborhood) were significantly related to each other, though no correlation coeffi-

cient is reported. The basic problem with the index of residential
stability is that it is formed by combining length of residence and
home ownership. Simply combining these variables in the manner
used by the authors can lead to the erroneous conclusion that a
person who has rented his home for twenty years is more transient
than a person who has owned his home for two years. This example
shows that the authors did not test or demonstrate the validity
of this index.

Dependent Variables

Although the authors state that the five dependent variables
were found to be significantly correlated, they failed to report
the values of the correlation coefficients. When the sample size
is sufficiently large, small correlations such as less than 0.1
can be significant. Significance of correlations does not
guarantee the reliability of the scale construction, but the
values of the correlations and the fact that they are significant
are important for demonstrating reliability, since one reliability
estimate can be given by:

$$\frac{n \, \bar{r}}{1+(n-1)\bar{r}}$$

where n is the number of items in the scale and $\bar{r}$ is an average
correlation among items. Therefore, further information is neces-
sary to evaluate the reliability of the dependent variables as
operationalized.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design in this study is superficial in that data
from a previous study were adapted for the purposes of this study.
The authors' strategy of using the existing data included modify-
ing the data for their purposes by weighting them. It seems that
the better strategy would have been to adjust the purposes of the
study to the existing data and then to design the study according
to those objectives. One alternative to the design presented
would be to conduct analyses similar to those reported in the

paper, but do it for three areas and then compare the results across the three areas. In this design, there would be no need to weight the data.

APPROPRIATENESS OF THE SAMPLING PROCEDURES

The researchers did not have control over sampling. Since the sampling (data collection) was actually undertaken for another study, the authors could not influence the sampling.

APPROPRIATENESS OF STATISTICAL METHODS

The increase in n (respondents) from 556 to 14,442 (weighted numbers) is too great not to have an adverse effect on the results of the statistical tests employed. It is not clear how weighting affected the estimation of taus, though it is probable that weighting resulted in a biased estimate.

Creation of dichotomous variables for the social integration and stability indices might have changed marginal distribution and resulted in different tau values. The authors created a "dichotomous variable" in the following manner: Using two variables with two possible choices for answers (yes/no), the authors combine these variables by putting yes/yes responses in one category and all other responses (no/yes, yes/no, and no/no) in the other category.

For the purposes of this study, discrete multivariate analysis taking the fear index as the dependent variable and the others as independent variables would have been a better statistical procedure. Weighting such as the authors did causes problems, since it is not clear how weighting affects estimation.

CONCLUSIONS

The authors report:

The greater the perceived use and density of people on
city streets, the greater the fear of criminal victimization.
This finding is qualified by the fact that the positive
relationship found between fear and the perceived volume of
street traffic is much less than the strength of the relation-
ship found between fear and other individual and community-
level characteristics, such as age, sex, race, and class.

No positive relationship exists between street traffic
and fear when residents are socially integrated into their
local community. For those persons categorized as socially
integrated, the perceived level of street traffic does not
appear to be related to their level of fear, while for those
not socially integrated the greater the street traffic, the
greater the fear.

DISCUSSION OF CONCLUSIONS

The conclusions are overdrawn, for three reasons.

First, the authors did not compare their model with
possible competing models or plausible alternate explanations
for the relationships between social and physical variables
and the fear of crime. Second, the validity of the social
integration and stability variables are questionable. Third,
the social integration and stability variables were
dichotomized, as discussed above, and this may have changed
the value of Kendall's tau.

THE EFFECT OF PHYSICAL AND SOCIAL FACTORS ON RESIDENTS'
SENSE OF SECURITY IN MULTI-FAMILY HOUSING DEVELOPMENTS*

AND

DESIGN FOR LIVING:
THE RESIDENTS' VIEW OF MULTI-FAMILY HOUSING

Author:

Franklin Becker

Reviewers:

Tetsuro Motoyama
Herb Rubenstein
Peter Hartjens

*The review is primarily addressed to this study, which summarizes
the second study listed. References are made to the second study,
which was also reviewed by AIR.
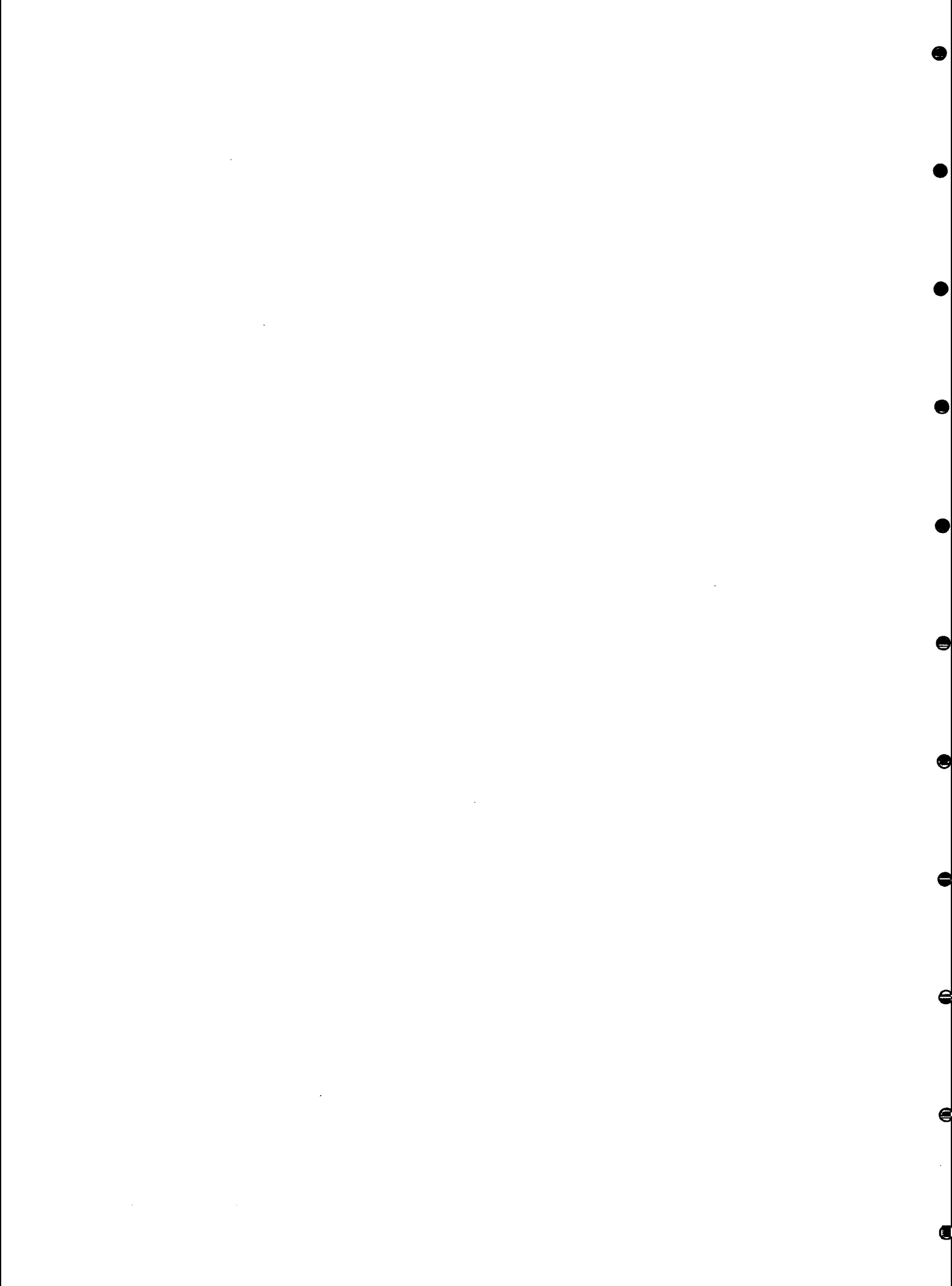
STUDY OBJECTIVES

The purpose of the study is to investigate residents' per-
ceptions of factors affecting their sense of security. One
small part of the study investigates the contribution to that
perception made by physical design factors. It is this section
of the study that is reviewed here.

RESEARCH DESIGN

The study consisted of interviews with persons in 357 ran-
domly selected apartments in multi-family housing built by the
New York State Urban Development Corporation. There were 591
respondents, and data were also gathered from approximately
"100 observation periods in which people, activities, and places
were systematically mapped." The research was conducted in
three types of high-rise and different types of low-rise
apartments. The author focused on the findings from the three
high rise developments. The study is exploratory in nature
(pre-experimental) and of the type often called "emergent,"
since the hypotheses were derived from the data itself.

VARIABLES

Independent

- apartment type
- location of apartment complex
- physical design factors
- number of acquaintances in housing development
- degree of friendship and trust among neighbors
- presence of security guards

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*According to the author, the goal of the research was "to look
at naturally occurring differences within and between develop-
ments that might provide some insight into user satisfaction
with many facets of the housing development". The original
research did not have the objective or the research design to
investigate the relationship between crime and the physical
environment.

Dependent

- feelings of security
- resident attitudes on whether physical design factors deter strangers from entering complex
- willingness to challenge defenders and change space

OPERATIONALIZATION OF VARIABLES

Independent Variables

Apartment Type -- The author divided apartment types into high rise and low rise.

Location of Apartment Complex -- Operationalized as urban/non-urban.

Physical Design Factors -- The author divided the complexes in terms of entrance and access routes to and within the complexes, existence of territorial definition, and existence of locked doors to lobbies and other semi-public places. No measurement of this variable was given. Rather, the author provided graphs and referred to the physical design aspects of apartment complexes in a very general manner.

Number of Acquaintances and Friends -- The author measured these variables through survey questions and divided the number of acquaintances (people one says "hello" to) into four categories: 1-3 persons, 4-8, 9-15, and 20+. "Friendships" is not operationally defined.

Presence of Security Guards -- Not operationally defined.

Dependent Variables

All dependent variables were operationalized through questionnaire items, examples of which are presented below:

"Do you think the layout discourages strangers from coming into the development?"

"Can you tell when a person is a stranger in the area right around your apartment?"

SAMPLING

The original sample met the following criteria: (1) urban, (2) occupied for at least six months, and (3) owned and operated by the New York State Urban Development Corporation. Later, smaller, more suburban complexes were added. The sample was non-random.

STATISTICAL METHODS USED

Descriptive Statistics -- The author reports survey results in two-way tables, giving percentages of responses by type of apartment complex. The author also presents frequencies and percentages to summarize the survey results.

Correlation Coefficient -- The author uses this statistical method to measure the association between the variables "having friends" and "feelings of security."

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The original study was primarily concerned with the relationship of social factors to residents' sense of security. The physical factors are neither operationally defined nor measured with sufficient precision to allow for hypothesis testing or adequate comparisons among building types.

APPROPRIATENESS OF RESEARCH DESIGN

The research design employed does not directly support the generalization of the findings regarding the relationships among specific physical design features, social factors, and residents' perceptions of safety. In order to allow for generalization, the research design would require housing developments with different levels of physical design and social factors. The present design is exploratory in nature, where the data are exploited to extract information.

APPROPRIATENESS OF SAMPLING PROCEDURES

The size of the sample (seven) is too small for hypothesis testing. Further, the similarity of the housing developments (or the author's failure to describe how they differed in terms of physical design) also limits the ability of the study to delineate the effects of physical factors on residents' feelings of security. Given that the author was conducting an exploratory study with support and direction from the New York State Urban Development Corporation, the sample size and selection process was probably limited at the outset.

APPROPRIATENESS OF STATISTICAL METHODS

Descriptive Statistics -- The author's use of two way tables including frequencies and percentages is appropriate for summarizing the results of the survey.

Correlation Coefficient -- Although little information is given on the manner in which the author computed the correlation coefficient, it appears that the correlation is wrong. The author reports, "The correlation was insignificant between the proportion of residents having twenty or more acquaintances and the proportion of residents who felt very secure." The author should have computed one correlation given by the individual's number of friends and his feelings of security, rather than using the proportion of persons in groups.

CONCLUSIONS

The author reports:

- The residents more often attributed a sense of security to the presence of guards than to physical design factors as such.

- Analysis of different developments indicated that design factors can influence guards' effectiveness.

- Having twenty or more persons to whom one said "hello" (acquaintances) did not correlate significantly with a resident's sense of security. The number of "good friends" who lived in the development did, however, correlate significantly.

DISCUSSION OF CONCLUSIONS

In general, the conclusions appear overdrawn. The conclusion about guards and design factors is based on a research design that confounded guards and design factors. To support such a conclusion, the research would have to include a factoral design with two factors -- the presence of guards and housing design. The research reviewed here does not include such a study design. The conclusion that design factors can influence guards' effectiveness represents an interpretation of non-quantitative data by the author. The first two conclusions are reasonable interpretations of the results from the empirical data analyzed in the research. However, their value is mainly exploratory because of the nature of the sampling and design of the research.

The conclusion that having greater than 20 or more acquaintances does not correlate with one's sense of security cannot be generalized to the inference that the number of acquaintances (from 1 to 20) is not correlated with one's sense of security. This was never tested. In addition, the author does not describe the research that supports his conclusion that the number of friends living in the complex does significantly affect a resident's sense of security.
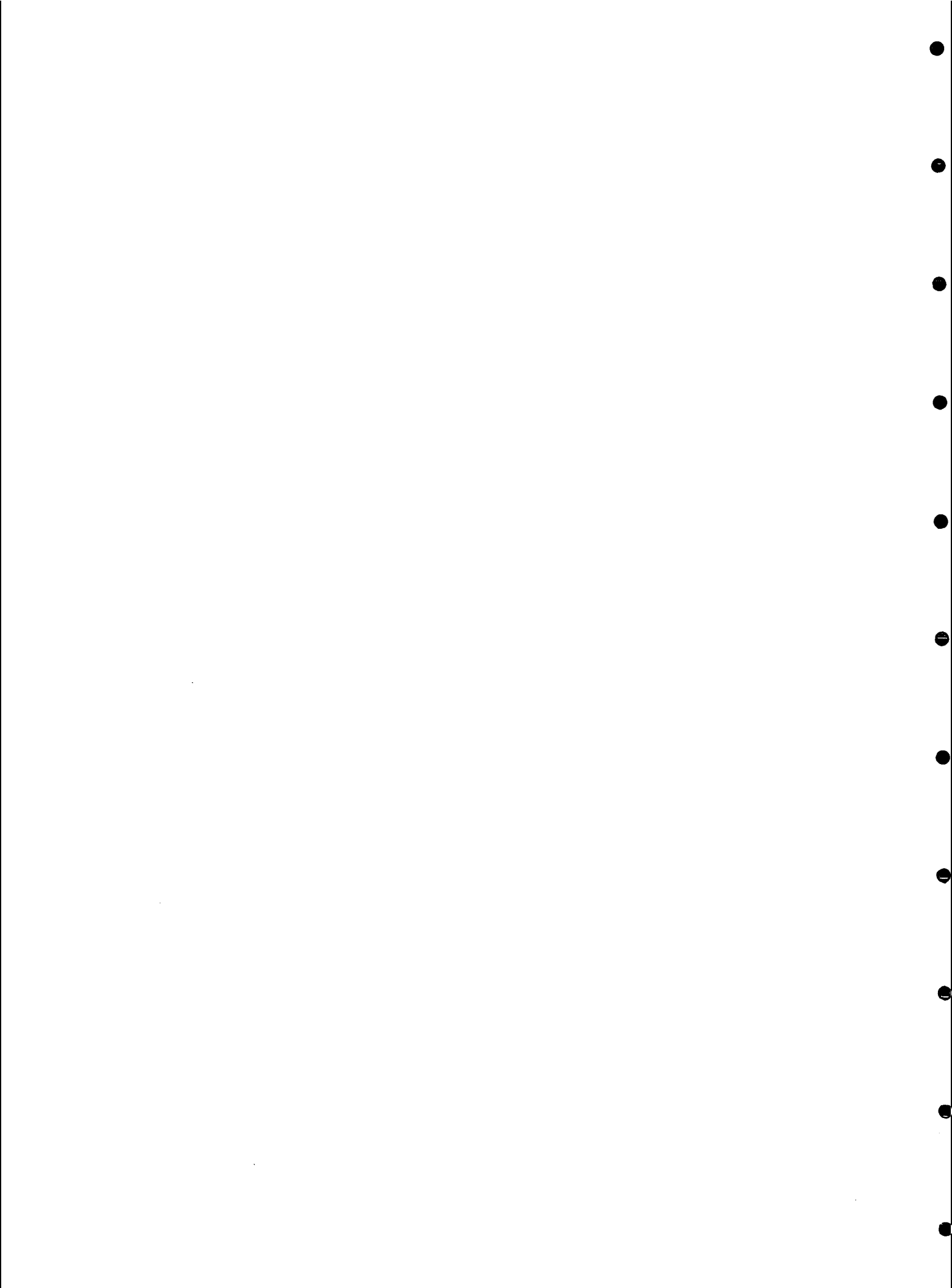
CHANGING STREET LAYOUTS TO REDUCE RESIDENTIAL BURGLARY

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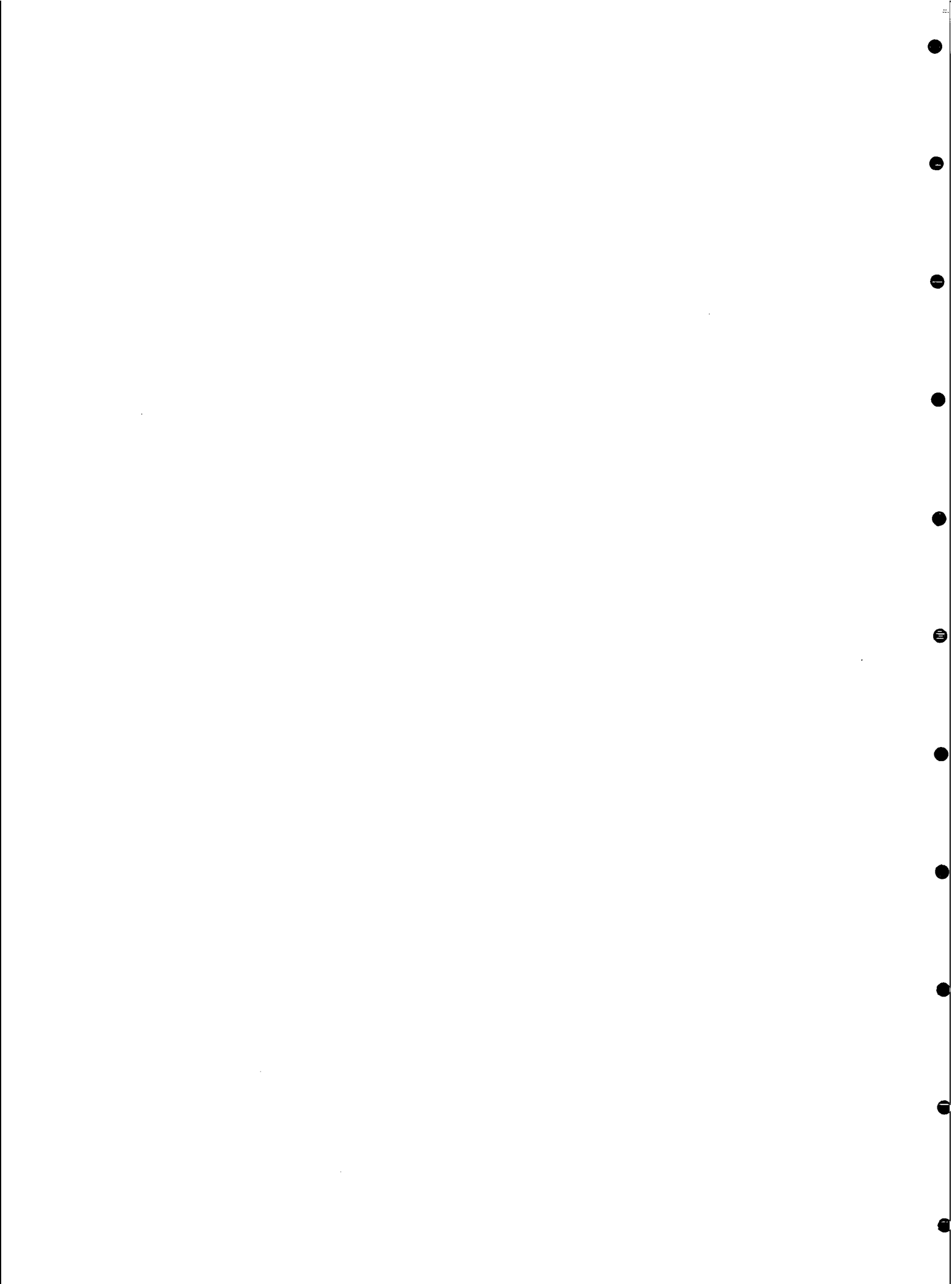
STUDY OBJECTIVES

The study investigates whether "relatively accessible street layouts are associated with relatively high rates of residential burglary". Further, the study seeks to determine:

- whether all types of inaccessible blocks (e.g., cul de sacs, "T" blocks, "L" blocks, etc.) have uniformly low residential burglary rates
- whether there is evidence suggesting that burglaries are displaced from blocks with less accessible streets to more accessible streets in the same vicinity, and
- whether street layouts found to have a deterrent effect on residential burglary have higher rates of other crimes.

RESEARCH DESIGN

The research design includes hypothesis-testing in two separate phases. The authors use a set of four groupings of streets (dead end, cul de sac, "T" type, "L" type) and develop a measure of "relative accessibility" for individual blocks based on the number of directions from which a car could enter or leave a block (p. 7). Then the authors select thirty (30) census tracts (random sample) in Minneapolis for consideration. From this sample, the authors select a random sample of eleven to sixteen (11 - 16) blocks for each type of street. To serve as a match for each study block of limited accessibility, the authors use the nearest through block feeding traffic into the study block as a control or comparison group (p. 8). Data on crime rates were collected from police records, while local directories provided resident counts.

During Phase 1, the authors compare the residential burglary rates of the individual blocks from the original sample, which represented the various layout types. The authors use the rate of burglaries per 1,000 residences in the test of their hypothesis regarding the relationship between accessibility and

residential burglary rates. During Phase 2, the authors test the strength of the hypothesis through the introduction of intervening (control) variables and the use of multiple regression analysis. Also during Phase 2, the authors shift the unit of analysis from the individual block to the census tract and develop permeability (accessibility) measures for each of Minneapolis' 127 census tracts for purposes of comparison.

VARIABLES (Phase 1)

Independent

- Relative accessibility of individual blocks (Type of block)

Dependent

- Residential burglary rate for individual blocks

Unit of Analysis

- Individual residential blocks

VARIABLES (Phase 2)

Independent

- Permeability (accessibility) of individual census tracts

Intervening

- Number of poor juveniles residing in individual census tracts
- Number of poor juveniles residing in adjacent census tracts
- Number of Blacks residing in individual census tracts
- Number of Blacks residing in adjacent census tracts

Dependent

- Residential burglary rates for individual census tracts
- Commercial burglary rates for individual census tracts
- Commercial robbery rates for individual census tracts
- Resident street robbery rates for individual census tracts

- Resident assaults by strangers for individual census tracts
- Resident rapes by strangers for individual census tracts.

Unit of Analysis

- Individual census tract

OPERATIONALIZATION OF VARIABLES

Independent Variables (Phase 1)

- The relative accessibility of individual blocks is measured by determining the number of directions from which vehicles could enter or leave the block. Five categories of blocks are distinguished, and each is ranked from least accessible to most accessible:
  - "Dead end" -- three access paths with no allowance for turning around
  - "Cul de sac" -- three access paths with an allowance for turning around
  - "L" Type -- four access paths permitting through traffic
  - "T" Type -- five access paths permitting limited through traffic
  - "Through" Type -- six access paths permitting through traffic.

Independent Variables (Phase 2)

- The permeability of individual census tracts is operationalized by applying a measure of street layout used in graph theory, the "beta" score. In graph theory, the beta score represents the ratio of the number of vertices (intersections) to the number of edges (blocks) in a given area. A low beta score indicates low permeability, and a high beta score represents high permeability.

Intervening Variables (Phase 2 only)

- Poor juveniles residing in the census tract is measured as the percentage of total perons under age 18 living in census tracts in households with incomes below the poverty level in 1970.

- Poor juveniles residing in adjacent census tracts were measured similarly. Adjacent census tracts were those of which the geographic center is within one mile of the study tract. The variable is introduced to serve as a control for the estimated range of residential burglars from their potential targets.

- Blacks residing in the census tract is measured as the percentage of Black residents of the census tract in 1970.

- Blacks residing in adjacent census tracts is measured in the same manner as poor juveniles residing in adjacent census tracts.

Dependent Variables (Phase 1)

- Residential burglary rates for individual rates are estimated through the use of public records on burglaries for the period of July 1974 through June 1975 in a randomly-selected sample of blocks representing each of the five street layout types. A burglary rate per 1,000 residences was computed using existing lists of residences in the individual blocks.

Dependent Variables (Phase 2)

- Residential burglary rates for individual census tracts are estimated through the use of police records for the period of July 1974 through June 1975. A rate per 1,000 residents was computed using 1970 census data.

- Commercial burglary rates for individual census tracts are estimated in a similar fashion, using available listings of commercial businesses during the period in question.

- Commercial robbery rates are estimated similarly.

- Resident street robbery rates are estimated similarly, except that street robberies occuring to victims while outside the census tract which they live are omitted from the rates. (p. 16)

- Resident assaults by strangers are estimated similarly.

- Resident rapes by strangers are estimated similarly.

SAMPLING PROCEDURES USED

In Phase 1, the authors use a random sampling technique to select 30 census tracts out of a universe of 127. The authors divide the blocks in the 30 tracts into four groups--dead end, cul de sac, "L" type, and "T" type--and randomly selected from eleven to sixteen of each type of block. These serve as the study

blocks. The researchers then select forty-four to sixty-four "through" type blocks located next to the study blocks to serve as controls.

No sampling was undertaken during Phase 2. Instead, all 127 census tracts in Minneapolis were used. (p. 10)

STATISTICAL METHODS USED

Phase 1

Descriptive Statistics -- The authors make a straightforward comparison of the relative frequencies of residential burglary rates per 1,000 residences for each type of block studied. The authors also compare the relative frequencies of burglary rates per 1,000 residences for the various types of study blocks and their respective control blocks.

Signs Test -- The authors use this non-parametric statistical method to test whether the pairs of match observations (study block and its control block) showed significant differences in burglary rates. This test formed the basis of the analysis during Phase 1, since no other tests of significance were conducted.

Phase 2

Correlation -- The authors compute a Pearson product moment correlation coefficient between all variables tested in Phase 2.

Multiple Regression Analysis -- The authors analyze the relationships between the independent variable, the beta score representing the permeability (accessibility) of individual census tracts, the intervening social variables, and the various crime rates used as dependent variables. Intervening and independent variables are entered in the regression equation in a fixed format with the independent variable entered last.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Phase 1

Type of Block -- The relative accessibility of blocks is determined by classifying blocks according to their least accessible intersection. This allows the measure to achieve a reasonable degree of accuracy, reliability, and precision, and generally to have high internal validity. Several concerns regarding its external validity are discussed below.

Residential Burglary Rates for Individual Blocks -- This measure (number of burglaries/number of residences x 1,000) is based on police data and other apparently adequate sources with regard to the number of residences. This continuous scale, given the inherent limitations of public records, represents a reliable and reasonably accurate manner for operationalizing the dependent variables.

Phase 2

Permeability of Individual Census Tracts -- The basic measure used is the "beta score," which is the ratio of the number of intersections divided by the number of blocks. The reliability of this measure appears to be reasonable, though as the authors point out it represents only one of three types of mapping scales that could be used to operationalize the variable. The measure has high internal validity, but may not represent a valid or accurate measure of accessibility. The authors state that the lower the beta scores, the less accessible are the street patterns in a given census tract. The validity and sensitivity of this measure are unclear, since the authors failed to compare the beta scores with the actual census tract street layouts. Further, the external validity is reduced, since the beta score is a measure biased toward analyzing vehicular accessibility, rather than pedestrian accessibility.

For example, there is a possible error factor because the measures ignore block (edge) length. Therefore, the permeability (accessibility) measures with regard to the census tracts and the individual blocks are susceptible to various threats to their external validity and precision. To the extent that youth crime is a problem, the bias of the measure to vehicular traffic patterns seems particularly inappropriate.

Social Characteristics Used as Intervening Variables -- All variables regarding poor juveniles and Blacks are based on archival data and calculated in a straightforward and adequate manner. The reliability and accuracy of these variables are good.

Crime Rates -- Residential and commercial burglary, street robbery, resident assaults, and other crime data used as the dependent variables are based on police records. The crime data appear to be accurate within the known limits of police reporting methods. Assuming that these reporting methods do not produce systematic biases from census tract to census tract (precinct to precinct), these dependent variables are reasonably accurate and reliable.

APPROPRIATENESS OF RESEARCH DESIGN

The research design is adequate for testing the major hypotheses put forth by the authors. The stratification of the blocks into the various types and the use of control blocks are sufficient to determine whether blocks with differing levels of accessibility experience varying levels of crime. The authors included only a small number of the many potential intervening variables that could contribute to the variation in reported crime. Further investigation would have been appropriate, using a large number of intervening variables such as resident income, income of adjacent census tracts, migration into and out of census tracts, existence of entertainment facilities, and other

factors traditionally considered to be contributors to the rate of crime.

The research design does not appear to meet the requirements of hypothesis testing with regard to displacement. The design does not directly answer the question of whether crime is somehow shifted to census tracts or blocks with higher levels of accessibility, though the authors conclude that there was no displacement effect.

APPROPRIATENESS OF THE SAMPLING PROCEDURES

The sampling techniques were reasonable. They were consciously designed to avoid bias, and in the second phase the use of the metropolitan universe increases the generalizability of the findings. The authors' reliance on random and stratified random procedures was appropriate, and the selection of control blocks was also undertaken in a reasonable manner.

APPROPRIATENESS OF STATISTICAL METHODS USED

All statistical methods used were appropriate for the type of data collected and for the major objectives of the study. The sample size was adequate for multiple regression analysis, though the limited number of intervening variables prevents one from firmly relying on the extent of variation in the dependent variables attributed to the independent variable.

POWER RELATIVE TO THE OBJECTIVES OF THE STUDY

The confidence in the results of the study is strong due to the following reasons:

- The sample size was adequate for the degree of precision required to test the hypothesis.

- The ratio of the sample size to the number of independent and intervening variables was high, and the statistical techniques used assured that spurious results could be detected and a full explanation of the results could be made.

- The information used was treated rigorously and completely.

CONCLUSIONS

The authors report:

- A relationship exists between street layout (relative accessibility) and the frequency of burglaries in the hypothesized direction. The authors found a higher frequency of residential burglaries in more accessible areas than in less accessible areas.

- The relationship is not uniform across all types of street layout. The relation holds for dead end, cul de sac, and "L" type patterns, but not for "T" type patterns.

- The low accessibility of streets that have low burglary rates does not seem to have the effect of displacing burglaries to more accessible streets within the same census tracts.

- The relation between street layout and residential burglaries cannot be dismissed by considering the traditional social variables tested in the study.

- Street layouts with low accessibility and low residential burglary rates do not seem to be vulnerable to other crimes.

DISCUSSION OF CONCLUSIONS

The statement that a relation exists between street layout and the frequency of burglaries appears to be justified by the results reported. The authors do not suggest a causal link between street layout and residential burglaries, but only an "association" between the two factors. In view of the theoretical works cited, the findings are plausible and can be described as further evidence supporting the theories. As the theories differ in the causal factors they propose, these results do not add to the explanatory power of the theories, but do add strength to the presumed existence of the phenomena that the theories attempt to explain.

The authors' second conclusion, that the relation is not uniform across all types of street layouts is factually correct, though the failure to test for significant differences or associ-

ations can be cited as reducing the generality of the statement. The authors do not offer any explanation for the absence of the expected relation in the case of the "T" type street layout.

Statement three, regarding the finding of no displacement, is not clearly justified in the data presented, and the authors cite no data or analytic procedures that indicate how the question was addressed. As the primary unit of analysis was the census tract, the crime rates reported apply to the census tract as a whole, as does the census tract "beta" score. To support such a statement, it would have been necessary to examine individual blocks in the tract with regard to both their permeability and crime rate. This research is undertaken in Phase 1 only. Further, the use of only one "control" block may not be a sufficient test for picking up a displacement effect. The way in which the results are presented does not suggest that this statement was derived from Phase 1 data, though no information reported for Phase 2 indicates how this conclusion is reached.

The authors' fourth conclusion, that the relationship between street layout and residential burglaries cannot be dismissed by considering the traditional social variables, is supported, though by no means proved, by the results presented. Although traditional socio-economic variables might have been introduced, the strength of the predictive power of the "beta" score appears to be relatively high, even after several social indicators were included in the analysis. A question remains, however, as to how accurate the "beta" score is in representing the actual texture or accessibility of a given street layout pattern.

Statement five, reporting that streets with low accessibility and low residential burglary rates are also not susceptible to other types of crime, appears to be justified by the results reported. The statement is, however, a negative hypothesis. In order to prove it with statistical integrity, it would have

been necessary to show that there is an inverse relationship
between permeability and these various other crime rates
sufficient to reject the hypotheses. The results show, in fact,
no such relationship between "beta" and other crimes. The
authors offer no explanation of why the relation would apply
to residential burglaries, yet not apply to other forms of
street crime, except that they state that "other" factors must
be operating.
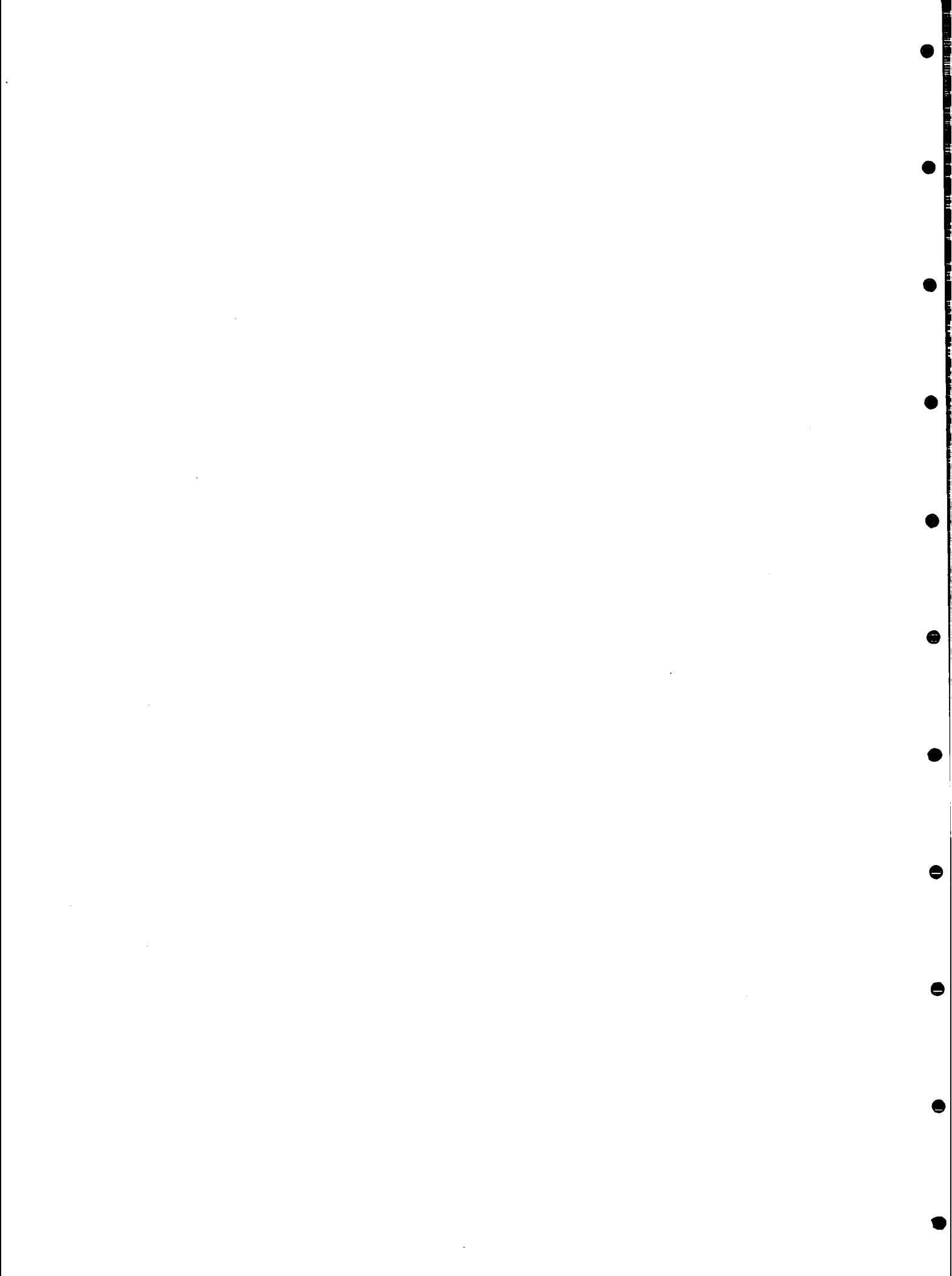
A TOPOLOGICAL TECHNIQUE FOR REGIONALIZATION
RESIDENTIAL BURGLARY AND URBAN FORM*

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*The study review herein is summarized in each of the articles cited on this title page.
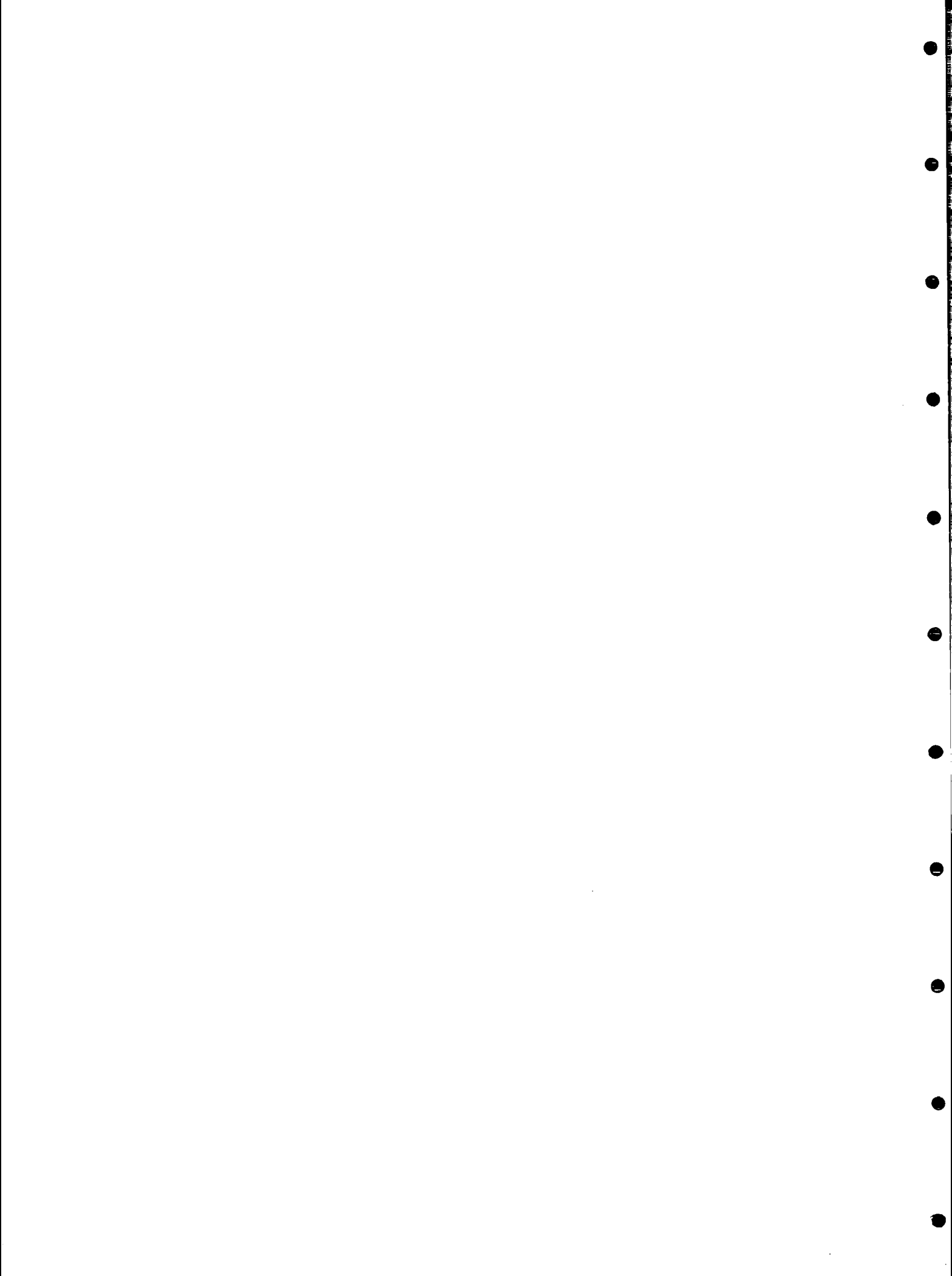
STUDY OBJECTIVES

The purpose of this study is to test the usefulness of "border-interior" relationships among city blocks (with respect to homogeneously defined residential areas) as a predictor of the level and spatial pattern of burglaries in a city.

RESEARCH DESIGN

Using alternative sets of characteristics of city blocks (racial composition, proportion of single families, rental or market level, and others described below), blocks in the city of Tallahassee, Florida were divided into two groups: "border" and "interior." Burglary rates were compared across these two groups by using t-tests of significance across each characteristic.

VARIABLES

Independent

- Location of block within neighborhood (border vs. interior)

- Average cost of housing

- Average rent

- Percentage single family housing

- Percentage small apartments

- Percentage large apartments

- Percentage black

Dependent

- Burglary rates

OPERATIONALIZATION OF VARIABLES

Independent Variables

Classification of blocks was made by analyzing census data variation per block among six independent measures: 1) average cost of housing, 2) average rent, 3) percentage of single family housing, 4) percentage of small apartments (two to nine units), 5) percentage large apartments (ten or more units), and 6) percentage black. When any of these measures varies by either (a) 10%, (b) 20% or (c) 30% from the adjacent block, the block is classified as a "border" block. Areas with less variation are designated "interior" blocks.

Dependent Variables

Burglary rates per block were generated from city police reports for crimes in 1970. Burglary rates were "geocoded" to the city block and mapped using the BRIDS line printer mapping system. Burglary rates per 100 dwelling units were then calculated.

SAMPLING PROCEDURE

The authors used the entire population of blocks within Tallahassee as their sample.

STATISTICAL METHODS

Analysis of Variance -- T-Tests to determine significance were conducted across border blocks and interior blocks for each of the six independent measures.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Operational definitions of "border" and "interior" are

reliable. These categories are, however, "self-validating",
in that they have no external reference beyond what is measured
by their own definition. (Note, the author used three defini-
tions based on variations of 10 percent, 20 percent, and 30
percent in the measures applied).

APPROPRIATENESS OF RESEARCH DESIGN

The research design is innovative and directly tests
the stated hypothesis in a manner free from threats to inter-
nal validity. External validity is very vulnerable by the use
of only one city in which to test relationships between vari-
ables. There is no assurance that the particular patterning
of Tallahassee neighborhoods does not account for differences
in crime levels found between "border" and "interior" blocks.

APPROPRIATENESS OF STATISTICAL METHOD

T-tests were a valid way to test for significance, how-
ever several one-way analyses of variance would have been more
appropriate tests of significance.

CONCLUSIONS

The authors report:

- Blocks which were in border areas had higher burglary
  rates than blocks which were in the interior of neigh-
  borhood sets.

- The reduction of burglary incidence might be possible
  by controlling the size and shape of neighborhoods.

DISCUSSION OF CONCLUSIONS

The first conclusion is well supported by the research.
The second conclusion is not well supported and represents
speculation on the part of the authors.

In order to determine the utility of the border concept it is necessary to determine whether it is a *better* predictor of burglary than other relevant variables. The study falls short of any analysis of the relative power of "border-interior" in contributing to the variance in burglary rates *compared* with the contributions of other possible predictors.

In addition, the techniques used shed little on the different physical characteristics in "border" vs. "interior" blocks and therefore tell us little regarding the effect of *physical* characteristics on crime rates. However, if the "border" concept is as useful as the study suggests, then it may be valid way to route police patrols and more effectively police neighborhoods against burglary.

COMPREHENSIVE SECURITY PLANNING:
A Program for William Nickerson, Jr., Gardens,
Los Angeles, Calif.*

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William Brill Associates

Reviewers:

Tetsuro Motoyama
Paul Fingerman
Herb Rubenstein
Peter Hartjens

* This report is one of a series of reports prepared
for HUD by William Brill Associates. These reports represent
an important contribution to the literature on crime and
will be included in the Task Six "Synthesis of the Literature".
However, since the basic methodology is used in the Brill
reports and is not empirically oriented hypothesis testing
type of approach, we review only this one representative
study for Task Three Assessment.
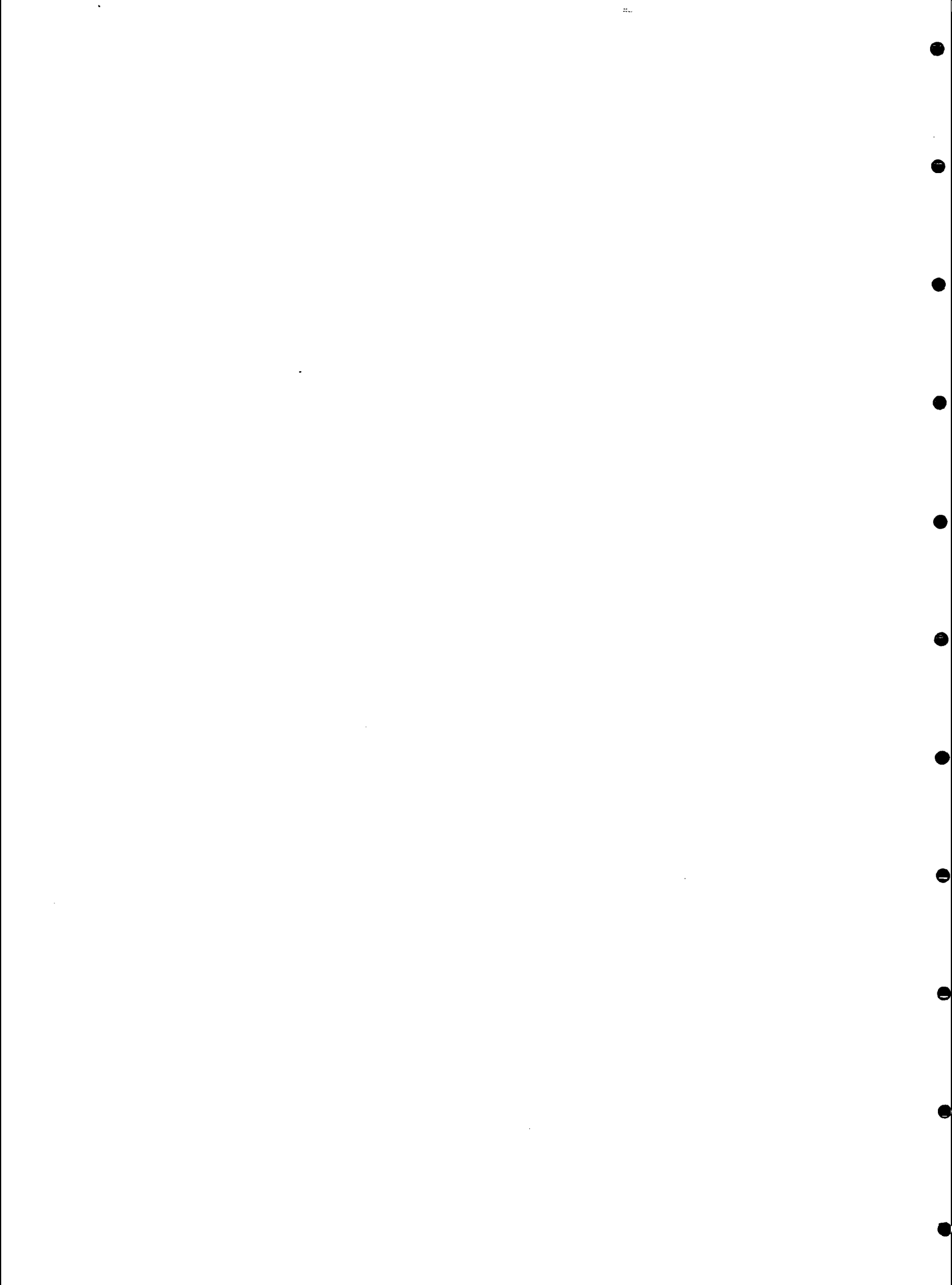
STUDY OBJECTIVES

The purpose of the study was to analyze the locations of crime and attributes of the social and physical environment that may contribute to crime in order to develop a comprehensive security planning program for William Nickerson, Jr. Gardens housing development. This review focuses on the research aspect of the study.

RESEARCH DESIGN

The research design was pre-experimental and exploratory in nature. It consisted of three related parts: (1) Household Safety and Security Survey, (2) a physically oriented Site Security Analysis, and (3) an investigation of the housing development's social problems and the level of police and other security-related social services.

The household survey collected data on victimization, fear of crime, and the extent to which residents alter their behavior because of crime-related problems in the housing development and surrounding neighborhood. The site security analysis was based in part on observation of the use of space. In addition, the author conducted an analysis of the extent to which the physical design of the housing met the following "vulnerability criteria." This analysis identified large areas of unassigned open space, ascertained whether the development was easily penetrable, had high risk areas, design conflicts, and whether the development provided residents with the opportunity for visual surveillance. These features were considered potentially crime-inducing physical design factors based on the defensible space theories of Oscar Newman. In addition to observation conducted by Brill, data for the study were collected from interviews with housing authority staff, management personnel, police, and residents concerning the current use of space and the location of crimes.

The social vulnerability analysis consisted of a study of the housing development's social problems and the lack of social and police services that may contribute to crime. The analysis was based on data collected from interviews with key persons in the housing development. The author collected data to assess the level of social cohesion, the extent to which residents were organized, and the level of social and police services in relation to their need.

VARIABLES

- Household Safety and Security Survey
  -- Victimization (several categories)
  -- Fear (expectation of victimization, fear for children, perceived dangerousness of several areas of the environment, and the need for personal protection)
  -- Altered behavior
  -- Location of crime
- Site Security Analysis
  -- Unassigned open space
  -- Penetrability
  -- Ease of surveillance
  -- Design conflicts
  -- High risk areas
- Social Vulnerability Analysis
  -- Level of social cohesion (attitude toward other residents, friendship and interaction patterns)
  -- Level of resident organization
  -- Level of social services and police services.

OPERATIONALIZATION OF VARIABLES

Household Safety and Security Survey -- The variables defined below were measured through surveys of the heads of households who lived at William Nickerson, Jr. Gardens.

Victimization -- Frequency data were collected on crime categories, including personal victimizations (i.e., robbery, purse snatching, assault, and sexual assault), victimization against the household (i.e., burglary, successful and attempted; larceny; and vandalism), and victimization against personal property (i.e., deliberate car damage and mailbox break-in).

Fear of Crime -- Respondents were asked:

(1) What did they think of their chances (probability) of being a victim of a crime within the next year?

(2) How worried (three point scale) were they about their children's safety in several locations of the housing development?

(3) To rate on a six-point scale (very safe to very dangerous) twenty different settings (locations) in the housing development.

(4) Whether they thought residents should carry something to protect themselves.

Altered Behavior -- This variable was measured through survey questions eliciting examples of ways that residents carried out their daily activities in order to reduce the probability of victimization.

Location of Crime -- Residents were asked where each of the crime incidents they reported occurred.

Site Security Analysis -- The author provided no operational definitions for the variables listed below. In the report, the author described the variables in terms of criteria and determined whether the housing development had areas that meet or do not meet the criteria.

- "Unassigned open spaces [were] those which individuals or groups of residents have not claimed for their own use."

- "Penetrability" referred to whether access to the site was open, unrestricted, or restricted.

- "Ease of surveillance" referred to whether activity areas were in plain view of residents and whether the locations of windows and apartments is conducive to overseeing open and public spaces in the housing development.

- "Design conflicts" referred to the existence of two incompatible activities at or near the same location.

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• "High risk areas" referred to areas that exhibit several physical design factors that "have combined to make an area particularly dangerous."

Social Vulnerability Analysis -- The variables listed below were measured through survey data:

• "Social cohesion" was defined as "the tendency of residents to stick together and to feel part of the community," and was measured through answers to the following questions --

-- Do you agree or disagree that:
   (1) people try to make the development a better place to live?

   (2) feel comfortable with other residents?

   (3) people are friendly with one another?

   (4) neighbors have the same beliefs about what is right or wrong?

Other components factored into the analysis of social cohesion included number of friends, number of female-headed households, and residents' perceptions of the seriousness of problem of youth gangs.

• "Resident organization" was defined as the existence of a representative tenants' organization.

• Social services and police services were assessed in terms of the adequacy/inadequacy of crisis intervention programs, security related social services such as drug counseling, and police patrol practices.

SAMPLING

The household survey sample consisted of 184 households that were proportionally stratified by the number of bedrooms per unit. The sampling procedures for key persons -- management, social service staff, police officers, and others -- was not described.

STATISTICAL METHODS USED

Descriptive Statistics -- The author presented the data in terms of frequencies or percentages. For example, he presented the number of housing units victimized either once, or twice or more, the frequency of victimization by category, and the percentage of persons who were worried about their children. The mean ratings of the residents' perceptions of the dangerousness of various locations were given. Descriptive data were provided on all other variables in the study. Victimization data were also expressed as the rate per 1,000 residents twelve years or older. Maps were given showing the physical layout of the housing development the use of space, and the location of incidents reported through the victimization survey.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Variables

The survey instruments used by Brill had been pretested and used in several other "Comprehensive Security Planning" studies. The reliability and validity of certain items may be questionable, since they call for conjectural responses and form variables based on only one-item questions. When a variable was composed of several items, it was much more likely to be measured with validity and reliability. The data derived from observations are expected to be reliable if one person was responsible for all observations. The reliability of the observations was enhanced through the use of photographs and maps.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design itself represented a good combination of research strategies to explore physical design and social problems that may contribute to crime. There was no hypothesis testing, and even the plotting of the locations of reported crime incidents was not capable of proving a causal relationship between physical factors of the built environment and crime rates. The design took as a given Newman's principles of defensible space, which have never been satisfactorily proven through empirical research. The goal of the research was not hypothesis testing. The goal was to gather sufficient information for physical design and socially-oriented strategies that may reduce crime. For this endeavor, the research design is acceptable.

APPROPRIATENESS OF THE SAMPLING PROCEDURES

The sampling of residents for the household survey was well thought out. The author did not provide sufficient information for evaluation of the key person samples.

APPROPRIATENESS OF THE STATISTICAL METHODS USED

Descriptive Statistics -- The author provided a sufficient level of detail to describe adequately each of the variables used in the study. No hypothesis testing was undertaken and no strong conclusions can be drawn based on the author's use of descriptive statistics.

CONCLUSIONS

The author reports:

- More than 50 percent of those interviewed believed that there is a 50/50 chance or better of being victimized.
- Waiting for the bus alone at night was the most fear-producing situation faced by residents.

- Many residents altered their behavior in order to avoid situations in which they feared being victimized.

- Units in rows perpendicular to the street and those surrounding the play area appeared to experience more burglaries than units parallel to the street and not adjacent to the play area.

- Robbery and purse-snatching appeared to be concentrated in areas where groups loiter and where excape is easiest.

- The housing development scored high on all the vulnerability criteria. The site was found to have large amounts of unassigned space, to be highly penetrable, to have design conflicts, to have limited opportunities for natural surveillance, and to have several high risk areas.

- The residents were not socially cohesive, resident organization was non-existent, values were not shared, friendships were few, and residents had only limited confidence that others wanted to improve the environment.

- Social services and police services were inadequate.

DISCUSSION OF CONCLUSIONS

These are observations that the author has not drawn on the basis of rigorous hypothesis-testing, but rather on the basis of the descriptive data collected in the study. No statistically valid conclusions in the study prove a causal connection between physical characteristics of the built environment and crime-related behaviors. Although social services and police services and resident organizations were, in the author's view, inadequate, the research design did not provide information that proved either that crime was caused by the lack of these services or that crime would be reduced if these services were improved.

The use of the data on the location of crime can only be made to infer a relationship between crime and layout, since no statistical tests of significance were reported. Although it is true that more crimes occurred in units perpendicular to the street, there were more units perpendicular to the street than parallel to it. The problem of failing to take into account a measure of crime per opportunity (number of burglaries per number of apartments) clouds some of the findings.

In conclusion, the study's purpose -- to identify some of the potentially crime-inducing problems -- was achieved. The study never attempted to test any hypotheses concerning the relationship between crime-related behaviors and the built environment. The study assumed (without operationally defining) that physical design factors such as open, unassigned space, the lack of natural surveillance opportunities, ease of penetration, and design conflicts were all crime inducing factors. Although some circumstantial evidence was presented in the study to support these assumptions, they were not proven to be true by the research.

STREETFRONTS AND BACKYARDS

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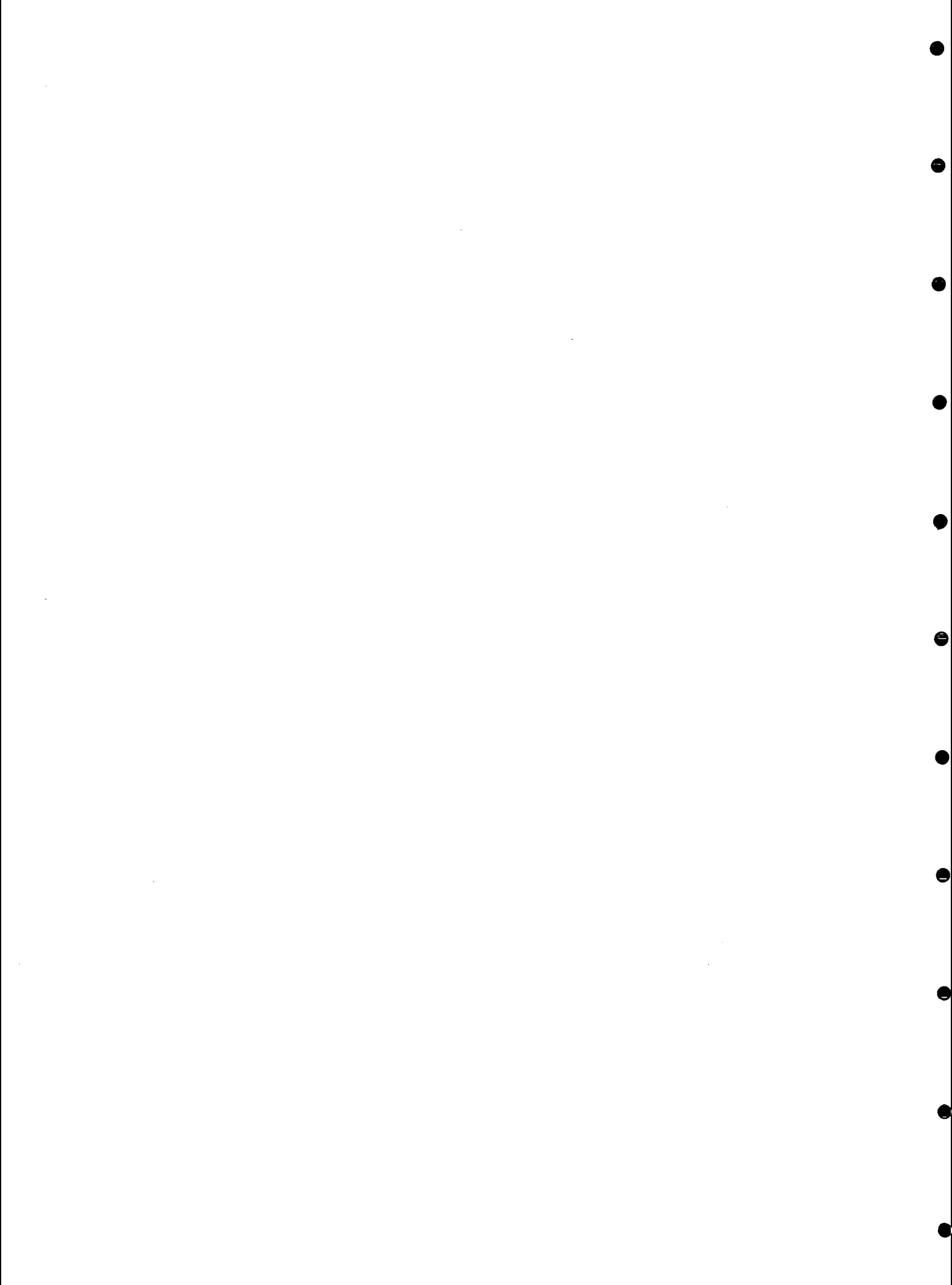
STUDY OBJECTIVES

The purpose of this study is to answer the following questions:

- What design qualities contributed to the differential use of sidewalk and park spaces?

- Whether residents familiar with the social realities of the study area perceived certain physical features in the environment as being more likely than others to attract social problems?

RESEARCH DESIGN

Description of Study

Respondents were shown three-dimensional models representing different arrangements of row houses that approximated existing conditions found in the study area.
In addition,   verbal descriptions were given to each of the 41 subjects of the actual conditions and area that the models represented.

First, models were divided into groups of four, and subjects were asked how the groups were different. Models were then presented in pairs, and each subject as asked to select the models that most fitted and least fitted the following descriptions: (1) most dangerous at night, (2) best place for children to play, (3) most likely to be littered, and (4) most desirable. Then all eight models were presented to the respondent and the same questions asked.

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*The author stated in response to this review that "The study was designed to explore the physical and social dimensions that, residents in our study felt, made spaces suitable or unsuitable for their use." However, the objectives listed here are taken directly from the report.

VARIABLES

Independent Variables

Objective characteristics of residential model sites

- houses do/do not face one another
- existence of streets, alleys, or parks/playgrounds between houses
- varying levels of vehicular access (streets) to houses
- existence/non-existence of back yards

Dependent Variables

- perceived danger of model site
- perceived suitability of model site as a play area
- perceived litter-proneness of model site
- perceived "desirability" of model site

OPERATIONALIZATION OF VARIABLES

Independent Variables

Independent variables were operationalized through the use of three-dimensional models that exhibited various elements and combinations of independent variables corresponding to those in inner-city neighborhoods.

Dependent Variables

Dependent variables were operationalized through interview responses by paid subjects. The respondents were asked which model, exhibiting specific physical characteristics, most fitted and least fitted for each of the four following verbal descriptions:

- most dangerous at night
- best place for children to play
- most likely to be littered
- most desirable.

Operational or standardized definitions for the terms used were not reported in the study, nor did it appear that respondents were given standard definitions for the terms used.

SAMPLING

Independent Variables

Structured samples were set up to replicate a variety of typical urban neighborhood configurations. Respondents were chosen in a stratified random method, with five to eight persons chosen from each study area block.

STATISTICAL METHODS USED

Descriptive statistics

Stimuli (models) were presented to respondents, who were asked to rate the models, based on their own subjective interpretations, citing most and least (1) dangerous, (2) suitable for children to play, (3) litter-prone, and (4) desirable as a place to live. The only statistical method used was a simple reporting of the number of each possible response for each model. Measures of significance, such as the use of chi square, were not employed.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The dependent variables--the responses--are not well defined or standardized in an acceptable manner. Although each respondent "rated" the characteristics on four pre-determined dimensions, little effort was made to direct respondents to use similar definitions for their responses. The unexplained term "desirable" is of little research value, since nobody knows what the respondents meant by this term. It is very likely that the responses to the previous questions affect the subsequent responses, thereby producing non-independent responses.

The small number of respondents precludes any firm test of internal statistical reliability. The lack of standardized

definitions, and of adequate measurement techniques applied
to dependent variables, preclude any assessment of the ex-
ternal reliability of the results for the sampled population.

A further complication arises from the use of "most" and
"least" on the same stimulus sets. This arrangement is not
good, since no one is likely to choose the same model for the
"most" and "least". This results in a negative relationship
of the two responses. Even if subjects were responding ran-
domly, the research would find some relationship, since the
relationship exists in the population. More importantly, any
statistical method of hypothesis testing that uses the responses
"most" and "least" would violate the independence assumption.

In addition, serious methodological problems are associ-
ated with (1) the unexplained additional verbal information
given to respondents, (2) the manner in which the models were
shown, and (3) the lack of reported information on why the sub-
jects chose models as more/less dangerous than others. These
three difficulties all contribute to the very real possibility
that the procedures confounded the results. The inadequace of
the stimuli is shown by the question, "Which model is most dan-
gerous at night?" The models were not equipped to render night-
time conditions, and the lights, traffic, and other factors that
may affect perceptions of danger were not included in the stimuli
in any way.

APPROPRIATENESS OF RESEARCH DESIGN

The research design is inadequate to provide results that
increase our knowledge of the crime/environment relationship.
There are no steps taken to promote validity and therefore one
does not know if the study is measuring what it purports to
measure. The author has approached the research questions so
indirectly that the results shed little light on the original
questions raised in the study.

APPROPRIATENESS OF THE SAMPLING PROCEDURES

The use of stratified random sampling for subjects living within the study area was appropriate. The stratification based on residence in blocks made sense, given that a variety of "block types" were presented as stimuli to respondents.

APPROPRIATENESS OF STATISTICAL METHODS

The study results could have been strengthened greatly by further analysis of the data generated by the study. Interview information was not used to the maximum extent possible. "Subjects were asked to give reasons for their answers," but this critical information was neither reported nor analyzed. These data would be important and necessary to construct a documented rationale or explanation *why* subjects considered one model more dangerous (safe, desirable, etc.) than another. Also, the use of chi square techniques would have improved the study tremendously. As it stands, there is little confidence in the study results due to the failure to use powerful statistical techniques.

CONCLUSIONS

The authors report:

- Nearly half the group of respondents selected as more dangerous the models with less access and back yards, while half selected the same models as less dangerous

- Suitability for play was found to be inversely related to the distance from automobile routes.

- The question concerning litter drew varied response, and the author suggests that respondents seem to believe that more people imply more litter, and good visibility leads to less litter.

- Desirability responses parallelled other answers.

DISCUSSION OF CONCLUSIONS

The conclusions beyond the descriptive information of the data do not seem to be justified by the data analyses given, though they may be based on responses that were not reported.[*]
The responses to the question on "desirability" were shown to correlate with a composite of the responses to the other questions. However, this may be induced by the sequence of the questions which were put to the subject. The explanation of the responses is weak and is not founded on the data produced and analyzed in the research effort.

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[*] The author responded that the study was composed of interviews and observations that were all part of the overall effort. It was small in size, and clearly exploratory in nature. The author concluded that the study provided useful insights into the interrelation between physical features of a site and the social control mechanisms that operate there. In the present research, our review ascertained what empirical evidence was presented in support of the conclusions. Certainly the study provided insights to the author which were not available to him before he undertook the study.

URBAN STRUCTURE AND CRIMINAL MOBILITY

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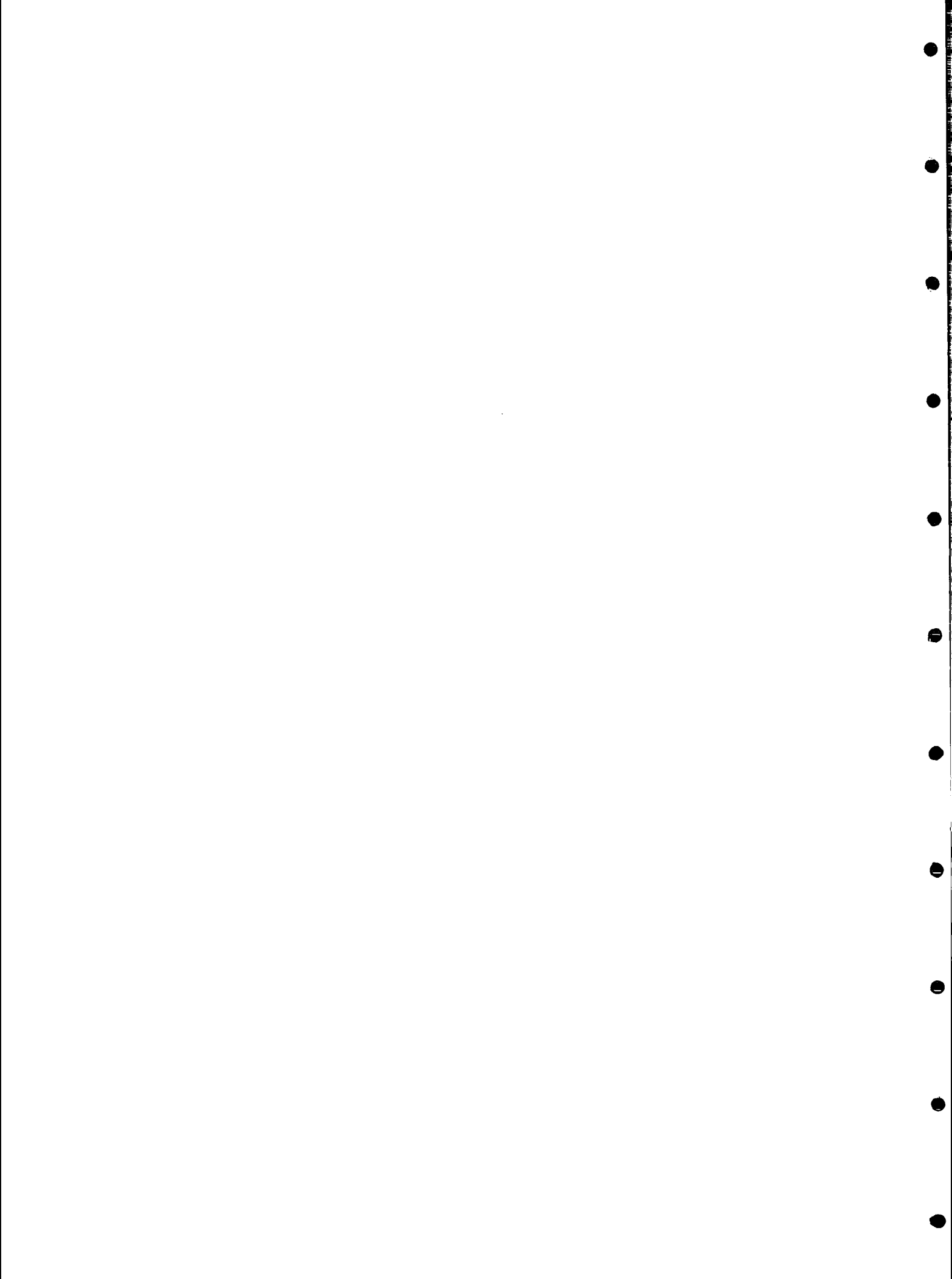
STUDY OBJECTIVES

The authors state two major objectives of the study:
(1) to describe the distance biases of robbery offenders in
metropolitan Miami, and (2) to offer explanations for these
biases by examining certain concepts of behavior as they
relate to movement patterns.

RESEARCH DESIGN

This study examines robbery trips of cleared robberies in
metropolitan Miami in 1971. The relationship between trip
frequency and distance is investigated using armed vs. unarmed
robbery and open-space vs. fixed space robbery as independent
variables. Theoretical functions were fitted to the observed
distance frequency data, and goodness of fit was determined by
the Kolmogorov-Smirnoff test.

VARIABLES

Independent

- type of premise
- armed robbery vs. unarmed robbery

Dependent

- distance travelled
- trip frequency

Units of Analysis

- robbery trips (n = 825)

OPERATIONALIZATION OF VARIABLES

Independent Variables

- No operational definition was given for armed vs.
  unarmed robbery.
- Type of premise was operationalized in two broad cate-
  gories: open spaces and fixed premises. Open space is
  outdoor space and includes such categories as: (1)
  streets, (2) parking lots, (3) school grounds, (4) other
  open spaces, and (5) vehicles. Fixed premises, which

are less evenly distributed throughout the urban land-
scape than are open spaces, are tabulated separately
as: (1) residences, (2) convenience stores, (3) restau-
rants, (4) gas stations, (5) bars, (6) grocery stores,
(7) drug stores, (8) loan companies, (9) supermarkets,
(10) liquor stores, (11) hotels or motels, (12) other
businesses, and (13) miscellaneous.

Dependent Variables

Robbery trip distances -- This variable was measured by
plotting the origin (location of residence) and the destination
(location of offense) on a detailed street map and then conver-
ting these points to coordinate locations. Trip distances were
computed using the following formula:

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Trip Frequencies -- This variable was grouped in one mile
distance bands (categories) from the origin.

SAMPLING

Data used in this study consisted of 825 robbery trips,
representing 642 cleared robberies that occurred in the Miami
metropolitan area in 1971. Both the city of Miami and most of
the surrounding suburbs are included in the sample.

STATISTICAL METHODS

Descriptive statistics -- Frequencies of robbery and the
mean distance travelled by type of premises victimized were
presented by the authors.

Kolmogorov-Smirnoff Test -- The goodness of fit of the
theoretical functions to the observed distance frequency data
was tested. One of three different theoretical equations
(Pareto, Exponential, and Pareto-Exponential) were fitted on
(1) the total sample, (2) the armed robbery sample, (3) the
unarmed robbery sample, (4) the open space sample, and (5) the
fixed premise sample.

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS

The internal validity of open space vs. fixed premises
is questionable. Two rationales for the distinction are given
by the authors. The authors state that victims in open-space
robberies tend to be moving as opposed to being stationary in
fixed premises. The authors suggest then that robbery is more
likely to be spontaneous than planned. While that theory may
have some validity, it is limited, since one knows that an
offender may also plan robberies in open spaces, e.g., by
choosing a parking lot and waiting for a victim to approach.
The second rationale, that fixed premises are less evenly
distributed throughout the urban landscape than open spaces,
is also questionable, since drug stores, convenience stores,
and liquor stores are also widespread. In general, the authors
do not provide sufficient reasons to support their choice of
the three independent variables or the manner in which they
have operationalized these variables.

Reliability is good for the dependent variables, but the
internal validity of robbery trips may be somewhat compromised
by the assumption that burglars always take the most direct
route from their homes to the scene of the offense. Robbers
may not always take the most direct route, and they may not
always start out from their homes. Collecting the data necessary
to pinpoint an offender's starting point exactly would be
extremely difficult and expensive. Given the inherent limita-
tions noted above, using homes as a surrogate for origin is
the best that can be done.

APPROPRIATENESS OF THE RESEARCH DESIGN

It is very possible that the present research design does
not answer the research objectives, since available data are
restricted to cleared cases. Results could be biased, in that

they reflect differences between cleared and uncleared cases.
If there are no systematic differences in the travel patterns
of uncleared and cleared cases, the research objectives can
be met by the research design.

APPROPRIATENESS OF SAMPLING PROCEDURE

The number of cases examined is adequate, but it is not
clear whether the 825 cases used in the study represented all
cases cleared in the Miami metropolitan area or a sample of
the cases.

APPROPRIATENESS OF STATISTICAL METHODS

Descriptive Statistics -- There is no problems in the
presentation of these statistics. The presentation of the means
and standard deviations would have added to the completeness of
the data, however, and allowed for greater understanding of the
results.

Kolmogorov-Smirnoff Test -- The authors fail to report how
the functions were fitted, e.g., by least squares, or some other
method. In addition, the method used to estimate parameters for
the nonlinear functions is not given by the author. It is not
revealed whether the authors fitted functions directly to the
nonlinear functions or transformed nonlinear functions into
linear estimations.

The Kolmogorov-Smirnoff test was used inappropriately.
The purpose of this test is to see how the sample distribution
fits with the hypothesized population distribution. One of the
important assumptions of the test is that "the hypothesized
distribution must be specified completely and without regard
to any information contained in the sample " (Bradley, 1974,
Distribution-Free Statistical Tests). Since the authors esti-
mated the functions, they violated this assumption. Chi-square
tests of significance would have been more appropriate.

CONCLUSIONS

The authors report:

- The results reveal that the movement behavior of robbery varies in terms of distance, depending on whether the robber is armed or unarmed, and whether the robbery takes place in open space or in a fixed premise.

- Criminal movement behavior is the product of a rational, spatial, decision-making process that involves evaluation of (1) an objective urban opportunity structure, (2) the differential attractiveness of particular elements of the structure, and (3) the universal constraint of distance.

DISCUSSION OF CONCLUSIONS

The first conclusion is supported by the data, but the second conclusion is clearly overdrawn. A test using only cleared cases is not sufficient to support these conclusions strongly. In addition, the inappropriate use of the Kolmogorov-Smirnoff Test further compromises these findings.
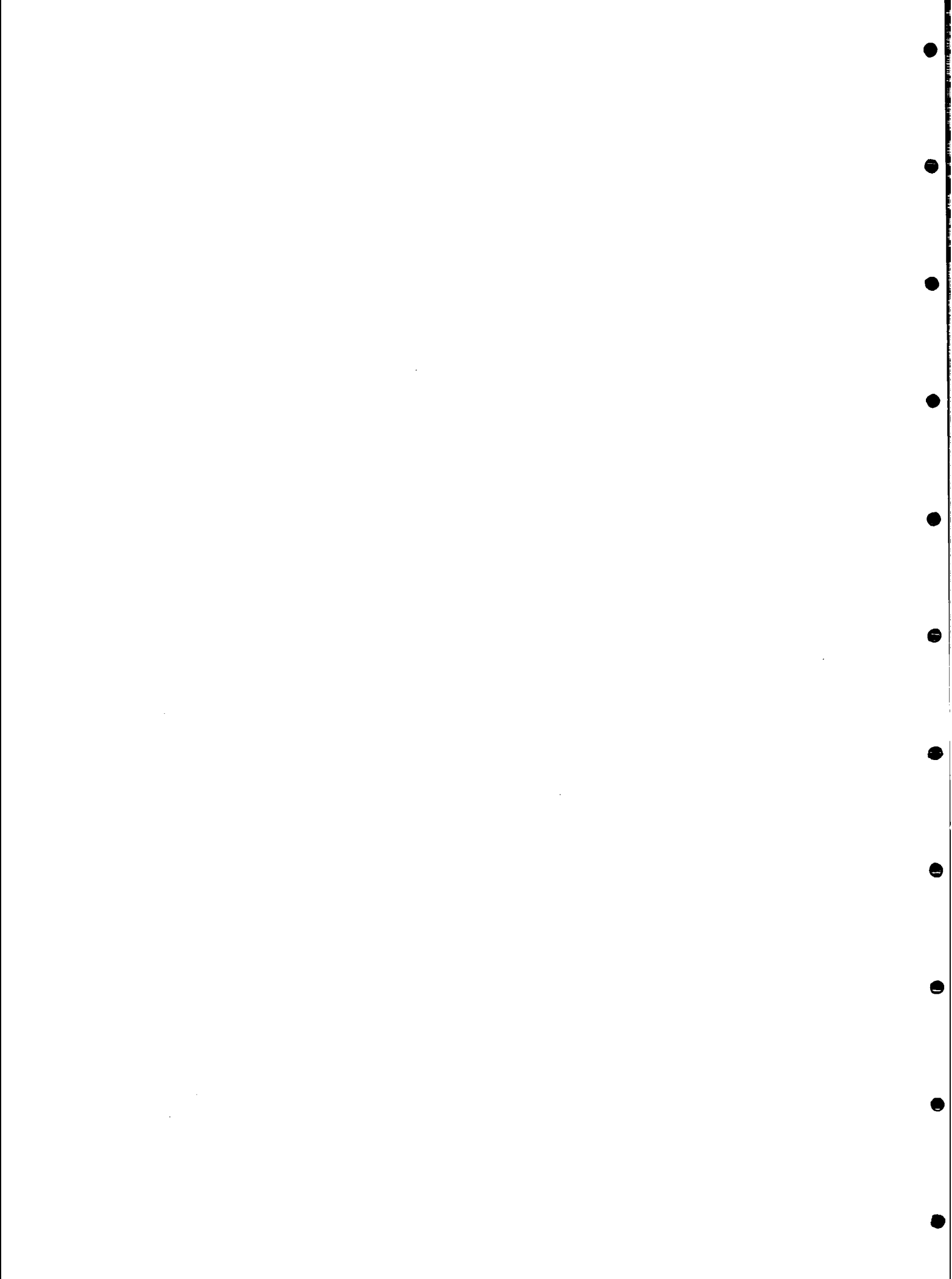
INSTALLATION, TEST, AND EVALUATION OF A LARGE SCALE BURGLAR
ALARM SYSTEM FOR A MUNICIPAL POLICE DEPARTMENT: PRELIMINARY
REPORT AND REPORT OF THE SECOND YEAR OF OPERATION.

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Reviewers:

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Herb Rubenstein
Peter Hartjens
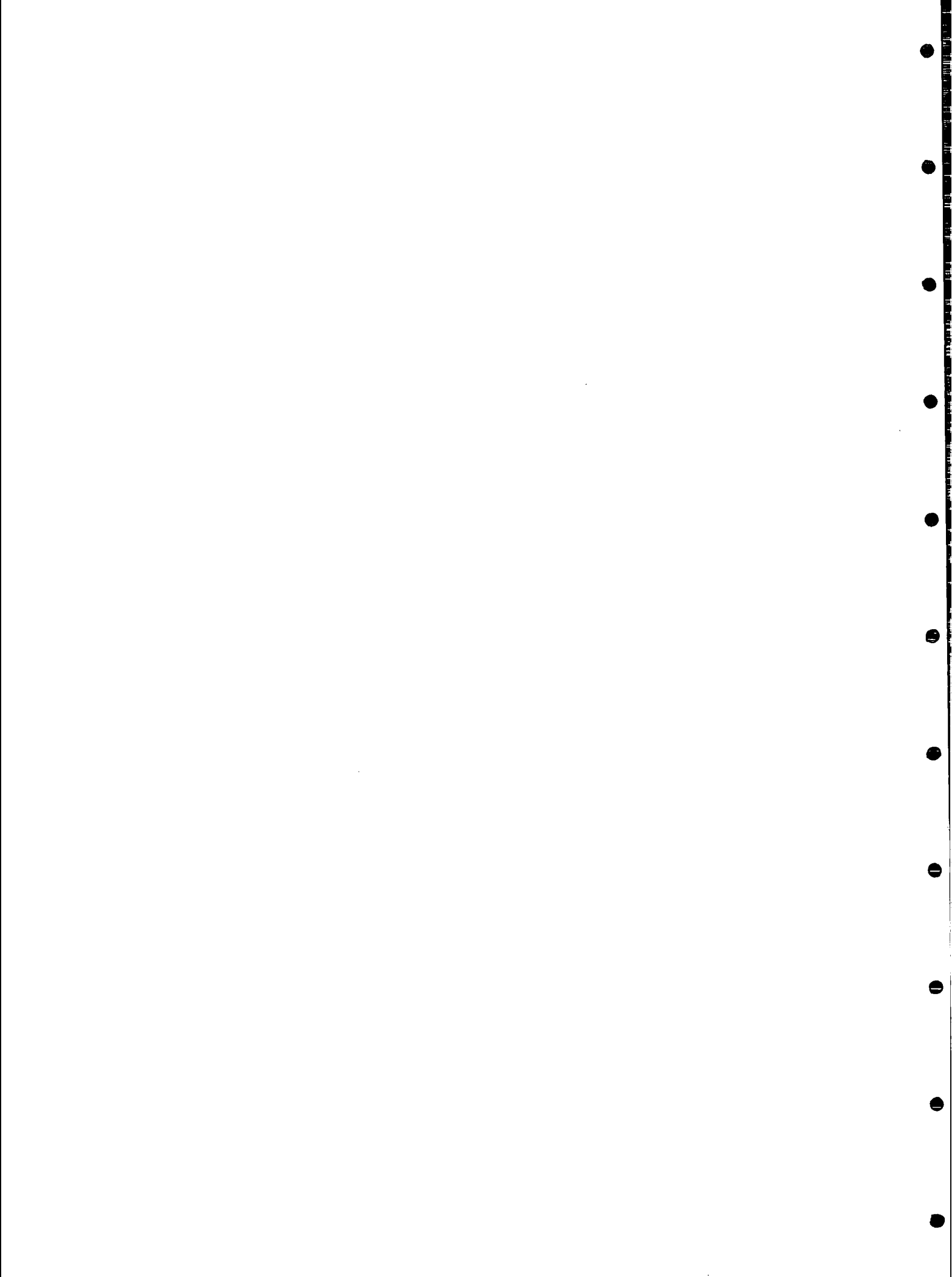
STUDY OBJECTIVES

The purpose of the study is to evaluate the impact of an alarm system field test in Cedar Rapids.

RESEARCH DESIGN

Approximately 300 silent alarm systems, wired to ring at police headquarters, were installed in small businesses and schools in Cedar Rapids. A subset of this group was matched with a control group of businesses and schools which did not receive alarms (142 pairs in 1970 and 115 pairs in 1971). Burglary rates were compared between those businesses with alarm systems (experimental group) and those without alarms (control group). The study also analyzed data on false alarms and compared the number of false alarms for those alarms installed as part of the project and those installed independently of the project (private alarms). The review below will focus on the alarm systems' apparent effect on crime-related behavior, and not on the research related to false alarms. The alarms under study triggered an alarm in the police station.

VARIABLES

Independent
- Treatment (alarm systems)
- Month of year and time of day
- Private vs. project alarm systems

Dependent

- Arrests at the scene
- Clearance rates
- Property/financial loss in cases where an alarm was received
- Burglary rate
- School burglaries
- Failure to receive an alarm
- False alarm rate

OPERATIONALIZATION OF VARIABLES

Independent Variables

- Treatment -- Businesses with alarms provided through the project and included in the matched sample
- Private Alarm Systems -- Businesses with alarms connected to the police communications center, which were paid for and installed independently of the project
- Month of year and time of day

Dependent Variables

- Arrests at the scene -- Arrest is defined as the arrest of one or more persons, so the figure used in the study did not reflect the number of persons arrested.
- Clearance Rates (including admission or discovery of evidence following arrest) -- The resolution of a burglary either through a specific investigation or through confessions or other evidence discovered at the scene of the crime.
- Loss in cases where an alarm was received -- Measured by the percentages of cases with a loss where an alarm was received.
- Burglary Rate -- Percentages of various situations where an alarm was not received were divided into three categories: (1) entry at unprotected point, (2) alarm not operational, and (3) alarm defeated.
- School Burglaries -- Measured as a percentage of the burglaries that occurred in the study sites (experimental and control groups).

- False Alarm Rate -- Measured as the number of false alarms received per month divided by the number of alarm installations.
- Burglary -- Any suspected activity that might be a burglary (very broad definition).

SAMPLING

The authors did not use a random sampling approach. Rather, they selected locations for the experimental and control groups based upon the criterion that each had been burglarized at least once during the previous four years.

STATISTICAL METHODS USED

Descriptive Statistics -- The author reports percentages or frequencies on all variables used in the study.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Most of the operational definitions are straightforward and well defined. The definition of burglary is weak, but it may have been the result of police operating policies at the time of the study, though the validity of the measure is questionable.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design is appropriate for the objectives of the study.

APPROPRIATENESS OF SAMPLING PROCEDURES

Non-random sampling from the population appears to be appropriate, since the author attempted to find stores that would be more likely to be burglarized, rather than a broader, more representative sample of stores.

APPROPRIATENESS OF STATISTICAL METHODS

The use of descriptive statistics is appropriate. The research should, however, have used hypothesis testing whenever comparisons between groups were sought. We reanalyzed the data reported in Table 1 (Arrests at Scene -- Experimental vs. Control Group) to determine if there was any interaction between treatment and year. The chi-square results were not significant at the .05 level, and this supports the researchers' interpretation. Then the variable "Arrest at the Scene" was added and the three variable tables were analyzed. The resulting chi-square analysis showed that arrest at the scene was associated with the treatment.

POWER RELATIVE TO THE STUDY OBJECTIVES

Although there were enough observations (115 and 142 matched pairs) to generate significant power through hypothesis testing, the failure to analyze the data thoroughly strictly limits the generalizability of the results of the study. More powerful statistical tests would have been appropriate.

CONCLUSIONS

The authors report:

- "Burglar alarms are effective." If an alarm is present, the chances of an arrest at the scene are five times as great.

- The clearance rate for alarmed locations was more than twice as high as for unalarmed locations.

- Whan an alarm was received, there was a loss by theft in only 11 percent of the cases, and that loss was minimal.

- In instances where there was no capture at the scene, "there was no loss by theft in 63 percent of the alarmed locations, more than twice the 31 percent unalarmed."

- "Burglars look for alarms, as shown by the high rate of entry at unprotected points."

- "School burglaries decreased dramatically during the second year...."

- "Cost of the alarm system can be justified on the basis of the decrease in investigation and prosecution time alone, without considering other benefits such as the very low rate of loss by theft at alarmed locations or public interest in capturing burglars." *

- "A reliable, low-cost system of detecting movement in an area is needed. This would allow detection of an intruder who had evaded perimeter detection." **

DISCUSSION OF CONCLUSIONS

In all cases but the last two, data reported in the study support the conclusions. The specific nature of the alarm system, sounding an alarm at the police station, should be kept in mind. The findings of this study are not completely generalizable to other types of alarm systems that are not directly linked to the police station. Finally, the use of a quasi-experimental design, along with hypothesis testing, has promise as a means of conducting future research on the relationship between environmental factors and crime.

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*According to the author, the cost data were taken from a study of the Oakland, California Police Department where costs of investigation and prosecution were broken down in great detail. Cedar Rapids had no investigation time or prosecution time where capture was following an alarm, because all persons pled guilty.

**The author acknowledges this was his opinion.
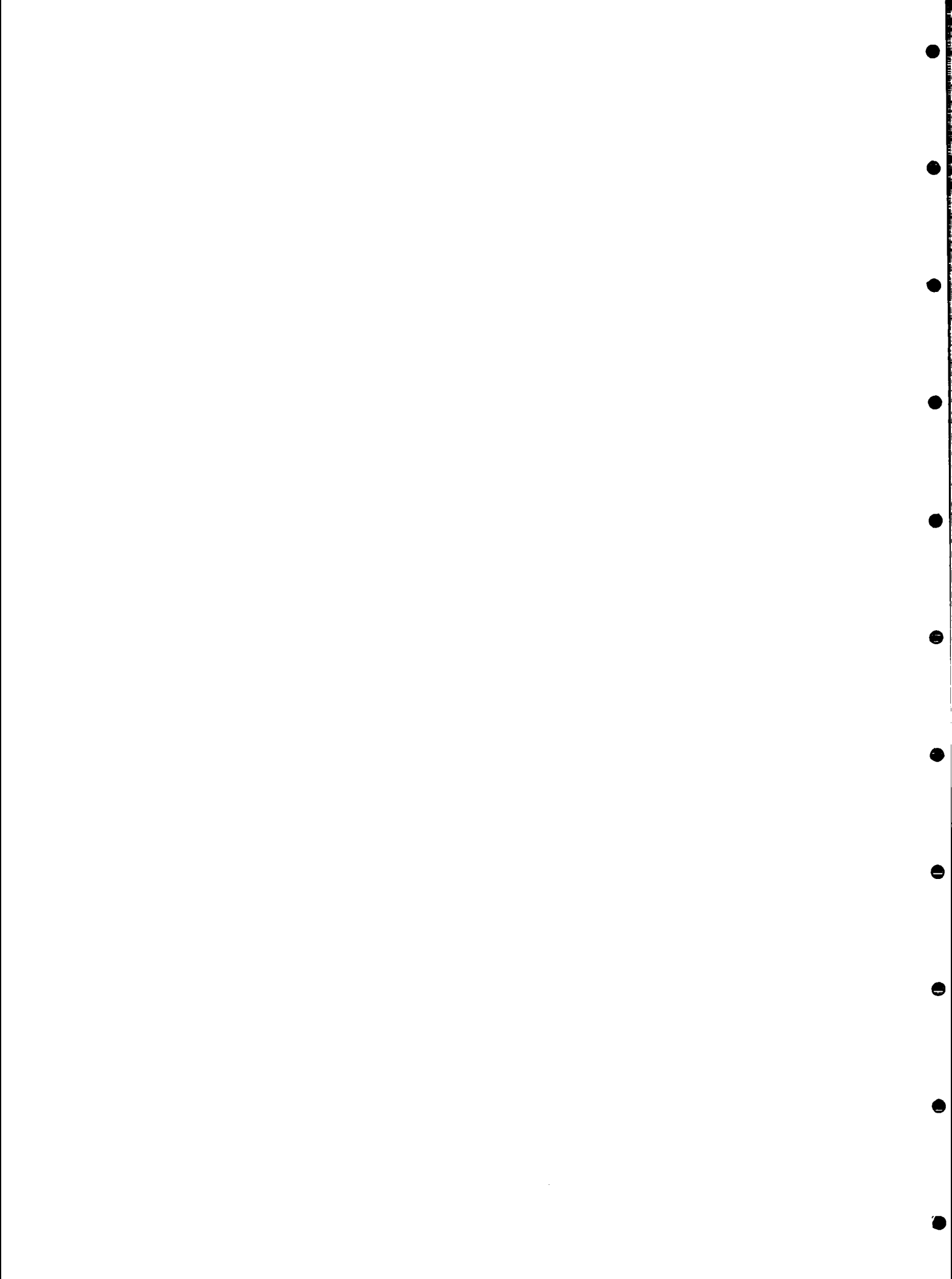
THE EFFECTS OF TERRITORIAL MARKING ON RESIDENTS
OF TWO MULTIFAMILY HOUSING DEVELOPMENTS:
A PARTIAL TEST OF NEWMAN'S THEORY OF DEFENSIBLE SPACE

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Richard Edwin Chenoweth

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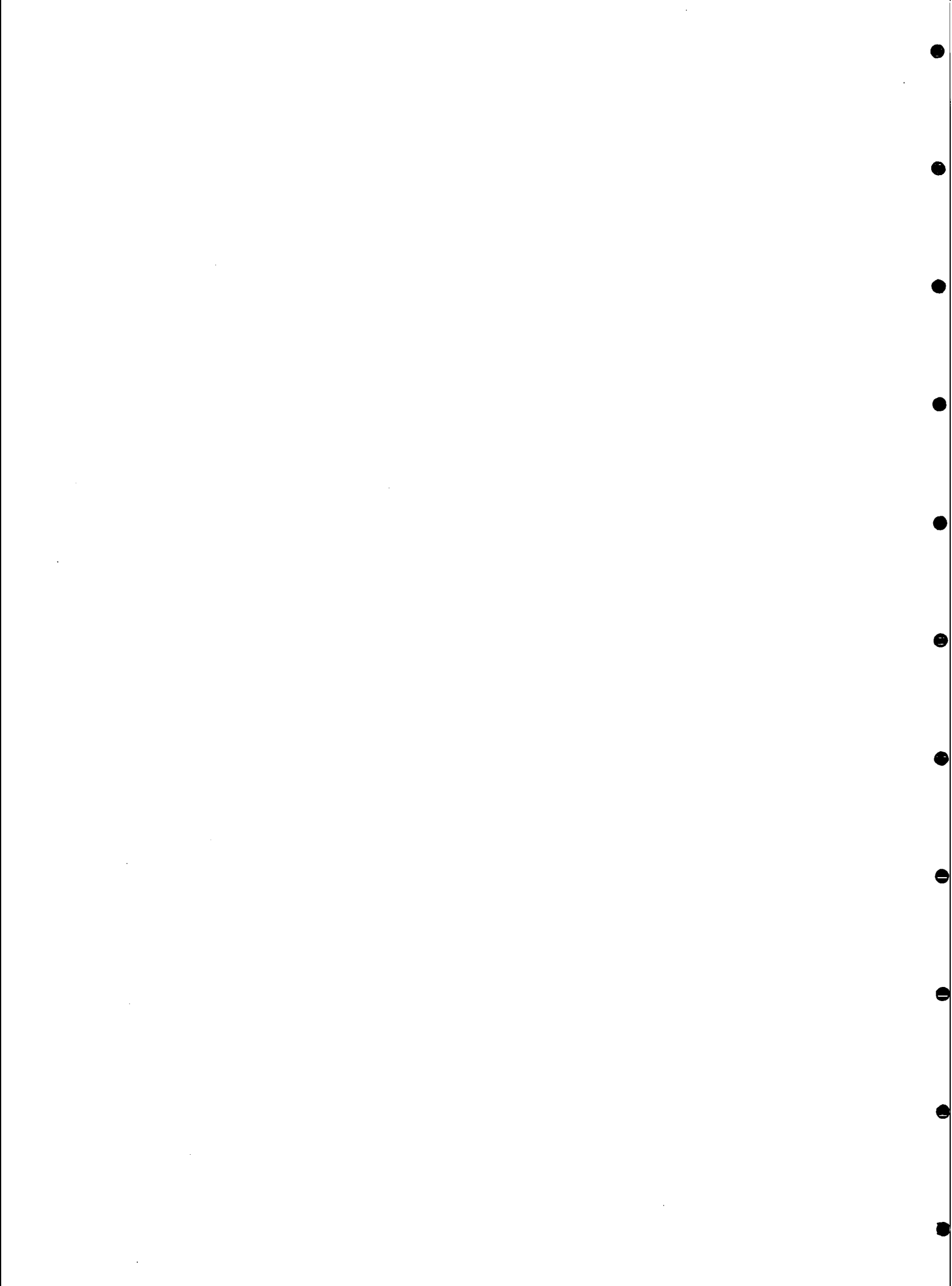
STUDY OBJECTIVES

The purpose of the study is to assess the effects of physical design changes on resident attitudes and behavior at two public housing developments. Specifically, a major objective is to test some of the relationships between crime and environment hypothesized by Newman (1972) in his book, *Defensible Space*.

RESEARCH DESIGN

The study area consisted of three row house type public housing developments located in a small Midwestern city. Two of the developments underwent design changes to produce a clear delineation of the private, semi-private, semi-public, and public spaces within them. A random sample of residents at each of the three sites was administered a questionnaire, both before construction and one year later, or approximately two months after a major portion of the construction was completed. The questionnaire sought to measure (1) proprietary attitudes toward defined areas, (2) territorial behavior, (3) social fabric, and (4) perceptions of crime. The study had a quasi-experimental design, with a treatment and control group.

VARIABLES

Independent

- Design changes to produce a hierarchy of zones of influence

Dependent

- Effect of environment on:
  -- emotional responses
  -- proprietary attitudes
  -- territorial behavior
  -- social fabric
  -- perception of crime

Units of Analysis

- public housing developments (n = 3)
- residents (n = 209)

OPERATIONALIZATION OF VARIABLES

Independent Variables

Design changes involved a complex set of construction changes and additions that were intended to produce definite zones of influence, i.e., defensible space. Design changes involved the following alterations:

- Two and a half foot high wooden fences were installed to define semi-private spaces. This fencing consisted on a single rail running between posts, symbolically demarcating the transition from one zone of influence to another.

- A four foot high fence was installed to enclose the outdoor areas adjacent to the rear of each dwelling unit to provide private enclosed spaces.

- Groups of 3 to 5 buildings, which had either adjacent fronts or faced each other, were color coded. The facades of these buildings were also changed to make them similar to each other and to set them off from all nearby groups of buildings.

- The color of fencing was also color coded to distinguish groups of buildings.

- Pathways across the sites were limited to provide greater direction to pedestrian traffic.

- Streets were widened in order to allow residents to park their cars directly in front of their dwelling units.

- "Speed bumps" were located at the transition points from one color-coded group of buildings to another.

- Garbage disposal was changed from individual cans at the rear of each dwelling unit to common dumpsters shared by residents of each group of buildings.

Dependent Variables

Dependent variables were measured through the administration of questionnaires to tenants in July 1976 and in May 1977. Respondents were given oral instructions and provided with a

map of the site in order to help them identify the areas referred to by the questionnaire.

- Scales adapted from Mehrabian and Russell (1974) were used to measure the *environment* by its direct effect on three primary emotional responses: (1) pleasure, (2) arousal, and (3) dominance. Residents responded on a 9 point scale to 18 pairs of bipolar adjectives. For each pair of adjectives, the residents responded to the question, "Living here at _____ makes me feel..."

- *Proprietary attitudes* were measured by one item on the questionnaire in which residents were asked if they had the right to say what goes on in four specific areas of the development. Residents answered on a five point scale ranging from "definitely" to "definitely not."

- *Territorial behavior* was measured as a resident's willingness to take action in response to a verbally described, potentially threatening situation. A scenario was described to the resident that involved the resident sitting at home and hearing a sound resembling a person walking in one of several areas. Residents then responded on a five point scale as to whether they "definitely would" to "definitely would not" take any of six possible actions presented. The actions presented included (1) ignore the situation, (2) wait to see if they heard the noise again, (3) call a neighbor, (4) call the police, (5) look out the door, and (6) go outside.

- *Social fabric* was measured in the following six categories in the questionnaire:

  (1) The relationship between achieved privacy and desired privacy was evaluated by asking the residents to describe how often they saw their neighbors, on a five point scale. Answers ranged from "much more than I want to" to "much less than I want to."

  (2) For each of the three areas in the development, residents were asked to specify the number of adults they know by name.

  (3) Respondents were asked to specify how many of the adults they had met in the last two months, to distinguish between pre- and post-construction acquaintance.

  (4) A measure of liking was created by asking residents to judge (on a nine point scale) how much they liked, trusted, and talked with residents in three areas in their development.

(5) An index of mutual helping was created by using the mean score from the residents' indications of how much they agreed or disagreed with two statements: (1) that somebody from the development would help them if they were in trouble, and (2) that they would help somebody else in the development who was having trouble.

- *Perception of crime or fear of crime* was measured by asking residents to describe how safe they felt from becoming a victim of crime at three different locations in the development. Responses were recorded on a five point scale from "extremely safe" to "extremely unsafe." In addition, seven items were used as indicators of the extent to which residents altered their behavior in an effort to improve their security, e.g., the extent to which residents were constrained by not visiting friends, going out, shopping at night, etc. Scores were summed across the seven items to give a behavior alteration score ranging from 0 to 7.

SAMPLING

Three public housing developments located in a Midwestern city served as the sample for housing developments. All three developments were row house dwelling units built in the mid-sixties and were similar in configuration and basic construction materials.

Apartment units at each site were randomly assigned to each interviewer. Respondents were adult heads of households. The total number of residents in the pre-construction sample was 209, with between 57 and 86 residents from each of the three sites. During the second round, the author sought to interview all persons interviewed earlier. One hundred and seventy-two persons were interviewed for the post-test. The sample reflected the overall composition of the housing developments, including a high proportion of Black, female heads of households with several children.

STATISTICAL METHODS USED

Hotelling's T^2 -- This measure was used to test for pre-test differences over the means of all 33 dependent measures. This procedure was applied to each pair of sites and is the equivalent of a one-way multivariate analysis of variance for the two group case.

Regression Coefficient -- This test was used to control for pre-test differences among the residents. Post-test scores were "regressed" or "partialled" in order to obtain the regression coefficient (the amount of change in the post-test scores per unit increase in the pre-test scores). The weighted means were then subtracted from the post-test scores, thus creating the regressed change score.

Correlation -- Correlation coefficients were computed between all dependent measures for the post-test.

Analysis of Variance -- The following ANOVA tests were performed:

- A one-way ANOVA with three levels of sites was used to check the possibility that changes in the dependent measures of primary concern might be attributable to improved attitudes toward the Housing Authority at the two altered sites.
- A one-way ANOVA was performed on each of Mehrabian and Russell's (1974) subscales: pleasantness, arousal, and dominance.
- A 3 x 4 (sites x areas) ANOVA was performed on the change scores for proprietary attitudes. A 3 x 4 x 2 (passive control) and 3 x 4 x 2 (active control) ANOVA was performed on the same data.
- A 3 x 4 ANOVA was performed on the change scores for analysis of changes in territorial behavior.
- A one-way ANOVA was performed to check for significant changes in the amount of time required to answer the door.
- A 3 x 3 (sites x areas) ANOVA was performed for each of the six social fabric measures.

Descriptive Statistics -- Pre-test and post-test means of dependent variables for the three study sites are given.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Independent Variables

The independent variable *design alterations*, including both construction changes and additions, is well defined and, at least theoretically, has validity.

Dependent Variables

The Environment's Effect on Emotional Responses -- The author's use of Mehrabian and Russell's scales, without citing measures undertaken to assess either their validity or their reliability, weakens the presentation of this variable. Not enough information is provided about these scales to assess their validity or reliability independently.

Proprietary Attitudes -- The author's definition, based on residents' self-evaluation of their right to determine what goes on in four separate areas appears to be a valid measure of this variable.

Territorial Behavior -- The operational definition and measurement techniques applied to this dependent variable are the weakest in the study. For example, "the time required to answer the door" is used by the author because it was "found to be positively related to property defense in one of Edney's (1972) studies." Since the nature of Edney's study is not given, nor the reliability or validity measures, one must question the reliance on this operational definition in the present study. The scenario presented to the resident does not appear to be an adequate measure of the willingness of the resident to take action in threatening situations. More importantly, the scale and measurement of responses are invalid,

because each score was arrived at by averaging scale values
and a response such as "would definitely ignore situation" or
"would definitely not go outside" results in an "average"
score on territorial behavior, rather than the very low one
that it deserves.

Social Fabric -- The author includes enough conditions
under this category to result in a valid measurement of social
fabric.

APPROPRIATENESS OF RESEARCH DESIGN

Given the limits of time and money with which the author
worked, the design is appropriate in terms of design modifica-
tions and the pre-test and post-test model. The design would
have been much stronger, however, with additional housing
developments added to the sample.

APPROPRIATENESS OF SAMPLING PROCEDURE

Given the limits of the scope of the study, the sampling
procedure is appropriate.

APPROPRIATENESS OF STATISTICAL METHODS

Hotelling's T^2-- The author states that this is the equiva-
lent of a one-way multivariate analysis of variance for the two
group case. This is not a valid assumption. Since the author
used three separate T-tests for the analysis, the result is
an alpha level different from what one would expect from one
multivariate test. Since he used the three T-tests, the author
should have inspected the variance matrices over the variables
in the three sites.

Regression Coefficient -- The author does not discuss how
weights were derived for the regressed scores. There are at
least two ways to compute regressed change scores. One is the
same as the analysis of covariance, where the pooled variances
and covariances are used. The other is to compute weights

within each site. These methods reflect different models, which are:

Model 1: $Y_{ij} = Mu + Site_i + B \times Pre\text{-}score_{ij} + e_{ij}$

(B will be estimated from pooled variance and covariance)

Model 2: $Y_{ij} = Mu + Site_i + B_i \times Pre\text{-}score_{ij} + e_{ij}$

(B will be estimated within the site)

ANOVA on regressed change scores from Model 1 is the same as the analysis of covariance using the prescore as the covariate. ANOVA on the scores from Model 2 is not the same as the analysis of covariance and, therefore, the results would be more difficult to interpret. It is not known which model the author used.

Correlations -- The matrix of correlation coefficients in Appendix D shows that the same measurements on the three different areas were highly correlated, while different measures have a low correlation. One interpretation of this result might be that residents could not discriminate among the three areas in the study. In addition, the diagonals of the matrix show that the test-retest reliabilities are generally low.

Analysis of Variance -- As reported previously, there is a high correlation between measurements in different areas of each housing development. This implies that the measure of area is nested within the measurement of site, causing a correlated error. If more sites had been used, this correlation error could have been controlled for, which could not be done with the actual low number (3) of sites.

Descriptive Statistics -- The presentation of means after the analysis of variance is not very informative, since the author fails to present standard deviations, variances, or inter-correlations. Presentation of the means over sites for the measure of territorial behavior (p. 39) appears to be incorrect.

It is certainly unclear whether these means are regressed change
scores or simple subtractions. In any case, they are not adjust-
ed means in the sense of the analysis of covariance.

CONCLUSIONS

The author reports:

The results of this investigation did not support the
hypothesis that physical design changes to create "defensible
space" facilitates the expression of territorial behavior and
that the residents of housing developments with defensible
space adopt proprietary attitudes and have a strong social
fabric. The author states that this outcome implies that
defensible space characteristics may not reduce the incidence
of crime by its intermediate effects on the inhabitants. The
author does recognize the limitations of his design and is
not willing to dismiss Newman's defensible space hypothesis
without further research.

DISCUSSION OF CONCLUSIONS

The author's conclusions are generally supported by the
data, which show that the physical design changes had no effect
on the dependent variables measured in the study. Although
the period of time after construction (two months) may be too
short for resident behaviors to be significantly affected by
physical design changes, the author dismisses this consideration.
The suggestion by the author that one would expect some immediate
effect is questionable, since nowhere in the literature is it
suggested how long it does (or should) take for physical design
changes to affect behavior and attitudes. Finally, as the
author acknowledges, the study did not collect data on two vital
areas of concern -- coincidence of crime or offender perceptions.
Crime data would have provided an important added dimension to
the study, even though this was primarily a study of the effects
of physical design changes on the residents.

A SAFE PLACE TO LIVE: SECURITY IN

MULTI-FAMILY HOUSING

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STUDY OBJECTIVES

The purpose of the study is to examine a broad range
of factors which contribute to or hinder residential security.
Part One is a presentation of the author's thesis that security
is the result of specific environmental features and personal
actions. Part Two discusses six case studies of housing devel-
opments in Boston. The case studies focused on the physical
design, management policies, resident attitudes and other
security factors of each housing development. The case studies
included a resident survey conducted in three of the housing
developments. The review that follows focuses on that survey
which is discussed in Chapter Eight of the report. This survey
sought to investigate the relationship between criminal victim-
ization, the physical design of the housing developments, and
the willingness on the part of the residents to participate in
security measures.

RESEARCH DESIGN

The study consisted of interviews with 202 residents of
three public housing developments in Boston. The survey
included questions regarding victimization, resident attitudes
regarding their personal safety in the housing developments
and the residents' willingness to perform specific activities
to increase their security. Based on the interview data the
author tested for relationships between knowledge of neighbors
and victimization experience, between resident awareness of vic-
timization and willingness to undertake security measures, and

between the existence of "insecure places" (i.e., dark places, threatening places, etc.) in the developments and resident perceptions of safety.

The study is exploratory in nature.

VARIABLES

Independent

- Knowledge of neighbors
- Awareness of victimization
- "Robspace"
- "Scary"

Dependent

- Victimization
- Willingness to undertake security related activities
- Attitudes toward personal safety

Units of Analysis

- Tenant (N=202)
- Housing Development (N=3)

OPERATIONALIZATION OF VARIABLES

Independent Variables

All variables were operationalized through an interview survey discussed above.

- Knowledge of neighbors - The author divided this variable into four categories: Zero, One-Four, Five-Seven, and Eight or more neighbors "known."
- Awareness of victimization - The interview question asked respondents if they had ever seen or

heard of at least one criminal incident in the
housing developments.

- "Robspace" was operationalized from the following
  question: "Is there any place in the development
  where you are afraid that you might be robbed?"

- "Scary" was operationalized from the following
  question: "When you come to your apartment from
  the bus stop or parking lot, are there 'scary'
  places that you have to pass through?"

Dependent Variables

- Victimization - This variable included all types
  of property and personal offenses against respon-
  dents.

- Willingness to undertake security related activities -
  The interview question asked respondents whether
  they were willing to look after the safety of areas
  within the housing developments other than his or
  her individual apartment.

- Attitudes toward personal safety - The interview
  question asked respondents whether they thought
  their development was one of the following: 1)
  very safe, 2) moderately safe, 3) moderately unsafe
  or 4) very unsafe.

SAMPLING

The author does not describe the sampling procedure.
Rather the author provides detailed characteristics of the
individuals in the sample which show the sample to be comprised

of a diverse group of people.

STATISTICAL METHODS USED

Descriptive Statistics - The author reports absolute frequencies and percentages in presenting the survey results.

Chi-Square - The author performs a series of two-way chi-square tests of independence between the following variables -

1) attitudes toward safety and "Scary"

2) attitudes toward safety and "Robspace"

3) victimization and housing development

4) victimization and knowledge of neighbors

5) awareness of victimization and willingness to undertake security related activities.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Independent and Dependent Variables

In general the variables are operationalized through the use of only one question. Failure to develop and test a series of questions regarding each of the variables tends to cast doubt on the validity and reliability of the respondents' answers. Since the author acknowledges that this is an exploratory study not designed to test hypotheses, the softness of the survey data is not critical.

APPROPRIATENESS OF THE RESEARCH DESIGN

As the author acknowledges, this is an exploratory

study with no real design. The study tested hypotheses which
emerged from the data rather than hypotheses set forth at the
outset.

APPROPRIATENESS OF SAMPLING PROCEDURES

The author does not discuss the sampling procedure
used. Due to the exploratory nature of the study, such
desirable features as "random sampling techniques" and
"representative samples" are not essential. It is important
to note that the sample is drawn predominantly from one housing
development (148 respondents) while the other developments
had only 22 and 19 respondents. The sampling procedure, as
the author acknowledges, precludes one from generalizing the
results from the study to other housing developments, and
cities.

APPROPRIATENESS OF STATISTICAL METHODS

Descriptive Statistics - The author's use of frequencies
and percentages present adequate summaries of the survey
results. However, they do not test any specific hypotheses.
Therefore, drawing any conclusions or rigid interpretations
of this information is uncalled for since there could be many
alternative explanations.

Chi-Square - The author's use of these tests of in-
dependence is correct to the limited extent that the two
variables are independent. These tests by themselves do not
give any indication of the direction of the relationship.
However, in some cases the author's computation of the chi-
square variables is incorrect. For example in Table 17 -

Victimization By Knowledge of Neighbors, the recomputation of

the Pearson chi-square yielded a value of 4.676 and the value

of 4.704 for the likelihood ratio. In contrast to the author's

finding of a relationship significant at the .05 level, these

recomputed values (with three degrees of freedom) show that the

relationship between victimization and knowledge of neighbors

is not significant at the .05 level.

Recomputation of Table 18 - Awareness of Victimization

By Willingness to Undertake Security Related Measures - also

revealed results different from those presented by the author.

In this case the values were significant at the .05 level,

consistent with the author's findings.

CONCLUSIONS

The author reports:

- Respondents who knew a greater number of their
  neighbors were victimized significantly less
  frequently than those who knew fewer neighbors.

- When presented with three hypothetical situations --
  1) hearing a scream outside their door, 2) observing
  a robbery in progress, or 3) observing someone
  walking away from a nearby apartment with a tele-
  vision or stereo -- most respondents indicated they
  would do nothing, or only call the police.

- Respondents who were aware of a victimization were
  more willing to undertake security related activities
  than respondents who were not aware of victimization.

- Respondents were more willing to undertake limited,

individually oriented security measures than group
oriented activities.

- Tenants were willing to allow greater security
  measures to be implemented in their housing develop-
  ment such as increasing the number of police or
  guard, installing TV monitors in corridors, and re-
  quiring the showing of ID cards at all entrances and
  exits. In addition nearly a third of the tenants
  would allow the use of paid informants and random,
  unannounced searches of apartment units if these
  activities could be successful in increasing their
  security.

- Residents' attitudes regarding their personal safety
  are specifically related to the existence of identifi-
  able areas in their development which are fear
  producing.

DISCUSSION OF CONCLUSIONS

The miscomputed Chi-square negates the conclusion
that respondents who knew a greater number of their neighbors
were victimized significantly less frequently than those who
knew fewer of their neighbors. The remainder of the author's
conclusions are supported by the data.

BURGLARY IN A SUBURB

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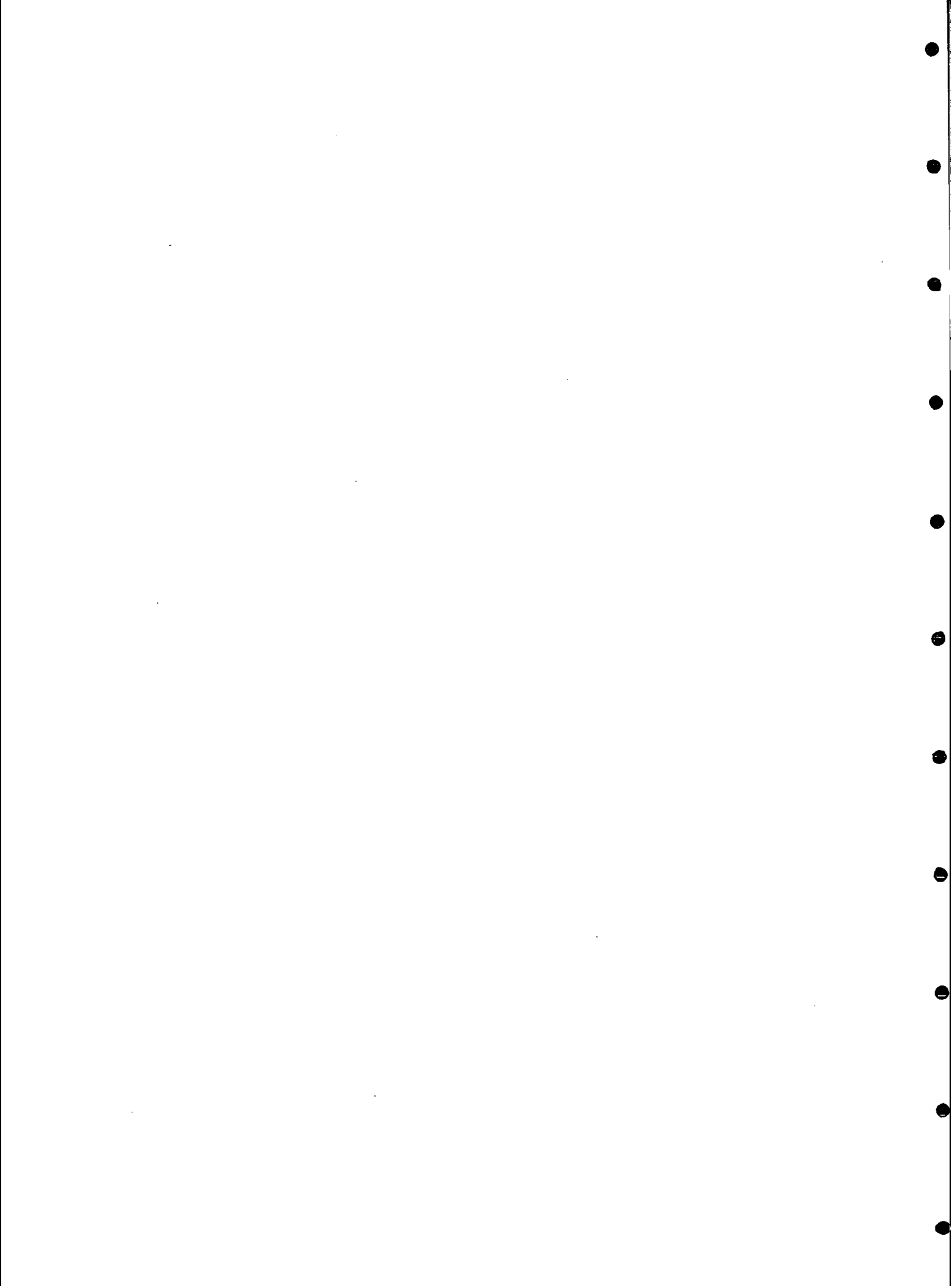
STUDY OBJECTIVES

The purpose of the study was to assemble a detailed picture of burglary in a typical suburban community. No hypotheses were tested, since the study was exploratory and descriptive.

RESEARCH DESIGN

The authors collected the following archival data from police records for an incorporated suburb in order to provide a comprehensive description of the burglary phenomenon:

- types of burglaries
- times of burglaries
- amount of losses
- reporting and clearance patterns
- use of burglar alarms

VARIABLES

For the purposes of this review, two parts of the study are examined, because they pertain to the relationship between physical environmental factors and crime: (1) types of burglaries, and (2) the use of alarm systems.

OPERATIONALIZATION OF VARIABLES

Types of Burglaries -- This topic included the following categories: (1) private residences, (2) commercial establishments, (3) schools or churches, and (4) other targets.

Use of Alarms -- Divided into four categories: (1) whether the burglary took place in a building with an alarm system, (2) whether the alarm worked at the time of the burglary, (3) whether, in those cases where the alarm did function, the burglary came to the attention of the police within an hour of its commission, and (4) the extent to which there was a financial or property loss when there was an alarm.

SAMPLING

The authors collected data on the universe of burglaries, attempted burglaries, and suspected burglaries from police records for a one year period from 1 July 1968 to 30 June 1969. A total of 949 incidents was reported.

STATISTICAL METHODS USED

Descriptive Statistics -- All data reported in the study were presented in the form of raw numbers and percentages. No other statistical method was used.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Types of Burglaries -- The four categories used in the study provide only minimal information on the type of structure victimized. Although this may have been the finest breakdown available from police records, the descriptive power of the study would have been improved if it had been possible to construct a more refined set of categories. For example, dividing "residential structures" into three categories -- single family, duplex or fourplex, and apartments -- or dividing commercial establishments into several smaller categories would have given an added dimension to the study.

Use of Alarm System -- The four categories used in the study appear to be adequate, with the exception of the time limit (one hour) for whether or not the police became aware of the burglaries. If the authors were trying to determine if alarms may increase the chances that police will apprehend the criminal, then a shorter period would have been more appropriate.

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*The authors did have a finer breakdown than the one reported in the article. The authors combined some categories after the initial screening.

APPROPRIATENESS OF SAMPLING PROCEDURES

Collecting data on the universe of burglaries in this suburb appears to form an adequate sample. The generalizability of the findings is limited, however, since only one metropolitan suburb was included in the study.

APPROPRIATENESS OF STATISTICAL METHODS

The use of descriptive statistics is adequate to support an exploratory study. No explanatory power is provided, however, through the use of descriptive statistics.

CONCLUSIONS

The authors report:

- On the average, more than one commercial establishment in five will be burglarized each year.

- The commercial burglary rate is ten times the rate for residences.

- Only 5.6% of all burglary incidents occurred in establishments or residences equipped with burglar alarms.

- Only 2.9 percent of all burglary incidents led to the sounding of an alarm. (This is approximately 55% of the number of burglarized units with alarms).

- In 85% of the burglaries where an alarm sounded, the incident came to the attention of the police. In comparison, only 16% of the burglary incidents without alarms came to the attention of the police within an hour.

DISCUSSION OF CONCLUSIONS

Although the study does not provide much explanatory power, the findings on the relationship between the presence of sounding alarms and police notification are significant. Further research should be undertaken in this area, including an investigation of the effects of rapid notification on apprehension rates. This study itself does not provide data on the potential deterrent effect of alarm systems.

ROBBERY DETERRENCE: AN APPLIED BEHAVIORAL
SCIENCE DEMONSTRATION

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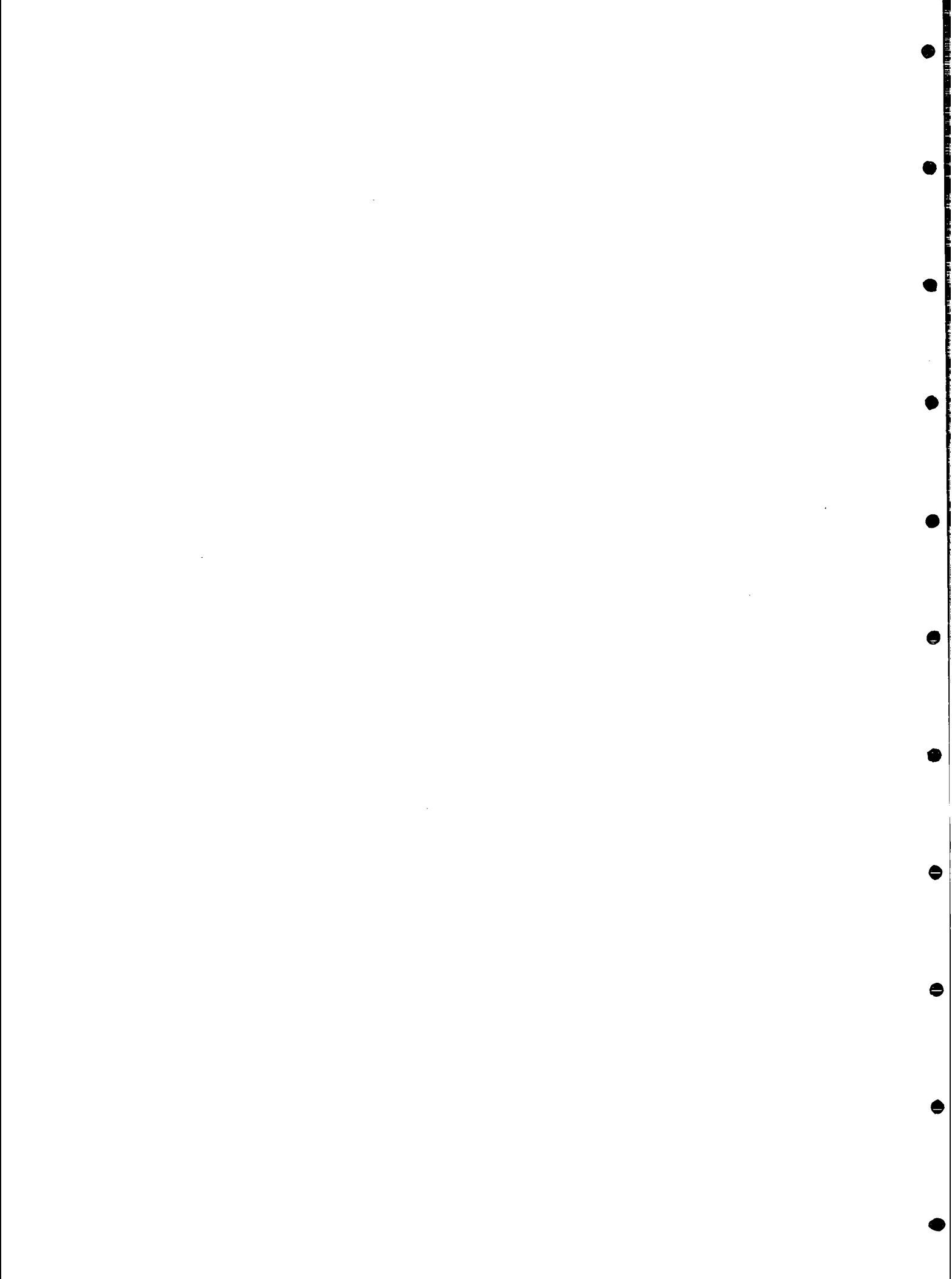
STUDY OBJECTIVES

The purposes of the study were to design and evaluate robbery deterrence techniques for implementation in small convenience stores. These techniques were evaluated regarding their impact on robbery rates and net reduction in financial losses.

RESEARCH DESIGN

The study was a field experiment using convenience stores owned by the Southland Corporation (i.e., "7-11"). During the study, 60 convenient stores were given crime reduction oriented physical design and employee training modifications, while a control group of 60 stores did not receive any modifications. In order to help select the stores for the experimental and control groups and subsequently place them into "matched" groups, past records of robberies and financial losses provided by the Southland Corporation were analyzed. The study sought to test the hypothesis that selected physical design modifications and employee training could significantly reduce robberies and resulting financial losses.

VARIABLES

Independent

- Physical design modifications

- Employee training

- Additional signs

- Additional lighting

Intervening

- Time period for experiment

- Time of day, season of year

- Socioeconomic variables of area adjacent
  to store

- Sales of the store

- Previous number of robberies of store

Dependent

- Number of robberies

- Financial loss

- Duration of robbery

- Death from robbery

OPERATIONALIZATION OF VARIABLES

Independent Variables

The independent variables consisted of the treatments
made to the experimental group of stores. The variables in-
cluded physical design modifications such as installation of
bell alarm systems, closing of potential escape routes, en-
hancement of surveillance opportunities, placing of "defensive
signs" throughout the store (e.g., "clerk cannot open safe"),
and lighting changes. In addition, the treatment included
such behavioral changes as training employees in robbery pre-
vention techniques, offering of rewards to employees who pro-
vided police with robbery-related information, the keeping of

less money in cash registers, providing free coffee to police
and other night time visitors, and the training of employees
in violence prevention techniques to employ during a robbery.

Intervening Variables

Several variables--months, weeks and year--were operation-
alized in a standard manner. Time of day was arbitrarily
divided into day (6a.m.-6p.m.) and night (three-hour units).

- The socioeconomic variable used in the analysis
  was based upon the author's previous research
  (factor analysis) of 1970 data. This variable
  was not explained in detail nor was any infor-
  mation supplied regarding either its reliability
  or validity.

- Sales of stores and past records regarding rob-
  beries were based upon the Southland Company records
  provided to the researchers.

- Ratings of stores regarding their "vulnerability
  to crime" were made twice for each store by two
  person teams who were formerly armed robbers.
  Each team rated each store on a scale based on
  a 21-part questionnaire. Assessments of overall
  attractiveness were factored into the composite
  scale score for each store.

Dependent Variables

- Number of robberies and deaths due to robbery
  based upon employees reports made during the study.

- Financial loss represented the amount of money
  taken during the robbery and was also based upon
  employee reports.

- Duration of robbery based on the subjective
  estimate of employees (victims) in combina-
  tion with estimate using a stop watch to cal-
  culate time elapsed for escape

Sampling

The study used a multi-stage stratified random sampling
procedure to select the experimental and control group of
stores. First, a "representative random sample" of stores
were selected from the population. This sample of stores
was divided into two groups with the author seeking to make
the groups "representative of the other stores" and "as much
alike as possible."

The two groups were then assigned at random to be the
experimental/control group. For purposes of analysis, the
stores in each group were stratified based on previous robbery
frequency. The stratification procedure was used to make
the experimental and control groups each have the same number
of stores with a history of zero, one, or two or more robberies.
The final sample of stores was also the product of stratifying
the stores based upon their "crime vulnerability" scale. This
resulted in the experimental and control groups having stores
relatively equal "crime vulnerability" ratings.

STATISTICAL METHODS USED

Kolmogorow-Smirnor Test - This test was used to ascertain
whether there was significant decrease in deaths as a percen-
tage of robbers.

Chi Square Test - This test was used to ascertain whether
there were statistically significant differences between the

frequencies of robberies for different months, differences between the number of robberies in the experimental and control groups, differences between the number of robberies for stores with different hours of operations, etc.

F-Test - The authors use this method to test whether various parameters are significantly different for the experimental and control groups. Parameters such as number of robberies, safety scores, financial losses, and sales volume and socioeconomic variables were tested to compare the experimental and control groups.

Correlation - The authors use correlation analysis to ascertain the degree of association between the frequency or robberies and socioeconomic status of area, sales volume, the "crime vulnerability" ratings given by raters as well as other variables.

Binomial Distribution - This statistical method is based upon the assumption that observations are randomly drawn from a binomial distribution with a parameter. The method tests whether observed frequency is significantly different from what is expected from the parameter. The authors use it to test the difference in the frequency of robberies between the experimental group and the control group by setting $p = .5$, i.e., robberies occur equally to both groups.

Descriptive Statistics - The authors use such descriptive statistics as mean, mode, percentages, and other basic measures in their analysis and presentation of findings.

*QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS*

The study states that 79 percent of the persons who
worked in the experimental stores received training. However,
the amount or actual extent of the training is not explained
nor can one be certain that this independent variable did
not exist in the employees of the control group stores. The
lack of an explicit statement regarding the content of "training"
is compounded by the lack of rigor with which the other ele-
ments of the treatment are described. For example, the
authors state that "in certain stores" a bell alarm system
was put in. How many stores, what type of alarm systems, etc.,
remain important unanswered questions. Further, the authors
have failed to state specifically how many stores got exactly
which combination of treatments. Serious doubt is cast upon
the extent of the physical design modifications since the
author's report that the physical changes made were "no" or
"low" cost changes. Finally, the study states that behavioral
changes were one of the independent variables. However, no
measures of employee behavior were made and the contention
made by the authors that training led to change in employee
behavior is not supported. The independent variables in this
study were not operationalized in a manner adequate for an
experimental type of study. The operational definitions of the
socioeconomic variables can not be assessed thoroughly since no
information is given regarding reliability or validity.

The operational definition of the "crime vulnerability"
ratings of the individual stores is reliable based on the
inter-rater correlations reported in the study. However,
their validity is questionable. The correlation coefficient
reported in Table 5-3 (0.17) is too small to assure validity.

APPROPRIATENESS OF RESEARCH DESIGN

The research design itself, the experimental design, is potentially very appropriate for knowledge building and evaluative research in the field of crime prevention through environmental design. In this instance, the research design was fatally flawed because the experimental group neither got uniform treatments, nor were attempts made to describe and analyze the differential treatments received by the experimental stores. The implementation problems related to the study are compounded by the author's failure to provide adequate operational definitions for the independent variables. This is a critical element of the experimental design framework. Thus, the research design, as it was implemented, fails to provide information sufficient to meet the objectives of the study.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling procedure used was appropriate for the experimental design employed in the study.

APPROPRIATENESS OF STATISTICAL METHODS

The authors state that they find no significant decrease in deaths as a percentage of robberies using a Kolomogorow-Smirnow Test. (See Table 2-4). The K-S Test is not a test that can measure the significance of a trend. It measures whether the sample measures agree with an hypothesized population distribution and has nothing to do with what the authors claim they are using it for. Although this inappropriate use of a statistical method is not related to any significant findings, it shows faulty understanding of this technique.

Chi Square Test - Although this is an appropriate test given the study's objectives, the authors made a simple mistake when using this statistical method. On page 18, the authors conclude that robberies occur with greater frequency during the fall months of October, November and December. (Table 2-7). This statement is based on an improper grouping of the data into quarters. This table was checked by deleting September and November values and recomputing the Chi Square. Doing this, one obtains $X^2(9)=9.792$, which is not significant. Since the total $X^2(11)$ value was 28.75, this recalculation shows that September and November were the months with the statistically significantly different levels of frequencies and by grouping the data into quarters, the authors misrepresent what the data show.

F-Test - The author's use of this method from ANOVA to compare parameters from the experimental and control groups at the beginning of the experiment was appropriate. However, the degrees of freedom in Tables 7-2 and 7-3 are radically different, although they should agree. This measurement is critical since it is the author's only evidence that the experimental and control groups were not significantly different in any way.

In addition, the authors fail to indicate what kind of
ANOVA's (i.e., one-way, two-way) were performed.

Correlation - The use of correlations for analyzing the
association of robbery frequencies with other variables does
not provide a good measure of the relationship between the
variables. Since the frequency distribution of robberies
is truncated, any variable with a differently shaped dis-
tribution will not correlate highly with it using this
measure of association.

Binomial Distribution - This test, used to determine
whether there were significant differences between the experi-
ment and the control group, was an appropriate use of this
statistical method. However, the authors did not use this
statistical method properly.

The authors used the binomial distribution to calculate
the probability of the observed distribution of robberies be-
tween the experimental and control groups. The authors state
that binomial distibution theory allows one to calculate the
probability of exactly K events in N occurrences. That is, the
authors calculate, the probability of exactly 57 out of the
97 robberies occurring in the control group to be .02. The
authors then conclude that .02 probability is less than
chance and therefore indicates that more robberies in the
control group were due to some systematic differences.

The starting point in assessing the appropriateness of
the binomial distribution for this research design is, "Did
the authors test for what they should have tested?" That is,
are the treatments to be evaluated by measuring the prob-
ability of exactly 57 out of the 97 robberies occurring in
the control group, or should they be evaluated by measuring

the cumulative probability of 40 or less robberies out of 97 occurring in the experimental stores (or 57 or more robberies occurring in the control group of stores). Once a level of significance is chosen and an appropriate critical region is identified, binomial distribution theory provides a test where the alternative hypothesis is accepted or rejected, based upon whether the value tested is in the region of "more than" or "less than" the point of entry into the critical region. It should be noted that P (z = 1.96) = 0 while P (z $\geq$ 1.96) = 0.025.

In the article, the hypothesis being tested is that both the control group and experimental stores have an equal number of robberies. The alternative hypothesis is that the control group has more robberies at some level of significance.

Usually, .05 is chosen as the level of significance (α) while using a binomial distribution. Given α = 0.05, the binomial distribution with the parameter =0.5 and N=97, the null hypothesis would be rejected if the number of robberies of the experimental group would be 39 or less. (See Table VI, "Distribution-free statistical test" by Bradley.)

Since the authors report that the experimental group had 40 robberies, we recomputed both the exact probability of N=40 and computed the cumulative probability of N $\leq$ 40 (N being less than or equal to 40 out of 97). The exact probability is .018. More importantly, the cumulative probability is 0.05188. This means that the probability is *greater* than allowable using the .05 level of significance and therefore, at the .05 level, one cannot reject the hypothesis that the number of robberies for the experimental and control groups are the same.

Thus, the major conclusion of the study, that the experimental stores had a significant reduction in robberies, is

not supported when the binomial distribution test is used correctly as a measure of cumulated probabilities rather than as a measure of the probability of one single possibility such as N=57.

Furthermore, the tables which report the findings from the binomial distribution as well as many of the other tables in Chapter 7, contain numbers which are plainly wrong and do not add up properly.

Power Relative to Objectives of Study

The confidence in the results of the study is low due to the lack of uniform treatment given to the experimental group and the failure to operationally define or measure the independent variables adequately.

OTHER QUESTIONS

In addition to the problems mentioned above, the authors showed little concern for the distributions of the data they were using and on occasion used an improper statistical test (one that relies on a normal distribution) for data with a highly skewed, truncated distribution. The frequency of robbery data was too skewed for its use in correlation analysis as a measure of its association with other variables.

In a totally separate area, the authors failed to report on the correlations among the scales of scores rated by former robbers. Therefore, nothing is known regarding the inter-rater reliabilities of the scaled stores. Furthermore, there were no independent analyses of the convenience stores' characteristics. This analysis would have been helpful since it might have revealed other important physical design or

employee characteristics closely associated with the rate of robberies in the individual stores. Certainly one-way ANOVA's (analysis of variance) could have been performed on the rating scales and other variables based upon the grouping of stores into categories of 0, 1 or 2+ previous robberies.

CONCLUSIONS

The authors report:

- The more attractive a store is to robbers, the more frequently it was robbed.

- The socioeconomic status of a store's neighborhood was not related to robbery frequency.

- The prevention procedures reduced robberies at a statistically significant level with the probability of the distribution to be chance less than .02.

- The robbery prevention procedures were effective for stores that were robbed frequently in the past and for those stores which were attractive as robbery targets.

- A promising new alternative strategy for reducing armed robbery has been established.

DISCUSSION OF CONCLUSIONS

- The conclusion that "the more attractive a store is to robbers, the more frequently it was robbed" is supported by weak correlation data and may, in fact, be an overstatement.

- The conclusion that the socioeconomic status of a store's neighborhood was not related to robbery frequency is based on a socioeconomic variable that is very questionable. That this conclusion is not supported strongly is perhaps due to the weak operational definition used by the authors for this critical variable.

- The conclusion that the prevention procedures reduced robberies at a statistically significant level is not supported by the statistical method chosen by the authors. Using a level of significance of .05, the null hypothesis that the control stores and experimental stores had an equal number of robberies, cannot be rejected as the authors contend. Reanalysis and proper compulation of the cumulative probability of 40 out of the 97 robberies occurring in the experiment stores yields a probability of 0.05188, and not 0.02 as the authors contend. Since 0.05188 is greater than the 0.05 level of significance usually chosen, this, the major conclusion of the authors, is found to be without support from the data reported in the study.

- The conclusion that the robbery prevention procedures were effective for stores that were robbed frequently (more than twice in year previous to study) is also not supported by the data. Recomputing the probability of the various rates of burglary using the binomial distribution, the probability of the reported difference is 0.082. This probability is greater than 0.05 and, therefore, one can reject the null hypothesis that the two

robbery rates for this group of stores is
not statistically significantly different
at the .05 level. (At the .10 level of sig-
nificance, the finding is supported by the
data.

- For those stores that had been robbed once, the
difference between the control and experimental
groups was significant at a level of 0.035. For
stores that had been robbed twice before the ex-
periment, the difference between the two groups
was not significant at the .05 level since the
probability of a type 1 error (rejecting a true
hypothesis) was 0.081.

- The only conclusion that is supported by data
at a .05 level of significance is that stores
which had been robbed in the past and were
attractive as robbery targets, had their num-
ber of robberies reduced through the treatment.

- Finally, the authors' conclusion that "a promising
new alternative strategy for reducing armed rob-
bery has been established" is not generally
supported by the study. The "strategy" upon
close inspection was a hodgepodge of a little
of this here, some of that over there, with
no reporting of what store got what nor what
types of behavioral changes resulted from such
changes. The failure to employ the statistical
methods properly led the researchers to find
significant results which reanalysis of the
data do not support. The findings of this study
are far from sufficient to support the conclusion

that the procedures employed significantly
reduce the probability of a given store being
robbed.
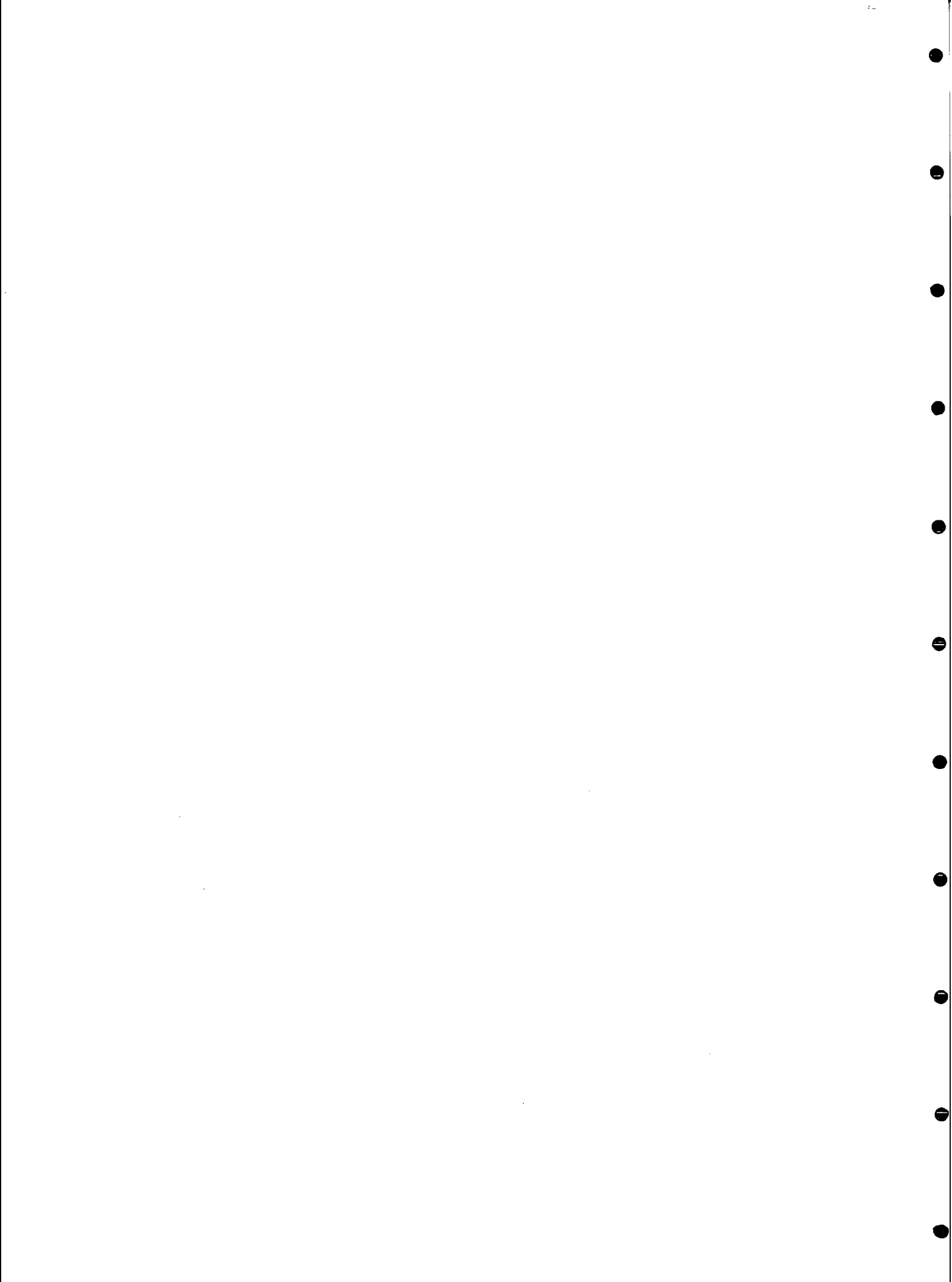
DEFENSIBLE SPACE IN SUBURBAN TOWNHOUSE DESIGN:
A CASE STUDY OF SIX CALIFORNIA DEVELOPMENTS

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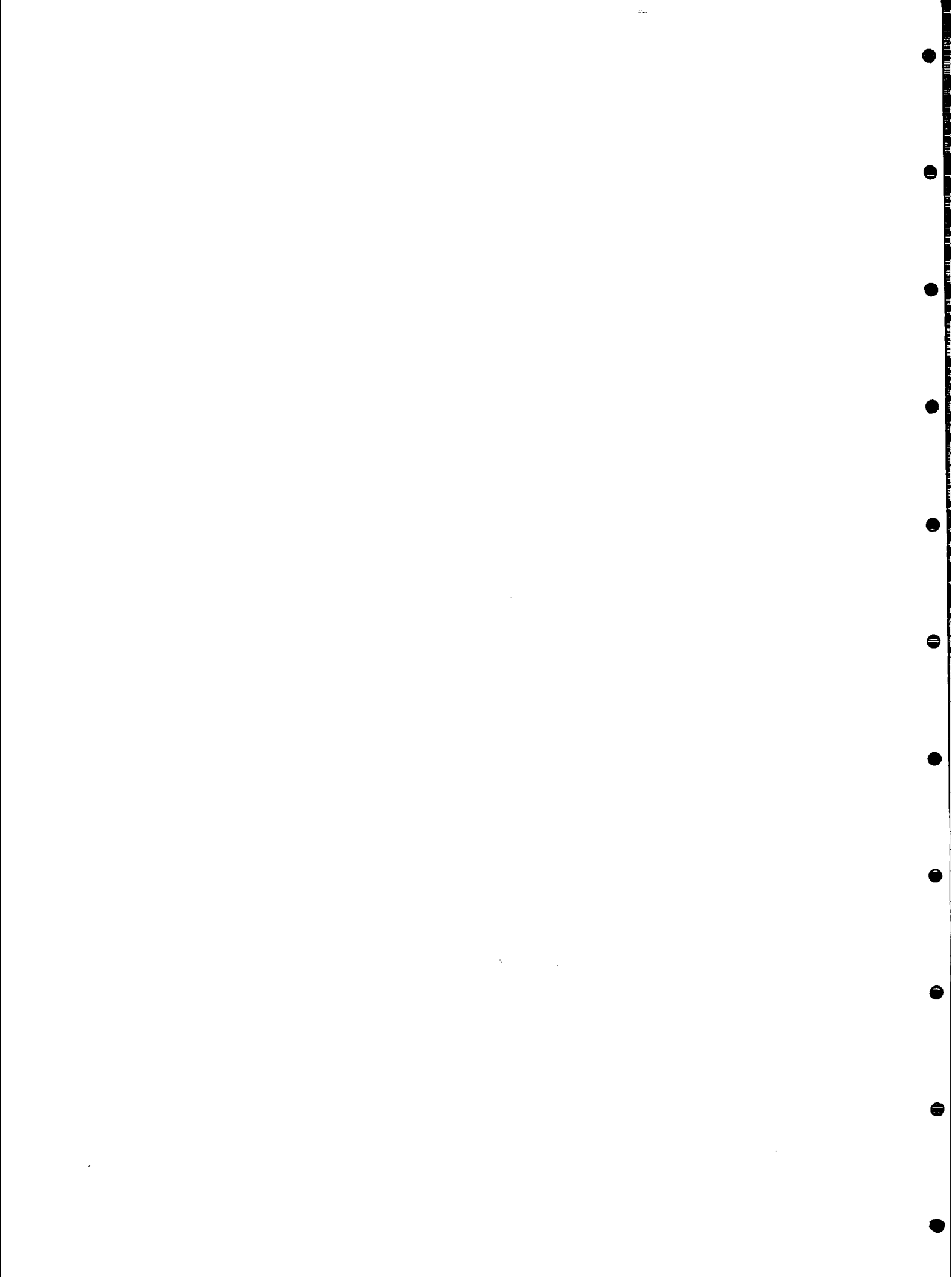
STUDY OBJECTIVES

The study begins with the assertion that, "Certain house and open space designs in themselves make criminal activity easy to detect and deter. Other housing plans make the residents easy victims of fear and insecurity." Given this assertion, the study seeks to answer three sets of questions:

(1) Do the residents feel confident as users of the open space and facilities or do they feel threatened in their homes and surroundings?

(2) Does good "defensible space" design coincide with attitudes of confident use and a lack of fear of crime? If the residents are dissatisfied, are the developments lacking some obvious features that could easily improve their defensible space design?

(3) Is the provision of defensible space features tied inevitably to the economies of housing provision?

RESEARCH DESIGN

The study was undertaken through researchers using observational techniques and later providing questionnaires to residents of six townhouse developments. The observers developed a checklist of "territoriality and surveillance features" derived from Newman's defensible space theories and considered either as desirable or undesirable. The townhouse developments were evaluated by the observers using the checklist, and the presence or absence of features was recorded. In addition, "the observers also recorded their judgments on the adequacy of each development's subdivision into a hierarchy of territorial obligations." Then each resident was given a detailed questionnaire "to survey the attitudes and behavior of residents." This study was pre-experimental in nature.

VARIABLES

Independent

- cost of housing

Intervening

- Territoriality
- Surveillance
- Hierarchy of space

Dependent

- Response to questionnaire regarding attitudes and behavior of residents

Units of Analysis

- Response to questionnaires

OPERATIONALIZATION OF VARIABLES

Independent Variables

- Cost of housing -- average price of houses in the development

Intervening Variables

Defensible space design features, such as territoriality, surveillance, and hierarchy of space were operationalized for the purposes of the study through the development of a checklist given to each observer. Observers noted the presence or absence of listed design features.

Territoriality was operationally defined through the checklist along three dimensions -- (1) "the extent to which the total area of the development is distinguished from its surroundings as a special area of 'semi-public' usage under the control of the residents," (2) the extent to which the developments are subdivided "into smaller clusters with shared space and responsibilities," and (3) the extent to which there are "semi-private spaces around each individual townhouse unit and the private open space adjacent to the house."

Surveillance was operationally defined through the check-list along three dimensions: (1) the extent to which major entrances, exits, and windows overlook the main routes for auto and pedestrian traffic into the housing complex, (2) the potential for visual monitoring (through windows, etc.) of major open spaces and recreation facilities, and (3) the amount of surveillance available to monitor house entrances, the semi-private zones, and neighboring homes within a cluster.

Hierarchy of space was operationally defined as the gradual flow within the townhouse development from public space to semi-public space, then semi-private space, and private space.

Dependent Variables

Responses to questionnaires included responses to open-ended, yes/no, and ordered categories or scale-type questions.

SAMPLING

Independent Variables

The sampling procedures used to select the six housing developments were not explained, though the authors did state that they were all suburban and covered a broad spectrum from low cost ($18,000+) to expensive ($75,000).

Intervening Variables

The authors state that "the list of defensible space features was drawn from numerous previous observations of suburban townhouses and from abstractions of Newman's judgments on public housing design."

Units of Analysis

The authors sampled the entire population of townhouses by dropping off questionnaires one evening and picking them up one hour later.

STATISTICAL METHODS USED

Descriptive Statistics -- Means and frequencies were given for the questionnaire items.

No data were provided regarding the checklist of environmental features by which the researchers evaluated the defensible space characteristics of the townhouses.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The operational definition of cost of housing was represented as the average price of the townhouses. Although the authors do not report their sources or figures for each house, the figures used are assumed to be sufficiently precise and reliable to stratify the townhouse developments into low, medium, and high cost developments.

The quality of the operational definitions and measurement techniques applied to the defensible space variables is poor. The authors failed to discuss or show any reliability of the measures used. In addition, the authors accepted as their source of validity for these definitions "the Newman literature" and did not attempt to validate the measures through any efforts of their own. Therefore, both the validity and reliability of these operational definitions are highly suspect. The authors should have used several independent observers to assess these variables and should have computed inter-rater reliability as an indicator of the reliability of their operational definitions. Further, it should be noted that measurement was undertaken and discussed at the "development level," but was never discussed (or, possibly, performed) at the individual house level from which the questionnaire responses were drawn. Finally, there is no information on the reliability of the items in the questionnaire. It is highly unlikely that the use of only one

question to ascertain a specific behavioral or attitudinal
measure for a respondent is stable enough to provide any
reasonable reliability.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design will not answer the specific questions
posed by the study, since the defensible space variables were
measured on the development level, while the questionnaires were
given to the individual residents at the house level. Therefore,
if the townhouse development is used as the unit of analysis,
the sample size of six is not enough to answer the questions
raised by the authors   (See *STUDY OBJECTIVES*). Essentially,
the authors failed to test or answer the major questions raised
at the outset of the study.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling procedure used to select the developments
and the respondents was not reported. The selection of the
defensible space variables was reasonable, since these were
the variables employed by Newman.

APPROPRIATENESS OF STATISTICAL METHODS

The use of descriptive statistics could have been appropri-
ate, but the statistics reported in the Appendix of the study
are not related to the specific questions listed by the authors
as the objectives of the study. In addition, the statistics
provided in the Appendix are of little value because of their
incompleteness. For example, the authors provide the means to
the answers in the questionnaire, but separate the means without
reporting the sample sizes and standard deviations. A sample
of 2, 2, 2, 2, 2, and 2 has the same means as a sample containing
1,000,000, 2, -1,000,000. The authors did not use powerful
statistical tests.

CONCLUSIONS

The authors state:

- During the first 15 years of townhouse construction, the need for surveillance opportunities was often ignored and the need for a set of clearly indicated territorial obligations was met only by chance.

- With careful forethought and an awareness of the criteria for defensible space, designers can provide for territoriality and surveillance without much additional cost or loss of attractiveness.

The authors recommend:

- Break up long rows of houses into clusters of houses that share open spaces and parking facilities.

- Extend the private and semi-private zone around each home, even if it must be at the expense of subdividing ownership of the greenbelt.

- Bring the garage entrances or parking places into full view of the homes in the clusters.

- Place windows and homes face to face with the greenbelts in such a way that residents will actually look out of the windows on a regular, casual basis without feeling that anybody's privacy is being invaded.

- Provide recreation facilities for families with children.

- Establish and use a design bank of workable designs.

DISCUSSION OF CONCLUSIONS

The authors' two conclusions and five major recommendations are not supported by any data reported in the study. The authors originally posited three research questions. They failed to address any of them in the study. Rather, the authors have come up with conclusions and recommendations that are drawn directly from Newman's theses and that have no independent support from the data and analyses provided in their own study. Furthermore, the research design, as it was employed, seems to boil down to a three stage process. First, Newman's statements and positions

on multifamily housing design are taken as the "standard."
They are not tested for validity, etc., nor questioned in any
way. Then, Newman's views are abstracted and codified into a
checklist that researchers use to "evaluate" the townhouse
developments. The authors report only a scant summary of this
evaluation. Then, the authors ask residents a series of ques-
tions and report the mean answers on a development by develop-
ment basis. Without carefully analyzing the relationship of
the six separate townhouse developments (no correlations were
reported, nor were analyses of variance undertaken), the authors
leap to a series of conclusions and recommendations for which
their study provides no independent basis of support.
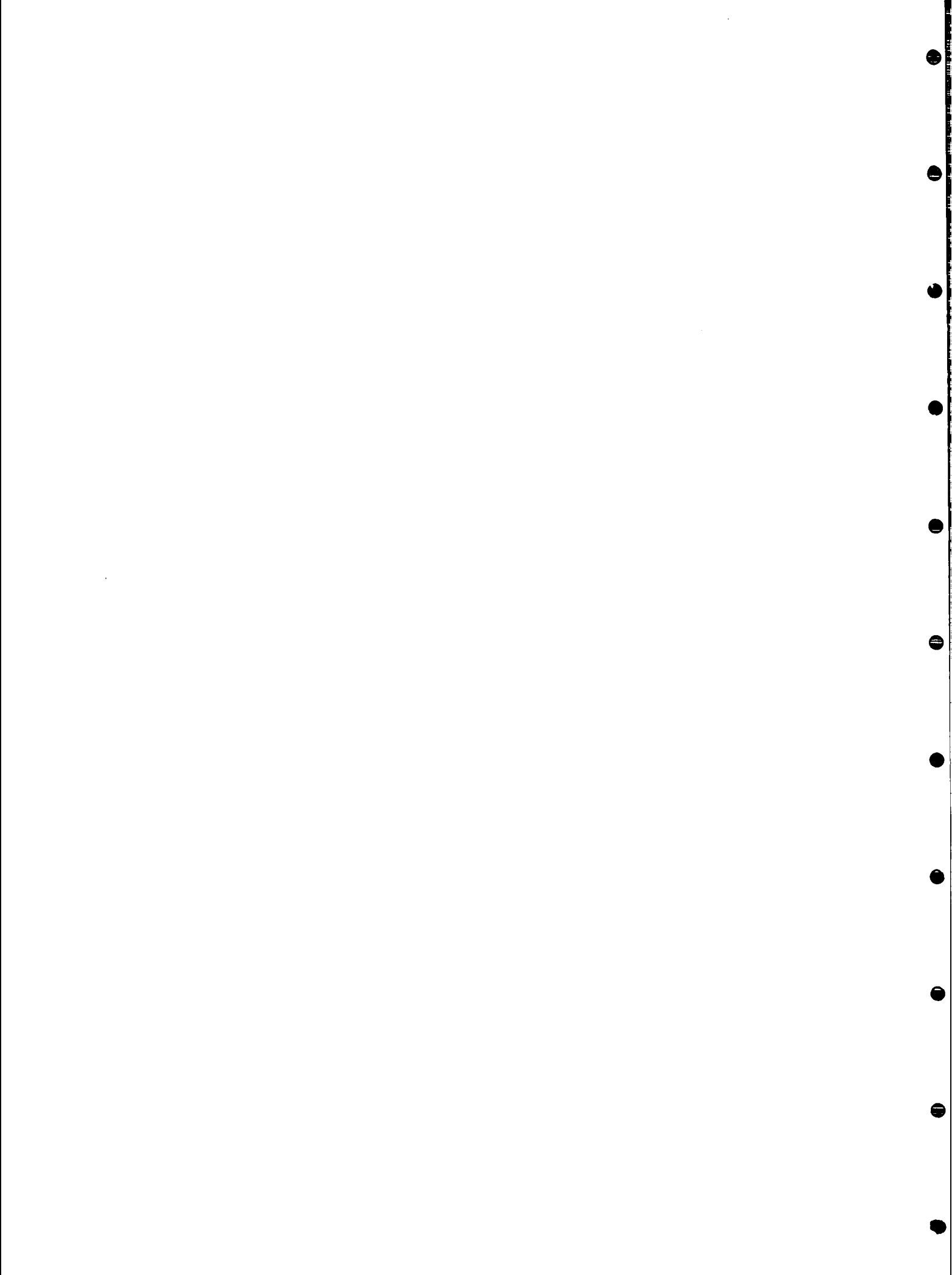
CONVENIENCE STORES, ARMED ROBBERY,
AND PHYSICAL ENVIRONMENTAL FEATURES

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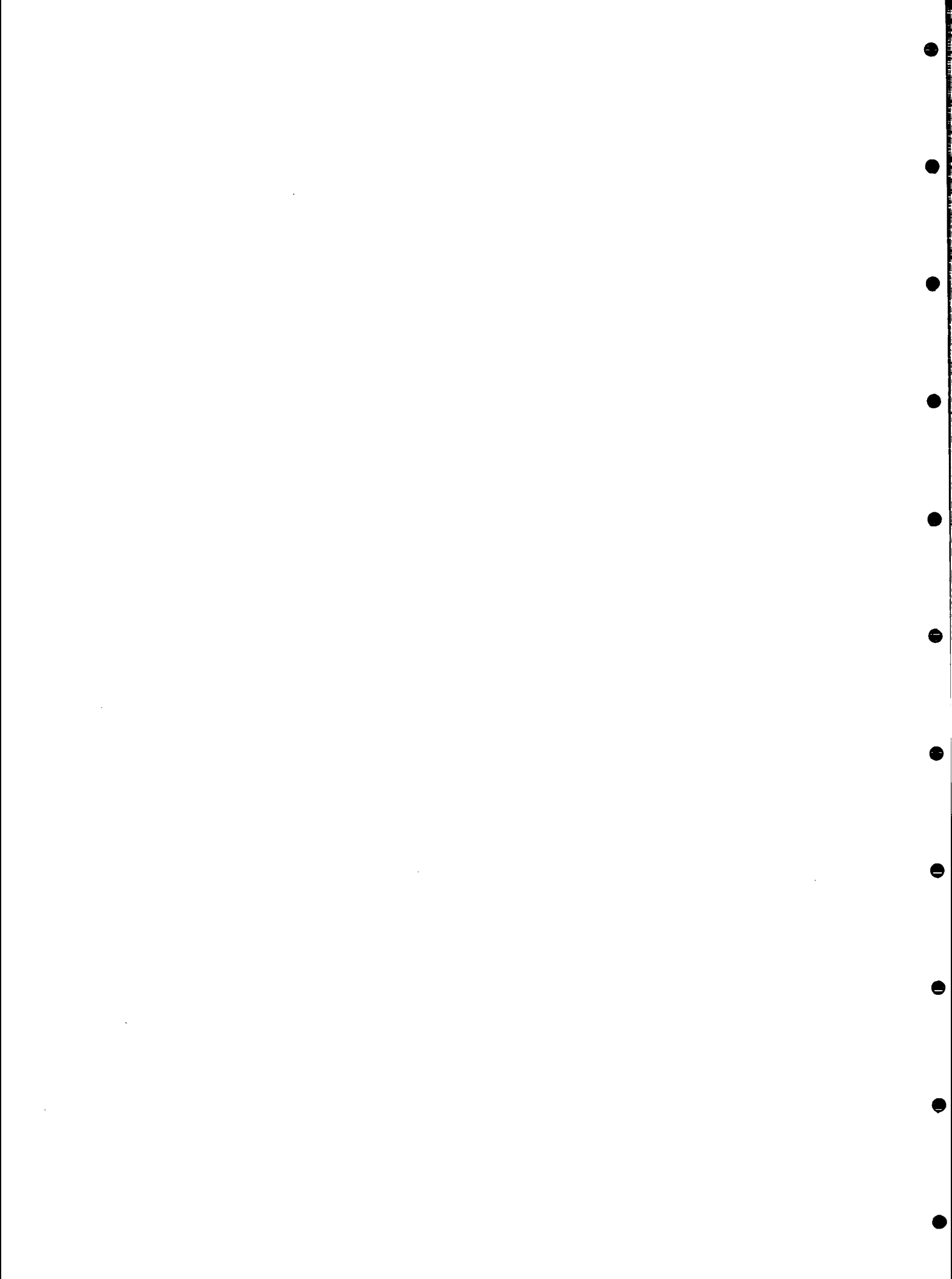
STUDY OBJECTIVES

The primary objective of the study is "to test whether
the vulnerability of convenience stores to armed robberies
is associated with certain environmental characeteristics,
such as: (1) proximity of store to major transportation route,
(2) location of store on a street with light vehicular traffic,
(3) location of store in a residential and/or vacant land use
area, and (4) location of store in an area with few surrounding
commercial activities.

RESEARCH DESIGN

Robbery information was obtained from police and sheriff
records on the 39 stores selected for study. On-site inspections
were conducted and the four environmental variables considered
as potential contributors to vulnerability were measured and
recorded. The hypothesized relationships between the environ-
mental variables and vulnerability to crime were then tested
separately with 2 x 2 chi square analysis.

VARIABLES

Independent

- Environmental attributes of convenience stores (listed
  above)

Dependent

- Vulnerability to armed robbery

Units of Analysis

- convenience stores

OPERATIONALIZATION OF VARIABLES

Independent Variables

Proximity to Major Transportation Route -- Proximity was considered as being within two blocks of a street that offers access for through traffic of a non-local origin. "Criteria such as number of passing vehicles, number of lanes, curves, intersections, or distance uninterrupted by traffic lights" were not employed to define "major transportation routes."

Amount of Traffic -- Based on actual traffic counts for the street on which the convenience store was located, grouped on a binary scale -- light or heavy.

Type of Land Use -- Based on on-site observations of each store on a trichotomous scale consisting of residential, commercial, and vacant. Each store received one rating, and stores surrounded by mixes of land use were placed into only one of the above categories. In all cases, the observed selected a category based on the "predominant" type of land use within three blocks of the store in all directions.

Number of Surrounding Commercial Activities -- The observer included "an activity" if it was within one block in any direction and if from its front (most heavily travelled entrance) there was a direct line of sight to the convenience store. In addition, stores within one block that used adjacent parking facilities and walking areas were included if there was a direct line of sight from these areas to the convenience store.

Dependent Variables

Vulnerability of Convenience Stores -- The variable is measured through archival data on the number of times each store was robbed (armed robbery only) during the study period (1 January 1973 to 30 April 1975). Convenience stores are divided according to two different classification systems in this study.

One grouping divided stores into two categories: robbed 0 - 2 times, and robbed 3 or more times. Another grouping divided stores into three categories -- robbed once, robbed twice, and robbed three or more times.

SAMPLING

The author selected the independent variables according to a review of the literature on the relationship between physical environmental factors and crime. The author selected the dependent variable, armed robbery, because this type of crime is likely to be premeditated. The author selected a sample of convenience stores as the unit of analysis because of: (1) their prevalence in the geographic area, and (2) the layout (design) similarities. No information is given on the criteria by which the sample of 39 stores were chosen for inclusion in the study.

STATISTICAL METHODS USED

Descriptive statistics -- The author provided frequency breakdowns for selected stores. *Chi Square* -- The author used chi square to test independence in four two-way tables between four independent variables and the victimization rates of the stores.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Proximity to Major Transportation Routes -- The author selected "two blocks or less from a major transportation route" as representing "near," because previous studies suggested that crime dwindles in areas greater than two blocks and for other related reasons. This dichotomous variable -- within or not within two blocks -- is subject to several criticisms. First, the block count -- zero, 1 block, and 2 blocks -- is a discrete variable and the creation of a category that is, in effect, a combination of these can be

justified only under very restricted conditions. (Bishop *et al.*, "Discrete Multivariate Analysis," 1975). The result of combining these three block measurements is an unclear description of the phenomena under study. Further, the author's selection of major routes was based on whether the route offered access for through traffic of non-local origin. The result of using this operational definition is unclear, but the validity of the definition is open to serious question.

Amount of Traffic on Adjacent Street -- Although the use of reliable data (machine recording) was quite good, the cut-off point of 10,000 vehicles per day on the two-point nominal scale (light/heavy) is arbitrary. The validity of this operational definition is open to question, since the amount of traffic at or near the time of the robbery is a more important piece of information than total traffic per 24 hour period. (The difficulty of gaining this data is certainly recognized). The author's use of "an educated estimate" for streets for which there were no traffic data is not explained in sufficient detail to be evaluated. The author should have stated how many streets in his sample had estimated traffic counts, should have used independent judges, and then tested the agreement/disagreement between the studies.

Type of Land Use -- The author offers no explanation of what criteria he used to determine the "predominant" land use in cases of mixed areas. The difficulty of such a decision is recognized, and in order to be free from the criticism of using an *ad hoc* approach, the author should have explained his decision-making process thoroughly and/or used independent judges and tested for inter-rater reliability.

Number of Surrounding Commercial Activities -- The operational definition used by the author appears to be adequate, with the recognized limitation that in difficult cases mentioned by the author reliance on his own judgment is less satisfactory than using several independent judges.

APPROPRIATENESS OF THE RESEARCH DESIGN

The single major problem with the author's design is that the number of stores (n = 39) is too small to test the stated hypotheses with rigor and confidence. The structure of the design is generally adequate.

APPROPRIATENESS OF SAMPLING PROCEDURE

The author provides too little information on how or why the 39 stores were selected for study. Given the limits of the study (a Master's thesis), the selection of the stores and four independent variables for the sake of convenience of data acquisition is understandable, though it limits the scientific quality (and therefore the generalizability) of the study.

APPROPRIATENESS OF STATISTICAL METHODS

The use of four chi square tests is a reasonable strategy if one is testing only for the individual effects of each independent variable or the dependent variable. This strategy is inappropriate, however, for assessing the joint influence of the independent variables on the dependent variables. Should the author have had a larger sample size, a more appropriate type of analytic procedure for assessing the joint influence of various combinations of independent variables would have been the use of a log linear model using all four independent variables and the dependent variable.

POWER RELATIVE TO THE OBJECTIVES OF THE STUDY

The confidence in the results is limited due to the inability to perform more powerful statistical tests.

CONCLUSIONS

The author reports:

- When tested individually, two hypotheses did not show statistically significant relationships, while two others did. A store's proximity to major transportation routes or its location in residential and vacant land use areas did not seem to affect crime (armed robbery) rates significantly. On the other hand, the amount of traffic in front of a store and the number of surrounding commercial activities did exhibit a statistically signficiant influence on the crime rate. (Note: The number of surrounding commercial activities was only found significant after converting a 2 x 2 table to a 2 x 3 table, allowing for the dependent variable to include three categories -- Robbed 0 - 1 times, twice, three or more -- rather than the original two -- Robbed 0 - 2 times, three or more.)

- All four independent variables were significant "when viewed in interaction with one another. The four hypotheses...were all highly significant in terms of explaining the fact that twelve of the convenience stores were robbed three times or more."

DISCUSSION OF CONCLUSIONS

The significance of "surrounding commercial activities," found after converting the dependent variable, may be due to the two zero entries in the 3 X 3 table, rather than confirming the hypothesis. The correct null hypothesis is that no relationship exists. The author's alternative hypothesis is that there exists a relationship between armed robbery and the existence of fewer surrounding commercial activities. However, the chi-square test performed by the author can not distinguish the directional relationship (between more and fewer commercial activities) stated in the author's hypothesis. Therefore the author's research does not support his conclusion that a convenience store is more vulnerable when located in an area with fewer surrounding activities.

The second major conclusion regarding the significance of

all of the independent variables when viewed in interaction with
each other is not supported by the study. The author never
tested the four independent variables and the dependent vari-
able simultaneously. The author bases this conclusion on analy-
sis of the patterns of four independent variables on the twelve
stores that were robbed three or more times. Similar analysis
of the pattern of the independent variables applied to the
stores that were robbed either no times or once or twice shows
that there is no clear way to distinguish them from the highly
vulnerable stores. Independent variables are important and
significant only if they serve to distinguish highly vulnerable
stores from those that are not vulnerable.
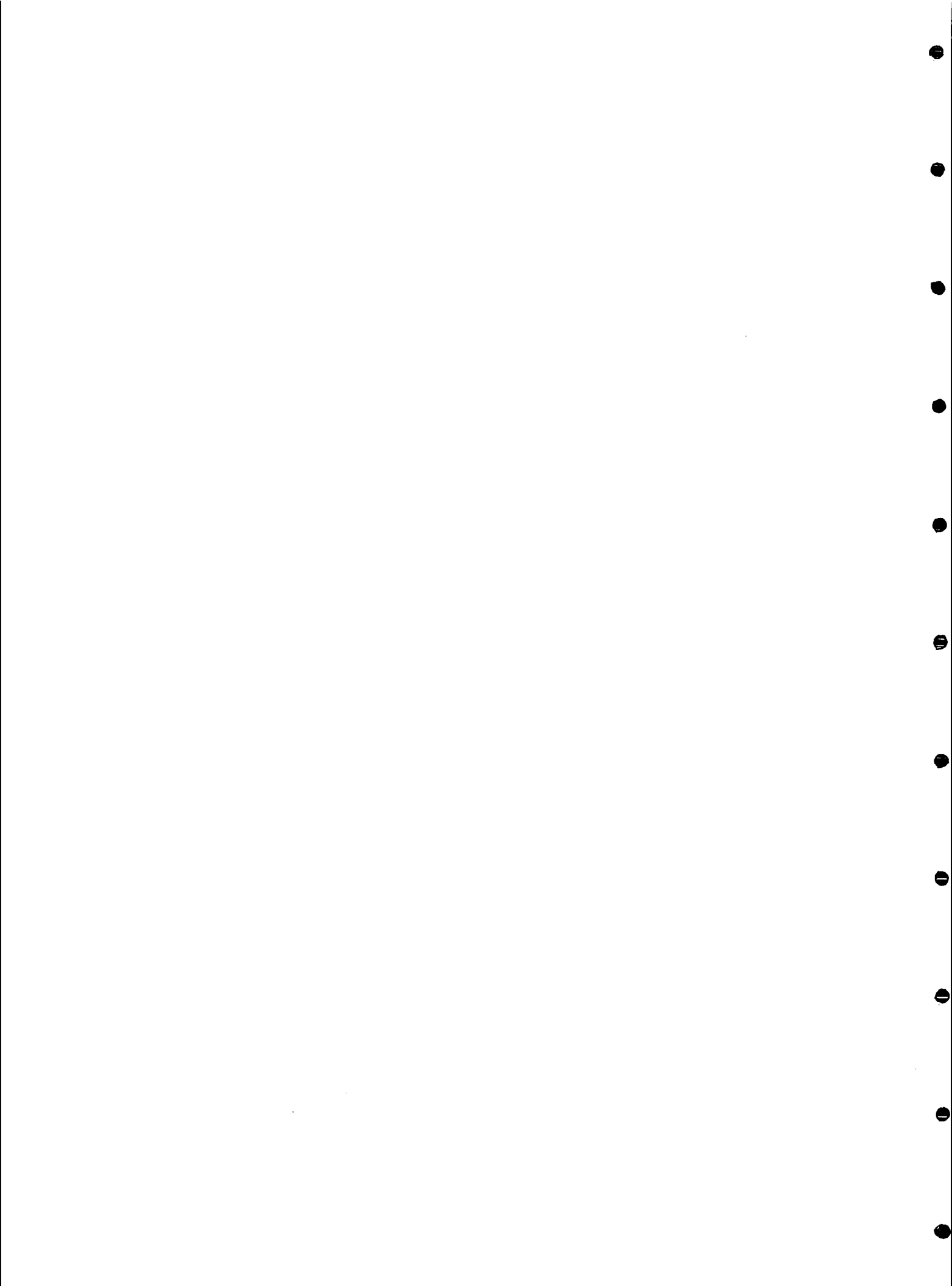
THE ANALYSIS OF ENVIRONMENTAL ATTRIBUTE/CRIME INCIDENT

CHARACTERISTIC INTERRELATIONSHIPS

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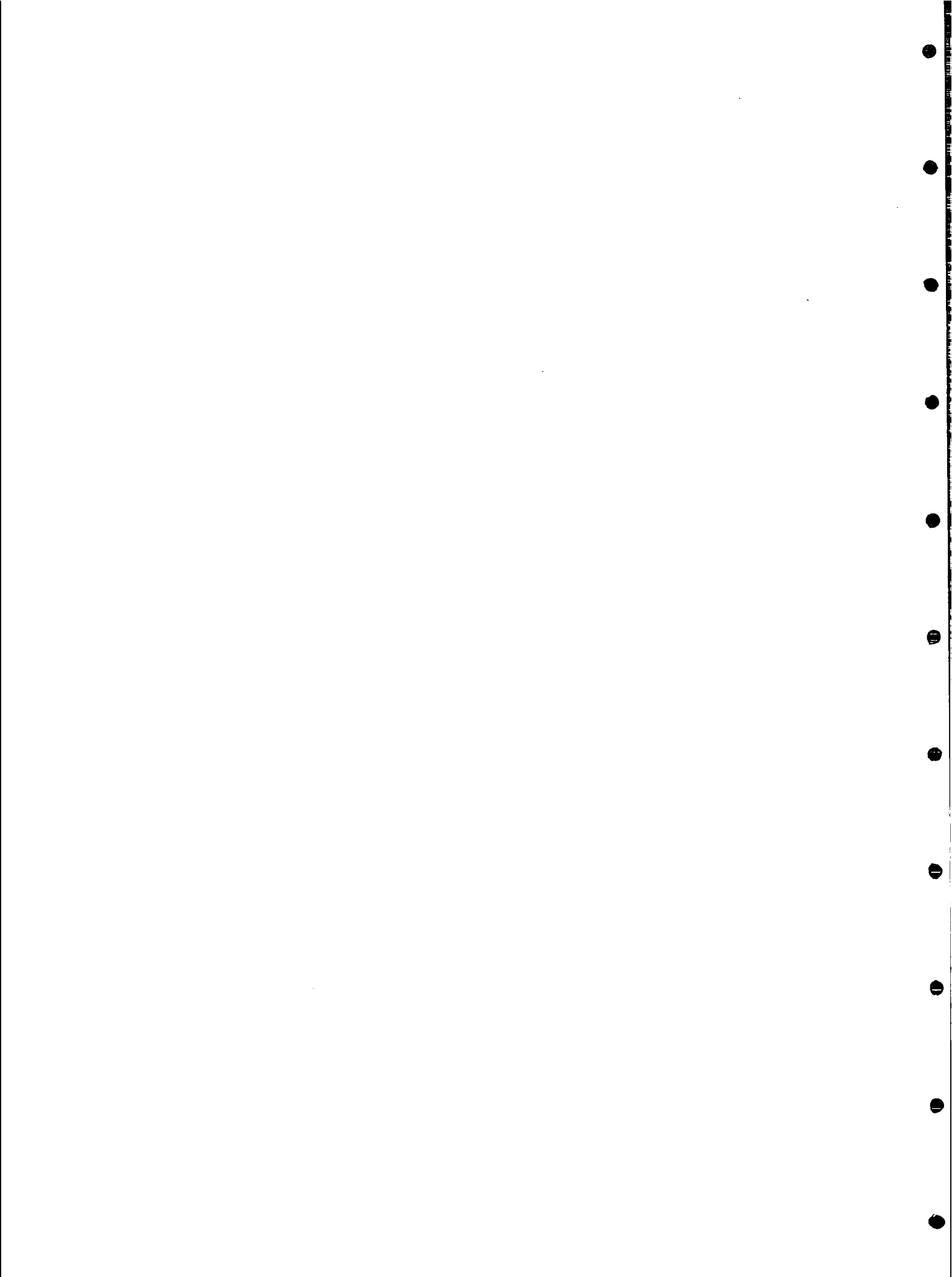
STUDY OBJECTIVES

The study analyzes crime incident data on four felony offenses -- assualt, robbery, burglary, and auto theft -- in order to answer the following questions:

- To what extent are crime incident characteristics or specific types of crime related in some contingent fashion to attributes of social areas?
- Do social areas differ in concentrations of characteristics or types of crimes?

RESEARCH DESIGN

The author analyzes data on the type and location (census tract) of crime in Westchester County, New York in order to investigate the relationship between various "social areas" and crime incident characteristics. Since each unit of observation consists of many social and crime related variables, the author uses cumulative communality key-cluster analysis to limit the number of variables under consideration at any one time. The author grouped the variables into clusters through consolidating the 30 census tract variables into four clusters. The four clusters consolidated the following dimensions: 1) size and structure of household; 2) sex and age of population; 3) variables related to income and poverty; and 4) other socio-economic characteristics. Then the author analyzed the 202 census tracts along the four dimensions (clusters) and developed nine groupings or clusters of census tracts. These nine clusters were termed "social areas." After developing these two sets of clusters, the author analyzed the distribution of assault, robbery, burglary, and auto theft rates in relation to the clusters of social areas to determine whether the mean crime rate of each social area is significantly higher or lower than one would expect from chance distribution.

The author then developed a refined categorization scheme
for assault (20 types), robbery (19 types), burglary (8 types),
and auto theft (16 types), and cross-tabulated each type of
crime with the social area clusters. This analysis provided
a more detailed picture of the relationship between the type of
crime (as defined by crime incident characteristics) and the
location (as defined by clusters of social areas). A more
detailed discussion of the statistical methods used follows in
a later section of this review.

VARIABLES

- crime incident characteristics
- social areas of a county
- crime rate

Units of Analysis

- census tract (n = 202)
- social areas (n = 9)
- assault (n = 317)
- burglary (n = 1751)
- auto theft (n = 674)
- robbery (n = 407)

OPERATIONALIZATION OF VARIABLES

Crime incident characteristics -- This variable was mea-
sured through archival data collected during a Crime and Service
Study in Westchester County, New York. The study used data
on four crimes -- robbery, assault, auto theft, and burglary.
Detailed creim incident characteristics included census tract
of occurence, age of offender, sex of offender, race of offender,
number of offenders, hour of day, day and month, weapons used,
items stolen, car recovery, location type, census tract of
victim, and relationship of victim to offender.

Social area clusters -- The author developed social area clusters through analyzing 30 separate social variables from census data. The were:

- tract population
- percentage of male, 14 years and older
- percentage of single male, 14 years and older
- ratio of males to females, 14 years and older
- percentage living at residence 5 years or longer
- percent black
- percent foreign born
- percent total children less than 18 years of age, with female head of household
- percent of total households with female head, with children less than 12 years of age
- median school years of persons 23 years and older
- percentage of population 16-21 not in school or a graduate of high school
- number of children born
- median income
- percentage of families below poverty level
- percentage of families receiving public assistance
- measure of income inequality (1)
- measure of income inequality (2)
- percentage of adult males unemployed
- percentage of adult females unemployed
- number of persons per household
- median number of rooms per household
- median number of persons per housing unit
- percentage of housing units without complete plumbing
- percentage of housing unit with some form of air conditioning
- percentage of housing units without automobile
- median value of owner-occupied housing units
- median contract rent
- percentage of housing units owner occupied
- percentage of housing units occupied
- percentage of housing units single unit housing.

In order to develop nine social area clusters, the author
used V-cluster analysis and identified four variable dimensions:
(1) variables related to size and structure of household,
(2) variables related to differential distribution of sex and
age of population. (3) variables related to income, poverty,
and availability of automobile, and (4) other socio-economic
status characteristics. The four social area dimensions were
divided into three possible value categories -- low, medium,
and high. Each census tract was analyzed with regard to its
score on each of the dimensions and this resulted in 198 of
the 202 census tracts forming 9 social area clusters.

Crime rate -- Number of crimes in each census tract per
1,000 persons (robbery, burglary, assault, and auto theft).

SAMPLING PROCEDURES USED

The author drew random samples of crime incidents from data
available from a previous study -- *Crime and Service Study*. Fifty
percent of the reported assaults and reported robbery incidents
were sampled, while 25% of the reported burglaries and reported
auto thefts were sampled. The author selected a random sample
of each type of crime to measure the distribution of crimes
across the nine social areas.

The selection of Westchester County was made because of
data availability. The author collected and analyzed data on
a sample of 198 of the 202 census tracts. Four tracts did not
fit into any of the nine clusters (social areas).

STATISTICAL METHODS USED

Cluster analysis -- The cumulative communality key cluster
analysis method developed by Tryon and Bailey was used: (1)
to group variables and observations along key dimensions, (2)
develop types of objects (such as census tracts robberies and
assaults) and (3) to test hypotheses by generating a random
sample of crimes and testing whether significant differences
were found in the distribution and types of crimes among the
nine social areas.

Descriptive statistics -- The author used two-way cross
tabulations, one-way frequency tables, means, and standard devi-
ations on the crime incident data, the nine social area clusters,
and the thirty social variables. In addition, the author presents
the correlation (without tests of significance) among the thirty
social variables drawn from census data.

Chi square -- The author uses chi-square in analyzing
offender/victim race characteristics and their relation to levels
of robbery in various social areas.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Crime incident characteristics -- The author used the data
available from the *Crime and Services* study in a thorough and
detailed manner. Validity is governed by the methods used in
the previous study, which recorded information from archival
police data. Reliability is good, and in general the author
has provided a good operational definition.

Social area clusters -- The author correctly used the
Tryon and Bailey approach to cluster or group the thirty social
variables that he drew from census data on tracts similar along
key dimensions and applied to 202 census tracts to develop
clusters. The validity of the data is governed by the quality
of the census data. The reliability of the data is presumably
good. Although the author does not explain why these thirty
variables were chosen from the many possibilities, those chosen
cover a broad range of areas, including: (1) size and structure
of household, (2) differential distribution of age and sex,
(3) poverty, and (4) other socio-economic characteristics.

Crime rate -- These data are derived from the *Crime and
Service* study and are adequate for the purposes of the present
study.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design is reasonable, given that the author had a large number of variables and observations to take into account. The use of cumulative communality key cluster analysis provided an objective method to reduce the number of variables to a more manageable number. The author's analysis of the distribution of the separate crimes -- assault, robbery, burglary, and auto theft -- across the nine social area clusters sheds light on the relationship between the social environment and crime rates. The author's analysis of the distribution of various types of assault, etc., across social areas provides a more refined picture of the crime-social environment literature.

The research design and product shed little light on the relationship between characteristics of the built environment and crime rates. This is the result of limited data collection on land use and physical characteristics. Furthermore, the author's unit of analysis is the census tract, which does not allow for the detailed analysis of the physical characteristics of the environment necessary to discern cause-effect or interpretable relationships between crime-related behavior and the built environment.

APPROPRIATENESS OF THE SAMPLING PROCEDURES USED

The author relied on random sampling whenever possible. This may be appropriate for the study, but it is not clear why the author randomly sampled the crimes, when it would have been better to use all the available data. In addition, the author used a sample of only 300 units in his investigation of the distribution of mean crime rates among the nine social areas. Tryon and Bailey used 3,000 units and it is an open question whether 300 is a large enough sample.

Cluster analysis -- Although the technique was appropriate for the study, several problems exist with the author's application of it to the data. The author's reporting of a factor coefficient of 1.0806 and a communality of 1.2702 for the variable PCTM (Table 3.6) must be incorrect because it is theoretically impossible for communality to exceed 1 and very unlikely for a factor coefficient to exceed 1. The overestimation of the communality probably contributed to the very high reliabilities reported. The correlation matrix of 30 variables shows that a reliability of .9 is higher than one can expect, since reliability can be estimated by

$$\frac{K\bar{r}}{1 + (K+1)\bar{r}}$$

where K is the number of items in the cluster and $\bar{r}$ is an average of inter-item correlations.

Further, when the author analyzes the relationship between assault and social area clusters, the 300 samples of crimes supposedly randomly selected (via computer program) show a very skewed distribution of means. It is possible that either the randomization was not performed correctly (more plausible) or that the distribution of the 202 census tracts was very skewed (less plausible). One would expect a more normal distribution to result from the 202 census tracts should randomization have been performed correctly.

and standard deviation. This suggests that there might be is quite different from the rest in that it has a large mean and standard deviation. The suggests that there might be outliers in this cluster, since whenever the census tracts are similar the standard deviation will be small. To the extent that there are outliers, the results of the study attributable to that cluster HIPROB may be misleading.

The author identifies several problems encountered in developing clusters to group variables regarding the types of assault, burglary, robbery, and auto theft. These problems show clearly the need to compromise clusters and drop variables when using cluster analysis, in order to simplify the data analysis process. Furthermore, as Table 5.4 shows, the clusters that the author obtained could easily have been obtained from the definition of the variables, rather than doing the sophisticated cluster analysis.

Another statistical method -- The author's use of two-way tables (Tables 5.8 to 5.17 on the relationship between assault and social area clusters) is problematic. In order to produce these two-way tables, the author collapsed other variables. This disorts the relationship among the variables, however, because this process will not recognize and does not report any interaction among the variables. (See Bishop, *Discrete Multivariate Analysis*, p. 39).

The author's use of dummy variables and missing data was incorrect in computing correlations and in performing cluster analysis. The input matrix of correlations to be clustered is not of full rank because of the redundant dummy coding. Also, cluster scores based on the dummy codes are highly misleading.

The author's use of two-way tables to identify the relationship between types of burglary and social areas of occurrence fails to provide the proper interpretation of the data. AIR reanalyzed Table 7.3, using a log linear model. This model suggested that two key factors -- residency and day of week -- are independent, conditional on the time of day of the crime. The author's use of two-way tables that use only one factor marginal against another factor (such as non-residential vs. residential) against crime areas (low, medium, or high) is misleading, since it neglects interaction terms. Analysis by a log linear model would have been prefereable throughout the study over the use of two-way tables.

Finally, the author did not perform tests of significance with regard to the relationship between the various types of burglary, assault, robbery, and auto theft discussed in Chapters 5 through 8 of the study, except for the use of chi square analysis in one instance.

CONCLUSIONS

The author reports:

- Crime rates for assault, burglary, robbery, and auto theft are significantly different in different social areas.
- Specific types of assault, burglary, robbery, and auto theft occur more frequently in certain social areas than in others.

DISCUSSION OF CONCLUSIONS

Since it is probable that the author used the cluster analysis incorrectly (i.e., communality above 1), it is not clear how much faith one can have in the results. More importantly, due to the nature of the study, one cannot ferret out consistent relationships between crime-related behavior and particular physical characteristics of the built environment.

ENVIRONMENTAL OPPORTUNITIES AND THE ECOLOGY OF CRIME

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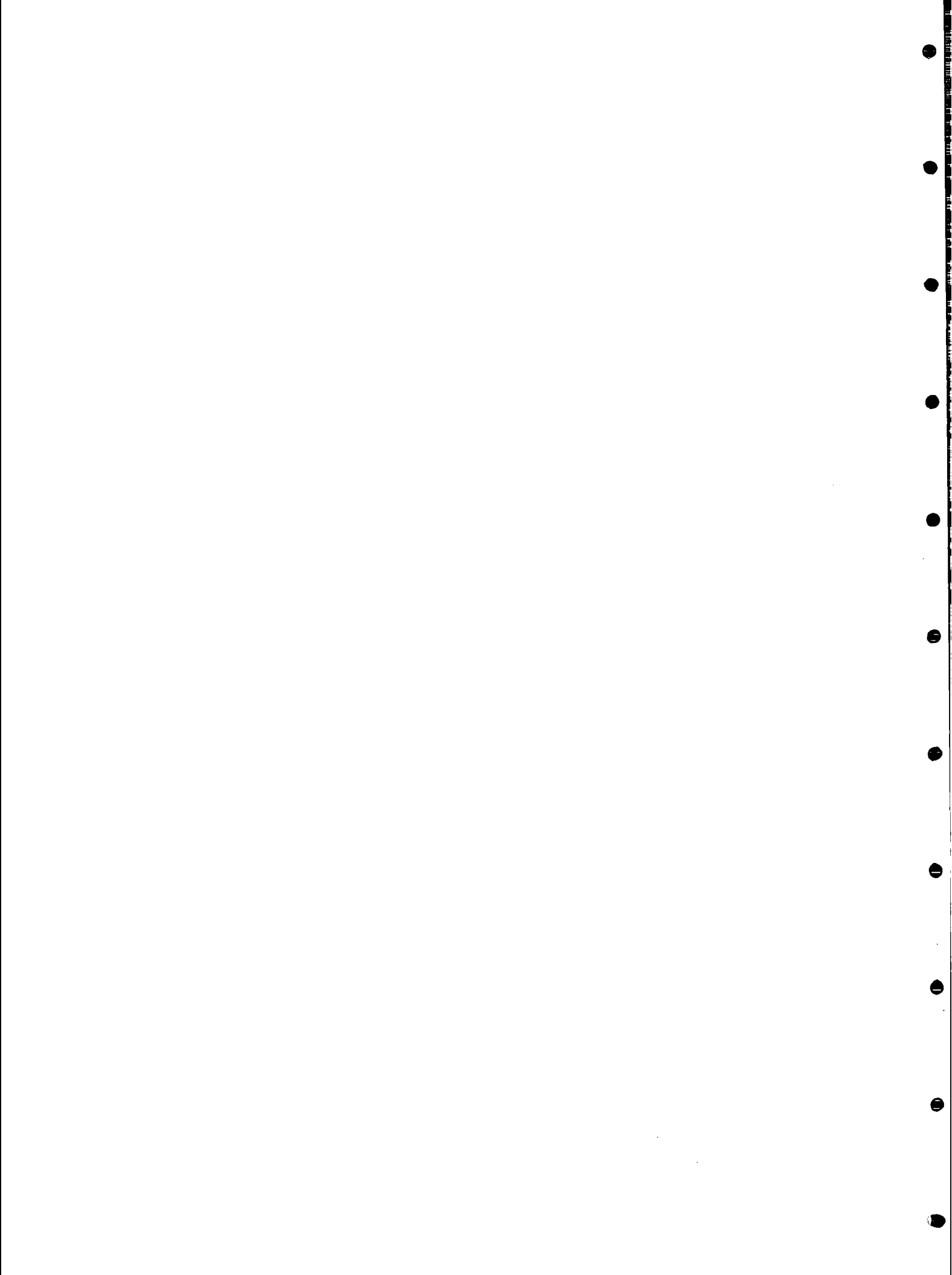
STUDY OBJECTIVES

The primary objective of the study is "to expand on the methodological and theoretical insights" in the area of research on the exploitation of environmental opportunities for crime.

In attempting to meet this objective, the author compares the extent of criminality, first, in areas with licensed hotels (i.e., those with bars) and control areas and, second, in areas with shopping areas and control areas.

RESEARCH DESIGN

The author did not employ a formal hypothesis testing design or test any of his results for levels of significance. Rather, the study takes police crime statistics on specific types of crime (see section on Operationalization of Variables, below) and compares the crime levels for areas with licensed hotels and a control group of areas without such hotels. In addition, the study compares police data on crime for areas with shopping centers and a control group of areas without such centers.

Further, for data analysis purposes, the author constructs a series of crime opportunity indices, which he suggests are useful in comparing crime phenomena in different areas of the city. These indices are a ratio of the number of crimes found in an area to the number of such environmental characteristics as parking stalls, bar seats, amount of retail space, and number of acres occupied by a shopping center. These "characteristics" represent measures of the opportunities for crime.

VARIABLES

Independent

- areas with/without a licensed hotel
- areas with/without a shopping center

Dependent

- crime rate

Units of Analysis

- areas with licensed hotels (n = 3)
- adjacent areas without licensed hotels (n = 24)
- areas with shopping centers (n = 3)
- adjacent areas without shopping centers (n = 24)

OPERATIONALIZATION OF VARIABLES

Independent Variables

- All areas were selected from municipal data that divided the city of Edmondton into 267 polling areas.
- The areas with licensed hotels also met the following criteria: (1) The licensed hotel represented the only "prominent opportunity complex" in the area, and (2) the area was surrounded by suburban residential areas.
- The areas selected for comparison purposes (the control group areas) were without licensed hotels and were adjacent to the areas selected with such hotels.
- The selected areas with shopping centers met the same criteria of being the only prominent opportunity complex in its area and being surrounded by suburban residential areas, and the control group areas for this part of the study were residential suburban areas adjacent to those with shopping centers.

Dependent Variables

- The dependent variable consisted of various types of crime rates as recorded in police records on an area by area basis.
- Specific crime rates reported were:
  - "Car crimes," including auto theft and theft from cars
  - "Bar crimes," including common assault, disorderly conduct, and violations of the Liquor Act
  - thefts, including thefts from retail businesses
  - fraud, shoplifting, shopbreaking, and mischief (vandalism).

SAMPLING

Independent Variables

Although the author does not explain why the particular areas were selected for study, it may be that the areas selected were the only ones in Edmondton, Alberta that met the criteria set forth by the author.

Dependent Variables

The author does not explain why he chose the particular crimes from the universe of recorded crimes committed in the city or the areas of study.

STATISTICAL METHODS USED

Descriptive Statistics -- The author reported the average crime rates for areas with licensed hotels and shopping centers and for the control areas.

Ratio -- The author also reported "crime opportunity indices" which were based on the following ratios:

- The "auto index" -- $\dfrac{\text{number of auto-related offenses}}{\text{number of parking stalls}}$

- The "bar index" -- $\dfrac{\text{number of "bar crimes"}}{\text{number of bar seats}}$

- The "theft index" -- $\dfrac{\text{thefts}}{\text{amount of retail space}}$

- The "miscellaneous crime index" -- $\dfrac{\text{number of frauds, etc.}}{\text{area (acres) of shopping center}}$

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The operational definitions of the independent variables are adequate. With regard to the dependent variables, however, the author uses a set of composite crime rates that includes such offenses as disorderly conduct and violation of the liquor law.

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The inclusion of these "site-specific" crimes and the failure to include a broader range of other crimes prevent the research and its findings from being generalizable. If the researcher's goal was to look at the effects of environment on crime, the measurement technique used should have included the rates of all crimes. The author uses a similarly circular approach to crime in shopping centers, focusing on such crimes as shoplifting and theft.

The failure of the author to define the independent variables adequately allows only such conclusions as (1) more shoplifting and theft occur in shopping center areas than in surrounding residential areas, and (2) more violations of the Liquor Act and disorderly conduct occur in areas with licensed hotels with bars than in surrounding residential areas. These findings do not go beyond what is intuitively obvious and, more importantly, they prevent the study from dealing with the effects that these environments have on other types of crime. Further, the failure of the author (or the original data source) to separate the composite "bar crimes" and "miscellaneous crimes" into separate offenses confuses the results, since one cannot determine the percentages or relative proportions of the separate types of offenses within the composite or relate specific offenses to the independent variables. This confusion limits the explanatory power of the study.

Finally, through more of an oversight than through the use of an inappropriate measurement technique, the author's Tables 1, 2, 3, 6, 7, and 8 are misleading with respect to population figures and "crude rate/1,000 population." The author should have noted that the number of people using these areas with hotels and shopping centers varies tremendously at different times of day, week, or year. Data that reflect only "resident population" of these areas is an inadequate basis for a crime/population ratio.

APPROPRIATENESS OF THE RESEARCH DESIGN

The weakness of the operational definitions and the improper limitation of the dependent variables to a narrow range of crimes contribute to making the research design inappropriate to meet the objectives of the study. The sample of only three study areas is too small to yield generalizable findings, and the indices created by the author are subject to the objections advanced above, and they do not yield any insight into the effect of environment on crime rates.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling procedure was inappropriate, even if the total of six areas selected as the "experimental group" represent the universe of areas that met the author's criteria. If there were other areas of Edmondton that met the criteria, the author should have increased his sample in order to increase the power and generalizability of his study. Alternately, the author should have changed his criteria to provide for a larger sample.

APPROPRIATENESS OF STATISTICAL METHODS

The use of descriptive statistics and ratios is reasonable. Further statistical analysis should, however, have been undertaken to determine whether the data show statistically significant differences between the study areas.

POWER RELATIVE TO THE OBJECTIVES OF THE STUDY

The study had very little power to yield valid, useful results, because of the small sample size, the lack of significance tests, and the weakness of the operational definitions used.

CONCLUSIONS

The author reports:

- Areas with hotels and shopping centers had considerably more offenses relevant to the presence of such facilities than did adjacent areas without such facilities.

This conclusion is supported by the following findings:

- More alcohol related offenses were found in areas with licensed hotels than in adjacent residential areas.

- More auto-related offenses were found in areas with shopping centers than in adjacent residential areas.

DISCUSSION OF CONCLUSIONS

These and similar results are very narrow findings, and they are not generalizable for other crimes. In addition, while the author created indices to explain the incidence of crime in areas with hotels and shopping centers, he did not create comparable indices for adjacent, control areas. Such lack of comparability limits the data on which the author can legitimately base his conclusions.

CRIME AND ON SALE LIQUOR ESTABLISHMENTS

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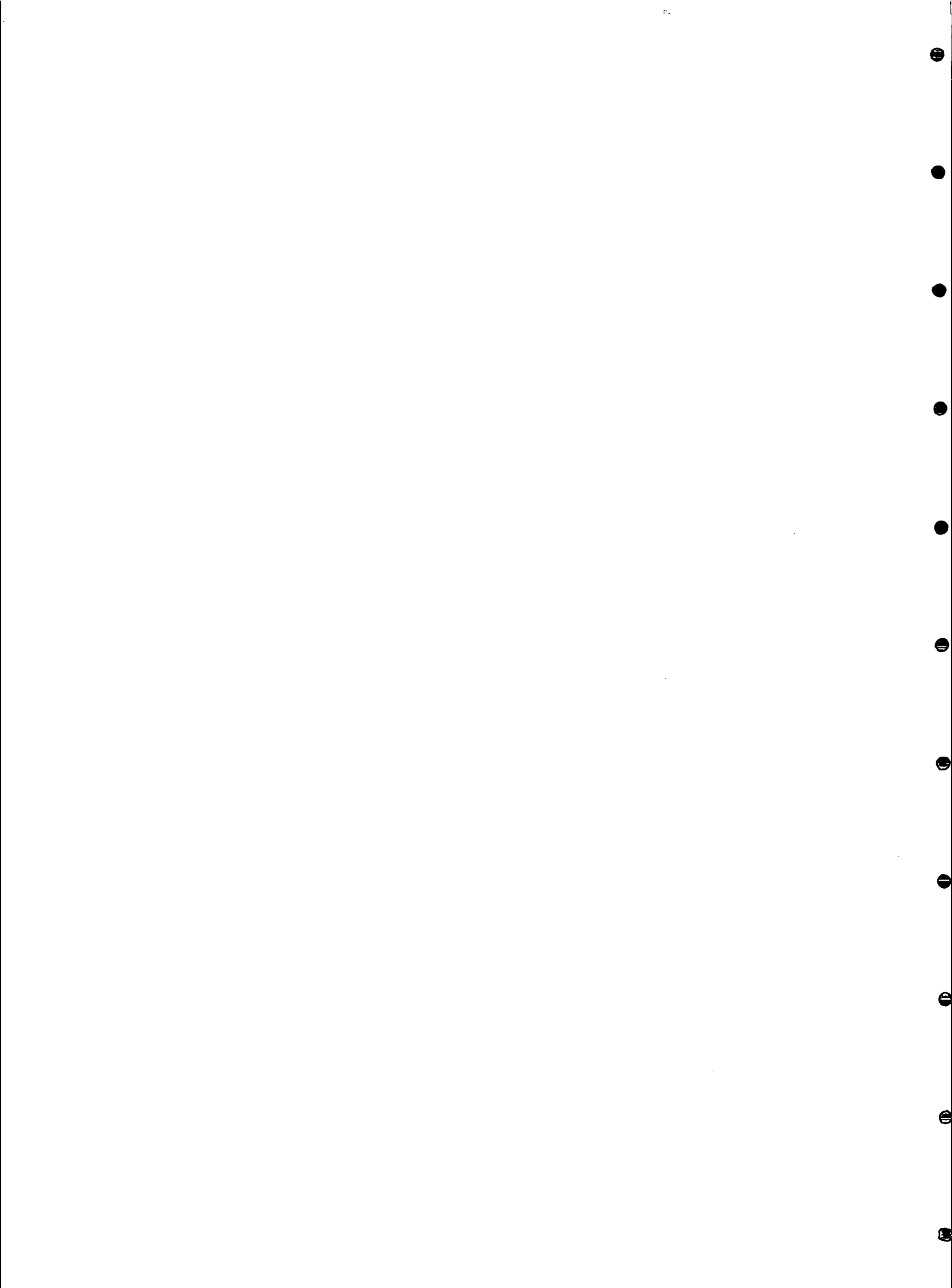
STUDY OBJECTIVES

The purpose of this study was to provide a preliminary analysis of the relationship between crime and the location of establishments with "on sale" licenses (i.e., bars). The study focused on the number of crimes committed within varying distances from the bar.

RESEARCH DESIGN

Six census tracts in Minneapolis were selected non-randomly for inclusion in the study. Archival crime data for the period of July 1974 to June 1975 were analyzed. The locations of crimes during this period were plotted on a map and their distances from on sale establishments were measured in order to investigate whether a clustering of crimes was taking place around these establishments. Crime data were expressed as "per opportunity" and took into account the number of bars and other places of opportunity at varying distances from the bar under study. The type of on sale license, the proximity of bars to commercial strips, and the possible differences in reporting rates were incorporated as intervening variables, and attempts were made to assess their effects on the dependent variables.

VARIABLES

Independent

- Distance of a reported crime from study site

Intervening

- Type of on sale license
- Location on commercial strip
- Reporting rates

Dependent

- Frequency of crimes in the area
- Ratio of crime to opportunity

OPERATIONALIZATION OF VARIABLES

Independent

Distance of a reported crime from study site -- This vari-
able is measured as the straight line distance from each facility
with an on sale license to the location of each crime. Archival
crime data on street robberies, rapes, larcenies, residential
burglaries, commercial burglaries, and assaults were included
in the analysis.

Intervening

Types of on sale licenses -- This variable was dichotomized
into facilities that sold only beer and those that sold both
beer and liquor.

Location on commercial strip -- This variable was dichoto-
mized into yes/no.

Reporting rates -- This variable was used as a "correction
factor" to reduce the hypothesized reporting bias that persons
who lived closer to bars would have higher reporting rates. It
was assumed that persons living from .0 to .1 miles away from
the bar would report 100% of the crimes in the area, while those
who lived further away would have typical (approximately 50%)
reporting rates.

Dependent

Frequency of crimes in area -- This variable was measured
as the percentage of crimes (by type and by total crimes) occur-
ring within five distance categories of the study site. The
five categories were: up to .1, .2, .3, .4, and .5 miles away
from the site.

Ratio of crime to opportunity -- This variable was measured
through the following formula:

$$\frac{\text{percentage of offenses}}{\text{percentage of land acreage}}$$

Offenses and acreage were measured in terms of percentage of offenses and proportions of acreage within a given distance decay interval of the study site.

SAMPLING

A non-random sample of six census tracts was used in the study. The sample of crime data included most major crimes reported from 1 July 1974 to 30 June 1975.

STATISTICAL METHODS USED

All data and analyses were reported in descriptive statistics -- ratios, frequencies, and percentages.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Variables -- It appears that distance was measured by Euclidean distance (straight line radii from the center point of the circle). This measure of distance will not in most cases represent the distance that one must travel along city streets. Further, this measure cannot take into account physical barriers or land use patterns that can have an effect on the real and perceived distance between point A and point B. This problem inherent in the simplistic measurement of distance used by the authors casts serious doubt on the independent variable as to whether it is a valid measure, given the objectives of the study.

The crime data appear to be reliable within the data collection (reporting) process, but the authors' attempt to correct for the hypothesized reporting problem bias was neither well

explained nor sensitive to the complexity of the problem addressed.

The ratio of crime to opportunity as defined by percentage of offenses divided by land acreage does not provide a sensitive measure of crimes per opportunity. There may be serious problems with the numerator, since the estimation of the percentage of offenses within the given distance from the establishment may be very imprecise. Fruther, there may be serious problems with the denominator, since the opportunity for crimes is probably not linearly related to land acreage. The number of stores (opportunities) in a commercial area are likely to be concentrated in one or two clusters. In this case, the opportunity for commercial burglary and robbery is negatively related with land acreage. Also, there is no evidence that pedestrians and residential units are evenly distributed throughout the study area. Therefore, the opportunity for assault, larceny, and residential robbery and burglary is not expected to be linearly related to the land acreage.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design itself is appropriate for an exploratory, descriptive study. While the design succeeds in describing the relationship between the location of on sale establishments and the existence of crime, the design is limited in its ability to analyze that relationship since it employs variables with doubtful validity and relies on simplistic approaches to complicated measurement problems.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The authors acknowledge that the non-random nature of the sample of census tracts limits the generalizability of the study. The authors' use of crime data was appropriate.

APPROPRIATENESS OF STATISTICAL METHODS

The use of descriptive statistics was appropriate, but there is little explanatory power derived from this level of analysis. Specifically, one must be very cautious about drawing causal inferences from research reporting only such descriptive statistics as frequencies, percentages, ratios, and graphs.

CONCLUSIONS

The authors report:

- There is a clustering of assaults and other crimes around on sale license establishments.
- Places that sell beer have a slightly higher clustering of crimes around them than establishments that sell liquor.
- The actual (causal) mechanism that accounts for crime clustering around bars is not known.

DISCUSSION OF CONCLUSIONS

The conclusions are supported by the data. The confidence that one can have in the statistical validity of the conclusions is limited because of the poor operationalization of the independent and dependent variables. Because of the descriptive nature of the study, no causal connection between the location of on sale license establishments and crime can be made. Further, the non-random nature and small size of the sample limits the generalizability of the findings. This study is, however, another in a series of reports that consistently show higher densities of crime in areas with beer and liquor selling establishments.
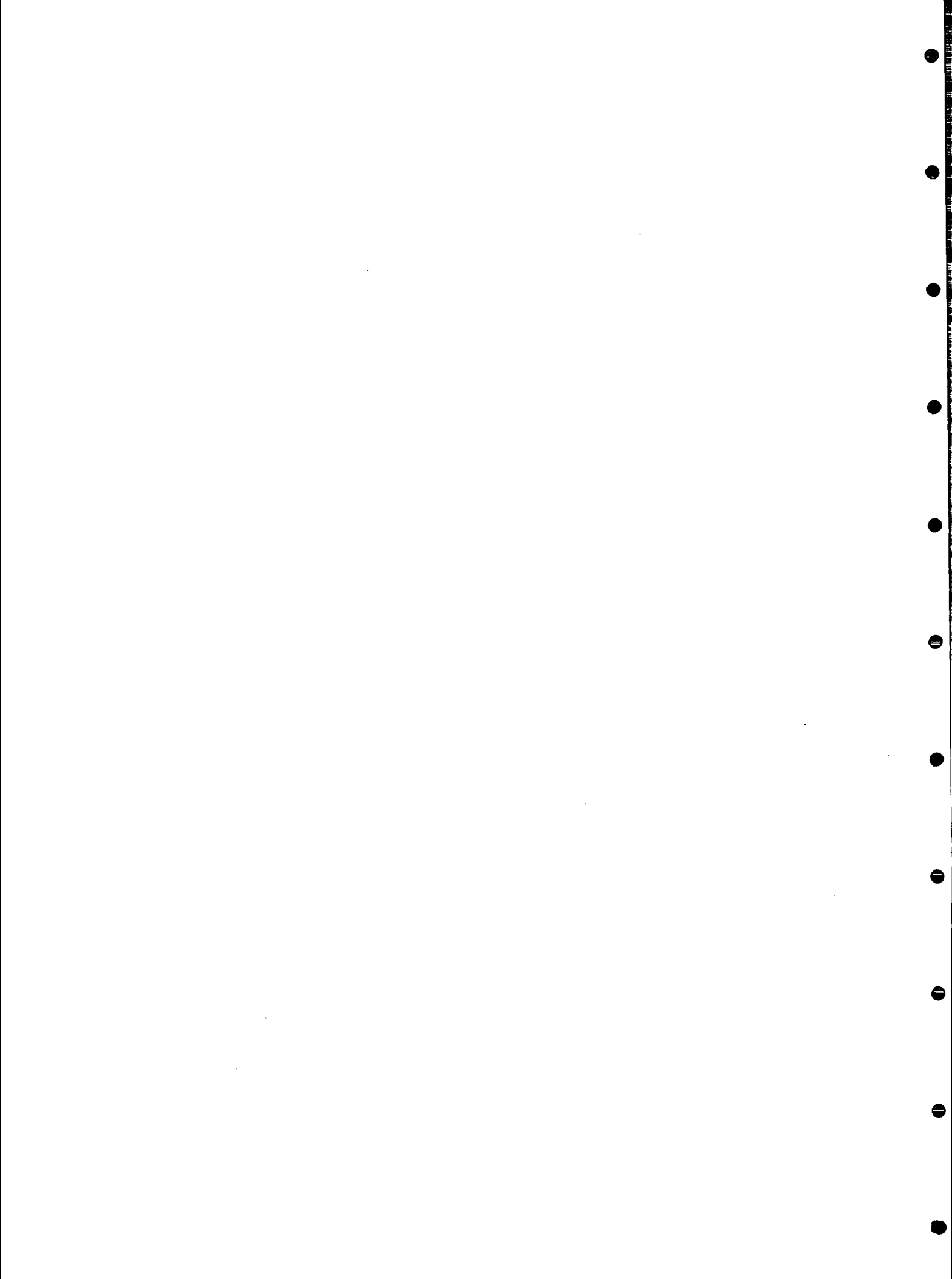
CINCINATTI HOUSING AUTHORITY
BUILDS SAFETY INTO PROJECT

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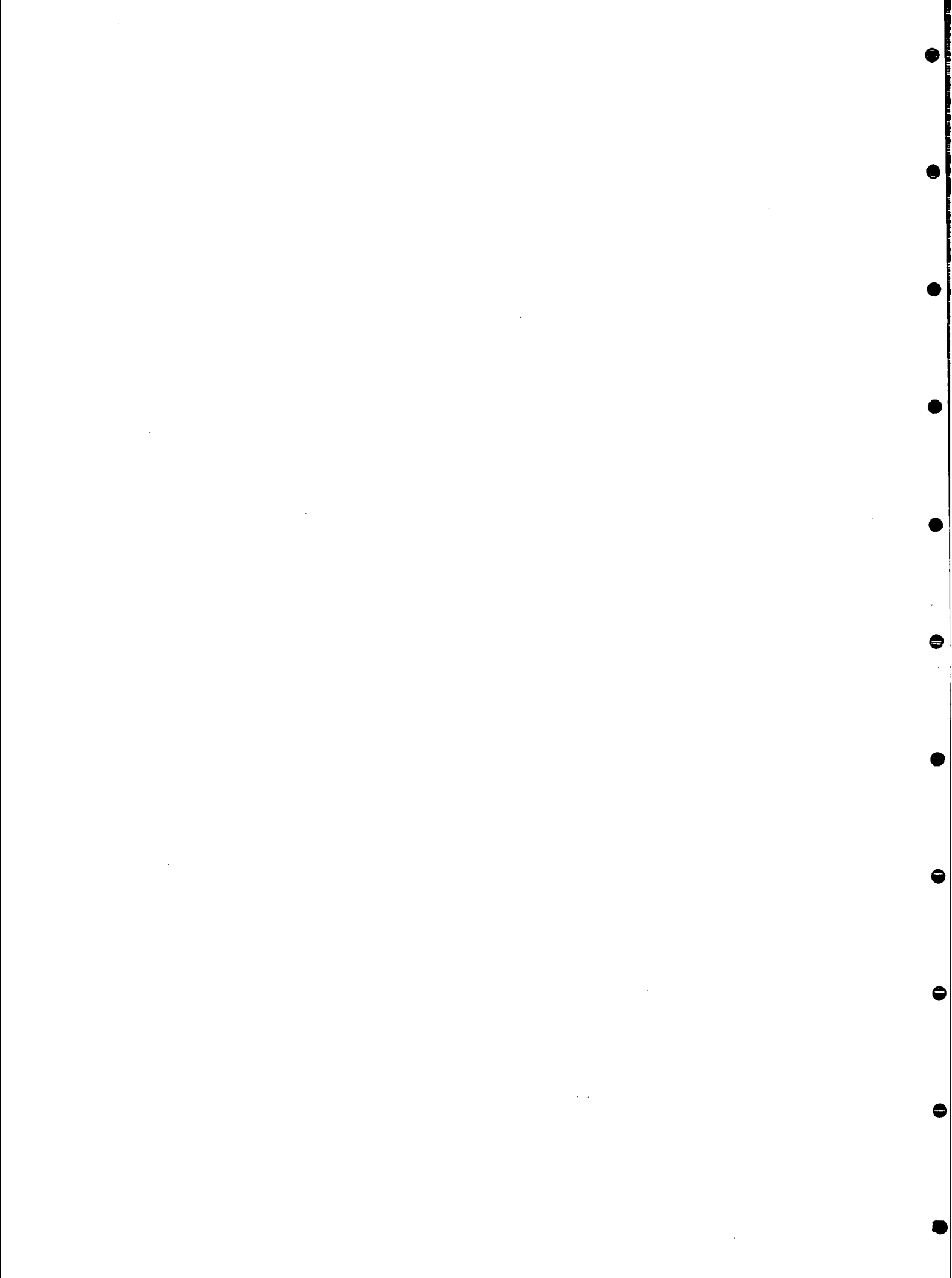
STUDY OBJECTIVES

The objective of this study is to provide an assessment of the effectiveness of the security oriented renovation carried out at the Millvale Housing Development in Cincinnati. The approach employed by *Brill Associates* was based on Oscar Newman's theories of "defensible space" and involved the changes of the physical design of the housing development to enhance surveillance and territoriality. The study reviewed here is a summary of the evaluation.

RESEARCH DESIGN

The study is a quasi-experimental design. One section of the housing development was renovated while another section was not. A comparison of criminal victimization data from the renovated and unrenovated area was conducted to test for the effects of the renovation on burglary and fear of crime.

VARIABLES

Independent

> o renovations vs. no renovations (treatment of variables)
>> - Renovations included:
>>> - new gabled roofs
>>> - refurbished building exteriors
>>> - additional outdoor lighting
>>> - addition of strategically located sitting areas
>>> - addition of large and small playgrounds
>>> - creation of individual yards through changing sidewalk paths and addition of low brick walls

Dependent

> o successful burglaries
> o perceptions of crime

OPERATIONALIZATION OF VARIABLES

Independent Variables

Renovations at Millvale involved the conversion of barrack-like housing into more esthetic, individualized units by adding gable roofs and refurbishing building exteriors. Renovations were designed to increase the residents' capacity for surveillance and feelings of territoriality.

Dependent Variables

- o Successful burglaries -- This variable is defined as a burglary where the offender succeeded in taking property. No information is given how this variable was measured.

- o Perceptions of crime -- No information was reported about the specific contents of the survey, although situations such as being alone at night, using the back door at night, walking from a bus to the house, and crossing the housing project at night. This variable was operationalized through questions on the victimization survey with regard to attitudes toward being.

SAMPLING

The report reviewed does not describe the sampling procedures used in selecting 22 percent of the total heads of households for the victimization study.

STATISTICAL METHODS USED

Descriptive statistics - The study reports the number of postrenovation burglaries in renovated and unrenovated areas.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Little information was given with regard to how the dependent variables were measured. The independent or treatment variables were well defined.

APPROPRIATENESS OF THE RESEARCH DESIGN

Since the research is an evaluation of an action program, the person designing the evaluation was limited at the outset of the study. There are two concerns regarding the evaluation design which consisted of a comparison of the treatment and control groups. First, a simple comparison of treatment and control groups cannot pick up whether the treatment actually reduced crime or simply displaced it to the unrenovated apartments. A report on the results of a pre/post test on victimization data for both control and treatment sections would shed more light on this question. Second, the report mentions that structured observations were undertaken, yet no results of this effort are reported.

APPROPRIATENESS OF SAMPLING PROCEDURES USED

The report does not provide sufficient information to allow for evaluation of the sampling procedures used.

APPROPRIATENESS OF STATISTICAL METHODS USED

The author's use of descriptive statistics is appropriate. The report does not discuss the data collection effort in sufficient detail to allow one to determine whether more powerful statistical techniques would have been appropriate.

CONCLUSIONS

The author reports:

o The incidence and success of burglary was reduced by the renovation.

o The residents' fear of crime was also reduced by the renovation.

DISCUSSION OF CONCLUSIONS

The conclusions are casually supported by the data and consistent with the objectives of the study. However,

insufficient information is reported in the study to allow for
statistical (hypothesis) testing of these conclusions. Since
the units to be renovated could not be controlled and were
not random, all findings of the study are conditional on the
selection of the renovated units and cannot be generalized.

A STUDY OF CRIME IN RURAL OHIO:

The Relationship between Ecological Factors and a Rural Crime Index

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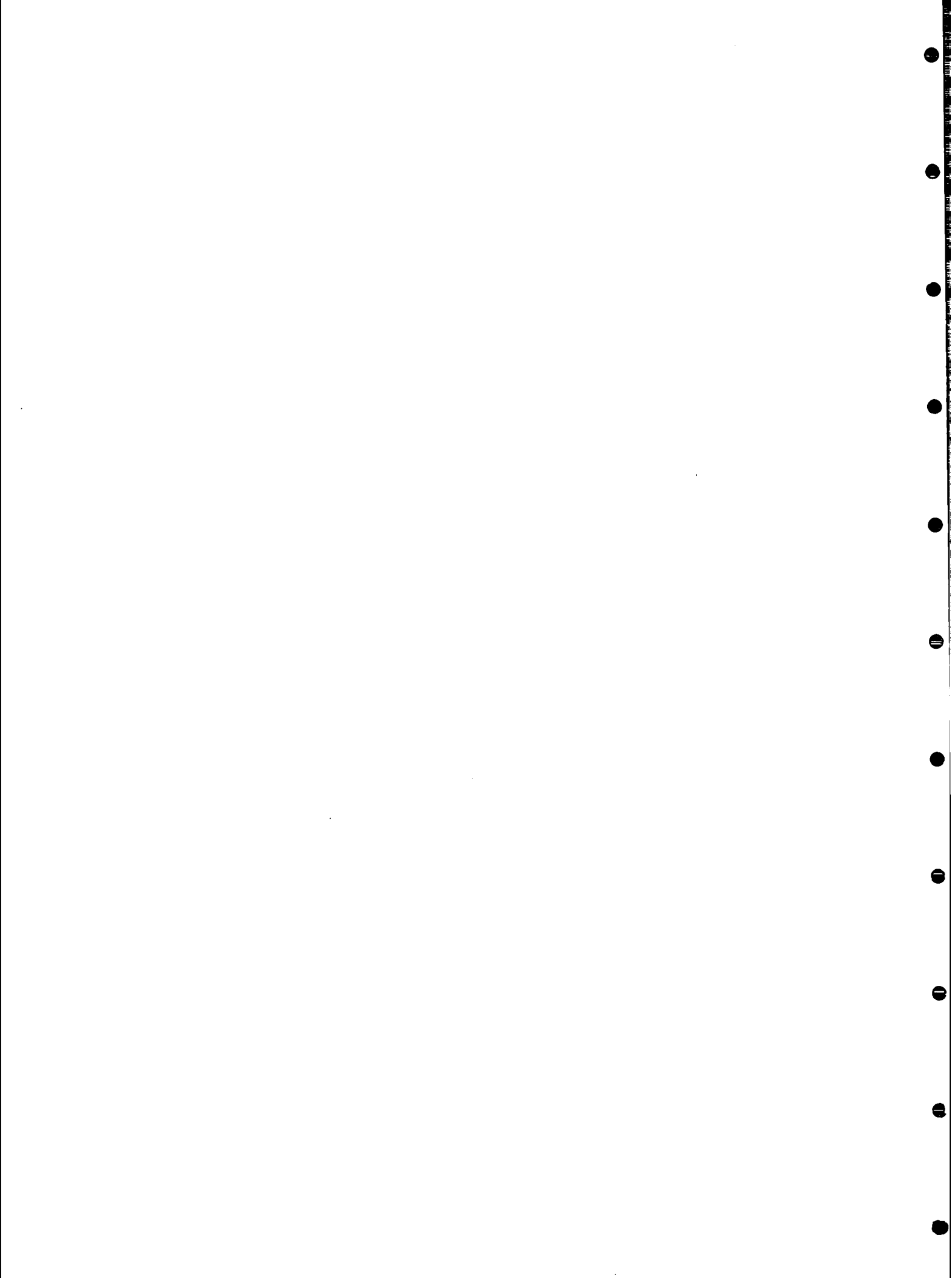
STUDY OBJECTIVES

The study addresses four general research areas:

● Are the factors which cause crime in urban areas the same for rural areas?

● What are the ecological factors which have a bearing on rural crime rates? How do they function in a rural area? How does their observed function differ from urban areas?

● Assess the usefulness of the concept of defensible space as a predictor of possible causes of crime and as a means of reducing crime in rural areas.

● What are some of the forms and functions of defensible space in rural areas by which the community creates a physical expression of a social fabric that defends itself against crime.

Specifically, the study undertook to test the following hypotheses:

● The crime rate is associated with the number of inhabitants in a community. The fewer the number of inhabitants, the lower the crime rate.

● The crime rate is associated with the degree of satisfaction expressed by community residents toward their community. The greater the degree of satisfaction, the lower the crime rate.

● The crime rate is associated with the location, number and condition of buildings, topography of the land, size and type of farming operation, distance from nearest neighbor, frequency of police patrol, and type of security measures utilized.

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A higher crime rate is associated with the following:

- Buildings located close to a public road
- Buildings located closest to an incorporated place
- Where the barn is located closer to the road than the house
- The greater the number of buildings on a particular farm or residency tract
- The poorer the overall condition of the buildings
- The smaller the size of the farm or residency tract
- The types of farming operations which require less presence by the residents
- The more hilly the topography of the land
- The farther the distance to the nearest neighbor
- The less the degree of acquaintance with neighbors
- The fewer times the police patrol the public roads as perceived by the inhabitants
- The fewer security measures used - fences, locked doors, the absence of a watchdog and a negative reaction to the possession of firearms

RESEARCH DESIGN

Description of Study: Nine Ohio counties with rural populations were selected from three clusters on a stratified non-random basis. The study was based on data collected from three sources--field interviews, census data and Uniform Crime Reports.

Field Interviews (Survey in the summer of 1974)

Ten townships were randomly drawn from the universe of townships in each of the nine counties. An intersection of two roads in each county was randomly picked from the map and this became the starting point for a continuous type sample. The interviewers were assigned a direction and each household in that direction was selected for interviewing. Interviewers were instructed not to interview households in incorporated places in order that the sample population would be open country

rural. In order to obtain additional interviews, six additional townships were selected randomly. A total of 889 questionnaires were completed either through personal interview or by a drop-off questionnaire.

These interview data were combined with 1970 Census data and data from the Uniform Crime Reports on each of the nine counties. The research design did not utilize a control group and is generally to be considered as employing a pre-experimental design type of methodology.

VARIABLES:

Dependent

Crime rate - based upon interviews with 889 residents including information on frequency and types of crime in each county. In addition, the author created a weighted crime index for each county (discussed in detail below).

Independent

- Demographic variable of population size
- Community satisfaction
- Distance of building from nearest incorporated place
- Distance of resident from nearest neighbor
- Acquaintance with nearest neighbor
- Closeness of the residence to public road
- Closeness of the barn to the public road
- Distance of the nearest non-residential building to the public road
- Total number of buildings on farm or residential tract
- Condition of buildings on farm or residential tract
- Total number of acres in farm or residential tract
- Topography of the land

- Type of arming
- Perception of police patrols
- Fences
- Other precautionary defense mechanisms

Units of Analysis

County (n=9)

Respondent to questionnaire (n=889)

OPERATIONALIZATION OF VARIABLES

Dependent Variable -- Crime Rate

The author determined that the Uniform Crime Report (UCR) alone is inadequate as a measure of crime since it does not differentiate among crimes as to their seriousness. The author, in order to "correct for" the grossness of the UCR, "weighted" each serious crime (i.e., homicide, forcible rape, robbery, aggravated assault, burglary, larceny and auto theft) by a factor of 2. The resulting formula for the weighted crime was:

$$\frac{2 \times A + B + C + D}{\text{Number of Persons in Sample Survey}} \times 100$$

Where A, B, C, and D are the crime categories reported in the UCR.

The author states that the use of the factor 2 for serious crimes was arbitrary, but was based on a review of the literature, personal consultation, and his own experimentation with several different weighting factors. No information was given regarding either the reliability or validity of this type of weighted index.

Independent Variables

- There were 16 independent variables used in the study. The number of rural inhabitants was derived from 1970 census data. The other variables were measured based upon data generated from the field interviews in the following manner.

- Community satisfaction measured by responses to questions regarding community services on a scale of 1-10.

- All distance assessments were based upon respondents' subjective judgements expressed during interviews. "Feet" or "miles" were used as appropriate.

SAMPLING

The sampling procedure included the use of a stratified random sample.

STATISTICAL METHODS USED

Chi-Square Measure - This measures the difference between the observed frequencies and those expected under the hypothesis that the groups do not differ. Two way tables of high-low crime rate against all independent measures except population were generated.

Gamma - A Measure of Association - This measures the relationship between two sets of ordered variables since it measures the association between each independent variable and the dependent variable. Estimates were based upon the same tables as the above.

Analysis of Variance - This measures the degree of asso-
ciation between the dependent variable and several independent
varibles.

The dependent variable-crime index from the nine sample
counties was tested against the following independent variables:

- Community satisfaction
- Distance of buildings from nearest incorporated
  place
- Distance of buildings from road
- Number of buildings
- Condition of buildings
- Number of acres
- Distance of nearest neighbor
- Acquaintance with nearest neighbor
- Degree of acquaintance with nearest neighbor

Descriptive Statistics

The report includes frequencies of crime occurences and
summary information on each county.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITION AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

- Each of the operational definitions and measurement
  techniques suffers from the author's failure to
  demonstrate internal validity. The author states
  that the hypotheses are generated from the liter-
  ature but fails in his responsibility to demonstrate
  that a relationship exists between the concepts de-
  rived from the theoretical literature and the vari-
  ables that he chose in the study. In particular,

there is no discussion given in the report that shows
that items in the questionnaire are actually measuring
the concepts and variables necessary to test hypotheses.*
For example, the variable "Community Satisfaction" was
operationally defined, based upon a response to ques-
tion regarding satisfaction with community services.
This measure should have been partially validated
against the responses in the previous item, where each
of the community services were rated by the four point
scale, from excellent to poor.

e   Second, it does not appear that the author assessed
    the stability of the responses. The researcher should
    have included some similar questionnaire items to esti-
    mate reliability and to create composites with higher
    reliabilities, especially since the author has used
    the respondents' subjective assessments of distances,
    building conditions, etc., which are subject to mea-
    surement errors.

APPROPRIATENESS OF THE RESEARCH DESIGN

Since the crime index was computed for nine counties,
there were only nine independent observational units associ-
ated with crime index. Therefore, if the data analyses in-
volve crime index as a variable, the number of units of an-
alysis is limited by the nine counties. Further, the respon-
dents to the questionnaire are nested within the counties,
and belong to the lower level in the hierarchical structure
of the data. Unless the crime index is computed at the re-
spondent level, the information obtained at the respondent

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*The author states that "The questions of the study were
 adapted from previous crime studies (Dinitz et al.) and
 they had been pre-tested for internal validity.

level should have been aggregated to the county level before
data analysis. This would have made the analysis consistent
with the unit of analysis for the crime index. Since there
are only nine independent units with crime index, the design
does not have much power. The research design and the pro-
cedures used are not likely to meet the stated objectives of
the study.[*]

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling procedure appears to be appropriate, given
the nature of the study. (Stratified random sampling tech-
nique used.) The procedure produces a rural crime index,
not a county index.

APPROPRIATENESS OF STATISTICAL METHODS

Chi-Square - Some tables show the degree of freedom dif-
ferent from those which should have been used in the table.
(See Tables 10 and 14.)

The unequal signs were reversed in some tables (for ex-
ample, Tables 6, 8, 10 and others), casting doubt and creating
ambiguity in the author's presentation of his findings.

Gamma - This is only one of many measures of associa-
tion. This requires an ordinal scale, but some of the vari-
ables reported in the tables do not have ordinal properties.

Analysis of Variance - If the dependent variable is crime
index from the nine sample counties as reported in page 76,
there are only 9 observational units giving 8 degrees of
freedom. All the analysis of variance tables show much
higher degrees of freedom. Therefore, it is likely that the

---

[*]The author disagrees with this comment. He stated that the
unit of analysis was taken as the residents throughout the
report.

researcher inappropriately used individual respondents as the unit. Since there are only 9 values associated with counties, the results reported based on reported degrees of freedom in the 700-800 range are wrong.[*]

Tables 10 and 14 have been reanalyzed and it is found that the results generated from this reanalysis do not agree with what was reported in Tables 10 and 14. The reanalyzed figures are attached. We have successfully recreated the statistics in Table 10 and 14 (see attached). It is discovered that one column was missing from both tables. However, it is not clear what this column corresponds to. If they are missing data, they should not have been included in the calculation of statistics. It should be also noted that entries in this column are too small for chi square analysis. There are some statistical analyses which can be performed on the nine observations--the counties. However, these analyses were not employed due to the researcher's failure to use the appropriate unit of analysis.[**]

POWER RELATIVE TO OBJECTIVES OF STUDY

Since the unit of analysis is the county (N=9), there is little confidence in the results of the study. Due to the small sample size, the study could not employ powerful statistical tests.[***]

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[*]The author disagrees with this comment. The actual computation might be different from the one this reviewer understood from the report.

[**]The author acknowledges mathematical errors in some of the tables. Those errors have been corrected in a later draft of the article.

[***]As stated earlier, the author disagrees with this comment. The unit of analysis was taken as the respondent.

CONCLUSIONS

The author reports:

- The data from the field interviews do not support the hypothesis that the level of community satisfaction is not related to the crime.

- While the data show that the nearer the buildings are to an incorporated place, the greater probability of victimization, the relationship is not significant at the .05 level.

- The hypothesis suggesting that crime rates would be associated with the distance between neighbors was not supported by the data.

- The data do not support the hypothesis that areas where neighbors knew each other and/or had a high level of acquaintance would have lower crime rates.

- The data do not support the hypothesis (at a statistically significant level) that the closeness of a residence to a public road would be associated with a *lower* crime rate. Similarly, data do not support the hypothesis that the closer the barn or other buildings to the road, the higher the crime rate, nor lend support to the hypothesis that the crime rate of a given area is associated with the distances of the nearest non-residential building to the public road.

- The data do not support the hypothesis that the total number of buildings on a farm or residential complex or their condition is associated with the crime rate.

- The data do not support the hypothesis that size
  of farm is associated with crime rate.

- The data show that higher crime rates are not
  associated with hilly land but rather tend to
  be higher in areas with flat land.

- The data do not support the hypothesis that crime
  rates are lower for farming operations which re-
  quire personal attention and provide opportunities
  for natural surveillance.

- The data do not support the hypothesis that crime
  rates are lower for areas where the residents per-
  ceive police patrol to be strong.

- The data do not support the hypothesis that
  fences and other precautionary defense mecha-
  nisms are associated with a lower crime rate.

- The data do show a statistically significant
  relationship between the number of inhabitants
  of a county and its crime level.

DISCUSSION OF CONCLUSIONS

Many of these conclusions are based upon analyses of
variance. There is a question regarding the appropriateness
of the way in which these techniques were used in the research.
These conclusions are weakened and may, in fact, be wrong due
to the possible inappropriate data analysis procedures used.
In addition, the hierarchical structure of the data, where
the respondents were nested within the counties, may have
confounded the conclusions.
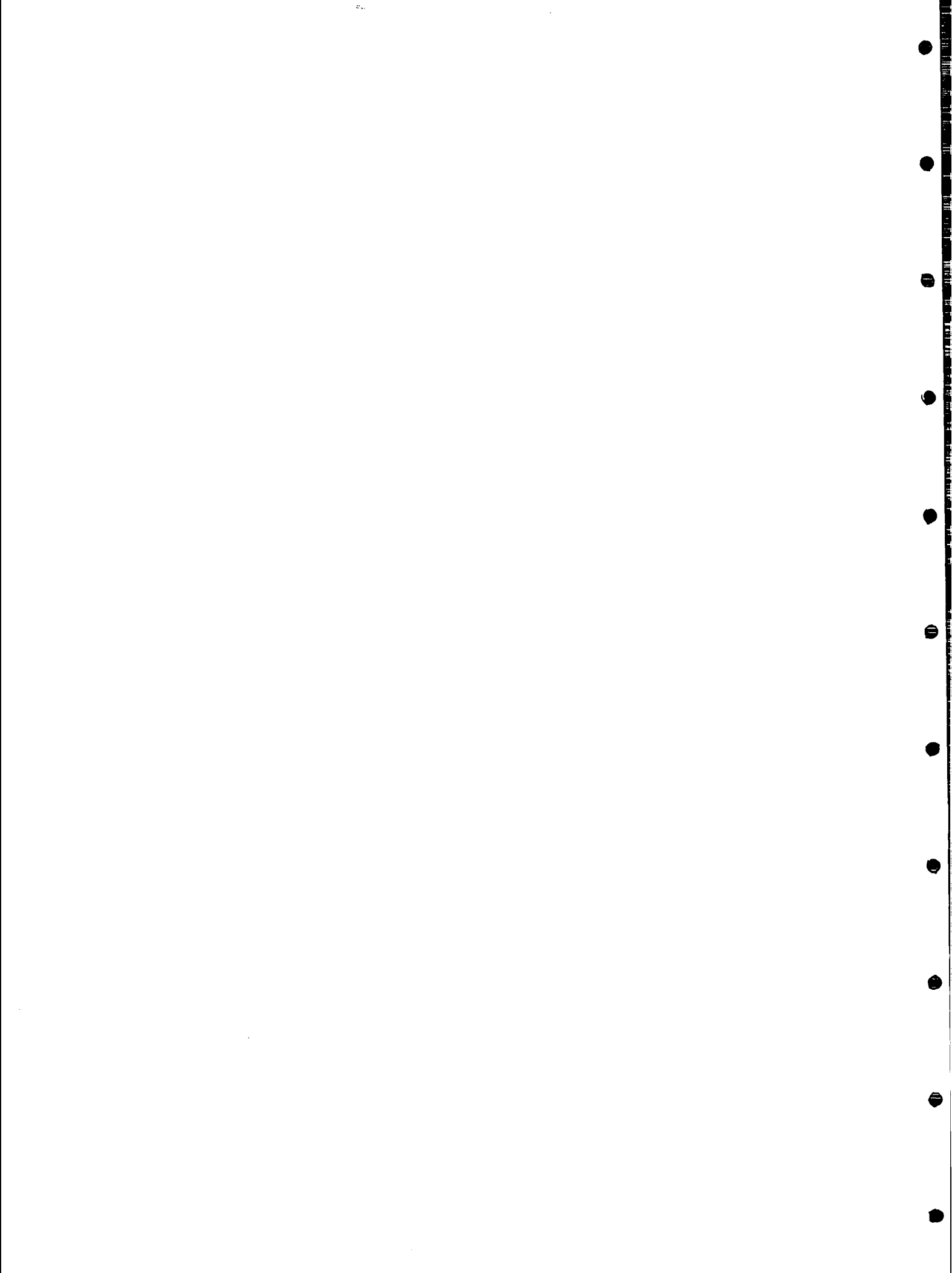
THE SPATIAL ECOLOGY OF STRIPPED CARS

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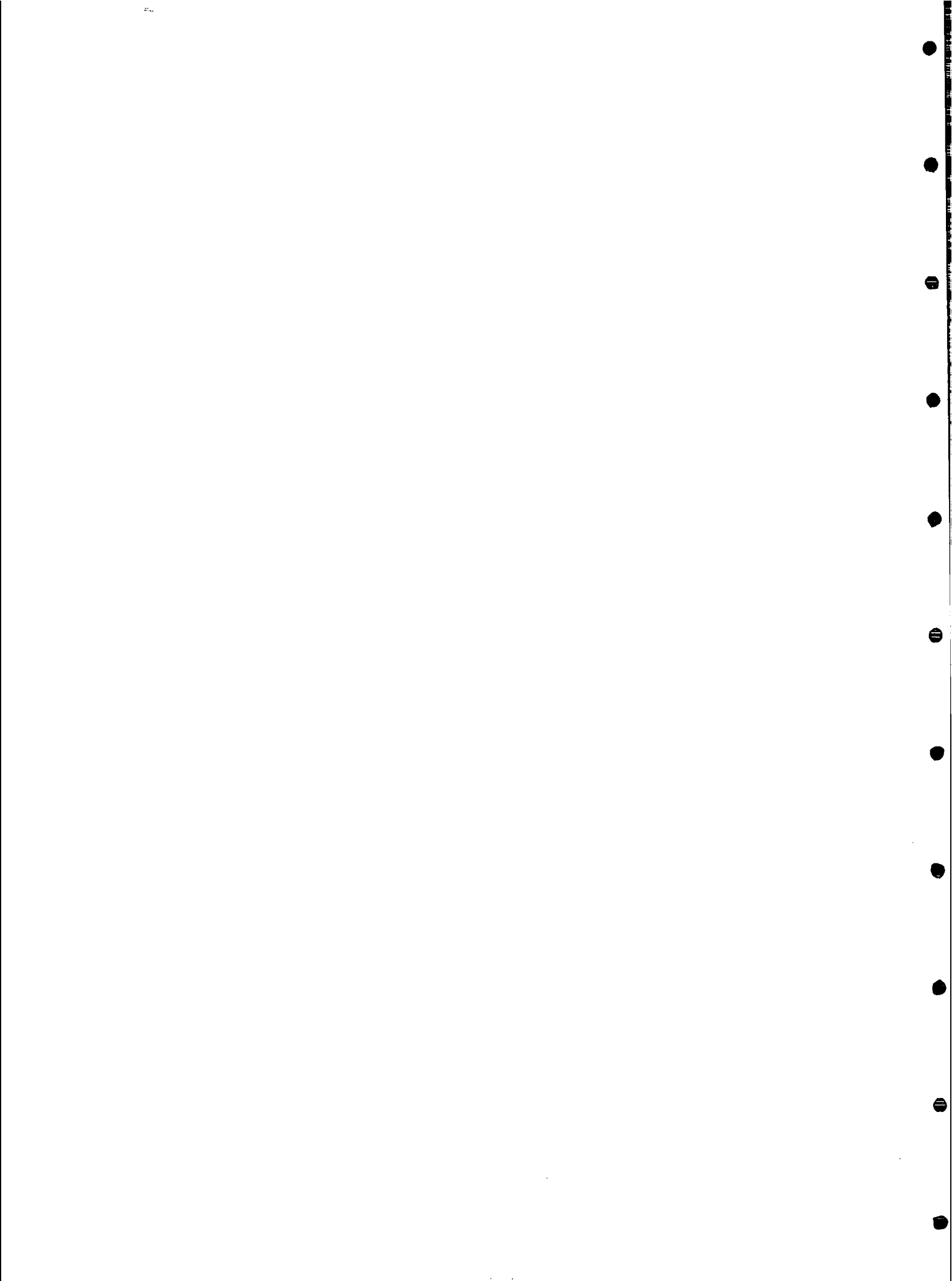
STUDY OBJECTIVES

The purpose of the study is to investigate the relationship between the existence of stripped cars (deviant behavior), land usage, and social control (surveillance) over urban spaces. The thesis postulated by the authors is that the physical behavior setting of stripped cars is characterized by lack of surveillance and represents socially unclaimed space.

RESEARCH DESIGN

Using an inner-city Philadelphia community, the location of each stripped car was identified through surveys and observational techniques and then related to the physical and social characteristics of the immediate setting. The study relied upon archival data on land use patterns and community characteristics. Surveys and observational techniques were used to identify the specific locations of stripped cars and to gather microdata on the physical and behavioral setting of the areas where stripped cars were found.

VARIABLES

Independent

- Land use and behavioral setting characteristics of an inner-city community.

Dependent

- Percentage of stripped cars in areas with varying land use characteristics and behavioral settings.

OPERATIONALIZATION OF VARIABLES

Independent Variables

The land use and behavioral settings of an inner city community are estimated through two sources. The authors rely upon data from previous research to develop a community profile for the areas studied. Second, land use is estimated through the analysis of census data on a randomly drawn sample of inner city blocks.

Dependent Variables

Vehicles are classified as stripped if they exhibit at least two indicators such as broken windows, missing body parts, flat tires, a raised hood, heavy graffiti defacement, or other signs of severe physical dilapidation.

The land use and behavioral setting of each vehicle is divided into six categories. Each category reflects the land use type of the space adjacent to the vehicle and the presence or absence of territorial control exerted over that space by local citizens. Through the use of survey and observational techniques, areas adjacent to stripped cars were placed into one of the following categories:

- institutional land use
- vacant structures (houses, stores, etc.)
- areas near the doorless and often windowless flank of a residential unit
- an occupied house, apartment or store
- commercial area

• vacant/parking lot

SAMPLING

Independent Variables

The two areas selected for study were chosen for different reasons and surveyed at different times. The primary area chosen by the authors was selected due to the availability of data from a previous study. The second area was chosen to increase the sample size.

The authors randomly drew a sample of 74 blocks from a population of 386 blocks and part blocks in order to estimate community-wide land use ratios. These estimates were used in comparing the land use characteristics of areas adjacent to stripped cards to the overall land use pattern of the community.

STATISTICAL METHODS USED

Descriptive Statistics - The behavioral setting of stripped cars is given in table form using raw numbers and percentages. A comparison of the behavioral setting of stripped cars and the overall land use characteristics of the community is also given in table form using raw numbers and percentages. The analysis of the data collected included a straightforward comparison of such percentages as--percentage of vacant house street frontage in the community compared to the percentage of stripped cars in front of vacant houses.

Chi-Square - Although the actual test is not described
in detail, the authors report that had the data been tested
via Chi-Square, the difference between the two data sets
community wide (percentages of street frontages and percentages
of stripped cars by a street frontage type) would have been
significant at the .001 level.

EVALUATION SECTION

*QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS*

Stripped car - Operational definition is highly reliable
and free from threats to reliability or validity.

Behavioral setting and land use - The authors' reliance
on census data in combination with data collected from obser-
vation appears to provide accurate and reliable estimates of
actual land use in most of the categories. As the authors
point out, however, lack of suitable data render two categories
much less reliable. These categories are "vacant house" and
"doorless flank."

APPROPRIATENESS OF RESEARCH DESIGN

The research design is adequate for confirming that
deviant behavior, as defined by the existence of stripped cars,
occurs in land use areas expected to have little surveillance
and represent socially unclaimed space. Due to the use of
stripped cars rather than a broader spectrum of crimes and

deviant behavior, the generalizability of the findings to other types of crime is strictly limited. The research design, itself, given additional data and a more uniform sampling procedure is appropriate for analysis of urban crime patterns and their relationship to physical and behavioral settings.

The authors acknowledge that the research design employed would be strengthened by the collection of data on stripped cars at one point in time rather than at two points in time several months apart. The delay allows for the possibility of a variety of intervening variables to contribute to the findings of the second stage and limit its comparability with the first survey's results. Since the authors combine these data, the possibility of non-comparability is a very important concern.

APPROPRIATENESS OF STATISTICAL METHODS

Since the authors state that their hypothesis will be investigated rather than formally tested, the use of descriptive statistics is appropriate. The data were suitable for Chi-Square analysis or other statistical methods designed for hypothesis testing.

POWER RELATIVE TO STUDY OBJECTIVES

The sample size of 138 is more than adequate to serve as a basis for a variety of statistical tests. However, the confidence in the results of the study is limited due to the inability to perform more powerful statistical tests.

CONCLUSIONS

The authors report:

● The highest percentage of stripped cars were found outside vacant houses and stores, institutional settings and doorless flanks.

● The settings adjacent to stripped cars are not typical or representative of land use patterns and behavioral settings in the community sampled. Adjacent settings such as vacant houses, empty lots and institutional settings are vastly overrepresented as locations of stripped cars.

DISCUSSION OF CONCLUSIONS

The study lends support to the hypothesis that deviant behavior (stripped cars) is more likely to be found in settings where one would expect surveillance to be low and social controls to be at a minimum.

CRIME AND THE PHYSICAL CITY

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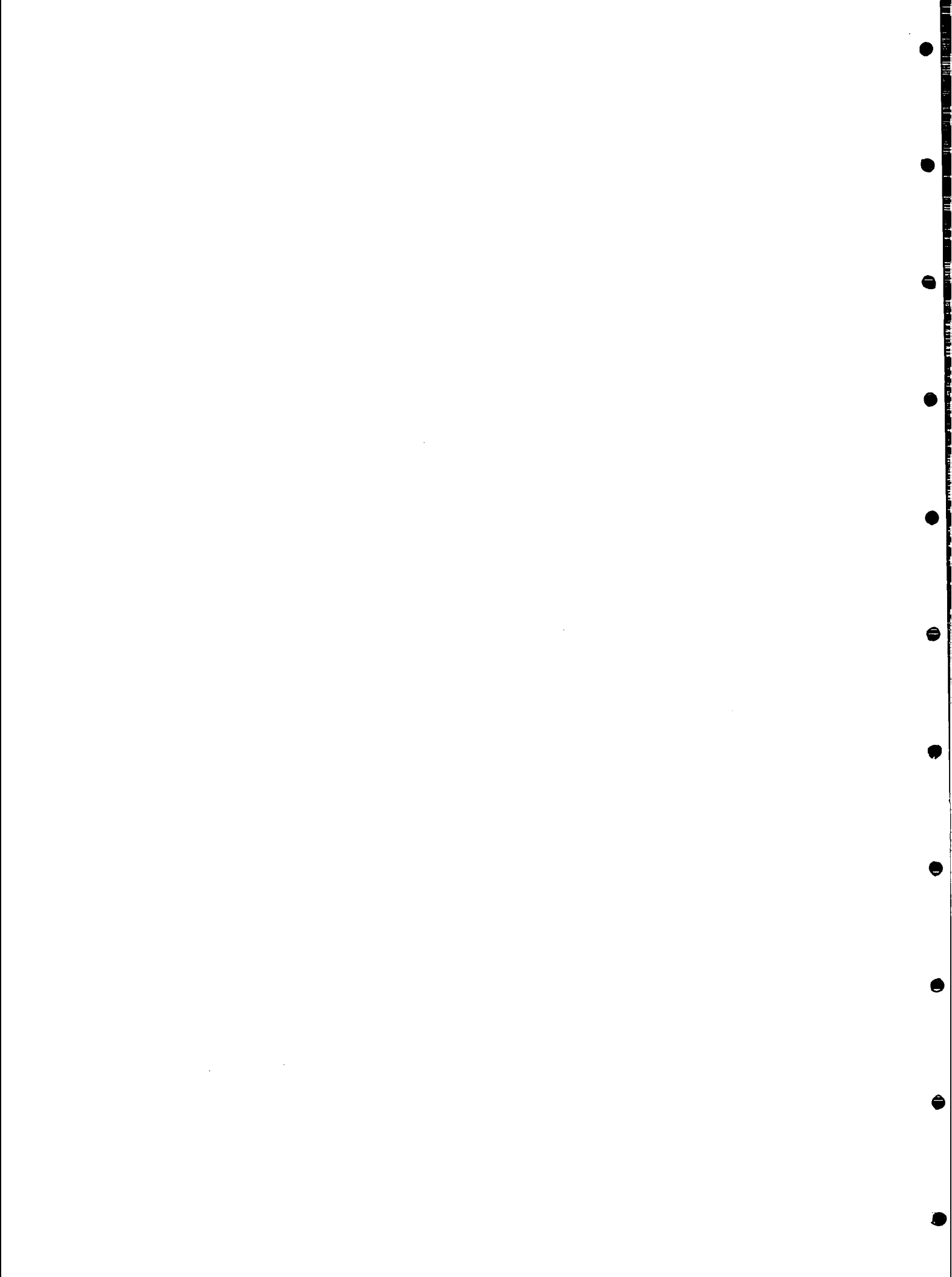
STUDY OBJECTIVES

The research was a pilot study to explore the general notion that the physical design of urban neighborhoods has a direct effect on urban crime activity. More specifically, the study presented the following hypotheses:

- "The rates of frequency of pedestrian traffic in commercial establishments such as dry cleaning stores, drug stores, hardware stores, and similar retail outlets appear to have a relationship to the commission of robberies."

- "The land uses which separate major urban arterial streets from interior residential zones appear to have varying degrees of influence on the extent to which criminal activity originating on the arterial streets is able to penetrate into the interior residential areas."

- "Overflow parking within residential neighborhoods caused when major arterial street facilities do not have adequate on-site parking increases crime."

- The layout of a metropolitan expressway system and the use of the superblock system in certain urban renewal areas relates to the ability of the police to patrol in those areas. An inability to patrol leads to a greater possibility of crime pockets.

- "Visibility in commercial store fronts tend[s] to have a direct relationship to the commission of crime."

- Surveillance in low and moderate income projects can be enforced through the grouping of room layouts within the dwelling units and the clustering of dwelling units.

- "The lighting of commercial and residential properties and adjacent allies, walkways, streets, and parking facilities has a direct relationship to the commission of crime."

- "Certain entrance and exit points in buildings exhibit a higher degree of susceptibility to breaking and entering....[I]ncreased security measures in the design of site layouts and street patterns" can serve to protect these entrances.

- "The level of maintenance and the condition of buildings in urban areas appear to have a relationship to crime."

RESEARCH DESIGN

The study is exploratory and consists of three separate parts -- a commercial survey, a residential survey, and an analysis of public housing developments. Buildings that had been victimized in 1969-1970 were selected for the study. The study analyzed in detail physical features of various structures and of geographical sections of Detroit, primarily through the use of on-site observation and surveys. The authors conduct no hypothesis testing and report the results of their surveys and data collection through descriptive statistics only.

VARIABLES

Independent

- Commercial site security data
  - frequency of pedestrian flow inside and outside commercial establishments
  - time of day and day of week of crime
  - location of structure on block
  - physical condition of structure and surrounding commercial structures
  - types of concealment and obstacles to window visibility, visibility to access points, etc.
  - existence of exterior and interior lighting
  - land use adjacent to structure
- Residential site security data
  - location of structure on block
  - types of concealment and obstacles to visibility
  - time of day of incident
  - condition of residential structure
  - exterior lighting
- Public housing security data
  - location of victimized apartment within complex
  - time of day of incident
  - location of non-apartment oriented crimes

Dependent

- Crime incidents
- Entry point of offender
- Method of escape

Units of Analysis

- Commercial structures (n = 289)
- Residential structures (n = 73)
- Public housing areas (n = 4)·

OPERATIONALIZATION OF VARIABLES

Independent

The majority of the independent variables were obtained through on-site surveys conducted by field staff associated with the research project. Crime related data were obtained from monthly crime record printouts prepared by the Records Bureau of the Detroit Department of Police.

Frequency of Pedestrian Flow -- Measured through on-site surveys and a six point nominal scale: (1) very busy, with crowding, (2) busy, but no crowding, (3) moderate, (4) light, (5) sporadic, (6) none.

Time of Day and Day of Week of Crime -- Based on police archival data.

Location of Structure on Block -- Operationalized on a four point scale: (1) corner, (2) near corner, (3) middle of block, (4) at major intersection

Physical Condition of Structure and Surrounding Commercial Structures -- Operationalized through a four point nominal scale: (1) standard, (2) deficient (minor), (3) deficient (major), and (4) substandard.

Type of Concealment and Obstacles to Visibility, etc. --
Operationalized through the following survey questions, which
were answered on a four point ordinal scale ("Good" to "None"):

- Visibility into alley from subject building
- Visibility into alley from surrounding buildings
- Visibility into structure from road
- Visibility into structure from sidewalk

The following survey questions were answered on a 10 point
ordinal scale from 1 (low) to 10 (high):

- Visibility into structure from adjoining buildings
- Visibility of entrance points (from street, adjoining
  buildings, and alley)
- Existence of shrubbery
- Existence of trees
- Existence of parked automobiles
- Existence of fences
- Existence of signs
- Existence of advertising

Exterior Lighting -- Operationalized through a 10 point
ordinal scale (high/low) based on the following survey questions:

- Quality of lighting on street
- Quality of lighting at entrance points
- Quality of lighting at other access points

Interior Lighting -- Operationalized through a survey
question answered through three categories: good, fair, and poor.

Land Use Adjacent to Structure -- Operationalized through
an open-ended survey question.

Dependent

Category of Crime -- Although these data were collected
from police records and included in the following categories
-- murder, rape, assault, robbery, breaking and entering, etc. --
the crime data were not divided into these categories for pur-

poses of analysis. Rather, without giving categorical breakdowns, the authors present the percentages of total crimes committed in areas on the corner/not on the corner, with/without adequate lighting, etc.

Entry Point of Offender and Method of Escape -- Collected from police records on an open-ended question basis.

SAMPLING

Areas of the City -- Eight of the thirteen precinct areas were selected for further study on the basis of a preliminary analysis of city-wide crime data. No selection criteria are given. After preliminary interviews, five of the eight pre-cincts were selected for the final study. No selection are given at this stage, either, except that the authors state that these precincts represent a cross-section of the city's physical and socio-economic structure.

Commercial Survey Sites -- Out of a universe of 10,000 crimes in the five precincts during 1969-1970, 289 "specimens" (crime locations) were selected. The sample selection criteria included: (1) the crime/location characteristics of the sample being "in proportion" to to crime/location characteristics of the universe, and (2) the completeness of the data on the police report form.

Residential Site Survey Data -- A sample of 73 previously victimized residential structures -- 52 single family units and 21 apartment buildings -- was chosen for the study. Sample selection procedures and criteria are not presented by the authors.

Public Housing Project Survey -- A sample of four public housing projects that had been the objects of criminal activity was selected for further analysis. Sample selection procedures and criteria were not presented by the authors.

STATISTICAL METHODS USED

Descriptive Statistics -- The report presents the results
of all surveys and data collected in the form of percentages.
No other statistical methods are used. Examples of the
percentage figures provided include:
- Percentage of crime by --
  -- day of week
  -- time of day
  -- method of entry
  -- location of structure on block

and all other independent variables listed above.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Spatial and Temporal Variables -- The operational definitions
are objective and reliable within the limits of police reporting
data.

Variables Measured through Site Surveys -- The operational
definitions are based on the subjective assessments of individual
researchers. Although the report addresses this issue when it
states that its observers were "carefully trained," etc., the
study failed to undertake checks of inter-rater reliability
that are essential when more than one rater is used.

Since the study did not involve hypothesis testing, the lack
of rigor in the operational definitions does not defeat the explo-
ratory value of the study.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The author failed to provide either the sample selection
criteria or the procedure used in developing the samples. Since
this was an exploratory study, the sampling procedures need not
be finely tuned. Attempts should have been made, however, to

develop representative samples. It may be that this was, in
fact, done and the authors only failed to report their procedures.

APPROPRIATENESS OF STATISTICAL METHODS

Given the exploratory nature of the research design, descrip-
tive statistics would be the only appropriate statistical method
for this study.

CONCLUSIONS

The authors report from the commercial surveys:

- Robberies were more likely to occur on Friday evenings.
- Robberies were more likely to occur in or near corner
  locations.
- Nearly 40% of the robbery sties had poor or no window
  visibility, and an additional 20% had poor visibility.
- Three fourths of the structures victimized had adequate
  front lighting, but a nearly equal number had inadequate
  rear lighting.
- Fifty percent of the robbery sites had inadequate side
  lighting, while nearly 70% of the burglary sites had
  inadequate side lighting.
- Two thirds of the sites victimized had either light or
  sporadic pedestrian traffic in their vicinity.
- The amount of traffic adjacent to the victimized sites
  was low in nearly 80% of the cases.

The authors also report these general findings:

- A significant portion of all types of crime is concen-
  trated along commercial strip development areas in
  Detroit and in areas surrounding a major institutional
  facility.
- In some precincts breaking and entering of dwelling
  units tended to concentrate within a two block penetra-
  tion area directly behind the commercial strip develop-
  ments which surround residential areas.

The authors report from the residential survey:

- Over 60% of the victimized sites were located at or near the corner of the block, with 65% of the total having side or rear access from the alley.

- Over 77% of the residential burglaries involved side or rear entrances.

- Two-thirds of the residential units victimized had some type of structural or maintenance deficiency.

- Fifty percent of the blocks containing a victimized residential unit had inadequate lighting.

- Nearly 60% of the adjacent alleys had no lighting, while an additional 32% had inadequate lighting.

- Nearly 70% of the victimized dwelling units had inadequate front lighting and an additional 17% had no lighting.

- Nearly one half of the apartment dwellings had inadequate front illumination and approximately the same number had no rear or side exterior lighting.

The authors report from the public housing survey:

- Ground floor apartments located at the end of a row of buildings are the most frequent objects of breaking and entering.

- Row house apartments are more often victimized than high rise apartments.

- Muggings and purse snatchings in public housing projects tend to occur along paved walkways leading to shopping and parking areas.

- Other areas with high crime rates include parking lots, enclosed areas such as courtyards not visible from the street or sidewalk, lobbies, stairwells, and laundry rooms.

DISCUSSION OF CONCLUSIONS

The study does not allow for causal relationships to be attributed on the basis of its findings. Most conclusions refer only to one type of crime and therefore one cannot generalize these conclusions to all types of crimes. Further, the generalizability of the findings is questionable because of the lack of randomness in the sampling procedure.

AN ANALYSIS OF PUBLIC SAFETY AS RELATED
TO THE INCIDENCE OF CRIME IN PARKS
AND RECREATIONAL AREAS IN CENTRAL CITIES

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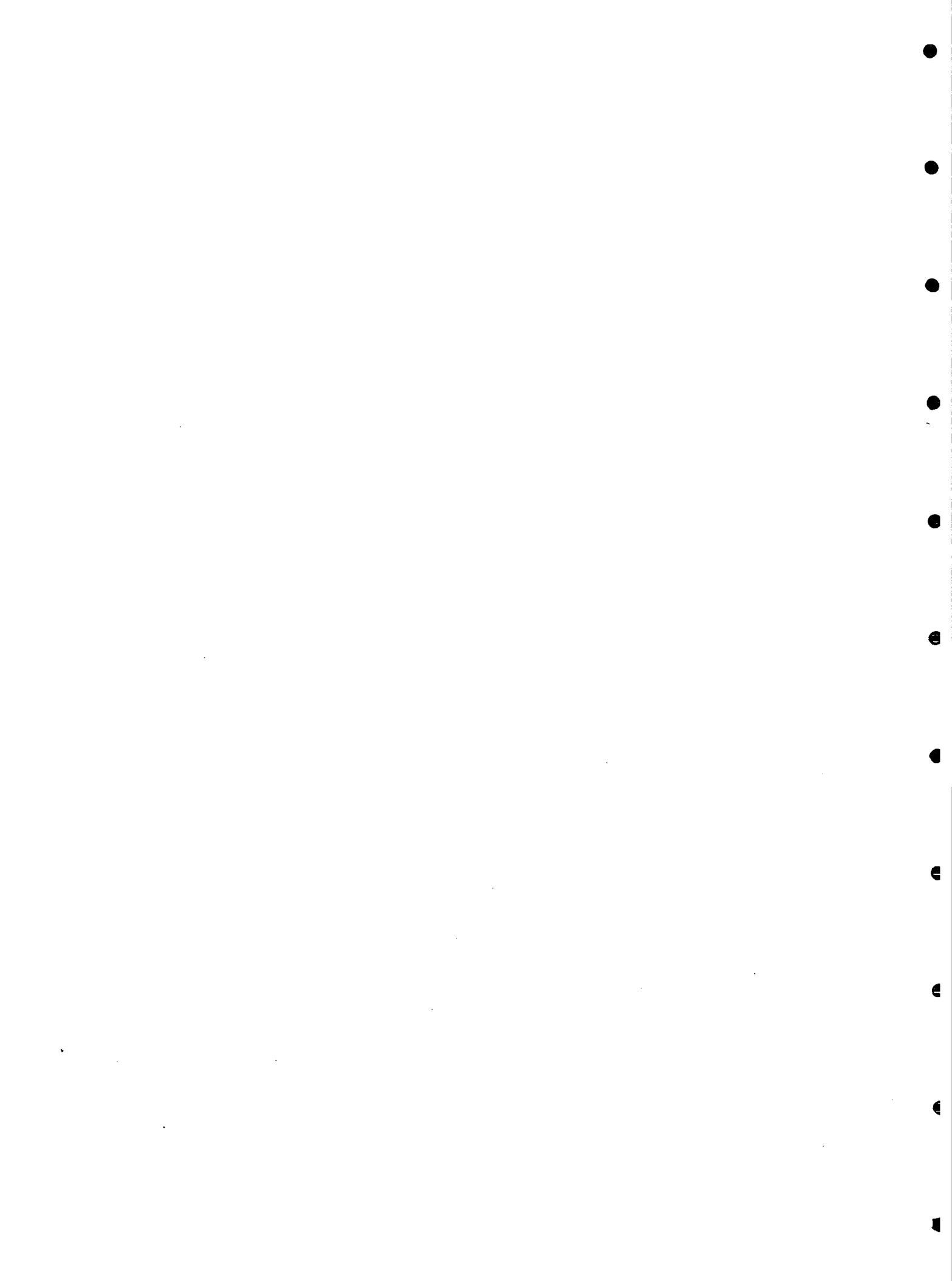
The work reviewed here is a compilation of three studies. Each study is a separate chapter of the overall work: (1) A Park Crime Analysis, (2) Public Perception of Parks and Safety, and (3) The Physical Environment. The work also includes a chapter of interpretations and recommendations and seven appendices. After a brief consideration of the objectives and research design of the work as a whole, each study is discussed separately below.

STUDY OBJECTIVES

The three related studies that comprise the report have the following set of objectives:

(1)   Estimate the frequency and types of crimes occuring in parks.

(2)   Identify the physical design factors that contribute to the existence of crimes in parks.

(3)   Investigate the resident perception of crime in parks through inquiries about the number of persons who do not use parks because of fear of crime.

(4)   Identify the physical design elements/strategies that could contribute to the increased safety (real and perceived) of parks.

RESEARCH DESIGN

The authors selected a sample of 64 parks in 16 cities for in-depth study. Data were collected from the following sources:

(1)   Archival police data on criminal offenses.

(2)   Structured observation (survey inventory) on the design, usage, and management of parks.

(3)   Interviews with approximately 500 residents concerning their use/non-use of parks.

I. A PARK CRIME ANALYSIS

STUDY OBJECTIVES

This study investigates the amount of serious crime reported in parks. It compares the frequency and severity of crimes in parks with that of surrounding outdoor locations. ·

RESEARCH DESIGN

The data used in this study were obtained from police reports of Index Crimes (serious crimes as determined by the FBI) in twenty parks in five major cities, as well as in the surrounding neighborhoods. Data were presented in table form, comparing frequency and rate of Index Crimes in parks with those occurring in surrounding areas.

VARIABLES

Independent

- type of outdoor location (park vs. surrounding area)

Dependent

- crime rate

Unit of Analysis

- service areas (parks and the neighborhoods surrounding them), n = 20

OPERATIONALIZATION OF VARIABLES

Independent

The types of outdoor locations are divided into two groups: parks and the areas surrounding parks. Parks were further divided into three categories: (1) sub-neighborhood parks (up to one acre); (2) neighborhood parks (one to twenty acres); and (3) community parks (over twenty acres). Non-park areas were divided into streets and the total area excluding the parks.

Dependent

Index Crime rates were calculated for total service areas, parks, and streets, and grouped into the following categories: (1) murder, (2) rape, (3) aggravated assault, (4) robbery, (5) all other offenses, and (6) total.

SAMPLING

The criteria used in the selection of cities included the following: (1) adequate geographic representation, (2) adequate distribution over size (population) range, (3) existence of a park police agency, (4) willingness and capability of the city to devote resources assistance to the study, and (5) representation of cities with areas offering "competition" (alternatives) to parks.

The criteria for selecting parks included the following: (1) parks must not have highly specialized services, such as a zoo or amusement park, (2) the park must be inside the central city or be recreation sites, and (3) the park must be typical or representative of similar open spaces elsewhere in the city.

Sixty-four parks were selected for the sample. For the *Park Crime Analysis*, research on reported crime was carried out for the parks in five of the study cities with one sub-neighborhood park, two neighborhood parks, and one community park selected in each city.

STATISTICAL METHODS USED

Descriptive statistics -- Comparisons were drawn from comparisons of percentages. No tests of significance were performed.

*QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS*

Operational definitions for all terms are self-evident or
are adequately explained, with the exception of one factor.
Service areas are defined as including both the park and the
neighborhood surrounding the park. The dimensions of the area
surrounding the park are not explained.

Several inadequacies of the operational definitions are
addressed by the author. For example, the author points out that
only Index Crimes are used for the analysis, since most cities
maintain comprehensive crime records only for these crimes.
Other, less serious crimes are therefore ignored by the study.
In addition, the author cites the problem of defining the appro-
priate denominator in measuring the crime rate, stating that the
number of people and the time spent in the park would be a more
sensitive denominator than that used. It is not clear from the
study how the denominator used was derived.

APPROPRIATENESS OF RESEARCH DESIGN

The research design is adequate for investigating the fre-
quency of crime in parks with that of surrounding outdoor loca-
tions. In addition, the design allows for comparing crime rates
across parks.

APPROPRIATENESS OF SAMPLING PROCEDURE

The criteria for the selection of cities and parks within
cities are comprehensive. For funding reasons, only five out of
sixteen of the sample cities were chosen for this analysis.
Given the exploratory nature of the study, twenty sample parks
are a sufficient sample for an analysis of this type.

APPROPRIATENESS OF STATISTICAL METHODS

The author may have concluded that the small sample size effectively precluded the usefulness of significance tests. Although the use of descriptive statistics is adequate for an exploratory study, more power might have been generated through attempting tests of significance.

CONCLUSIONS

- Index Crimes committed in the twenty study parks represented just over one percent of the crimes committed in the areas surrounding the parks.
- Park crime represented a slightly higher, but still insignificant proportion of street crimes at just under four percent.
- The most frequently reported crimes were robberies and larceny. Larceny was reported most frequently in parks with recreation centers and swimming pools.

DISCUSSION OF CONCLUSIONS

The findings of the research show that crime rates in parks are very low. As Peter Rossi has noted in the study, , the measurement of crime in parks is highly suspect for two reasons: (1) under-reporting, and (2) inadequate methods for calculating a crime rate that reflects the probability of a person in a park becoming a victim. Although that probability is high, the limited amount of time that persons spend in parks yields a crime rate that is low when measured as a rate of crime per persons using the park). Given these problems, the results are biased downward and do not adequately reflect the risk of becoming a victim to which park users are subject.

II. PUBLIC PERCEPTION OF PARKS AND SAFETY

STUDY OBJECTIVES

The purpose of this study was to test whether city dwellers avoid using public parks out of fear for their safety. The study investigated the following factors:

(1) Residents' perceptions of the relative importance of providing parks and recreation spaces

(2) Those physical elements of parks affecting residents' perceptions of their personal safety and the quality of the site

(3) Those factors associated with central city park usage and non-usage

(4) The degree to which the perception of crime (fear of crime) affects park usage and whether it is associated with specific locations within neighborhood and community parks.

RESEARCH DESIGN

A total of 416 resident park users and non-users in 16 major cities were surveyed concerning their attitudes about nearby parks. In addition to user and non-user categories, the distribution of interviews was divided among males and females, different age categories, and different cities.

VARIABLES

Independent

- park user/park non-user
- male/female
- age

Dependent

- resident attitudes concerning the following factors:
  -- comparative importance of parks
  -- reasons for not using parks, and factors that cause dislike of parks

-- strategies that the city could use to encourage non-users to use parks

-- reasons for avoiding areas of neighborhood and community parks

-- perception of the quality of lighting in parks

-- concern for personal safety in parks

-- perception of crime in parks

OPERATIONALIZATION OF VARIABLES

Independent

- Park user or non-user is defined in the following ways: Park users are those respondents interviewed in the parks themselves. Non-users are defined as those respondents who were interviewed in neighborhood areas other than the park who indicated that they never or very seldom used parks.

- Male/female is self-explanatory.

- Age is grouped into four categories: (1) 10-19 years, (2) 20-29, (3) 30-49, and (4) over 50.

Dependent

All dependent variables were measured through resident interviews:

- Comparative importance of parks is measured on a three point scale: more important, as important, or less important than other city services.

- Reasons for not using parks was asked of the non-user respondents in an open-ended question format. In addition, users were asked what aspects of parks they did not like.

- Strategies to encourage non-users to use parks was asked of non-users in an open-ended format.

- Reasons for avoiding areas of neighborhood and community parks was asked of park users in an open-ended format.

- Perception of the quality of lighting in parks was asked of park users on a two point scale: "pretty good," "not very good," and "don't know."

- Concern for personal safety was asked of park users and and non-users on a two point response scale: "concerned over safety," "not too concerned over safety," and "don't know."

- Perception of crime in parks was asked of park users and
  non-users on a three point scale: "crime is a big problem,"
  "crime is not a big problem," and "don't know."

SAMPLING PROCEDURE

A schedule of 500 interviews was developed, providing for
the equal distribution of age and sex specific respondents
among 16 cities and 64 parks. (For the review of the selection
of cities and parks, refer to *A Park Crime Analysis, supra.*)
Interviews were conducted with users and non-users of parks
and were divided between day and night, weekend and weekday
evening interviews. Individual interviewees were selected at
random in or around the study parks. Park users were inter-
viewed in the park and non-users were interviewed in other
neighborhood areas. A total of 416 usable interviews were
completed for the study.

STATISTICAL METHODS USED

Descriptive statistics -- The author presents the results
of the survey in frequencies and percentages. No tests of
significance are performed.

EVALUATION SECTION

*QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS*

Operational definitions for both independent and dependent
variables are not refined. The validity of these variables is
questionable, but since this is an exploratory study the lack
of refinement is not too detrimental to the study objectives.
In addition, there is a possible lack of internal validity in
the author's grouping of park users and non-users. Park users
is defined as those respondents who were actually interviewed
in the park. There is no indication that these respondents
were regular parks users or if they just happened to be in the
park that particular day. In addition, the author acknowledges

that the composition of the sample is not necessarily statistically representative of the general user and non-user populations.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design is appropriate for an exploratory study.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling procedure appears to be appropriate, though more information should have been provided on the exact sampling procedures and categorizations of the respondents. The author does not discuss how respondents were approached, how selection was randomized for each cell, and why there were only 416 "usable" interviews out of the schedule of 500.

APPROPRIATENESS OF STATISTICAL METHODS

Because of the non-random aspect of the sampling, the author states that the data obtained are not amenable to tests of significance. Therefore, the reliance on descriptive statistics was appropriate.

CONCLUSIONS

The author reports:

- Crime and the fear of crime are significant, but are not the principal factors that keep non-users out of parks. Non-users simply prefer forms of non-park recreation.

- Only a minute percentage (1.2%) of park users cited crime (including use of drugs) as something that bothers them about parks. Yet 45.9% of users and 54.7% of non-users expressed concern about their safety in parks. In addition, only 13% of users thought that there is a lot of crime in parks. The author states the the findings reveal a concern for personal safety, but do not show clearly what physical or other features of parks contribute to crime or the fear of crime experienced by users and non-users of parks.

DISCUSSION OF CONCLUSIONS

The author's conclusions generally follow the results of the data. It should be noted, however, that when the author refers to fear of crime as a significant factor in keeping non-users out of parks, he is referring to the five percent of the residents who indicated that attitude in their responses. Also, since the validity of the survey instrument was not demonstrated, the conclusions may be somewhat overdrawn.

III. THE PHYSICAL ENVIRONMENT

STUDY OBJECTIVES

This survey was a first attempt to develop standard reporting items on central city parks. The ultimate objective is to identify those physical features that differentiate parks with high and low crime rates and to evaluate those factors that appear to be most influential in maintaining a low crime rate. That ultimate objective was, however, outside the scope of this report.

RESEARCH DESIGN

Data were collected on four major elements of park sites -- natural, man-made, security, and park/community relationship -- in 64 parks in 16 cities. An overall evaluation of sub-neighborhood parks, neighborhood parks, and community parks was made, based on that data.

VARIABLES

Major Categories

- type of park

Subcategories

- Natural elements
  - -- topography
  - -- trees and shrubs
  - -- water (natural)
  - -- shape
- Man-made and use elements
  - -- buildings
  - -- drives and parking
  - -- small child play areas
  - -- passive use elements
  - -- on-site walks
  - -- onto site walking access
  - -- access and use control
  - -- organized use area (hard)
  - -- organized use area (turf)
  - -- swimming facilities
  - -- organized site usage
  - -- site programming
  - -- scope of site's organized use
  - -- cultural, ornamental elements
  - -- predominant use estimate
- Security elements
  - -- lighting
  - -- communications
  - -- security patrol
  - -- access and use control
  - -- visibility by day
  - -- visibility by night
- Park/community relationship
  - -- location
  - -- development
  - -- development, type
  - -- development, intensity
  - -- condition of area
  - -- street usages
  - -- street lighting

OPERATIONALIZATION OF VARIABLES

Major Categories

Type of park -- was divided into three categories: (1) sub-neighborhood, size up to one acre, (2) neighborhood, one to twenty acres, and (3) community, over 20 acres.

Subcategories

· ● *Natural elements* -- were measured along the following dimensions:

Subjective Quality/Appearance: (a) good, (b) fair, (c) poor

Topography: (a) extremely hilly, (b) rolling, (c) flat

● *Man-made and use elements* -- were all measured on a three-point response sheet. Examples include:

Buildings: (a) administrative or recreation and rest facilities, (b) rest facilities only, (c) none

Drives and parking: (a) through access with internal circulation and parking, (b) on-site access with limited parking, (c) no formal internal circulation

● *Security elements* -- were measured on a three point scale with open-ended descriptions added for some factors. Examples include the following:

Lighting: (a) more than 50% of park lighted at night, (b) 25% to 50% of area lighted at night, (c) less than 25% lighted, including none or peripheral only. Describe: _____

SAMPLING PROCEDURES

Sixty-four parks in 16 cities were selected for data collection (Refer to *Sampling* under *A Park Crime Analysis, supra,* for details.)

STATISTICAL METHODS USED

Descriptive statistics -- Conclusions were drawn from compariso of percentages. No tests of significance were performed.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The author states that the selection of measures was based in part on their generalizability to parks in most cities. In addition, because of the constraints of the project, the measurement unit had to be such that data would either be reasonably available or accessible to measurement by a trained observer without sophisticated equipment. With these restrictions in mind, and one other qualification listed below, it can be said that the operational definitions and measurement of the variables are reasonably ambitious and complete. The qualification is that the author failed to demonstrate either the validity or the reliability of the measures used. At least interrater reliability should have been reported, using independent raters.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design is appropriate for a pilot study for developing standard reporting items on central city parks. On the other hand, the limitations of the research are important. No attempt was made to correlate any of these factors with crime rates. The present study is not capable of identifying those physical features that differentiate parks with high and low crime rates.

APPROPRIATENESS OF SAMPLING PROCEDURES

The selection of cities and parks was appropriate given that this was an exploratory study. If it was the author's aim to develop a standardized form, however, a random sampling approach would have helped to insure that the form captures the full range of possibly important reporting items.

APPROPRIATENESS OF STATISTICAL METHODS

For the types of data collected, descriptive statistics are appropriate.

CONCLUSIONS

The author reports:

- Over 65% of the parks inventoried were rated "good" or
  better on their overall appearance and physical quality.
  The parks tended, however, to score poorly on security
  factors. Community parks in particular had deficiencies
  and problems.

- The evaluation undertaken was concerned only with tra-
  ditional approaches to security such as lighting and
  fences. No sophisticated, environment-oriented crime
  reduction devices were found in any of the parks. The
  author uses this finding for the conclusion that, "Had
  more rigorous standards been applied, none of the
  neighborhood or community parks would have been ranked
  above poor."

DISCUSSION OF CONCLUSIONS

Judging from the data, the survey instruments, and the tables
given in the report, the conclusions appear to be somewhat over-
drawn. The value of the study in the crime-environment field is
limited considerably by the author's failure to meet an important
objective of the study -- the identification of physical factors
associated with high or low rates of crime and fear of crime.

TACTICAL ANALYSIS OF STREET CRIME

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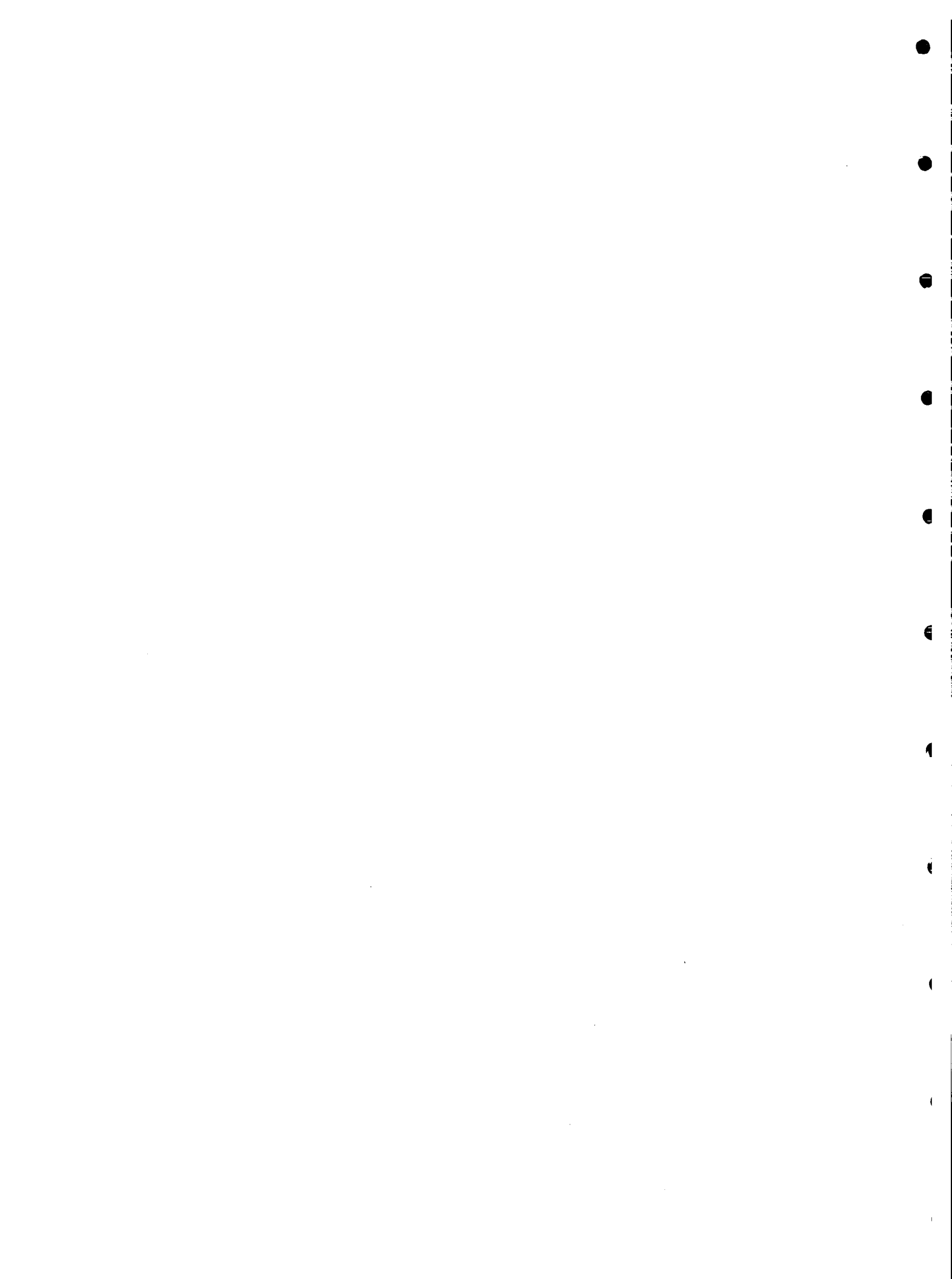
STUDY OBJECTIVES

The purpose of the study was to assess the manner in which the physical street environment acts as any accessory or deterrent to street crime. The study explored the relationship between environmental factors and three groups of users-- the pedestrian, the offender and the policeman. The goal of the study was to identify physical design changes that will deter criminal behavior and identify usage patterns that will reduce criminal activity in a given site. The study investigated only reported stranger-to-stranger violent crimes that took place in public spaces.

RESEARCH DESIGN

Archival crime data for outdoor crimes in 1971 were plotted and analyzed for seven police reporting areas in Jacksonville. Four high and four low crime sites were selected for further study. Data were collected on each with regard to 1) physical characteristics of buildings in the area; 2) pedestrians' perceptions of the relationship between environmental factors and criminal behavior; 3) offenders' perceptions of the physical characteristics which serve as either a deterrent or promoter of crime; and 4) police perceptions of the relationship between environmental factors and criminal behaviors.

Specifically, the following six hypotheses were discussed in the study:

1) Whether users, offenders and police officers perceive the effect which environmental factors have on criminal behavior.

2) Whether environmental factors are associated with the incidence of crime.

3) Whether users' behavior is influenced by incidence of crime.

4) Whether users, offenders and police share similar perceptions with regard to identifying environmental factors most conducive to the incidence of crime.

5) Whether the actual incidence and location of crimes in each reporting area agree with those perceived by the users.

6) Whether users of a high crime reporting area are more aware of environmental factors as they relate to crime than are those users of a low crime reporting area.

The collection of data on the physical characteristics of a site was made through a physical site inventory form and the use of on site observers. The observer recorded all environmental factors which might deter or promote criminal activity. These were recorded in a narrative and check off format. The collection of attitudinal data from pedestrians was made by a user survey which gathered data on: 1) fear of crime, 2) level of awareness of environmental factors which may be relevant to the level of crime and perceptions of safety, 3) patterns of use of the environment and factors which influence this usage and 4) open ended questions eliciting information on other determinants of patterns of use.

VARIABLES

Independent Variables

- Environmental factors
  - open space
  - building types (residential and commercial)
  - structural conditions of buildings

- potential surveillance
- concealment and visibility
- street type, condition, surveillance, communications and concealment
- traffic (pedestrian) count

Dependent

- Location of crime
- Character of criminal act
- Outcome of criminal act
- Attitudes of users, police and offenders of relationship between environmental factors and incidence of crime

OPERATIONALIZATION OF VARIABLES

Independent Variables

Based upon a physical inventory of 171 structures at eight study sites the study collected a broad range of data on environmental factors including:

- open space (i.e., parking lots, playgrounds, parks, etc.)

- residential building types (i.e., single-family detached, high rise apartments, etc.)

- commercial building types (i.e., retail stores, gas stations, bars, etc.)

- other building types (i.e., schools, churches, etc.)

- structural condition of buildings (i.e., abandoned, shabby, etc.)

- street type (i.e., residential street, one-way, collector, etc.)

- street surveillance (i.e., people on the sidewalk, speed of vehicular traffic, etc.)

- street communications (i.e., police patrol, police/ fire call box, etc.)

- street concealment (i.e., foliage obstructions, parked cars, etc.)"

- traffic (pedestrian) count -- this variable was measured by a survey conducted by Jacksonville police officers who observed a particular location at a particular time of the day. The number of persons observed at two three-minute intervals were either counted or estimated by the officer. If estimated, this was noted by the officer.

The environmental indicators were ranked in order from 1 through 15. The rankings were developed from three survey forms. The author states "The degree to which the indicator contributes to a safe or unsafe street condition is derived from an overall average of each group's response frequencies to open-ended and forced-choice questions."

Dependent Variables

- Location of crime -- self explanatory

- Character of criminal act -- this variable refers to 1) the manner in which the offender approached the victim, 2) the victim and offender behaviors involved, 3) whether a weapon was used, 4) day or night, and 5) other descriptive elements of the crime. Both crime variables were measured with archival data of the Jacksonville Sheriffs Department.

- Violent crimes were defined as murder, forcible rape, robbery and aggravated assault. Archival data were broken down to the study areas. Out of the 333 violent crimes, 153 were determined as between strangers.

- Outcome of criminal act -- this variable refers to such information as 1) did offender escape, 2) was anyone injured, and 3) was the subject identified and/or arrested.

- Attitudes of users, police and offenders between environmental factors and incidence of crime -- these variables were measured through open and closed ended survey questions presented to persons from each group.

SAMPLING

All crime data in the selected categories -- criminal homicide, rape, robbery and assault -- for 1971 were collected and analyzed for the study. The crime data were disaggregated first into reporting areas and then into the sites selected for detailed study. A total of 153 offenses, the universe of stranger-to-stranger crimes in the study areas were analyzed in the study.

Reporting areas represent a subdivision of a geographical area assigned to a uniformed officer. The sheriff's department selected seven areas non-randomly emphasizing high crime areas. One "trouble free" and one "troublesome" reporting area was included as "controls". Eventually, the areas were selected taking into account homogeneous socioeconomic characteristics and the predominant land use. Three downtown reporting areas were treated as one study area for statistical purposes.

Study sites were selected after all stranger-to-stranger
violent crimes were mapped and plotted for each reporting
area. The authors selected a "purposive" sample with one
high and low crime site included in each study area. The
objective to be maximized in the selection of study sites
was to identify environmental factors that were important
in "either encouraging or retarding violent criminal behavior."

User survey respondents were selected to reflect the
reporting area's sex/age characteristics of victims. Accord-
ing to Table 15 the breakdown of the sample of 132 users
per reporting area showed 20, 1, 20, 13, 21, 16, 22, and 19
users were interviewed in each area. Offender survey respon-
dents were selected from the Jacksonville County jail and
the Delaware Correctional Center. A total of 10 offenders
who had a history of stranger-to-stranger crimes were selected
from the Delaware Facility. Fourteen offenders selected
from Jacksonville did not have a history of stranger-to-
stranger crimes. Police survey respondents included seven
of the police officers who had been on the force for at
least three months and who patrolled the study sites. It
is unclear whether seven represents a sample of police offi-
cers or the universe of officers that patrol the study areas.

STATISTICAL METHODS

Descriptive statistics -- The authors present and analyze
the data in terms of percentages, mapping of crimes, con-
tingency tables and figures. No tests of significance or
correlations were performed.

In developing their findings concerning the environmen-
tal factors which could be associated with high crime rates
the authors analyzed the frequency and percent of users,
offenders and police who mentioned each enviromental factor

as being crime-related. Crime records were searched to find out whether the investigating officer mentioned any environmental factors in his report. Archival land use data were also factored into the analysis. In investigating each hypothesis the authors used several data sources.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Variables

Even though the authors stated that the survey instrument and the physical inventory form had been pretested and refined, it is not clear how reliable and valid these instruments were. It was possible to compute interrater reliabilities, but this was not done. The crime data appear to be reliable and valid subject to the normal limitation of underreporting.

APPROPRIATENESS OF THE RESEARCH DESIGN

For an exploratory study the present design can offer some useful information such as the possible refinement of measurement instruments. However, the present design is too weak to generate policy recommendations since the sampling procedure was limited (non-random and therefore not generalizable) and the quality of the survey data was questionable.

APPROPRIATENESS OF SAMPLING PROCEDURES USED

The sampling procedures used to select reporting areas appear to be reasonable. The selection of users, who appear to be interviewed "on location" at each study site was not random and presents serious problems of generalizability. The selection of 14 offenders who did not have a history of stranger-to-stranger crimes (the subject of the study)

was not appropriate. If the seven police officers represent a sample rather than the universe, the sample size of police officers was too small to use as a base for generalized statements regarding police viewpoints on crime-environment linkages.

APPROPRIATENESS OF STATISTICAL METHODS

With the exception of crime data, much of the descriptive statistics reported in the study are unsatisfactory. The problem with these statistics is that they are based on derived and/or aggregated variables which were not well defined.

CONCLUSIONS

- User, police and offenders agree that certain environmental factors are conducive to the incidence of street crime.

- Environmental factors are associated with the incidence of street crime.

- Offenders' decision to commit a crime is usually place specific and not victim specific.

- Surveillance opportunities have an impact on crime rates in the following manner. "Outside surveillance indicators that are witness related (visible building occupants; people on the sidewalk) have a greater impact on deterring the criminal behavior of the offender than inside surveillance indicators associated with the structural characteristics of a building (i.e., the number of windows and floors in a building)."

- "The offender chooses a site where those (environmental) indicators clearly favor his chances of committing a successful offense."

- The reporting area including large public housing projects had the highest crime rate.

- For users the two environmental factors most positively associated with the incidence of crime were the existence of alleyways and vacant buildings. The three environmental factors most negatively associated with the incidence of crime include police patrolling, pedestrians and street lighting.

- For offenders the two environmental factors most positively associated with the incidence of crime are obstructions to vision and alleyways. The three environmental factors which deter crime are street lighting, pedestrians and visible building occupants.

- For police the three environmental factors most positively associated with the incidence of crime are bars, buildings in substandard condition and vacant buildings. The two environmental factors which deter crime are police patrolling and street lighting.

- Environmental factors associated with high crime sites included
  - unpaved and narrow streets
  - poor quality of neighborhood commercial units
  - intrusion of commercial uses into residential neighborhoods
  - obsolete physical structures
  - inadequate security maintenance of public spaces
  - recessed entries to commercial structures

DISCUSSION OF CONCLUSIONS

The combination of definitional problems, the weak survey design and the limitation in the sampling procedures used reveal that the conclusions were overdrawn. The authors call for further study based on this research and the study has merit as an exploratory endeavor. However, the study did not by itself, demonstrate a causal connection between physical design characteristics and crime related behaviors.

AN ANALYSIS OF THE RELATIONSHIP
BETWEEN
ASSAULTS AND MOBY DICK'S BAR

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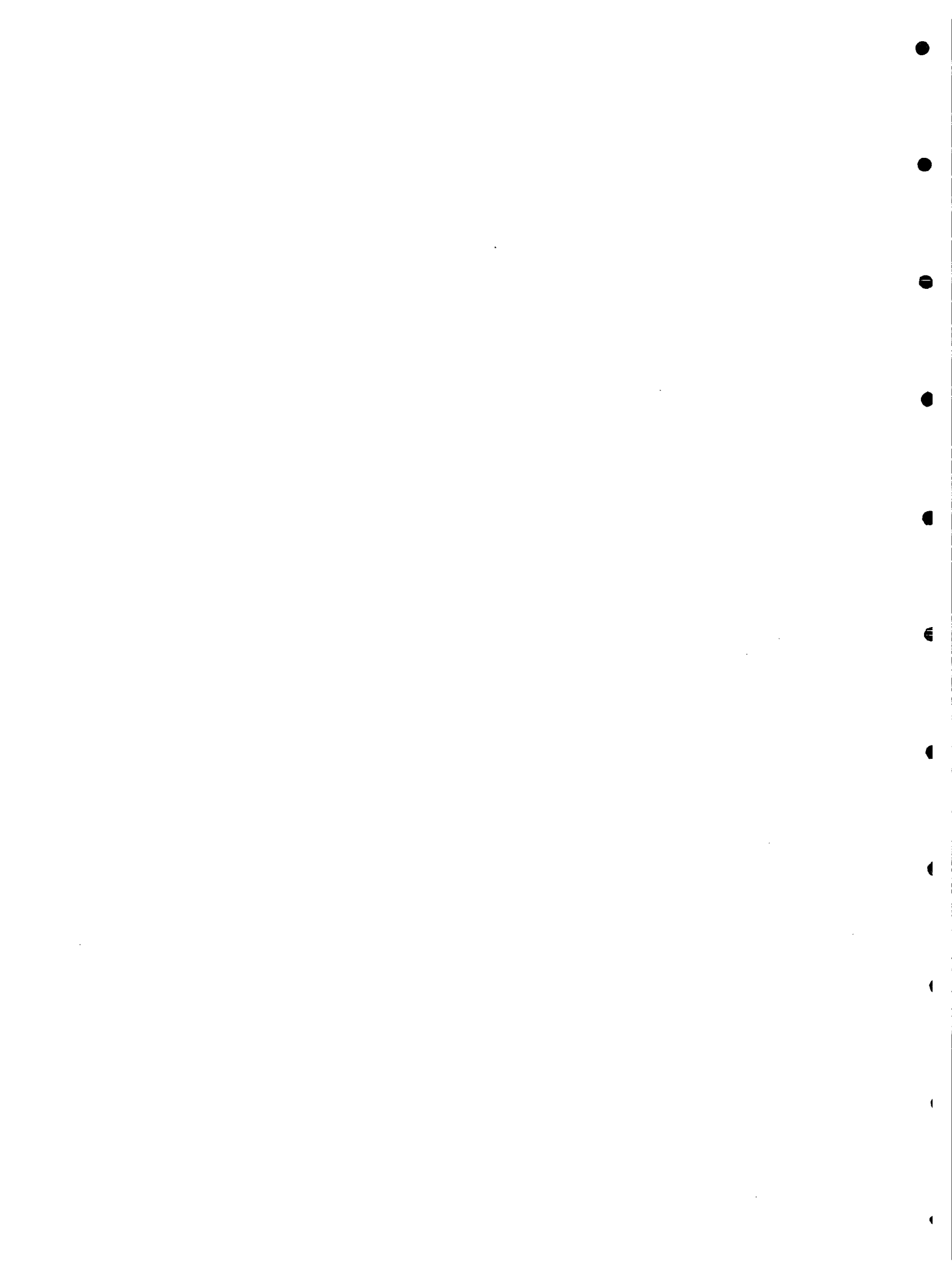
STUDY OBJECTIVES

The purpose of the study is to assess the "degree to which the crime of assault is associated with Moby Dick's Bar." The study seeks to test the hypothesis that the closer one gets to a bar, the more reported crimes there are.

RESEARCH DESIGN

Data from Minneapolis police records on assaults during the period of July 1, 1974 through June 30, 1975 were analyzed in terms of their distance from Moby Dick's Bar.

VARIABLES

Independent

- Distance of a crime from Moby Dick's Bar

Dependent

- Number (frequency) of offenses
- Percentage of crime divided by percentage of total area

OPERATIONALIZATION OF VARIABLES

Independent Variables

- Crimes were plotted on a map (grid), and located in terms of X, Y, coordinates which represent the distance from the bar.

Dependent Variables

- Number of crimes measured per .00085 square mile area through archival police records identifying location/type of crime.

- Percentage of crime divided by percentage of total area is a measure of the density of crime around Moby Dick's Bar. Areas

are divided into concentric circles with
radii of .1, .2, .3, .4, .5, and .6 miles.

SAMPLING

The authors selected one bar for study. The sample of
crime data included the universe of reported assaults within
a 0.6 mile radius of Moby Dick's Bar between July 1, 1974 and
June 30, 1975.

STATISTICAL METHODS USED

- Graphs and figures including a two-dimensional
  "density map" which presents a clear picture of
  the location of crimes in relation to Moby Dick's
  Bar.

EVALUATION SECTION

*QUALITY OF THE OPERATIONAL DEFINITIONS AND MEASUREMENT TECH-
NIQUES APPLIED TO THOSE TERMS*

The dependent variables are clearly defined. The inde-
pendent variable--distance of a crime from Moby Dick's Bar--
is clouded by the fact that there are 57 other bars within a
0.6 mile radius on Moby Dick's.

APPROPRIATENESS OF THE RESEARCH DESIGN

The study is purely descriptive. The author's use of
graphs and figures is clear and informative. The study men-
tions that "further analysis" was undertaken to correct for
the confounding influence of the other 57 bars within a 0.6
mile radius. Unfortunately, the authors did not explain the
analytic techniques used to control for this possible bias.

APPROPRIATENESS OF SAMPLING PROCEDURE

The sampling of crime data is appropriate for the study. The selection of one bar, Moby Dick's, for analysis limits the generalizability of the study.

APPROPRIATENESS OF STATISTICAL METHODS

The use of graphs and figures is appropriate to describe the correlation between the density of crime and the location of Moby Dick's bar. The graphs show clearly that most of the assaults occur along Hennepin Avenue. If the assaults are uniformly distributed along a section of Hennepin Avenue, then the dependent variable -- percentage of crime divided by percentage of area -- can be a linear relationship (with distance) if the "center" (bar) is located in the geographic middle of the distribution. In this instance, Moby Dick's bar is not in the geographic middle of the section of Hennepin Avenue that experiences a high crime rate. Since the bar is at one end of the high crime section, the relationship observed between the percentage of crime divided by percentage of area can be that reported in Figure Four -- a curvilinear relationship. The existence of the curvilinear relationship does not prove that there is a causal relationship between the bar and reported crime. The statistical methods used are not appropriate for inferring a causal connection.

CONCLUSIONS

The authors report:

- There is a clustering of crimes around Moby Dick's Bar.

- At least five times as many crime "are associated with it" than would be expected given the high crime rate in the area.

DISCUSSION OF CONCLUSIONS

The data do support the descriptive conclusions given by the authors. The confounding factor, the other 57 bars within the 0.6 radius of study, was discussed by the authors but not sufficiently explained away to permit one to conclude that a much larger number of crimes than expected "are associated with" the existence (location) of Moby Dick's Bar. There is no question that the authors have isolated a high crime area with many bars. The extent to which the bars, per se, or one particular, (Moby Dick's) is *the* cause of the crime, has not been documented by the research.

CRIME AROUND POLICE PRECINCT
STATIONS IN MINNEAPOLIS

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STUDY OBJECTIVES

The study investigates the hypothesis that the geographic distribution of crime is related to the location of police precinct stations. Specifically, the study seeks to answer the question whether the crime rates in areas near police precinct stations is lower than in other areas of the city.

RESEARCH DESIGN

The study identified the crime rates (densities) at various distances from the precinct stations. Comparisons were made among the crime rates found at each successive (farther) distance from the station. Comparisons were also made between crime rates near the precinct station and overall rates for the entire precinct.

VARIABLES

Independent

o Distance from precinct station

Dependent

o Crimes per square mile
o Location of crime in relation to precinct stations

OPERATIONALIZATION OF VARIABLES

Independent

Distance was measured by drawing concentric circles around the station with radii of .2, .3, .4, .5, and .6 miles. These are referred to as distance decay curves.

Dependent

Crimes (including burglary, robbery, and assault) per square mile and the locations of crime in relation to precinct stations were measured based on data collected from Minneapolis police offense reports 1 July 1974 through 30 June 1975.

SAMPLING

All reported burglaries, robberies, and assaults were used in the analysis. In addition, a 25 percent sample of reported larcenies and vandalism, and a 20 percent sample of auto thefts were included in the analysis. The study was based on a sample of six precincts.

STATISTICAL METHODS USED

The authors present and analyze the data using graphs and figures.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The use of distance decay models (concentric circles with radii of .2, .3, .4, .5, and .6 miles from the precinct station) may be problematic when reported offense data are used as the dependent variable. It is possible that there is a positive correlation between the percentage of crime incidents *reported* and the proximity to precinct stations. Thus, the reporting bias could camoflauge any suppression effect that police precinct stations have on the actual (not reported) crime rates.

A second measurement problem in the study is the use of crime data across precincts. The authors compare the data without taking into account the divergent land use, physical or social environments found in each precinct. The simplicity

of the analysis used in comparing crime rates across precincts might make Figures 2 through 7 of the study misleading. These measurement-related problems are a function of the inherent bias in reported crime data as compared to actual crime data. Only through large-scale victimization surveys could the authors have attempted to reduce the reporting bias problem. Such an effort was clearly beyond the scope of the study.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design is simple, straightforward, and appropriate for assessing the correlation between the location of a building and a particular dependent variable such as crime. As the authors acknowledge, this is a very limited design and does not allow for inferences of causality. Further, to the extent that the type of building or structure observed may affect crime reporting levels, this bias problem may prevent the researcher from adequately assessing the hypothesized correlation that she/he seeks to test. The authors recognize these limitations and state clearly that the design employed provides only a description of the crime picture at varying distances from police precinct stations.

APPROPRIATENESS OF SAMPLING PROCEDURES

For the limited purposes of the study, the sampling procedures appear to be appropriate.

APPROPRIATENESS OF STATISTICAL METHODS

The use of graphs and figures is appropriate. The plotting of all crimes on a grid (street) map with the precinct station in the center (Figures 8 through 13) is very informative. The authors' use of a two dimensional graph called the "crime density map" presents a clear and detailed picture of the location of various crime levels in a precinct. The value of these methods is purely descriptive.

CONCLUSIONS

   The authors report:

   ● There is no evidence of less crime in the immediate
     vicinity of precinct stations when compared to entire
     precincts.

DISCUSSION OF CONCLUSIONS

   The conclusion is supported by the data. Because of
the possible reporting bias problems, the conclusion should be
qualified to take into account the hypothesized relationship
between proximity to police precinct stations and reported
crime levels. Further, this conclusion is limited to the
study area, and is not generalized beyond the study precincts.
On the other hand, the study has merit in its ability to de-
scribe the relationship between reported crime levels and
proximity to police precinct stations.

NEIGHBORHOOD DETERIORATION AND THE LOCATION

OF ADULT ENTERTAINMENT ESTABLISHMENTS

IN ST. PAUL

Author:

Minnesota Crime Control
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Reviewers:

Tet Motoyama
Herb Rubenstein
Peter Hartjens

STUDY OBJECTIVES

The purpose of the study was to investigate the causal relationship between the existence (location) of adult entertainment establishments and neighborhood deterioration. Specifically, the study focused on two indicators of neighborhood deterioration -- median housing values and crime rate.

RESEARCH DESIGN

The study analyzed median housing value and crime rate data for selected census tracts for the years 1970 and 1976. The relationships between the independent variable -- number of adult entertainment establishments, two intervening variables -- age of housing and amount of commercial/industrial zoned areas, and the dependent variables -- housing values and crime rates -- were analyzed through regression and analysis of variance techniques.

VARIABLES

Independent

- Number of adult entertainment establishments.

Intervening

- Age of housing.
- Combined commercial/light industrial zoned lineal frontage.

Dependent

- Median housing values.
- Total crime rate per 1,000 population.

Unit of Analysis

- Census tract - (N = 75).

OPERATIONALIZATION OF VARIABLES

Independent Variable

- Number of adult entertainment establishments --
  After compiling an inventory of all adult entertain-
  ment establishments in St. Paul from 1970-1976,
  four types of establishments were selected for
  inclusion in this study. They were

  - alcohol-serving without live entertainment,

  - alcohol-serving with live entertainment --
    non-sexual,

  - alcohol-serving with live entertainment --
    sexual,

  - sexually oriented (bookstores, theatres and
    saunas).

Intervening Variables

- Age of housing -- This variable was operationalized
  as the percentage of housing in the census tract
  built before 1940.

- Combined commercial/light industry zoned lineal
  footage -- This variable was based on a review of
  land use ordinances and was measured for each
  census tract.

Dependent Variables

- Median housing values -- For the year 1970. This
  variable was measured by census data on owner-

occupied units. For 1976, the 1976 archival date
from the property sales file of the Minnesota Depart-
ment of Revenue were used.

- Total crime rate per 1,000 population -- This vari-
able was measured by archival data from the St. Paul
Police Department. The Department's "grid level
data" were aggregated to the census tract level with
the 1970 population (census data) used to derive
the rate per 1,ooo population.

SAMPLING

The sample of census tracts selected for the study con-
sisted of 75 of the 76 tracts in St. Paul. The authors
excluded the downtown tract since it did not in any sense
constitute a neighborhood. The sample of four types of adult
entertainment establishments includes all alcohol serving
establishments and all sexually oriented establishments.

STATISTICAL METHODS USED

Descriptive statistics -- The study reports much of the
raw data on the variables in figures, percentages and
frequencies.

Regression -- The dependent variables were regressed on
both the number of each type of adult entertainment establish-
ment, on the total number of establishments, and on the inter-
vening variables. Regression analysis was used to shed light
on the following questions:

- "Does deterioration tend to occur in the same
areas of the city as adult entertainment businesses
are located in 1970, 1976?"

- "Does the relationship, if any, between neighbor-
hood deterioration and adult entertainment persist

even when other factors are controlled?"

- "Does deterioration follow rather than precede the location of adult entertainment establishments?"

- "Do adult entertainment establishments contribute to deterioration?"

Analysis of variance -- The authors divided the number of establishments into the following categories, "0," "1," "2 or more," and performed analysis of variance to show the relationship between number of establishments within a census tract and extent of deterioration as measured by the dependent variables.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Variables

The variables were clearly defined and likely to be reliable within the limitations of the data sources. The validities of the dependent and intervening variables are questionable. The crime rate per 1,ooo population has the measurement (numerator and denominator) problems usually associated with archival crime data. Also, the categories overlap. Therefore the statistical analyses on the different types of establishments are not independent.

APPROPRIATENESS OF THE RESEARCH DESIGN

The use of only two points in time, 1970 and 1976, may not be sufficient to analyze social changes over time. Deterioration is more likely to occur over a long period of time (except in marginal areas) and be the result of many factors

associated with land use, shifts in demographic characteristics of the population and economic cycles. The research design employed will not capture either the causes or extent of deterioration in the short time frame and limited analytic framework used by the authors. This problem may have been caused by the unavailability of dates prior to 1970.

APPROPRIATENESS OF SAMPLING PROCEDURES USED

The researchers used all of the available and relevant data and the sampling of adult entertainment establishments appear to be appropriate.

APPROPRIATENESS OF STATISTICAL METHODS

Descriptive Statistics -- The use of descriptive statistics is appropriate. The information provided is adequate to describe the measure of each variable.

Regression -- The study does not provide adequate information to explain the results of their regressions. Important missing information is the sum of squares and the degree of freedom. Since there are two dependent variables, presentation of one R for each condition is not a conventional method of presenting the results. More importantly, it appears that the researchers neglected to take into account the distribution of the independent variables across census tracts. For example, in 1970 there were only five sexually oriented establishments. It is unlikely that this low number will have meaningful covariance with the dependent variables. Inspection of the author's findings (tables) shows that establishments with high frequencies, do have a better distribution and more significant results. Thus, the analysis of the types of adult entertainment establishments with a low frequency, by the nature of the statistical technique employed, can be expected to show insignificant results.

Further, the author regressed the dependent variables of 1970 and 1976 on the intervening variables and independent variable of a different year in order to answer the question whether the deterioration in neighborhoods preceded rather than followed the location of adult entertainment establishments. In order to answer this question the authors should have regressed the dependent variables of 1976 on the dependent variables of 1970. As a matter of fact, each of the years from 1970-1976 should have been used to answer this question.

Analysis of Variance and t-tests -- The tables presented in the study leave out such important information as mean squares and degrees of freedom. These tests as they were performed can not prove the existence of a threshold in the number of adult entertainment establishments necessary to bring about neighborhood deterioration. There should have been significance tests for no difference up to the threshold and tests for the difference after that threshold level had been reached.

CONCLUSIONS

- The presence of all adult entertainment establishments tends to be associated with neighborhood decline in both 1970 and 1976.

- When analyzed separately, the relationship between adult entertainment establishments and deterioration exists only for alcohol serving and not for sexually oriented facilities.

- Controlling for legal and market influences (zoning and neighborhood age) the presence of alcohol serving adult entertainment establishments is significantly related to the neighborhood deterioration.

- There is no relationship between the presence of sexually oriented facilities and neighborhood deterioration.

- Neighborhood deterioration follows the location of adult entertainment establishments.

- The addition of an adult entertainment establishment to an area with more than one or two of these establishments already present is associated with a marked

increase in neighborhood deterioration (threshold phenomena).

DISCUSSION OF CONCLUSIONS

Some of the conclusions are likely to be overdrawn, since they are based on a research design too limited to answer several of the questions addressed. The authors' inappropriate use[*] of regression analysis further limits the confidence that one can have in the general conclusion that the presence of alcohol serving entertainment establishments is a cause of neighborhood deterioration. A statement made by the authors with regard to their initial analysis is an appropriate response to the later analyses as well. The authors state: "It is possible that the relationships between neighborhood quality/deterioration and adult entertainment establishments found in Stage I are due to other influences that were not included in the analyses."

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[*]The authors disagree with this comment.

TELEVISION SURVEILLANCE AND CRIME PREVENTION: EVALUATING AN ATTEMPT TO CREATE DEFENSIBLE SPACE IN PUBLIC HOUSING

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STUDY OBJECTIVES

The purpose of the study is to evaluate the effectiveness of electronic surveillance equipment (cameras and microphones) in hallways and elevators of public housing. The equipment was hooked up to residents' television sets so that each resident could view these spaces at all times by turning on channel 3 of their sets. The study measures the extent to which residents use the new equipment and assesses the equipment's impact on victimization and fear of crime within public housing.

RESEARCH DESIGN

The study used three experimental buildings in the Bronxdale Public Housing Complex, and three control buildings in the same complex. Residents of the experimental and control sites were interviewed both before and after the installation of the surveillance equipment. The interviews with residents gathered victimization, attitudinal, and behavioral data so that the impact of the treatment (installation of the surveillance equipment) could be assessed.

VARIABLES

Independent

- Presence or absence of electronic surveillance equipment
- Number of security precautions taken by residents (not operationally defined)

Intervening

- Extent to which surveillance equipment is used by tenants
- Interaction among residents (not operationally defined)
- Confidence in police

Dependent

- Criminal victimization
- Fear of crime
- Behavioral responses to crime or fear of crime (not operationally defined)

C-453

Units of Analysis

- Treatment group residents: n = 32 (pretest), n = 29 (post test)
- Control group residents: n = 26 (pretest), n = 21 (post test)

OPERATIONALIZATION OF VARIABLES

Independent

Presence or absence of electronic surveillance -- This is the treatment variable. Closed circuit t.v. monitoring systems were placed in three buildings (treated as one unit of analysis -- treatment group). The cameras and microphones transmitted continually the view and sounds from elevators and hallways on channel 3 of each resident's t.v. set. Tenants were instructed to keep their sets tuned to the receiver channel (channel 3) when they were not watching other programs. Residents were asked to report irregularities by calling the Housing Authority Police.

Number of security precautions taken -- This variable, though discussed by the authors, is not operationalized, measured, or taken into account in the research effort. Examples of security precautions mentioned by the authors include karate training, use of deadbolt locks, etc. No data were collected or analyzed with regard to this "variable."

Intervening

Extent to which surveillance equipment is used by tenants -- This variable was measured through resident interviews and operationalized on a yes/no basis, with the resident being asked (1) if he/she uses the monitoring device at least once a day, and (2) if he/she had ever used it.

Confidence in police -- Through resident interviews, the authors apparently asked whether the respondents thought that the police were doing a good job. No measurement scale was given, nor was the exact wording of the question provided in the study.

Dependent

Criminal victimization -- This variable was measured through resident interviews and divided into the following categories: (1) robbery, (2) attempted robbery, (3) aggravated assault, (4) simple assault, (5) purse-snatching and pocket-picking, (6) burglary, (7) attempted burglary, and (8) observed vandalism. Data were collected covering a period of one year prior to implementation (pre-test). Post-test interviews were held three months after implementation. Either victimization data for the three months after installation were annualized, or the authors collected data from residents covering a one year period, including three months after implementation and nine months prior to implementation. The authors do not state clearly what they did to get annual rates for post-test data. The language (questions) used in the victimization survey was adapted from LEAA victimization surveys.

Fear of crime -- This variable was measured through resident surveys, including four specific questions concerning (1) whether the respondents felt safe at night, (2) whether they felt safe during the day, (3) whether the respondent was thinking of moving out because of crime, and (4) whether the respondent curtailed activities because of crime.

SAMPLING

- Buildings -- The treatment group included all three buildings where the monitoring systems were installed. The control group included three buildings in the same housing development and were selected taking into account building design and other factors that might account for variations in crime rates.

- Residents -- The author states that pre-test surveys
  were administered to a random sample of a half of the
  residents of the treatment and control buildings.
  Post-test surveys were administered to those who were
  not in the pre-test sample. In selecting the sample,
  the authors chose the residents, with two qualifica-
  tions. First, they did not call back persons who were
  not home during the original visit. Second, "many
  tenants" refused to participate in the survey.

STATISTICAL METHODS USED

Descriptive statistics -- The author presents the results
of the surveys in percentages. No tests of significance or
other data analysis techniques were used.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Independent Variables

- Presence or absence of surveillance equipment -- The
  quality of the operational definition is adequate.

- Number of security precautions taken by residents -- No
  operational definition is provided, no measurement taken,
  no analysis conducted with this "variable."

Intervening Variables

- Extent to which surveillance equipment is used by tenants
  -- The operational definition was never explicitly stated,
  but the authors report data on the percentage of residents
  who "have used" the equipment and those who use it at
  least once a day. Both these definitions are subject to
  serious problems, since neither is precise. That is, one
  cannot distinguish whether those who use the equipment
  at least once a day use it for five minutes or five hours.
  The category "have ever used it" is much to broad for
  analytic purposes.

- Confidence in the police -- The authors imply but do not
  provide a scale for measuring varying levels of confidence
  in the police as expressed by residents. The operational
  definition is neither reliable nor precise enough to be
  used for analytic purposes.

Dependent Variables

- Fear of crime -- This variable is measured through the use of surveys. The general questions that were used (four unscaled single response, yes/no answers to such questions as "Do you feel safe...?") are not free from serious threats to their validity or reliability. The usefulness of the fear of crime variable as defined by the authors is further compromised by the fact that the authors never specify a particular place (e.g., elevators, hallways, apartments, outdoors) when asking residents about their fear of crime. When evaluating a site-specific security device, it is important to determine whether the device has any effect in the area in which it is operational and/or elsewhere, but one cannot find this distinction in the present study. Similarly, the authors' failure to use a scale for such questions as, "Are you thinking of moving out of the housing project because of crime?" yields gross and very imprecise data regarding the extent to which a person is affected by crime. For example, the authors' variable artificially lumps together those who have once thought of moving with those who have thought seriously about it.

- Criminal victimization -- The operational definition is clear, but one is unsure whether the post-test crime rate is based on a three month period that has been annualized or actually includes a nine month period prior to completion of the surveillance system. If the latter is the case, then the definition is grossly invalid. If the former (three months annualized), this may be too short a period for data collection, since crime is often seasonal. In either case, the victimization data are weak, though much of the problem may have been the result of program implementation surveys and not the result of conscious choices made by the authors.

APPROPRIATENESS OF THE RESEARCH DESIGN

The use of a pre/post quasi-experimental design is appropriate, though the smallness of the number of units which received the treatments casts some doubt on the generalizability of the evaluation findings. In the demonstration program, there were only three buildings which received the treatments, and the research design had to be molded around that fact. In addition, the residents were nested within the experimental and control buildings, and the variance of their responses constituted error terms similar to those of the analysis of the variance model. A further complication recognized by the

authors is the short time period (three months after the system became operational) used for the evaluation. It is possible that short-term effects will not be a good predictor of longer-run effects. The timing of the post-treatment data collection was not completely under the control of the authors.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

Respondents -- A major weakness of the study is the small number of respondents. The authors state that this was because of resource limitations. The two qualifications discussed earlier (not calling back those not at home and a large number of refusals) create a non-response problem that may produce significant biases in the data and the results. There is no indication as to the likely direction of the bias or its possible magnitude.

Buildings -- The explanation of the choice of the three control group buildings discusses the physical design of the buildings, their distance from the experimental group, and other characteristics. A weakness of the study is that the authors do not give enough information about the control group buildings to confirm that they are sufficiently similar to the experimental buildings for comparison. *

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*The authors disagree with this comment. Palumbo stated that "We compared the experimental and control buildings with the entire tenant population on race, and income and found them to be very similar thus allowing us to conclude that our sample is likely to be representative." However, as the authors acknowledged, the control buildings were not selected randomly. Since this is the case, it is important to show that the experimental buildings and control buildings did not differ substantially, rather than to show the representativeness of both the experimental and control buildings.

APPROPRIATENESS OF THE STATISTICAL METHODS

The use of descriptive statistics is appropriate. The
authors may have decided that their sample was too small to
justify the use of more powerful analytic techniques. Although
the results would probably not have been significant, the authors
might have enhanced their study by performing a test of signifi-
cance such as chi-square.**

CONCLUSIONS

- The difference between the pre- and post-test crime rates
  for the experimental buildings is so small that the authors
  conclude that the surveillance equipment failed to deter
  crime.
- There was no significant difference in resident attitudes
  about crime after the experiment.
- Only 14% of the respondents used the equipment, and no
  tenant had observed a crime on the closed-circuit television.
- 69% of the respondents claimed that they made use of
  the system, but only 14% of the respondents used the
  monitoring device at least once a day.
- No tenant had observed a crime on the closed-circuit
  television.

**The authors disagree with this comment. Palumbo stated that
"We did not draw a random sample from the entire tenant pop-
ulation but used six entire buildings, three of which were
experimental and three of which were control buildings.
Thus, a test of statistical significance is not appropriate."
We have two problems with this response. First, it appears
that the authors did not recognize the hierarchical struc-
ture of the data where the tenants were nested within the
buildings, and the implications this has on the proper kinds
of data analysis to be employed. Second, the response rate
was 34.5%, and the six entire buildings were not surveyed.
Unless the missing responses are assumed random, there is no
way of knowing the extent of the biases caused by the missing
responses.

DISCUSSION OF CONCLUSIONS

While the study shows convincingly that the program was a failure, each of the conclusions and results is compromised by the small sample size, the short term nature of the evaluation period, and the authors' failure to use sensitive (scaled) measurement instruments. For example, the occurrence of some crimes is a rather rare event. Therefore, if the effects of treatment on victimization are sought in the research, it is important to have a rather large sample size before victimization rates can be estimated with reasonable accuracy. Most of the conclusions were based upon the percentages, which are not as powerful to detect as other methods. Development of composite variables, such as fear of crime, might have increased the reliability and allowed for other statistical methods, such as analysis of variance.

The finding that no tenant had observed a crime on the closed-circuit television, and the discussion about this finding, are very strong. Although the finding may be due to the small sample size, it leads one to question the logic of the surveillance system used by the closed-circuit television, especially the probability of seeing a crime in progress.

Although the quantitative methodology has some problems cited above, the article provides a good discussion of substantive issues of defensible space theory based on their empirical findings.

THE PRIVATE STREETS OF ST. LOUIS*

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Reviewers:

T. Motoyama
S. Shore
H. Rubenstein
P. Hartjens

*The reviewers requested and received a draft of this study. At the time of writing this report no final version was completed. Since that time the study has been completed and is a Chapter in Community of Interest by Oscar Newman. We are not responsible for any divergence between the study reviewed here and the final version.
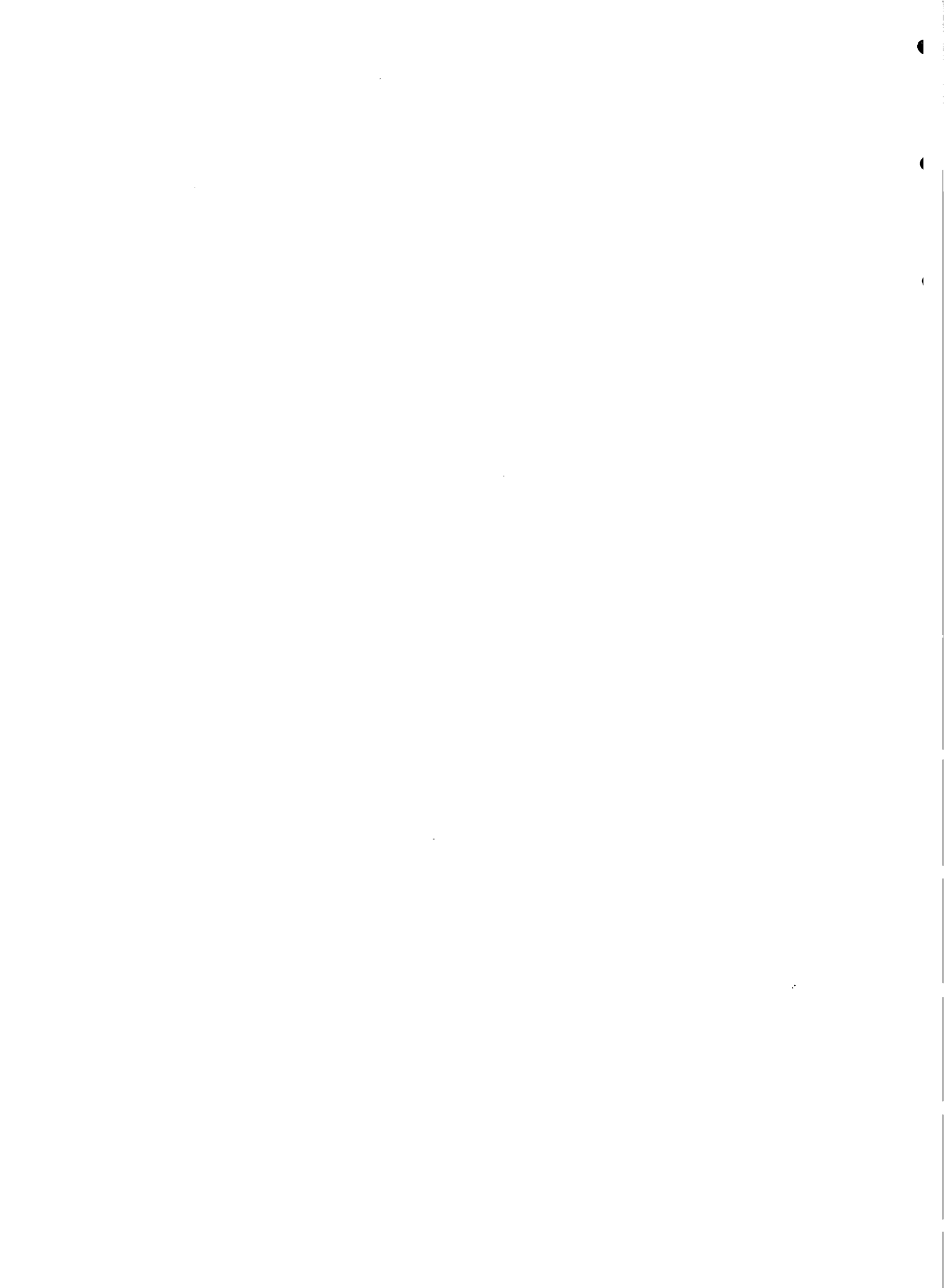
STUDY OBJECTIVES

The purpose of the study is to investigate whether private (enclosed) streets have lower crime rates and higher resale values than public or open streets. Specific comparisons were made from samples of the two types of streets. Private streets are those where residents have created a formal association, where houses are single family dwellings, and where streets have been physically blocked off at one end to prevent through traffic. Public or open streets are open-ended, residential through streets.

RESEARCH DESIGN

The study compared adjacent public and private streets both at the beginning and the end of the change of a socio-economic cycle with regard to variations in crime and property values. The author selected three sets of streets--one set of public and private streets matched on socioeconomic characteristics and two sets that were not matched on socio-economic characteristics. Archival data were collected on crime and property values, structured observations were employed, and interviews with residents were conducted.

VARIABLES

Independent

- public vs. private streets

Dependent

- burglary rates
- crime rates
- neighborhood/street safety
- security measures
- asking and sale prices for housing
- property assessments
- extent of demolitions
- percentage of rented/owner-occupied structures

OPERATIONALIZATION OF VARIABLES

Independent

Private streets in St. Louis and in neighboring University City are defined as those streets where an incorporated street association has been formed that then becomes the title holder of the street right-of-way. All property owners on the street are required to join the association and all houses must be single family homes. The street is also blocked off to prevent through traffic. This closure of the street is accomplished through installation of a physical barrier across one end of the the street, creating a cul-de-sac. The other (open) end of the street is generally also "defined," either by a narrowing of the pavement or the erection of a symbolic portal. The study investigates three sets of private streets and adjacent public streets.

Dependent

Burglary rates per 1,000 residents were computed using estimates of population derived from resident interview responses and the U.S. Bureau of the Census. There is no information concerning the sources of the burglary data, though it appears to be based on reported crime from 1968 to 1973.

Conversions of single family structures to multi-family structures were identified through permit records for structural alterations from the St. Louis Building Permits Office from 1960 to 1973.

Crime rate per 1,000 residents included crimes of burglary, assault, vandalism, theft from auto, theft of auto accessories, and purse-snatching from 1966 to 1973. The crime rates are based on reported crime, though no information is given concerning their source. (Presumably, the data are from St. Louis police archival data files).

Perception of security was measured through resident inter-
views. Residents were asked about the safety of their neighbor-
hoods and streets at night.

Security measures were identified through observations.
Twenty-six tours were undertaken on 15 different days in each
of three streets in University City. The observer assessed
the variation across streets in residents' tendencies to leave
possessions lying in their yards. House windows, shades, and
shades and car windows and doors were checked to see if they
had been left open.

Property assessments were measured as the combined value
of the land and any improvement to the land. Average assessment
comparisons were obtained from the St. Louis Tax Assessor's
Office.

Data on the number of demolitions were obtained from the
St. Louis Department of Building Permits for the years 1937
to 1973.

Percentages of rented/owner-occupied structures were measured
for 1973 from that year's property assessment records of the
City Tax Assessor's Office. Percentage of rented structures
in University City was obtained from University City occupancy
files for the years 1968 to 1973.

Asking and sale prices for housing were obtained through
the files and weekly published reports of a real estate service
corporation for the years 1968 to 1973. Prices were standard-
ized to 1967 dollars.

SAMPLING PROCEDURES

Three sets of pubic and private streets were used in the sample. One set of streets had similar socio-economic character- istics in both public and private streets (University City). One set had a private street consisting of a white, middle- class population, while the public street had a lower-class, mixed racial population. The other set had a private street consisting of a middle income population for the private street, while the adjacent public street had a lower income Black population.

For the interview sample, the author did not report either the sampling procedure or the sample size.

STATISTICAL METHODS USED

Descriptive statistics -- Two-way tables of percentages, counts, or average dollar values are presented showing figures for the dependent and independent variables. No tests of significance were performed.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The independent variable is clear and reliable, but the dependent variables present several problems. The source of burglary rate and crime rates is never presented by the author. Although at one point in the text it is implied that reported crime rates (based on archival data) constitute the dependent variable, the author also reports that residents were asked whether anybody in their family had been victims of crime during a two-year period. The victimization data based on the survey are not reported.

Another dependent variable -- perception of security -- is based on resident interviews. Only two yes/no questions were asked. They are not precise enough to provide useful information. In addition, observations used to measure security are not explained sufficiently to demonstrate their reliability. Other dependent variables are adequately operationalized and measured.

APPROPRIATENESS OF THE RESEARCH DESIGN

The lack of adequate control groups seriously compromises the research design. Public streets adjacent to private streets are not compared to other public streets, leaving the reader without any confidence in their representativeness. The author never demonstrated that the adjacent streets chosen have populations with similar socio-economic characteristics. The internal validity of the study is limited, since the author does not present any evidence that the "adjacent" streets and their residents are an appropriate comparison group. The differences found between the public and private streets investigated may be the product of other variables such as racial composition and income level. The research design does not have the capability to determine whether the physical design or some other differences (variables) might be producing the variations in crime and resale values that were found. A much more elaborate research design using both cross-sectional and longitudinal data would be necessary in order to ferret out the factors that are producing the differing crime rates.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The failure of the author to report the sampling procedure or number of the respondents interviewed compromises the value of the information based on interviews.

The draft reviewed did not report the sampling procedure or the number of residents interviewed.

APPROPRIATENESS OF STATISTICAL METHODS

The author did not provide the number of persons sampled, but reported the percentages of persons answering and various mean figures. Providing the percentage figure without providing the number of respondents and providing the mean without reporting the variance does not provide the reader with very much information. Thus, the descriptive statistics are weak. The tables presented do not cover the same range of years, which limits the comparability among the tables. Finally, since no hypothesis testing was performed, no strong conclusions can be drawn from the data.

CONCLUSIONS

The author reports:

- Private streets experience less crime than public streets.
- Private streets in high crime communities that are adjacent to public streets composed of different population groups have less crime than the surrounding area.
- Residents of the private streets feel that their street was considerably safer than the surrounding area.
- The physical closure of the private streets creates "a sense of place" for its residents by redefining the street as a social space and encouraging interaction among residents.

DISCUSSION OF CONCLUSIONS

Neither the research design nor the data presented are sufficient to support the author's conclusions or reject plausible alternative rationales to explain the findings. The differences found in crime rates and resale values have not been shown to be a function of the physical design of the built environment, resident associations or a "sense of place" among residents. The differences may be due to any number of causes, including random error. The research design can provide a

statistically sound case for the conclusions and rationales
provided in the study.
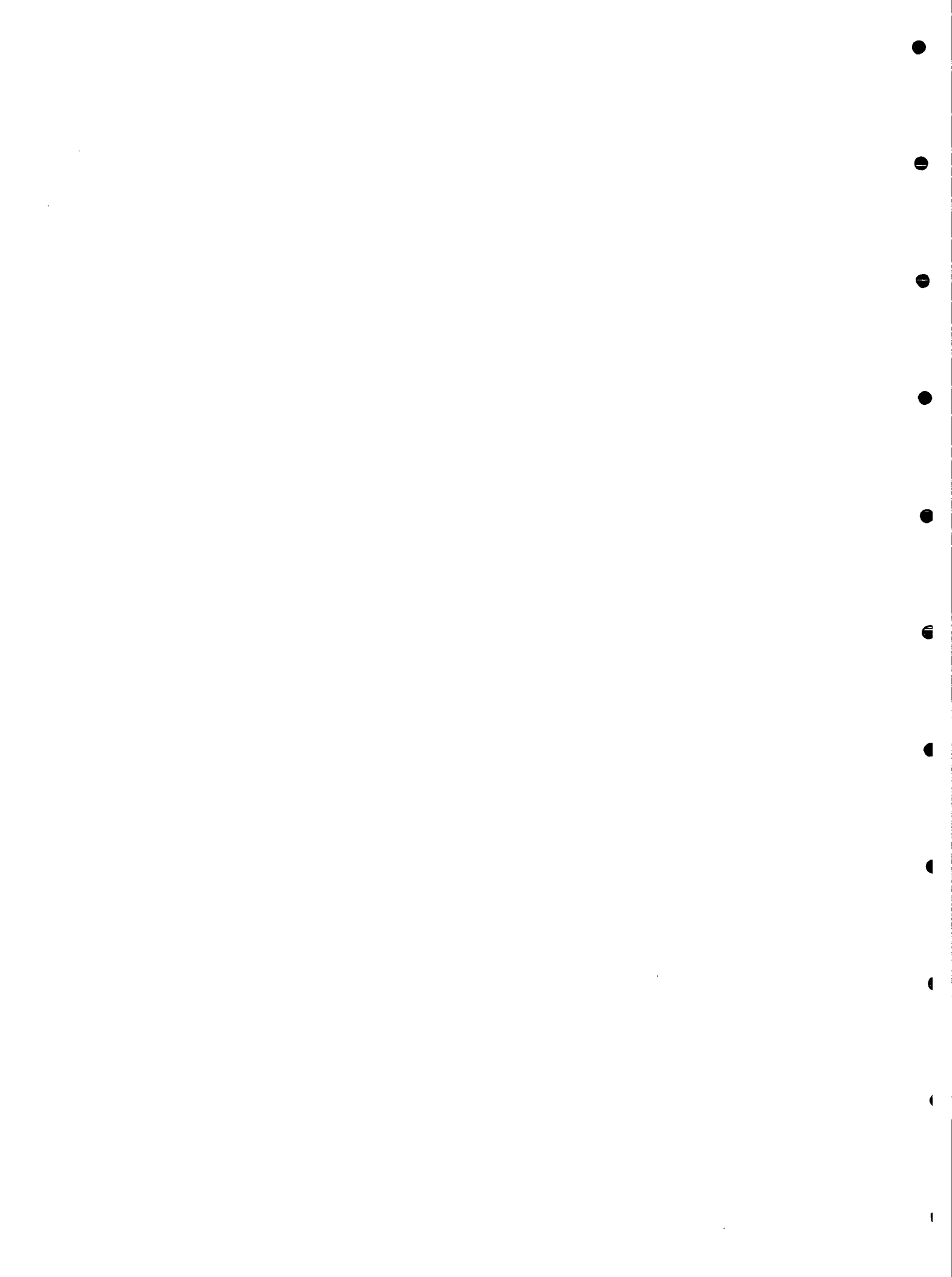
ENVIRONMENTAL CORRELATES OF SCHOOL VANDALISM

Authors:

Pavel Pablant
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Reviewers:

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Peter Hartjens
Herb Rubenstein

STUDY OBJECTIVES

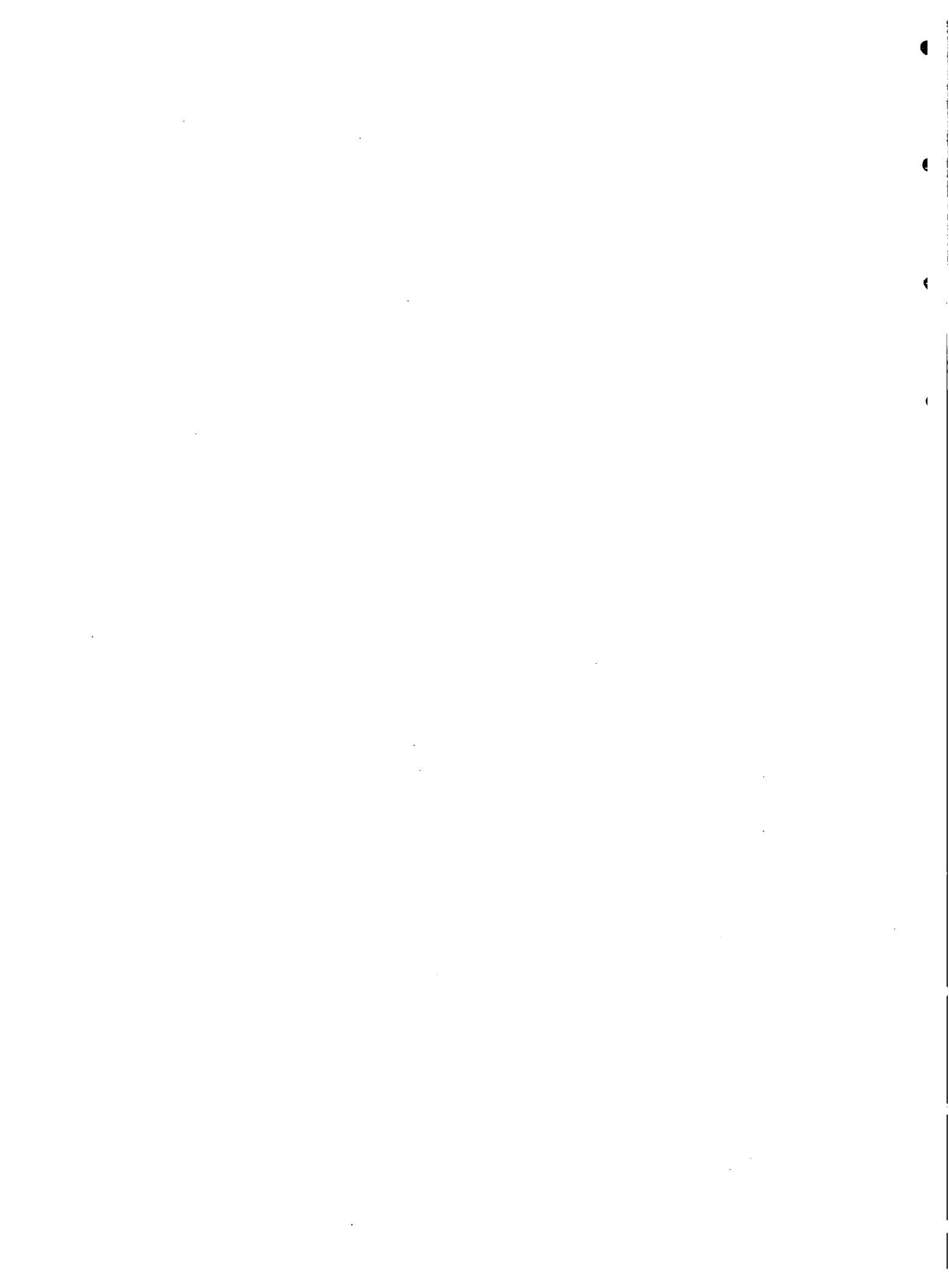The objective of the study was to examine the relationship between a variety of environmental factors, such as aesthetic quality, activity levels, and habitation density, and the incidence of school vandalism. The study examined three hypotheses:

- "Schools with low vandalism rates will be characterized by a higher level of aesthetic appeal and maintenance of properties, while schools with high vandalism rates will be characterized by lower aesthetic appeal and inadequate upkeep."

- "Schools with low vandalism rates will be surrounded by highly diverse and active neighborhoods with high habitation density and land coverage, while schools with high vandalism rates will be surrounded by less active neighborhoods with lower habitation density and land coverage."

- "Unimpaired visibility of school property will function as a deterrent to vandalism, such that high visual accessibility of school property by neighbors and passerby will be found to be associated with low vandalism rates, while the reverse will characterize schools with high vandalism rates." (Authors statement of hypotheses).

RESEARCH DESIGN

Thirty-two schools, located in the Houston Independent School District were paired on the basis of geographic proximity, enrollment size, racial and ethnic composition of students, and grade level. One school of each pair was characterized by a high rate of vandalism, the other by a low rate of vandalism. Each school was rated for its environmental characteristics by three independent observers. The raters

used a standardized rating scale, the School-Neighborhood
Attribute Scale (SNAS) consisting of 10 subscales and 29
environmental attributes. Schools with high levels of
vandalism were compared with schools with low levels of
vandalism in relation to their total SNAS score, subscale
scores, and individual attribute scores. The design is
pre-experimental with matching of subjects.

VARIABLES

Independent Variable

- Level of vandalism

Intervening Variables

- School location

- Size of school enrollment

- Racial/ethnic composition of students

- School grade level

Dependent Variables
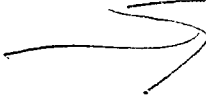
- School - Neighborhood Attribute Scale Score (Summary
score on the following subscales and attributes)

- Quality of school building (score)

  - Preservation of school property

  - School building surface form

  - Building design characteristics

  - Structure

- Quality of Surroundings (score)

  - Aesthetic quality of school grounds

  - Preservation of neighborhood property

  - School - neighborhood property quality

- Distinctiveness of school building (score)

  - Building size

  - Identification of school property

  - School building vs. neighborhood age

- Observed activity level (score)

  - Activity level

  - Usage diversity of immediate surrounding

  - Usage of surrounding pathways

- Potential activity level (score)

  - Potential or incidental activity of surrounding area

  - School ground usage

  - Block size surrounding school

- Density of land usage (score)

  - Proportion of enclosed space on school grounds

  - Density of usage on surrounding land

  - Land coverage density

  - Building lines of surrounding blocks

- Isolation of school building (score)

  - School building line

  - Open space surrounding school

  - School neighborhood continuity

- Visibility of school building (score)

  - School visibility

  - Residents' school view

- Penatrability (score)

  - Fences

  - Window characteristics

- Lighting (score)

  - Lighting of school property

  - Lighting of neighborhood

Unit of Analysis

- Individual schools

OPERATIONALIZATION OF VARIABLES

Independent Variable

Level of Vandalism - The level of vandalism was defined as a dichotomous variable: high vandalism (HV) and low vandalism (LV). Each school was assigned to one of these categories on the basis of the number of "forceable entries with consequent theft or damage to school property or equipment" as reported to the school district security office during

the school years of 1970 and 1971. The number of vandalism occurrences reported for high vandalism (HV) schools varied from 5 incidents to 27 incidents over the two year period. The number of vandalisms reported from low vandalism (LV) schools varied from 0 incidents to 7 incidents.

Intervening Variables

School location - In order to control for location effects each pair of schools was matched for proximity. The distance between paired schools varied from .05 miles to 2.75 miles.

Size of school enrollment - In order to control for size effects each pair of schools was matched by enrollment level. The difference between the paired schools' enrollment varied from 2.5 percent to 38.9 percent.

Racial/Ethnic composition of students - In order to control for the effect of the racial/ethnic composition of students in the schools, each pair of schools was matched on this variable. Schools were matched on the basis of the percentage of Blacks, Mexican-Americans and Whites (including Native Americans and Orientals) in each school.

School grade level - In order to control for school grade level, elementary schools were paired with elementary schools and junior and senior high schools were also paired.

Dependent Variables

Each of the dependent variables was derived from the subjective ratings of three independent judges on the 29 environmental attributes listed above. Each judge rated each school on the basis of two on-site observations. For each attribute the rater selected one of three descriptive responses that, in his or her judgement, best characterized the school or the surroundings being rated. The authors

assigned a numeric value to each response. A response that
described an environmental feature thought to be associated
with a high level of vandalism was assigned a value of "3".
A response describing a feature thought to be associated with
a low level of vandalism was assigned a value of "1". An
"intermediate" description response was assigned a value of
"2". Each of the variables was derived from these assigned
scores.

School - Neighborhood Attribute Scale score - This
variable is the sum of the median scores of the three raters
on all 29 environmental attributes. The scale scores may range
from 29 to 87.

Subscale scores - These variables include:

- Quality of school building

- Quality of surroundings

- Distinctiveness of school building

- Observed activity level

- Potential activity level

- Density of land usage

- Isolation of school building

- Visibility of school building

- Penatrability

- Lighting

Each of the subscale scores is a composite score consisting
of the sum of the median scores given by the three independent
raters on three or four environmental attributes.

Attribute scores - Each of the 29 individual attributes
was rated on a three-point "ordinal" scale. The scale consisted
of three alternative descriptions of a particular environmental
feature. The judges selected the description which most
closely matched their perception of the school or its surround-
ings. Numeric values were assigned to each alternative
description based on the researchers' assumption of the
relationship between environmental features and vandalism.
In general, features characteristic of poor upkeep, common or
undifferentiated architecture, simple or unaesthetic
appearance, lack of boundaries, older structure, low activity
levels, physical isolation, lack of visibility, unrestricted
access, and low illumination were regarded as indicators of
higher vandalism rates. Features of the opposite characteris-
tics (e. g. good upkeep, distinctive architecture, etc.) were
thought to be associated with a lower vandalism score.

Interrater reliability was computed on each item on
the scale. Only those items where all three raters gave
the same rating were considered to demonstrate rater agreement.
The raters agreed on their ratings on 67.7 percent of the
items on all schools.

SAMPLING

The thirty-two schools were selected from a total
school population of 235 schools in the Houston Independent
School District. The selection technique was non-random
matching of schools on the basis of vandalism level,
proximity, size of enrollment, and racial/ethnic composition
of students. A t-test was computed on:

- The average number of vandalism entries occurrences

- The average amount of monetary loss due to vandalism

- The average number of Blacks enrolled

- The average number of Mexican-Americans enrolled

- The average number of Whites enrolled, and

- Average enrollment

A significant difference on these means was found only on the first two factors. The authors interpreted this to mean that the schools chosen for the study varied only on the variable of vandalism level.

STATISTICAL METHODS USED

Mann-Whitney U-test - This measure was used to test the difference in the SNAS scores and subscale scores between high and low vandalism schools. (The text refers to the use of *median* scores on the U-test. The accompanying table indicates the use of group *means*.)

Wilcoxon Matched - Pairs Signed Rank Test

This measure was used to test the significance of the difference between SNAS items for each pair of schools in the sample.

Test of Significance Between Two Means - The test was applied to the 29 average individual environmental attribute scores to estimate the probability that the means of the two groups were different above a level which could be attributed to chance.

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Independent Variables

Vandalism level. This variable is well-defined within the limits of the record-keeping system of the school district. Two factors limit the possible usefulness of this variable. First, the designation of a school as a HV school (high vandalism) or LV (low vandalism) is applied in an uneven fashion. Two of the HV schools had fewer instances of vandalism reported than three of the LV schools, and had the same number reported as two other schools in the LV category. Thus, vandalism level was treated as a relative variable, not as a measure of absolute rates of vandalism. That is, the difference between high or low applied only to the pair of schools, not to the schools' record relative to all other schools. Considering that the rates apply to a two year period, it is difficult to equate high vandalism with as few as 5 instances.

Second, for purposes of the overall research design the use of 1970-1971 vandalism data may limit the validity of the study. The report was published in July of 1975, but no dates are given when the on-site observation of environmental factors were made. A significant lag in publication is possible, as is a possible lag in the analysis of the data and preparation of the report. However, if a significant lag existed between the observation dates and the dates of the reported vandalism data, the authors may be limited in their conclusions. Significant changes in the environmental features may have taken place in the intervening period,

Intervening Variables

The intervening variables are well-defined. However, matching schools on the basis of *proximity* is difficult to evaluate. It is unclear how matching of the schools on the basis of proximity improved the analysis. Distances of up to 2.75 miles in an urban area may represent significant differences in neighborhood composition: The factor of proximity, however, does not appear to affect the analysis to any great extent.

Dependent Variables

The operationalization of the environmental factors of a school is reasonably concise and well defined. The individual attributes vary, however, from factors of physical layout (e. g. number of buildings) to matters of aesthetic taste (diversity vs. repetitiveness in architecture).

In certain instances the attributes thought to be indicative of low or high vandalism rates appear to be contradictory (e. g. use of fences to reduce penatrability vs. visibility of school buildings to increase surveillance potential). Moreover, many of the attributes associated with high and low vandalism are also indicators of neighborhood socio-economic status. The use of student characteristics only partially controls for this interaction. The authors do not indicate whether the enrolled students actually live in the vicinity of the school - a factor affected by the use of bussing.

The only area where the variables associated with the scale do not directly measure the phenomena or feature of interest is in the area of activity level. Only one of the measured attributes directly observed actual activity levels. All of the other attributes address potential activity in the form of opportunities or accessways.

The validity of the scale as a measure of environmental quality cannot be assessed independently on the basis of information provided in the report. Many of the individual items would appear to be highly interrelated. For example, the age of the school building would be related to architectural style, upkeep and density of landscaping. Nevertheless, the items themselves appear to describe relatively discrete aspects of the schools and the surrounding areas.

APPROPRIATENESS OF THE RESEARCH DESIGN

Within the limits noted above the design was adequate to test the hypotheses laid out in the report. Conclusions can only be drawn about the district from which the sample was selected.

Appropriateness of the Sampling Procedure

The use of matched pairs of schools was a suitable sampling approach. There is, however, some question as to whether the matching criteria adequately controlled for the variations thought to intervene on the instances of school vandalism. Use of student racial/ethnic composition may or may not control for the effect of socio-economic factors, given the possibility that students may have been bussed from outside the area of the schools. Similarly, the use of proximity as a matching factor may or may not serve to eliminate differences in neighborhood settings. A closer matching of neighborhood characteristics would have improved the validity of the findings.

APPROPRIATENESS OF STATISTICAL METHODS

The use of descriptive statistics is sound. In addition, the author's use of the Mann-Whitney U-test and T-tests was appropriate. It appears, however, that the authors' use of the Wilcoxon matched pairs signed rank test was inappropriate. This test requires that items analyzed have independence. The items in the SNAS scale analyzed by the authors are not independent. The results reported in Table 5 are based on the violation of a key assumption necessary to perform the Wilcoxon test properly.

POWER RELATIVE TO THE OBJECTIVES OF THE STUDY

On the assumption that the matching of schools serves to reduce extraneous effects, which is not altogether clear, and that the test instrument is valid, the sample size is adequate. Clearly, not all items on the scale are related to vandalism rates and there is a possibility that there are interrelationships between items. Thus, the size of the sample can be questioned.

CONCLUSIONS

The author's report:

"The results offer support for the hypothesized relationship between vandalism rates and the aesthetic quality and level of preservation of school property"

"The hypothesized relationship between neighborhood activity level and vandalism rate was also supported. Activity level of the surrounding neighborhood, as measured by observed incidental, or potential activity, habitation density of surrounding area, and usage diversity was found significant in differentiating HV and LV Schools"

"The assumption of vigilance as a deterrent to vandalism was further supported by the results."

The first conclusion, regarding the relationship between environmental attributes and vandalism, if left at the level of a statement of association, appears to be upheld by the results. The data actually indicate that upkeep and maintenance are more closely associated with vandalism rates than architectural design. However, extending that conclusion to say that high levels of aesthetic quality *caused* lesser rates of vandalism is not and cannot be supported by the research design used by the authors.

The second conclusion regarding neighborhood activity and vandalism is justified on the basis of the findings, with the following limitations: Direct observation of neighborhood activity level was not measured. Rather, potential activity level was examined. The implication of causality is again presented in the study and is not supported by the research.

The third statement regarding vigilence and vandalism is justified on the assumption that the authors mean that the "potential" for surveillance is associated with lower levels of vandalism. Actual surveillance was not examined. It is also useful to note that the two latter hypotheses actually describe the same effect. In order for the activity level of a neighborhood to have an effect on crime the opportunity for surveillance must also be present. A more precise test of the results would have been to examine the "mix" of environmental factors present at the schools in relation to the incidence of vandalism. The indication of causality in the third conclusion is, in any case, overdrawn.

The overall assessment of the study is that it fulfills its basic objectives, and should be used to generate further research where levels of vandalism is treated as a dependent variable.
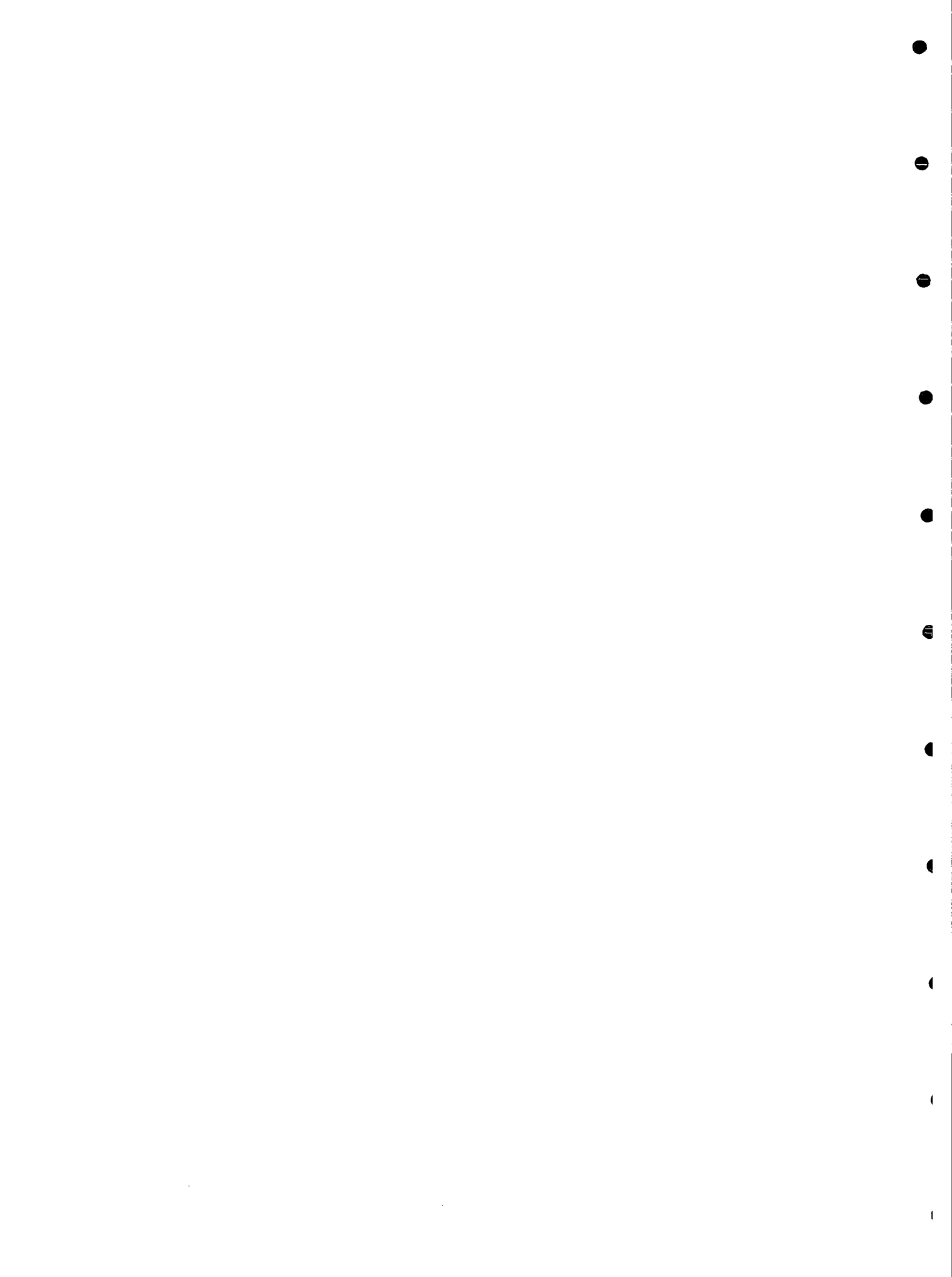
TERRITORIAL BEHAVIOR AND FEAR OF CRIME IN THE ELDERLY

Author:

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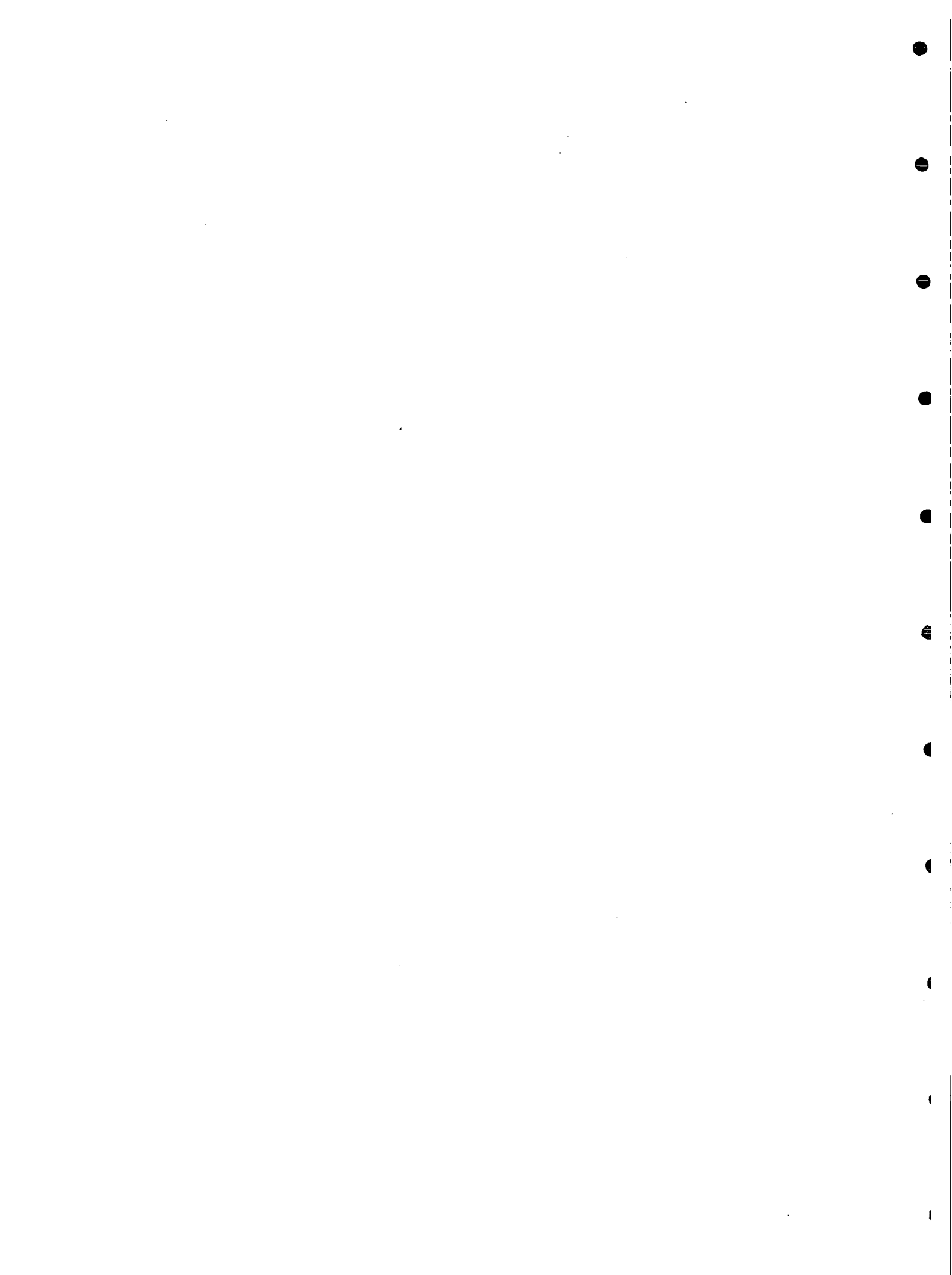
STUDY OBJECTIVES

This study was designed to investigate the effect of one type of territorial behavior -- the use of visible territorial markings -- on two measures of fear of crime in elderly home-owners: fear of personal assault and fear of property loss.

RESEARCH DESIGN

A sample of persons over 65 was interviewed to ascertain fear of property loss, fear of assault, and the perception of territoriality. These were analyzed separately in three 2 x 2 x 2 analysis of variance designs in conjunction with sex (male/female), territorial markers, and living arrangements.

VARIABLES

Independent

- two or more visible territorial markings/none or one visible territorial markings
- sex of respondent
- living arrangement of respondent

Dependent

- fear of property loss
- fear of personal assault
- perception of territoriality

Units of Analysis

- respondents (n = 157) (elderly homeowners)

OPERATIONALIZATION OF VARIABLES

Independent Variables

Territorial Markers -- Four categories were used: signs (e.g., no trespassing); "keep out" barriers (e.g., fences); personalizations (e.g., welcome mats); and external surveillance devices (e.g., viewing devices to observe visitors). A marker

was counted only once (even if it fit more than one category). Prior to the study, the four interviewers were trained in the recognition of these territorial markers. After training, all the interviewers independently scored the visible markers of 30 randomly selected homes. An average inter-rater reliability of .92 was obtained. Scores of 0 or 1 were put into the low territoriality group, 2 or more in the high territoriality group.

Sex of Respondent -- male or female over 65.

Living Arrangement -- Homeowners over 65 who live alone homeowners over 65 who live with one or more persons.

Dependent Variables

A questionnaire was administered to the respondents orally to record the dependent variable categories. The questionnaire contained three scales: (1) *Fear of Property Loss*, (2) *Fear of Personal Assault*, and (3) *Perception of Territoriality*. The items were of the 5-point Likert type and ranged from "strongly agree" to "strongly disagree." The scales for fear of property loss and fear of personal assault contained fear of crime items that were adapted and extended from a scale developed by Lawson et al. (1976). In addition, the fear of property loss scale consisted of 11 items, such as "When I am away from home, I worry about my property" and "I don't feel that my home is safe enough from burglars." The fear of personal assault scale consisted of 16 items, such as "There are times during the night when I am afraid to go outside" and "I think that this is a safe place to live." The final scale was that of perceived territoriality, and consisted of five items, such as "I have tried to arrange my home so that other people would know that it belongs to me" and "I feel responsible for what occurs on the grounds of my home." This scale was designed as a check on the visible territorial markers score. (p. 136).

Units of Analysis

Respondents were 157 homeowners, aged 65 or older, selected from several predominantly white, middle class communities in central Pennsylvania. A total of 175 homes of people over 65 were contacted. The 157 respondents represent an 85% response rate. How the 175 homes were selected, aside from the fact that they were owned by persons over 65, is not revealed.

STATISTICAL METHODS USED

The scores for fear of property loss, fear of assault, and perception of territoriality were treated separately with three 2 x 2 x 2 analyses (territorial markers x sex x living arrangement) through the use of unweighted means analyses of variance.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Independent variables, visible territorial markings, sex of respondent, and living arrangement are well-defined and reliable. For the purposes of analysis, however, territorial markers might better have been divided into four quantitative categories (e.g., 0-1, 1-2, 3-4, and 5 and over). Inter-rater reliability on that variable should be very high -- a practice trial yielded a .92 reliability average.

The questionnaire measuring the dependent variables appears to be well designed, though a copy should have been included in the published study to allow for a validity check, particularly the scale on perceived territoriality.

APPROPRIATENESS OF RESEARCH DESIGN

The research design appears to be appropriate, though it might have been still more so if correlation had been established between territorial markings and perceived territoriality as a measure of internal validity before the implementation of the rest of the design. When this analysis was incorporated at a later time, it did appear to be a measure of internal validity.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling procedure is too vaguely described to be evaluated.

APPROPRIATENESS OF STATISTICAL METHODS

The unweighted means analysis of variance is an approximation, with no particular hypothesis tested (Speed et al., 1978, 105-112, Journal of American Statistics Association). Mean and standard deviations should have been given along with the sample size. When sample sizes are not equal, however, interpretation of marginal means, such as means of male and female, is misleading.

These are very technical criticisms, and the author's failings in this area do not weaken the support for the conclusions given in the study.

CONCLUSIONS

The author reports:

- The analysis of variance of the fear of property loss yielded significant main effects of sex and territorial markers, but none for living arrangements. Males had significantly less fear of being robbed than females, and homeowners who were high in territoriality were signficantly less fearful than were homeowners who were low in territoriality.

- Fear of personal assault was a significant main effect of sex and territorial markers, to the same degree as fear of property loss. Those who lived alone and were low in territoriality were more fearful than those who lived alone and were high in territoriality.

- The analysis of variance on the perceived territoriality data yielded signficant main effects of sex and of territorial markers. Males and those in the high territorial marker group perceived themselves as being more territorial about their homes than did females and those in the low territorial markers group. There were no signficant interactions. The main effect of terri-

torial markers on the perceived territoriality data supports the conception that visible territorial markers are a behavioral aspect of a homeowner's territorial attitudes. Homeowners in the high territorial markers group perceived themselves as being significantly more territorial than did homeowners in the low territorial markers group. Overall, the results for the fear of of crime data indicate that territorial behavior significantly affected the homeowners' level of fear. Patterson offers other possible explanations for the data: "Rather, it is possible that those elderly homeowners who felt enough mastery of their environment to actively create visible territorial displays would also be those elderly who were not that fearful of being victimized (i.e., those who have remained physically and socially active.)"
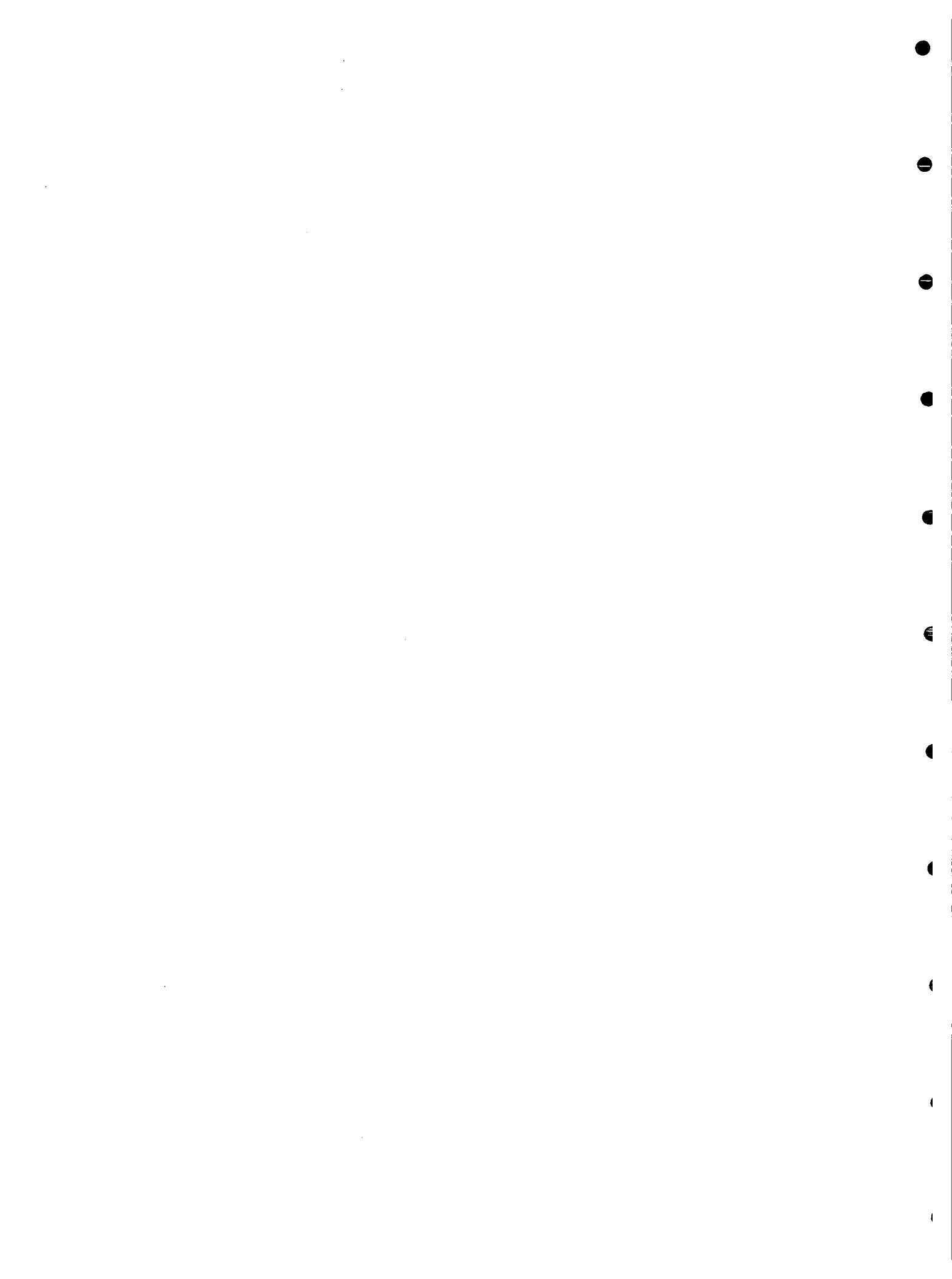
TESTING ACADEMIC NOTIONS OF ARCHITECTURAL DESIGN FOR BURGLARY PREVENTION: HOW BURGLARS PERCEIVE CUES OF VULNERABILITY IN SUBURBAN APARTMENT COMPLEXES

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Tetsuro Motoyama
Paul Fingerman
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Peter Hartjens

STUDY OBJECTIVES

To "discover the physical cues upon which burglars fasten as they assess the vulnerability of potential targets." These findings are then compared to the "defensible space" theories of Oscar Newman and others to determine if burglars perceive and are deterred by the specific characteristics of built environment hypothesized by Newman as deterrents.

RESEARCH DESIGN

The study design is essentially descriptive and explanatory. The study collected interview data from convicted burglars who were shown slides and then visited apartments. The visits yielded the burglars' assessments of the physical characteristics which were then compared to a checklist of defensible space "notions." The remainder of the research design evolved out of the data collected from the interviews and physical assessments. The author conducted an empirical analysis of the structural characteristics of a sample of 250 previously burglarized apartments. The study included no control groups, stratified samples, randomization of stimuli, or other experimental controls. Limited hypothesis testing was included.

VARIABLES

Independent

- Objective characteristics of residential sites and units at the time of burglary
  -- availability of natural light
  -- presence/absence of casual observers
  -- availability of artificial light
  -- structural recessions or obstructions at point of entry
  -- proximity to roadways
  -- presence/absence of foliage near point of entry
  -- presence/absence of opaque barriers at point of entry
  -- number of angles of surveillance available at point of entry

Dependent

- Perceived vulnerability of residential sites and units
- Frequencies of burglaries

Unit of Analysis

- Individual suburban townhouses or row houses and their yards (residential site or unit)

OPERATIONALIZATION OF VARIABLES

Independent Variables

o Availability of natural light at the time of the burglary was operationalized as a two point nominal scale according to the time of year that the burglary incident took place: October to March -- less natural light; April to September -- more natural light.

- Presence or absence of casual observers at the time of of the incident was operationalized on a three point scale according to the time of day that the burglary took place: 7 a.m. to 5 p.m. -- low probability of residents being available to observe the burglary; 5 p.m. to 11 p.m. -- high probability of incident being observed; 11 p.m. to 7 a.m. -- low probability of observation.

- Availability of artificial lighting at the time of the incident was measured on a three point scale: "poor" -- one "small" light or no light at point of entry; "fair" -- light at point of entry and a second light within 40 feet of the point of entry; "good" -- conditions specifed under "fair" plus additional lighting along access path to point of entry.

- Structural recesses or obstructions at point of entry was measured on a three point scale: "very much," "somewhat," and "not at all."

- Proximity to roadway was measured on a three point scale: "not close" -- a distance of 75 feet or more, "fairly close" -- a distance between 30 and 75 feet, "very close" -- less than 30 feet.

- Presence or absence of foliage at point of entry was measured on a three point scale: Heavy, Light, None.

- Presence or absence of opaque barriers is measured on a three point scale on the extent of trees or bushes around the point of entry: non-transparent (heavy), semi-transparent (light), and none.

- Number of surveillance angles available at point of entry was operationalized on a three point scale, according to whether the line of sight to the point of entry was obstructed from two or more angles, one angle, or no angles.

Dependent Variables

- *Perceived vulnerability of residential sites and units* -- Paid subjects, convicted former burglars, were interviewed under two conditions. First, sixteen subjects were shown sixteen slides of previously burglarized residences and were asked to rate the probability that a burglary would be committed there on a five point Likert-type scale. The subjects were not told that the residences had already been burglarized. After rating a slide, the subjects were then asked to indicate why they had rated the slide as they did. The subjects were given one minute to respond to each slide. Additional verbal information was provided about the surroundings of the site shown on the slide. The responses were recorded on a five point scale from (1) will definitely not occur, to (5) will definitely occur. Under Condition Two, seven individual subjects were taken to actual sites (residential units) of previous burglaries. The subjects were told of the previous burglary and then asked to evaluate verbally the vulnerability of the site. Their responses were recorded in conversational form by the interviewer.

- *Frequency of burglary* -- A random sample of ten townhouses or row house type apartment complexes in Franklin County, Ohio was selected. Police records were searched to find all reported burglaries that had taken place in those complexes over the previous three year period. For each incident, the following information was collected: address of the unit burglarized, date of the incident, time of day, mode of entry, point of entry.

SAMPLING

The author selected several samples for the study. The author selected a random sample of 250 burglarized apartments and from that a sub-sample of sixteen for showing, in slides, to convicted burglars. The sample of convicted burglars consisted of 23 persons who were residents of a half-way house. The

selection was apparently non-random. Sixteen persons were asked
to rate slides, while the other seven were asked to visit apart-
ment sites and rate them. A third sample was the random selection
of ten two-story townhouse type apartment complexes.

STATISTICAL METHODS USED

Descriptive Statistics -- The author reported the sample
mean, mode, median, frequency distributions, and standard deviation
in developing the residential site vulnerability scale.

Chi Square Tests on Cross Tabulations -- This test was
performed for significant differences between the following
variables:

- season of year and time of day
- difficulty of surveillance and time of day
- difficulty of surveillance and lighting
- proximity to roadway and time of day

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS

Independent Variables

Availability of Natural Light -- The author's use of a
two point nominal scale is subject to gross inaccuracy with
respect to the amount of natural light on the date of the
reported incident. Its use for analysis is, therefore, severely
limited.

Presence or Absence of Casual Observers at Time of the
Incident -- The author's two point scale is based solely on
his assumption that the probability of there being observers
is a function of whether or not residents could be expected to
be at home at various times of day and night. The assumption
that most people will be away from their apartments from 7 a.m.
to 5 p.m. is, at best, a gross generalization and certainly
does not hold for families with children, for example. As an
empirical measure, the scale is subject to gross inaccuracies
as to the actual availability of observers at the time of the

incident. No independent check was made by the author of the accuracy or adequacy of this measure. Given these reservations, operationalizing this variable in the indirect manner chosen by the author is inadequate.

Availability of Artificial Lighting -- Operationalization of this variable based on direct measures is adequate and reliable. As an empirical measure, the three point scale is adequate, though it is possible that there were changes in the lighting from the time that the incident occurred to the time that the research was conducted.

Structural Recesses or Obstructions at Point of Entry -- The study does not provide sufficient information to evaluate the accuracy, reliability, or validity of this measure.

Proximity to Roadway -- The direct measure employed to operationalize this measure is free from ambiguity in regard to its accuracy or reliability. The distance categories may have been arbitrarily chosen, and the analytic value of this variable would, therefore, be limited.

Presence or Absence of Foliage at the Point of Entry -- Although a direct measure was used to operationalize this variable, the author did not describe how he systematically determined that foliage was heavy, light, or non-existent. The three point scale is expected to produce reliable and generally accurate assessments, but the grossness of the scale limits the analytic power of this variable. Further, as with artificial lighting above, the operationalization of this variable is subject to the possibility that there were changes in landscaping between the time of the incident and that of the research.

Presence or Absence of Opaque Barriers -- The author does
not provide sufficient information on this measure for one to
assess its relevance, accuracy, validity, or reliability.

Number of Angles Surveillance Available -- Although the
author used direct measures, he failed to specify how this
measure was applied in a given example. For example, at what
distance from the apartment did the observer stand? The accu-
racy and reliability of the measure are expected to be free
from ambiguity, and the validity of the measure appears to be
free from major threats.

In general, the operational definitions provided for
analyzing residential sites and units are not good. The indi-
rectness of many of the measures, the lack of independent
checks, and the grossness of the scales used limit the utility
of these definitions. In addition, one does not get a sense
that these definitions represent the broad range of objective
characteristics sufficient to ascertain the existence or non-
existence of defensible space features for a given residential
unit.

Dependent Variables

Perceived Vulnerability of Residential Sites and Units --
This variable was operationalized by the showing of sixteen
slides of various types of apartment settings to sixteen con-
victed burglars. No detailed information was given regarding
the content or variation of the slides. The comments below
represent an evaluation of the procedure used to collect infor-
mation from the respondents.

There are several major problems. First, the small number
of respondents (n = 16) precludes any firm tests of internal
statistical reliability, though it appears that this was not a
serious problem. Second, the lack of a control group, in combi-
nation with the small sample size, precludes rigorous assessment

of the external reliability of the scale (responses) for the
subject population. Third, the data collection procedures may
have had serious confounding effects on the results. The author
reports that he supplied "additional verbal information" to the
subjects in describing the surroundings or context from which
the slide was taken. This verbal stimulus may not have been
consistent across slides and may have altered the perceptions of
respondents in various ways. In addition, the group situation
in which the subjects viewed the slides may have resulted in
"task learning" or significant differences between responses to
early and late slides. These represent serious internal and
external threats to the validity of the approach used by the
author in operationalizing the vulnerability scale.

Later in the study, seven convicted burglars were taken
individually to residential units for their assessment. The
author does not report how this observation took place, nor
does he mention how the data received were reported or recorded.
The sense is that the situation was conversational and unstruc-
tured. No analysis is reported of the relationships between
the seven subjects' responses, the actual characteristics
observed, and the responses to the slides discussed above.

Frequency of Burglary -- Since police records were used
to estimate the number and location of burglaries, the measure-
ment of this variable is adequate. The author did not discuss
the inherent limitations of police data or investigate how these
limitations may have resulted in biases.

APPROPRIATENESS OF RESEARCH DESIGN

The research design is not sufficient to meet the objec-
tives of the study. The hypothesis tested emerged from the
first phases of the study. The sample sizes were too small, and
procedures were too fraught with room for confounding the results
to provide an adequate test of how burglars perceive "defensible
space" (as academically defined). Further, the lack of control

groups or efforts to randomize sample selection or stimuli also limits the quality of information produced from the study. The research questions were often approached indirectly, and the analytic methods employed were insufficient, given the nature of the data generated.

APPROPRIATENESS OF SAMPLING PROCEDURE

Slides -- The author selected a random sample of burglarized apartments and then selected a sub-sample of sixteen apartments, which he photographed and showed to burglars. This random sampling might have been improved by a larger stratified random sampling technique that selected apartments according to a range of defensible space characteristics. The sample size used by the author was too small.

Subjects -- The author's selection of 23 subjects from a halfway house reflects the difficulty in the state-of-the-art in gaining access to burglars. A larger, random sample would have been more appropriate. Given the smallness of the study, however, and the enormous expense of sampling such a larger target population and the futility of trying to select a representative sample, the author's method of selecting the burglars was probably as good as any other approach that one could reasonably expect him to use.

APPROPRIATENESS OF STATISTICAL METHODS

Chi Square -- This test was appropriate, given the data of the study. Computing the degrees of freedom as including the "not applicable" is, however, inappropriate.

Descriptive Statistics -- These were used appropriately, though it should be noted that they have limited analytic value, since they are often based on inadequate operational definitions. The author apparently accepted all scale scores and operational definitions at face value.

POWER RELATIVE TO THE OBJECTIVES OF THE STUDY

Although the sample size necessary for the study to exhibit much power is unknown, the smallness of several of the samples used in the study strictly limits the generalizability of the results. Further, the limited statistical analysis performed on the data, the lack of reporting and using all the data collected, and the evolutionary nature of the research design all contribute to little confidence in the results of the study.

CONCLUSIONS

The author reports:

- Burglars do not perceive "defensible space" as it is defined academically, since they take into account a less detailed, more obvious set of opportunity criteria than those defined by Newman.

- Defensible space theory should be revised accordingly.

DISCUSSION OF CONCLUSIONS

The explicit conclusions are overdrawn in their criticism of the theory of defensible space. The author's design falls short of being able to support such a conclusion in several ways. First, the author fails to test independently the stimuli presented to the burglars for the presence or absence of the environmental cues thought to suggest vulnerability or invulnerability in defensible space theory. Second, the small sample size, the confounding of factors during the research project, and the lack of rigor or analysis of data from on-site observations weaken the study to the point that it cannot support the author's call for revising the theory of defensible space. Finally, the study is based on far too many indirect measurement devices and stimuli, including the use of slides to represent actual sites, to draw any hard conclusions regarding what characteristics of the built environment burglars take into account in making their decision whether or not to burglarize

a particular apartment. The author is to be commended for
identifying a large gap in the defensible space theory.

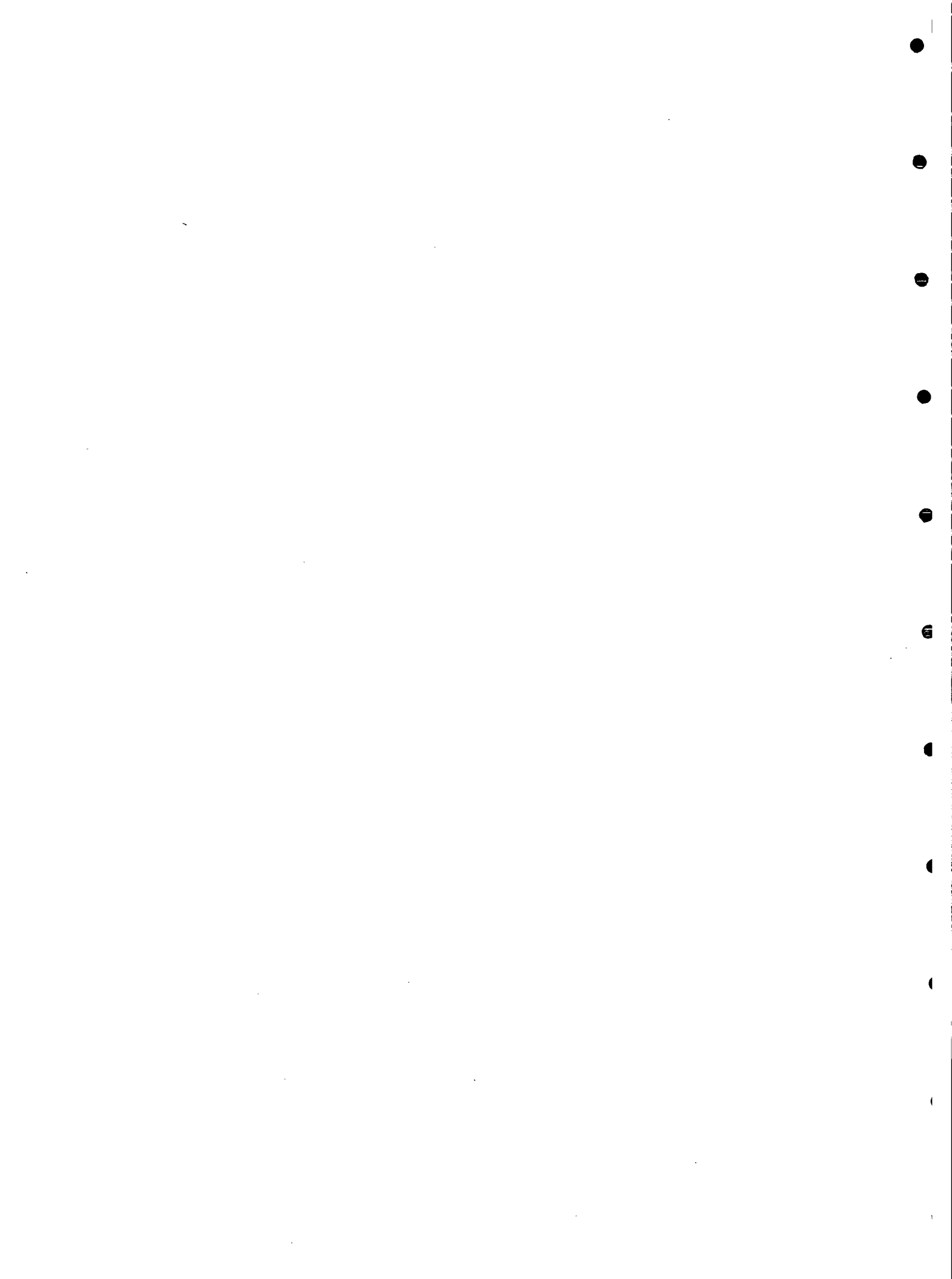CRIME SPECIFIC ANALYSIS

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STUDY OBJECTIVES

The research question posited by the author is: "Are certain kinds of burglaries committed by certain types of burglars?" Previous studies have shown that the characteristics of burglary offenders and of burglary incidents each conform to patterns. The purpose of this study is to see how the patterns are interrelated.

RESEARCH DESIGN

The data base for this study is drawn from burglary data collected through a crime-specific study of burglary conducted by the California Council on Crime and Justice. This data covered a one year period in six California jurisdictions and included all burglaries cleared by arrest. The characteristics of burglary incidents are clustered through the use of a variable analysis (V-analysis) that results in three clusters: (1) use and amount of force to enter a premise, (2) characteristics of the target area census tract, and (3) the type of structure burglarized. The incidents are clustered again through the use of object analysis (0-analysis) based on the composite scores of the V-analysis clusters. Seven types of incidents are identified.

Similar steps are taken with the offender data, resulting in the identification of eight types of offenders. Two-way cross tabulation analyses are then performed between the types of incidents and the types of offenders. In addition, the author conducts an analysis of demographic characteristics to examine the releationship between the sex, race, and age of apprehended burglary offenders and various incident characteristics.

VARIABLES

Characteristics of Burglary Incidents

- day of week
- type of structure
- use of force to gain entry
- use of tool to gain entry
- type of property stolen
- extent of street lighting
- visibility of point of entry
- functioning of alarm system
- target area
- serial numbers etched on property

- time of day
- point of entry
- outcome
- loss
- damage incurred
- method of detection
- lighting with respect to point of entry
- extent of alarm system
- security inspection conducted
- dog on premises

Offender Variables

- place of residence
- race
- number of offenders
- offender released or held
- under supervision
- prior arrest (burglary)

- age
- type of arrest
- distance of offender's home from scene of offense
- prior record
- prior arrest (drug)

Unit of Analysis

- cases matched according to incident and offender (n = 1,196)

OPERATIONALIZATION OF VARIABLES

The characteristics of burglary incidents are all treated as dichotomous variables with the following values:

- day of week -- weekday/weekend
- time of day -- day/night
- type of structure -- residential/non-residental
- point of entry -- door/window
- use of force -- force/no force
- outcome -- attempted/completed
- use of tool -- tool/no tool
- loss -- loss/no loss
- damage -- damage/no damage
- type of property stolen -- money or hard salable items/other
- method of detection -- return of victim/other
- extent of street lighting -- street lights within 100 feet/
  no street lights within 100 feet
- lighting with respect to point of entry -- point of entry
  lighted/point of entry not lighted
- visibility of point of entry -- point of entry visible/
  point of entry not visible
- extent of alarm system -- premises with alarms/premises
  without alarms
- functioning of alarm system -- alarm system functioned/
  alarm system did not function
- security inspection -- security inspection/no security
  inspection
- target area -- Northern California/Southern California
- Dog on premises -- dog present/dog not present
- serial numbers etched on property -- identifying serial
  numbers/no identifying serial numbers.

On p. 19 of the present study, the author says, "The first
report in the series (Pope, 1977a) contains a detailed discussion
of these characteristics and the procedures used to arrive at
each dichotomy. The more extended presentation, however, is not
essential for understanding the analysis undertaken in this
report."

Offender characteristics are all treated as dichotomous
variables with the following values:

- Northern California/Southern California (residence)
- 17 years or younger/18 years or older

- white/black and other
- male/female
- reasonable cause/other type of arrest
- single offender/multiple offender
- burglary less than 1 mile from offender's residence/ burglary 1 mile or more from offender's residence
- released by the police (complaint not filed)/held for prosecution (complaint filed or suspect transferred to the jurisdiction of another agency)
- no prior record of any kind/prior arrest record
- not under supervision/under supervision
- no prior drug arrests/prior drug arrests
- no prior burglary arrest record/prior burglary arrest record

SAMPLING METHODS

The data used in this study were developed from a crime-specific burglary study conducted by the California Council on Crime and Justice. Burglary data were compiled for six separate police jurisdictions and covered a one year period from April 1972 to May 1973.

Only those incidents cleared by arrest were considered. The offender and incident data were merged. Whenever an offender was responsible for more than one incident or if an incident was committed by more than one offender duplicate offender information would be added to the data base for the first case and duplicate incident data would be added to the data base for the second. The result was a matched data set of 1,196 cases in which each offender was linked to each incident and vice-versa.

STATISTICAL METHODS USED

Cluster analysis -- V-analysis and O-analysis were used with both offender and incident data according to the system developed by Tryon and Bailey.

Descriptive statistics -- Two-way tables were presented with frequencies and percentages.

<u>*EVALUATION SECTION*</u>

QUALITY OF OPERATIONAL DEFINITIONS AND MEASURMENT TECHNIQUES APPLIED TO THOSE TERMS

The operational definitions of variables are generally weak. Several definitions are ambiguous. For example, time of day is divided into day and night, but the author does not make it clear at what time the division occurs. Other definitions lack precision because of their dichotomous ("yes/no") formulation. For example, how much light is necessary for the incident to be described as one where the point of entry was lighted? While the author's dichotomous categories are not invalid, greater clarity (scaled or more refined measurement techniques) would have improved the validity of the operational-ization of the variables.

APPROPRIATENESS OF THE RESEARCH DESIGN

In general, there appears to be no theoretical basis to guide the cluster analysis. Existing data are used for the research variables, but the selection of these variables is not well planned or organized. For example, when incidents occurred during daytime, there is no need to take into account variables such as "extent of street lighting" or "lighting with respect to point of entry."

APPROPRIATENESS OF STATISTICAL METHODS

Cluster analysis -- Since there were duplicated data, the correlations used in the V-analysis of incidents and offenders were higher than they would normally be, and since the number of instances of duplication were not presented the reader cannot assess the magnitude of the bias. The author does not report that 70% of arrested offenders in this study were in-

volved in group burglaries. This large number is of substantial concern, since any duplication is a violation of the independence necessary for correlation analysis.

The author fails to describe how the dichotomous variables were coded. For example they could have been coded as two (zero/one) dummy variables or as one variable. It seems likely that the latter coding was used.

Some of the variables used in the incident V-analysis were extremely skewed and could not possibly be correlated highly with other variables. Variables such as "outcome," "dog on premises," and "serial numbers" are examples of variables that are too skewed to be highly correlated with other variables.

Descriptive statistics -- Duplicate data also cause problems in the two-way tables that are presented because some of the countings violate independence. Because of this, the data base used in this study cannot be used for hypothesis testing.

CONCLUSIONS

The author reports:

- In general, burglary was not found to be a patterned event. Aside from some minor relationships, certain types of burglary offenders did not tend to commit certain types of burglaries. These minor relationships were found:
    -- Females are more likely than males to burglarize non-residential structures, using little or no force to gain entry.
    -- Black/other offenders were more likely than white offenders to use a tool, make forcible entries, and damage property.
- Burglars 18 years old and older are more likely than those younger to commit burglaries at night and during the winter.
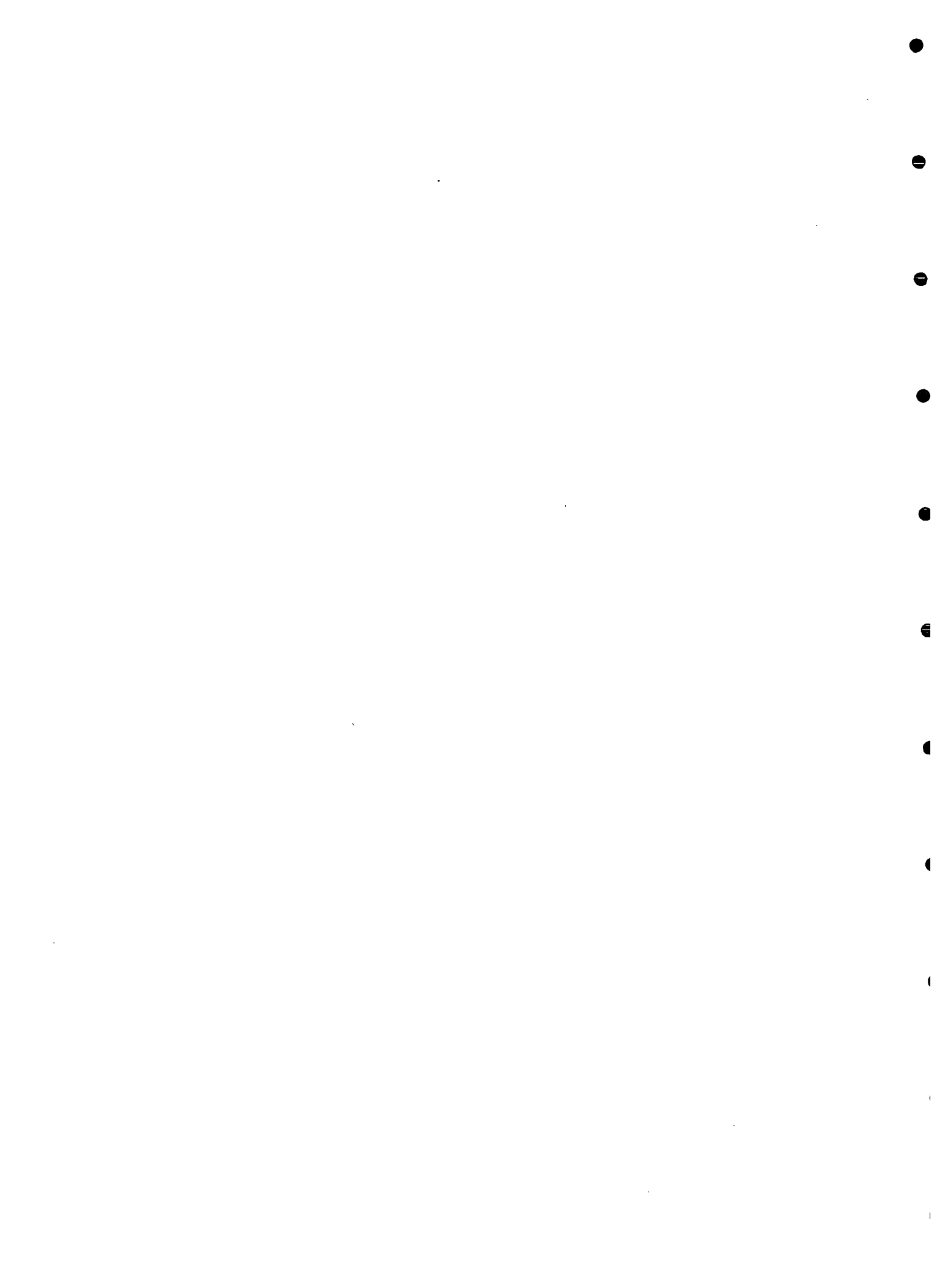
RESIDENTIAL CRIME

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STUDY OBJECTIVES

This book investigates residential burglary and robbery through three separate studies conducted in the Boston Metropolitan Area. In an effort to establish more effective strategies for control of crime, the studies attempt systematically to examine the rates and patterns of burglary and robbery both in terms of methods employed, targets chosen, and the social and physical characteristics of the areas victimized. Following the overview of the book presented below, each of the three studies is reviewed separately.

RESEARCH DESIGN

Thirty-nine "representative" areas of the Boston Standard Metropolitan Statistical Area were selected for the sample according to a stratification of housing types, race, income, and crime rates (p. 6). The information used in the study was gathered from the following sources: (1) an academic and popular literature search, (2) an analysis of criminal justice system records on residential crime, including an examination of 2,500 murders, rapes, burglaries, and robberies, (3) a survey of households, which included interviews with almost 1,000 victims and non-victims of residential robberies and burglaries and an audit of the security aspects of their homes, (4) a field observation study of the comparative security features of 39 selected geographic areas, and (5) a study of residential offender behavior, including detailed interviews with 97 adjudicated burglars and analyses of their criminal histories (p. 6).

The format of the study includes sections on Offender Behavior, Environmental Factors, Victimized Persons and Dwellings, and Control of Residential Crime. Appendices include information on residential crimes other than robbery and burglary, interview procedures, tables, and maps. The review below treats each part of the study separately.

I. OFFENDER BEHAVIOR STUDY

STUDY OBJECTIVES

The study was conducted primarily to obtain detailed information on how and why particular burglars attack specific dwellings. According to the author, the study is exploratory and means "to guide similar studies of a more ambitious nature."

RESEARCH DESIGN

The information used in this study was obtained from police reports of residential robberies and burglaries from 39 reporting areas in the Boston Metropolitan Area over a three year period (n = 1,988), and from personal interviews with 97 adjudicated burglars who volunteered for the study.

VARIABLES

Independent

- age of offender
- racial make-up of area
- race of offender
- drug use

Dependent

- housing type
- planning factors used by the offender
- hour of preferred operation
- use of transport
- method of entry

Units of Analysis

- offenders (n = 97)
- reporting areas in Boston (n =39)
- police records of offenses (n = 1,988)

OPERATIONALIZATION OF VARIABLES

Independent Variables

- Age categories for offenders were trichotomized into (1) under 18; (2) 18-25 and; (3) over 25.

- Race categories were dichotomized into White and Nonwhite

- Drug use was divided into persons who were drug users or nondrug users at the time of their arrest.

Dependent Variables

- *Housing Type* -- Respondents were shown slide sequences of different types of housing and asked to select the type similar to that which they most frequently bur- glarized. In addition, they were asked to discuss the reasons for their selections of housing type. The slides were photographs of actual buildings of the following types:

    - A public housing project with elevator buildings;

    - A group of attached (row) houses;

    - A group of small multi-family houses (known in Boston as three or four deckers);

    - A group of large multi-unit older brick apartment buildings;

    - A group of luxury high-rise apartment buildings; and

    - A group of single-family houses.

Method of Operation - was operationalized through inter- views with burglars. Respondents were asked what types of information they were most concerned with knowing before selection of a sight. Choices included occupancy of residents, availability of valuables, presence of a burglar alarm, police or security patrols, and location of entrances and escape routes.

Transportation - Interviewees were asked how far they were willing to travel from their homes to "make a hit" and whether they would be likely to use a car or travel on foot.

Method of Entry - Interviewees were asked the location and portal of entry, and which method they would normally use to enter a door or window, (e.g., picking lock, looking for open door, breaking glass, etc.)

Hour of Preferred Operation - Interviewees were asked what time of day or night did they prefer for carrying out burglaries. Categories were divided into (1) 6 a.m. to 12 p.m.; (2) noon to 6 p.m.; (3) 6 p.m. to midnight; (4) midnight to 6 a.m., and (5) no preference.

Racial Composition - was divided into Black, White and Mixed.

SAMPLING

1. *Offenders* - Interviewees were sought among probationers at an inner city and an outlying district court, and among prisoners at two houses of correction which serve the city of Boston and a large portion of its suburban area. Participation was voluntary.

To control for individual veracity, each interviewee was given a skill test in which he demonstrated his method of attack on doors, locks and windows which were constructed for this study. In addition, the offenders' criminal history was checked against his own statements.

2. *Reporting Areas* - The metropolitan area, Boston, was assumed to possess a residential crime problem representative of urban areas throughout the country. Thirty-nine areas of the Boston Standard Metropolitan Statistical Area were selected according to a stratification of housing type (public housing, large multi-unit dwellings, small multi-unit dwellings, and single-family houses), race (predominantely white, black, or

mixed), income (high, medium, low), and crime level (low, medium, and high reported residential burglary rate).

After these areas were selected, police records were gathered and analyzed for all residential burglaries (N = 1,988) and robberies (N = 152) reported in each area between 1/1/69 and 9/30/71. Eighteen areas were selected from the original 39 for further analysis. A victimization survey of nearly 1,000 victims and non-victims was undertaken along with a coordinated site survey of the physical environment.

STATISTICAL METHODS

Descriptive Statistics - Conclusions were drawn from comparisons of percentages. No significance tests were performed.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

For an exploratory study, the variables are adequately defined. Race categories (White and Nonwhite) could have been further divided and drug use could have been explained more specifically. Measurement of all variables is adequate for an exploratory study.

APPROPRIATENESS OF THE RESEARCH DESIGN

The research design is appropriate for the stated purpose, to obtain detailed information on how and why particular burglars attack specific dwellings. The design does not permit definitive conclusions, but is suitable for an exploratory study.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

Whenever a target population is sampled, conclusions cannot go beyond that particular population. In this study, all

interviewees were adjudicated burglars and any generalizations
beyond that target group must be made very cautiously.

In addition, the author acknowledges that the validity of
the interview data is limited by the small size of the sample,
and a possible lack of veracity among the interviewees. He
states, however, that "these limitations were not considered
sufficient to invalidate the restricted purpose for which the
data was collected." In support of his position the author
shows that behavioral similarities between the sample of bur-
glars and the universe of burglars in Boston were established
by comparison of interview data with police crime and arrest
reports and data from the victimization survey of 1,000 house-
holds.

APPROPRIATENESS OF STATISTICAL METHODS

For an information gathering survey in an exploratory
study, a comparison of percentages is adequate. However, the
approach lacks explanatory power.

CONCLUSIONS

Target Selection

The offenders who were over twenty-five years of age
selected single-family houses most often indicating that
apparent affluence was a prime factor in their selection.
Younger age offenders generally selected public housing projects
and multi-family homes, indicating that their choice was
guided more by the accessibility of the structure than by the
probability of substantial gain. Whites and drug users were
also somewhat more likely to select single-family homes than
nonwhites and nondrug users.

The author states that although single-family homes were
selected by interviewed burglars more frequently than housing
projects, survey data indicated that housing projects have
higher burglary rates than single-family homes. This apparent

discrepancy parallels the bias in the author's sample towards older offenders.

Methods of Operation

Almost three-quarters of the interviewees indicated that they used some sort of planning, with the older burglars tending to do somewhat more planning than drug users and younger burglars. In addition, the burglars expressed a preference for burglarizing unoccupied residences during the day. Approximately one third of all interviewed burglars wanted evidence of whether there were valuables on the premises and one-third also wanted to know whether a burglar alarm system was in use. Few of the interviewees attempted to assess either the frequency of police patrols, location of entrances, or availability of escape routes. Older offenders were somewhat more likely to be concerned with these matters, were confident about their ability to operate in well-protected neighborhoods, and were least likely to be deterred by police patrols or burglar alarms.

Transportation

Younger and nonwhite interviewees were the most likely to travel on foot, and tended more than the other groups to operate within their own neighborhoods. Approximately half of the interviewed burglars indicated a willingness to operate within their own neighborhoods.

Method of Entry

Interviewees in all categories were far more likely either to pry the door or break the window than to use such sophisticated techniques as picking a lock or cutting glass.

II. ENVIRONMENTAL FACTORS STUDY

STUDY OBJECTIVES

The purpose of this study was to attempt to relate the environmental characteristics of various reporting areas to their crime experience. Such factors studied included a broad range of physical and social characteristics of an area which appeared to make the area more or less vulnerable to residential robbers and burglars. It was hypothesized that high residential crime rates would correlate with characteristics of neighborhoods which one would expect either to produce or attract criminals.

RESEARCH DESIGN

Thirty-nine reporting areas in the Boston Metropolitan Area were classified in terms of various social and physical variables and the average annual burglary rate associated with each classification was then tabulated. The six social indicators selected for statistical analysis were: geographic location; median income; predominant housing type; racial composition; size of youth population; and burglary rate of surrounding area. Tabulations of average burglary rates associated with each factor were tested for statistical significance with chi square computations. In addition, five "opportunity" factors (or vulnerability factors) were tested for statistical significance: urban design factors, social cohesiveness of areas, occupancy patterns, visibility of targets and deployment of police or other patrol forces, were analyzed. Data for these variables were collected by site surveys, resident interviewes and archival crime data.

VARIABLES

Independent   *Dependent*

    Social Factors

- geographic location
- burglary rates of sur-
  rounding neighborhoods
- race
- income
- percentage of youth
  population
- predominant housing
  type

- annual burglary rate

    Opportunity or Vulnerability Factors

- access or physical vulnerability
- social cohesiveness
- occupancy
- visibility
- police protection

Unit of Analysis

Reporting areas (RAs) in the Boston Metropolitan Area
(N = 39)

OPERATIONALIZATION OF VARIABLES

Social Factors

- Geographic location - is divided into three areas:
  (1) the core; (2) adjacent to the core; and (3) out-
  lying. The core section includes the downtown busi-
  ness section, a few wealthy residential areas, one
  university area, and most of the low-income ghetto
  area of Boston. Adjacent areas and outlying areas
  are not explicitly defined, but rather identified in
  map format.

- Burglary rates of surrounding neighborhoods are the
  average annual residential reported burglary rate of
  surrounding neighborhood.

- Race is divided into (1) predominately White (less than 20% Black); (2) predominately Black (over 63% Black), and (3) Mixed (20-63% Black).

- Income is divided into three categories: (1) lower income, (below $5,000); (2) middle, ($5,000-$8,000), and higher (about $8,000). The author states that this definition of income provides for a relative ranking of an area rather than an absolute one, since the areas under study were predominately lower and lower-middle income areas on an absolute scale.

- Percentage of the youth population is defined as the percentage of the population of under eighteen years of age. This variable is divided into three categories: (1) less than 20%, (2) between 20-30%, and (3) over 40%.

- Predominate housing type is divided into four categories: (1) single-family; (2) small multi-family structures, 2-9 units, usually walk-up; (3) large multi-family structures, 10 or more units (often elevator buildings; and (4) public housing projects.

Vulnerability Factors

- Access or physical vulnerability - methods for measuring this variable included observations of the land use composition of areas, and site surveys, including day and night observations of traffic conditions and pedestrian traffic. Car traffic was divided into categories of light (generally very few or no passing vehicles over a period of 10-15 minutes); moderate traffic, generally a steady flow of passing vehicles every few minutes; and heavy traffic, generally a continuous flow of passing vehicles. Pedestrian traffic was also classified as light, moderate, and heavy. In addition, observers took notice of residents in their yards and in the streets in order to estimate outdoor activity in the neighborhood. The household survey also analyzed the security of dwelling portals (doors and windows) in reference to federal standards. Too few portals met the standards to allow for areas to be ranked along this variable.

Social Cohesion - In order to obtain a rough estimate of social cohesion, the household survey phase of the study developed an index of social cohesion based on the answers to the following three questions:

1. In some neighborhoods people do things together and help each other--in other neighborhoods people mostly go their own ways. In general, what kind of neighborhood would you say this is mostly--one where people *help each other* or one where people *go their own ways?*

   ( ) *Help each other*

   ( ) *Go their own ways*

2. How many families around here do you feel you know well enough to ask a favor of if you needed something--would you say *most* of them, *some* of them, or *almost none* of them?

   ( ) *Most*

   ( ) *Some*

   ( ) *Almost none*

3. And how long have you been living at this address?

"The areas were rated low, medium, or high in degree of social cohesion, based on the following scale. One point (each) was given if a person knew almost none of his neighbors, had lived at his present address less than two years, or said that people in the neighborhood went their own way. Two points (each) were given if a person knew some of his neighbors, or had lived at his present address two to five years. Three were given if a person knew most of his neighbors, said they help each other, or had lived there more than five yars. Those who received an average score that was less than 1.6 were defined as low, between 1.6 and 2.5 were defined as medium, and those with 2.6 or more were defined as nigh. Any residential area where 40 percent or more. responses fell into the low category was defined as low; where 40 percent or more fell into the high category, the area was classified as high in cohesion."

Occupancy - Three categories were developed: (1) high occupancy, 60 percent or more of the dwellings were unoccupied in the daytime *no more than* five hours a week; (2) low occupancy, 60 percent of the dwellings were unoccupied in the daytime more than 35 hours per week; and (3) medium occupancy, residual category.

Visibility - a survey of exterior, public lighting was conducted for this variable. No other information is given.

Police protection - percentage of all crimes discovered in progress by patrolling police, as reported through police archival data.

Dependent Variable

- Annual burglary rate is the residential burglary rate per 1,000 households averaged for 1969, 1970 and 1971, based on police archival data.

SAMPLING

Reporting Areas

See "Offender Study."

Victimization Survey Sample

A total of 220 victims of residential burglary and 682 non-victims were surveyed. These respondents included a random sample of dwellings in each of the 18 reporting areas which had reported a burglary between 1/1/69 and 9/30/71 and a random sample of dwellings which had not reported any burglaries during the same time frame.

STATISTICAL METHODS

Each of the six social indicators and its association with average burglary rates was tested for statistical significance with chi square computations. A multivariate regression analysis was also used for social variables. Relationships between vulnerability factors and residential burglary were also tested for statistical significance with chi square computations.

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

All social factors were well defined. Under "vulnerability factors" more information could have been presented concerning the method of tabulating both auto and pedestrain traffic, including the various hours and days in which counts were taken. Since counts were, however, rough measurements, these facts are not essential. In addition, neither visibility nor lighting is well defined by the author. Since residential burglary most often occurs in the daytime, this variable is not a crucial one.

The dependent variable, residential burglary rate, is well defined by the author, who includes comprehensive data in the appendix.

APPROPRIATENESS OF RESEARCH DESIGN

For an exploratory study, the research design is appropriate.

APPROPRIATENESS OF SAMPLING PROCEDURE

Survey sample seems adequate and appropriate for an exploratory study.

APPROPRIATENESS OF STATISTICAL METHODS

Multiple regression seems to be appropriate except that the ratio of (N = 39) and the number of variables is not high. Therefore, the results might not be stable. Also the possible importance of covariance can be easily seen from the fact that no t-values were significant in the last row of the results presented.

It is not clear from the study what kind of chi square computation was performed. (Tables 3-11 and 3-12 on pp. 35, 49).

The data provided in Tables 3-1 through 3-8 alone cannot generate chi squares since N's which generated these rates were not reported. (See Fleiss, J. L. "Statistical Methods for Rates and Proportions," 1973). Also it should be noted that tables show *AVERAGE* rates. Therefore, analyses of variance with or without transformation should have been used.

CONCLUSIONS

The author reports:

- *Geographic Location* - Results were not statistically significant, however they were suggestive. Most of the core residential areas report medium to high rates of burglary; and among those which deviate are three areas which contain luxury high-rise apartment areas with special security devises and private guards.

- *Burglary Rates of Surrounding Neighborhoods* - Residential burglary for given areas was a function of the overall burglary rate of the surrounding neighborhood, except where there was a concentration of well-secured buidlings.

- *Race* - The rate of residential burglary was significantly higher in Black areas than in White or Mixed areas.

- *Income* - The association between low income levels and high crime rates was statistically confirmed.

- *Age* - There was no significant relationship between burglary rates and size of youth population.

- *Predominant Housing Type* - Differences between housing types and crime rate were not statistically significant, although single family areas had a markedly lower rate than the others.

- The results of the multivariate regression show race to be the most significant predictor of burglary rates, followed by rates of the surrounding areas. The author states that the covariance of race with income and size of youth population, however, suggests that "the burglary rates of surrounding neighborhoods are just as likely to represent socio-economic continuity as to represent a causative factor of crime patterns."

Access or Physical Vulnerability - Physical "access" characteristics were correlated with burglary and robbery rates only in the luxury high rise apartment areas which had elaborate security precautions, low burglary rates and no robberies.

Social Cohesion - Burglary rate was inversely related, although not significantly, to the social cohesion measures.

Occupancy - Burglary rates of an area did not significantly vary with the occupancy patterns of the residents.

Visibility - No correlation existed between robbery and burglary rates and exterior, public lighting.

III. VICTIMIZED PERSONS AND DWELLING STUDY

STUDY OBJECTIVES

This study explores the differences between the people and structures which were and were not victimized in selected Boston Metropolitan Areas. This study is an approach to answering why one particular household is burglarized and not another.

RESEARCH DESIGN

This study utilizes a survey sample consisting of a random sample of recently burglarized dwelling units in eighteen reporting areas in the Boston area, and a random sample of non-burglarized units. Victims were compared with non-victims for socio-economic characteristics, race, and social characteristics. Victimized structures were compared with non-victimized structures on accessibility features and detection factors.

VARIABLES

Independent   *Dependent*

   Victim Characteristics

- Income   • Victimization rate
- Race
- Age
- Marital status
- Education
- Occupancy behavior
- Social isolation
- Concern about burglary

   Structure Characteristics

- Number of portals
- Standard or nonstandard doors
- Location on block
- Structure type

OPERATIONALIZATION OF VARIABLES

Victim Characteristics

- Income characteristics - Income was tabulated per house-
  hold and divided into categories: (1) less than
  $8,000; (2) $8,000 - $14,999; and (3) $15,000 or more.

- Race - was divided into White and Black.

- Age - Age of head of household; divided into three
  categories: (1) 30 years or less; (2) 31-64 years,
  and (3) 65 or more years.

- Marital status - divided into single and married

- Education was tabulated in the following categories:
  (1) less than grade 12; (2) high school graduate;
  (3) any college education, and (4) higher degree.

- Occupancy behavior - was defined as the number of
  daytime hours not at home each week. Categories
  included: (1) out 0-5 daytime hours per week;

(2) out 5-35 hours per week, and (3) out more than 35 hours per week.

- Social isolation - The same three questions used to measure area cohesion in the *Environmental Factors Study* were applied to individuals.

- To measure concern about burglary - The following question was asked: How worried are you about your home being broken into or entered illegally when no one is at home? Would you say *very worried, somewhat worried, just a little worried,* or *not worried at all?*

Structure Characteristics

- *Number of portals* - is defined as the number of entry options in a residence, including windows and doors.

- *Standard and nonstandard doors* - a standard door was defined as one which must (1) be of metal, metal panels, solid wood, or hollow wood of three-quarter inch thickness; (2) have no exposed hinges; (3) have no unprotected glass near the door handle; and (4) lock with either a three-quarter inch dead latch or dead bolt or a vertical bolt. Nonstandard doors was a residual category.

- *Structure types is divided into three categories* - single family, small multi-unit and large multi-unit.

- *Location on block* - is defined as either a corner location or a non-corner location.

Dependent Variable

Victimization rate is the number of individual households victimized per 1,000 households.

SAMPLING

The same survey consisted of independent random samples of recently burglarized and non-burglarized dwelling units.

In addition, 125 victims in the burglarized households were interviewed. An additional 95 victims of burglaries which were not reported were identified and interviewed. Interviews were also conducted with 682 non-victims of residential burglary.

STATISTICAL METHODS USED

Descriptive Statistics - The author presents frequencies and percentages with regard to all independent variables and the dependent variable.

Chi Square - The author reports that "the information presented" (presumably all independent variables and the dependent variable) was tested for statistical significance with chi square computations.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Operational definitions are adequate and well categorized for an exploratory study. In addition, the author provides a rationale for the inclusion of each variable, with information included on the results of previous studies. More information, however, could have been provided concerning the interview process, including how interviewees were approached, length of time per interview, and pre-test measures and checks on the reliability of the survey results.

APPROPRIATENESS OF RESEARCH DESIGN

This pre-experimental research design is adequate and reasonably complete for an exploratory study.

APPROPRIATENESS OF SAMPLING PROCEDURE

The sampling procedure is appropriate and well thought out.

APPROPRIATENESS OF STATISTICAL METHODS

Chi Squares - Since no hypotheses were specified for the tables with more than two factors, it is not clear how to interpret the significance. For example, Table 4-2 on page 57

has three factors, namely race, income, and victimization (yes or no). For this table it is possible to compute several chi squares based upon log-linear models. Since the author did not specify what chi square was computed with which model it is not clear how to interpret the result.

Descriptive Statistics

The tables with frequencies and percentages are appropriate, but interpretation of these figures should be done very conservatively since no hypothesis testing was involved.

CONCLUSIONS

The author reports:

- The high crime areas were all low-average income areas. Within these areas, the upper income houses within both these areas and middle income areas appear to be victimized most frequently.

- No significant differences in victimization existed between the Black and White groups, although high income Blacks experienced the highest victimization rate of any group.

- Victimization experience appeared to have some effect on security behavior, as well as on fear level.

- The probability of a dwelling unit being burglarized tends to increase with the number of entry options open to the burglar - particularly when these options include windows as well as doors.

- Door quality is associated with burglary rate.

- Corner structures have a higher probability of being burglarized.

DISCUSSION OF CONCLUSIONS

The conclusions reached by the author are based on measures of association and should not be interpreted as allowing causal inferences between and among variables. This study represents a very well done exploratory study which does not

attempt to provide vast amounts of new knowledge regarding the
relationship between environmental factors relevant to crime
and crime prevention behavior.

PATTERNS OF BURGLARY

Author:

Harry Scarr

Reviewers:

Peter Hartjens
Tet Motoyama
Herb Rubenstein

STUDY OBJECTIVES

This report is a study of the patterning of burglary offenses. Its aim is to cover the entire structure of the crime, presented by the author in the following hypothetical order:

- *Needs* that may be met through successful burglarizing

- Knowledge of *burglary technology*

- *Perceived opportunities* to burglarize

- Burglary perceived as a path *to meet needs*

- *Choice of burglary* over other paths

- The burglary *attempt* , which succeeds in the complete cycle. (If it fails, the police and court systems come into play and this single cycle is broken.)

- *Conversion* of the burglarized goods into a useful form

- *Satisfaction* for the act

- *Reinforcement* of the whole series of steps in the cycle, thus increasing its probability of reoccurrence.

Overview of the Study

This study explores the patterns of burglary in three different jurisdictions in the Washington, D.C. Standard Metropolitan Statistical Area using the following five data sources: (1) police reports of burglary offenses for the years 1967, 1968, and 1969, as reported by the police departments in these areas and by the Uniform Crime Reports; (2) 1970 census data; (3) interviews with victims of burglary and with persons who had not been victimized; (4) interviews with offenders and; (5) interviews with criminal justice system personnel. This review will be divided into two sections: (1) a review of the author's study of spacial, temporal and social characteristics associated with burglary; (2) the author's victimization survey. Interviews with offenders and criminal justice personnel will not

be presented in this report since they do not investigate in any way the relationship between the physical environment and crime or crime prevention behaviors.

SPATIAL, TEMPORAL AND SOCIAL CHARACTERISTICS ASSOCIATED WITH BURGLARY

RESEARCH DESIGN

Using police and census reports as data sources, this study explores the spatial and temporal patterns of crime in three Washington, D.C. jurisdictions. In addition, various social characteristics, including race, composition of households, and others, are correlated with the occurrence of burglaries. This review will focus on those aspects of the study which are related to the physical or built environment.

VARIABLES

- place of entry

- means of entry

Unit of Analysis: burglarized residences and businesses

(N=5740 [1967]; 22,625 [1968]; 27,567 [1969] 1)

OPERATIONALIZATION OF VARIABLES

- *Place of entry* - is the percentage distribution of the place in the building where breaking and entering took place. Categories include the following: (1) door; (2) window; (3) roof; (4) other, and; (5) unknown.

- *Means of entry* - is divided into the following categories; (1) break glass; (2) force lock; (3) open unlocked door/ window; (4) use key to unlock door; (5) other, and; (6) unknown.

SAMPLE

Three jurisdictions in the Washington, D.C. Standard Metropolitan Statistical Area are chosen for the study. The three include Fairfax County, Virginia, Washington, D.C., and Prince George's County, Maryland. The author does not discuss the basis for area selection.

STATISTICAL METHODS

Descriptive Statistics - The author presents the results of the study in frequencies and percentages. No tests of significance are performed.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

Operational definitions are determined by the information available in the police records. They are satisfactory for an exploratory study.

APPROPRIATENESS OF RESEARCH DESIGN

There is no research design in the sense of hypothesis testing associated with the study. The design is appropriate for an exploratory study.

APPROPRIATENESS OF SAMPLING PROCEDURE

No explicit rationale is presented for the choice of the three Washington, D.C. jurisdictions. However, in the description of the three sites the author implies a rationale in that the three areas differ in racial makeup, population density, rate of growth, and family income.

APPROPRIATENESS OF STATISTICAL METHODS

No statistical analysis is performed. This can be considered appropriate for an exploratory study, but yields little explanatory power.

CONCLUSIONS

The author reports:

- In all three jurisdictions, doors are the primary point of entry, with front doors being used most often in

two study areas and rear doors used more often in one
study area. The author suggests that differences in
housing type may be accountable for some of the differ-
ences

o Data on means of entry available for the two study areas
show that in the more urban areas burglars break locks
and enter forcibly more often than in more suburban areas.
The author suggests that one contributing factor might
be that urban residents may lock their doors more often
than suburban residents.

DISCUSSION OF CONCLUSIONS

The conclusions are accurate based on the data presented.
The author is careful to note that his hypothesized causal
explanations should be taken as the author's viewpoint rather
than as inferences drawn from data analysis alone.

VICTIMIZATION SURVEY

STUDY OBJECTIVES

This study is intended to explore the differences between
burglarized homes and businesses and other nearby non-burglarized
homes and businesses in order to determine what, if any, factors
may be controlled in order to prevent or deter burglary.

RESEARCH DESIGN

The author conducted a survey of 180 recently victimized
persons and 166 persons who had not been victimized. The
survey gathered data on: 1) background and demographic
information; 2) victimization experiences; 3) psychological
orientations; 4) responses to the perceived crime problem or
the crime problem experienced as a victim and; 5) physical
characteristics of the residence of all interviewers. The
surveys asked a series of questions related to target
behaviors undertaken by victims and non-victims to reduce
their probability of future victimization. It is this part
of the survey which is reviewed below.

VARIABLES

TARGET HARDENING
- Leaving a light on inside
- Leaving a light on outside
- Having a dog on the premises
- Having a private patrolman or security guard
- Having a chain lock without a key on the door
- Having a dead bolt lock
- Having a bar across a sliding door or window
- Having key locks on windows
- Having other special locks
- Having other protective measures

BEHAVIOR CHANGES
- Usually have someone at home now/during day/evening/ time of burglary
- Leave a radio on
- Keep their doors locked in the daytime
- Keep their doors locked in the evening
- Keep their windows locked when someone is home
- Notify police when out of town
- Have neighbor or friend watch or check apartment when out of town

PREVENTIVE EFFORTS
- better street light
- stronger police powers
- more crackdown on offenders
- more programs for youth

OPERATIONALIZATION OF VARIABLES

The variables are described in the study only to the extent they are listed above. No other operational definitions are given.

SAMPLING

The study area was stratified according to political juris-
diction (Fairfax County, D.C. and Prince George's County) bur-
glary type (residential vs. non-residential), and neighborhood
(high burglary rate vs. low burglary rate). A listing of
burglary victims in 1969 was developed from police archival
data for each of the twelve "cells" resulting from the inter-
action of these three stratification factors. Addresses of
burglary sites in each list were then ordered randomly, and the
interviewers proceeded through the list until 15 completed
interviews had been conducted. A comparison group sample of
non-victims who resided in the same neighborhoods as the vic-
timized sample was chosen primarily by random sampling techniques.

STATISTICAL METHOD

Descriptive Statistics - The author presents the results
of the survey in frequencies and percentages. No tests of sig-
nificance are performed.

EVALUATION SECTION

*QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES
APPLIED TO THOSE TERMS*

No operational definitions are given for variables.
However, the variables are straightforward and no further
definition is necessary for an exploratory study.

APPROPRIATENESS OF THE RESEARCH DESIGN

The exploratory nature of the research design is adequate
for gathering data systematically on crime prevention behavior
across the two dimensions studied: changes in behavior after
victimization, and differences in behavior between victims and
non-victims. The design does not allow for casual inferences.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling procedure is detailed and comprehensive for an exploratory study, including three levels of stratifications and nearly equal numbers of subjects across all "cells."

APPROPRIATENESS OF THE STATISTICAL METHODS

The use of descriptive statistics is appropriate for an exploratory study.

CONCLUSIONS

The author reports:

- Although victims of residential burglaries change their behavior to reduce the probability of future victimization, their post-victimization behavior often does not exhibit more protective behaviors than those employed by non-victims.

- The behaviors which victims were more likely to undertake than non-victims included 1) leaving a light on inside, 2) having bars or wire mesh on doors or windows, 3) having a dead bolt lock, 4) having a bar across a sliding door or window, and 5) having special locks such as key locks on windows.

- Businesses which were victimized are more likely after their victimization to use a burglar alarm, leave a light on outside, have a dog on the premises, have bars or wire mesh on doors or window, engage the services of a security guard, have a dead bolt lock, have a bar across a sliding door or window, have special locks and take other protective measures.

DISCUSSION OF CONCLUSIONS

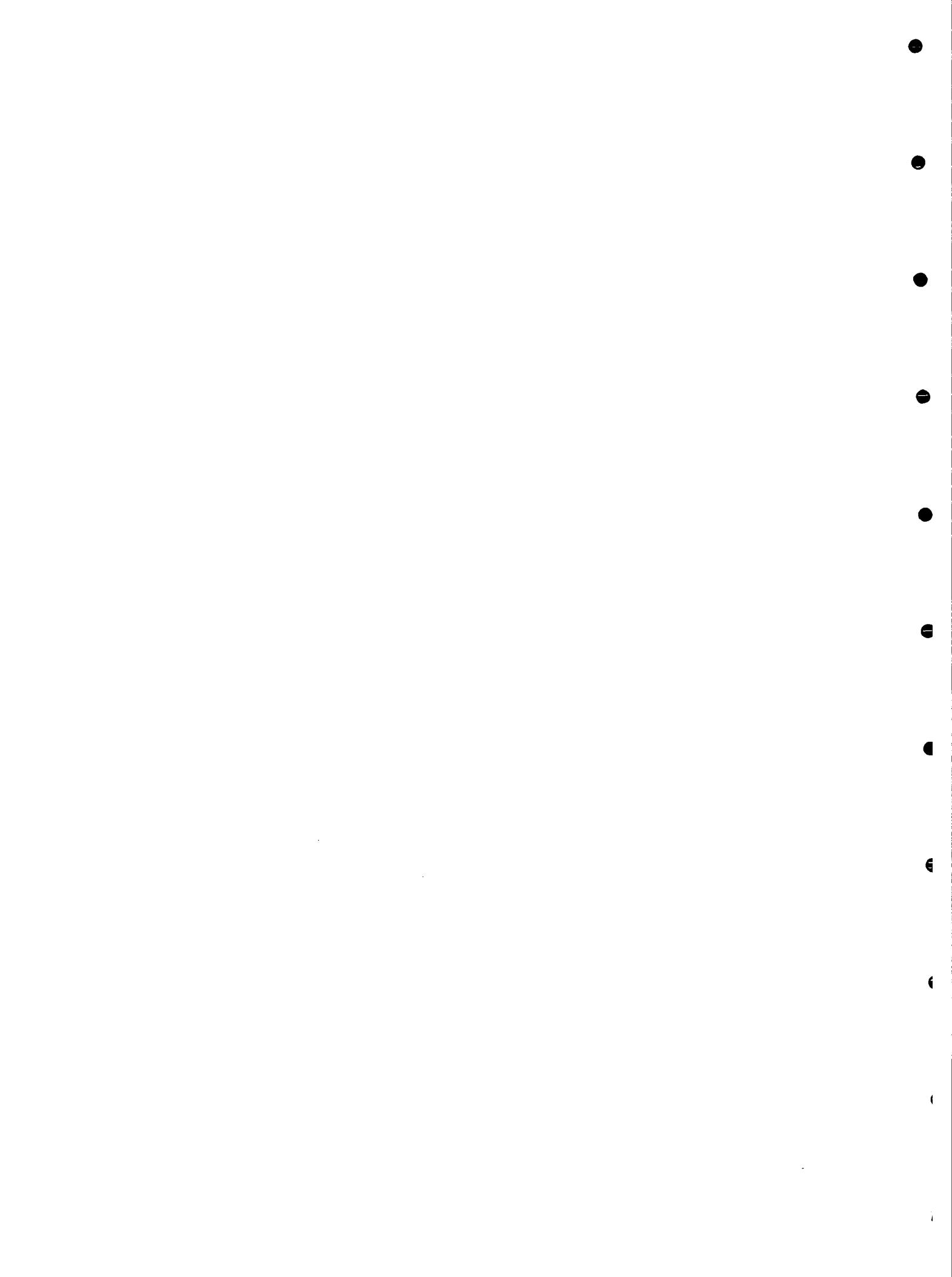The author's conclusions are based on the data presented.

DEFENSIBLE SPACE IN A HOUSING PROJECT: A CASE STUDY FROM A SOUTH FLORIDA GHETTO

Authors:

R.J. Tata
S. Van Horn
D. Lee

Reviewers:

T. Motoyama
H. Rubenstein
P. Hartjens

STUDY OBJECTIVES

The objective of the study is to "demonstrate links between residents' perceptions of their residential environment and observed personal and community attitudes." Specifically the authors review Newman's "defensible space" model and evaluate the Citrus Park public housing development against the physical design guidelines set forth by Newman.

RESEARCH DESIGN

The study consisted of 83 interviewers with residents in Citrus Park public housing development. Interview questions focused on resident attitudes toward environmental conditions, respondents' sense of secuirty and community pride. The interview results were interpreted according to Newman's theories on positive/negative aspects of the physical design of residential buildings.

VARIABLES

- Functional area
- Sense of community
- Attitudes toward safety and security
- Physical design of project

UNIT OF ANALYSIS

- Respondent (n=83)

OPERATIONALIZATION OF VARIABLES

Each variable was operationalized through a question asked to the resident during an interview. The questions were:

1) How would you change the place where you live to make it better?

2) If a neighbor called for help would you assist him?

3) How would you help him?

4) Do you lock your door when at home?

5) Do you lock your door when there is no adult at home?

6) Where do you prefer to have your children play?

7) Do you recognize most of your neighbors?

8) Where do you prefer to meet friends?

9) Where are you afraid to go?

10) Where do you visit often?

SAMPLING PROCEDURES USED

The authors do not report how the 83 residents were chosen.

STATISTICAL METHODS USED

Descriptive statistics -- The authors present interview results in percentage figures. A descriptive map is also provided.

EVALUATION SECTION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENT TECHNIQUES APPLIED TO THOSE TERMS

The authors neglected to test the interview questions with regard to either their validity or reliability. The authors' claims that the questions measure sense of community, pride, etc. are not substantiated. In general, measurement of such

complex concepts as sense of community through one or two
interview questions will not provide an adequate operation-
alization of the variable. Such is the case in this study.

RESEARCH DESIGN

The research design based upon interviews with residents
is not sufficient to demonstrate the existence of caused linkages
between residents' perception of their environment and observed
personal and community attitudes. The design is similar to the
situation where there is a treatment group but no control group.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The author provide no information on the sampling pro-
cedure used except to provide the number of respondents (n=83)
and location (Citrus Park Housing Development). In order to
meet the stated objectives of the study, it would be necessary
to sample various types of housing developments with appropriate
sampling strategies.

APPROPRIATENESS OF STATISTICAL METHODS USED

The information given through the use of descriptive
statistics (percentages) is not very informative without
information on comparison groups. In addition the authors
failed to report how the descriptive map was developed.

CONCLUSIONS

The authors report:

- The physical design of Citrus Park violates six of
  Newman's eight precepts for creating secure (defensible
  space) residential complexes.

• The effect of the poor physical design is a sense of frustration, abination from society insecurity and rapelessness among residents.

DISCUSSION OF CONCLUSIONS

The conclusions are not supported with statistical integrity by the research. The failure of the study to employ a comparison group renders the study unable to varify the link between resident attitudes and the physical design of the housing development. Certainly these attitudes may be the result of other causes. The study design's failure to be able to reject a false hypothesis leaves it with little analytic power. In addition the authors accepted the Newman precepts without verifying them. The possible lack of validity of these concepts further erodes any confidence that one can have in the results of the study.

FOCUS ON ROBBERY:

THE HIDDEN CAMERAS PROJECT--SEATTLE, WASHINGTON

Author:

D. Whitcomb

Reviewers:

Herb Rubenstein
Tet Motoyama
Peter Hartjens

STUDY OBJECTIVES

This research and demonstration effort included the installation and evaluation of hidden cameras placed in businesses in Seattle. The objectives of the project were to determine whether hidden cameras (1) increased robbery clearances, (2) increased convictions, (3) reduced the incidence of robbery in the treatment sites and in Seattle as a whole, (4) affected the potential risk of injury in a robbery situation, and (5) reduced the cost of processing and prosecuting robbery cases. Objectives four and five are not reviewed below since they do not investigate the relationship between environmental factors and criminal behaviors.

RESEARCH DESIGN

The study employed an experimental design. One hundred and fifty (150) businesses were identified as "likely to be robbed." One-half were given hidden cameras while the other half were not treated. The experimental period was June 1976 to April 1977. Approximately three months after camera installation, one-half of the cameras were moved randomly from their original sites to previously untreated (control) sites. Thus, one-half of the treatment became control group sites. No further movement of cameras took palce during the project.

In addition, the study compared the level of commercial robberies in Seattle to the crime levels found in other cities of 250,000 population or more. The study also compared non-criminal robbery rates in Seattle to commercial rates using non-commercial robbery rates as the comparison group. Both of these tests sought to provide further evidence on the effectiveness of the demonstration program in Seattle.

VARIABLES

Independent

- Treatment or no treatment (hidden camera vs. no treatment)

Dependent

- Clearance status
- Robbery rate
- Whether cleared by arrest
- Whether there was an arrest (Yes/No)
- Cause of arrest
- Cost of cameras plus installation

Unit of Analysis

- Robbery
- Suspect

OPERATIONALIZATION OF VARIABLES

Independent Variables

- Cameras were concealed in a simulated stereo speaker box and focused on the store's cash register area. Cameras could be activitated by employees using pocket radio or by a mechanism on the cash register.

Dependent Variables

- Clearance status--This variable was measured by whether or not the robbery was cleared.

- Whether cleared by arrest--This variable was measured by whether the clearance was by exceptional means (identity of offender known, but can not be arrested due to incarceration, death, victims refused to prosecute, etc.) or by an arrest.

- Cause of arrest--This variable was divided into four categories--(1) photography by camera, (2) arrest at or near scene, (3) victim-witness identification, and (4) other.

SAMPLING

The sample of businesses was selected on a study of the distribution of robbery. After the exclusion of taverns and banks, a pool of 200 businesses that had been previously burglarized and had a high probability of burglary was reduced to 150 businesses. Seventy-five potential sites were selected randomly as experimental sites with the remaining originally receiving no treatment.

STATISTICAL METHODS USED

Two-way tables and chi-square--Effects of hidden cameras were tested by chi-squares through comparing treatment and non-treatment groups on the clearance rate for robbery, on the rate cleared by arrest for robbery, and on the arrest rate for suspects.

Regression--The regression analysis was used to predict expected robbery rates in the study year based upon robbery rates of the preceding four years. A similar regression was run to predict the crime rate of all cities combined over 250,000 and served as a comparison group statistic.

Analysis of Covariance--The author selected an eleven month period, August 1975 to June 1976, as a pre-project period and August 1976 to June 1977 as the post-project evaluation period. Using the same named months as covariates, the author tested for the significance of the difference between the commercial and non-commercial robbery groups.

Correlation--The author analyzed the relationship be-
tween the number of persons arrested and convicted (cumulative)
as a result of attempting to rob a site with a hidden camera
and the number of robberies during the corresponding month.

EVALUATION

QUALITY OF OPERATIONAL DEFINITIONS AND MEASUREMENTS TECHNIQUES APPLIED TO THOSE TERMS

The variables are well defined and are likely to be both
reliable and valid since most of them are categorical. The
variable robbery rate is appropriately defined although sub-
ject to problems common to reported crime data, namely under-
reporting.

APPROPRIATENESS OF THE RESEARCH DESIGN

The experimental design used in the study appears to
have been implemented as rigorously as possible given the
real world setting in which the project took place. The use
of randomization of treatment increased the validity of the
design. The author did not, however, seek to determine
whether there was an interaction effect between treatment and
police attitudes and behavior. Omitting this dimension from
the research design leaves the reviewer without any means of
determining whether the existence of hidden cameras directly
affected criminal behavior and prosecution or had an effect
on them through the interviewing variable of increased police
surveillance and patrolling of the treatment stores and sur-
rounding areas.

In addition, one would expect another source of con-
foundment overlooked by the researchers. Since the stores in
the experiment had been robbed before, one would expect that
police policing patterns would reflect the time when the last
robbery took place. It is well known that police patrols

are changed in an area immediately after a "hit" and soon
return to normal. The recently robbed stores in the study
group could be expected to receive different police protection
than those not recently robbed. The experimental design in
the real world could not have controlled for either confounding
influence. Yet, further research on these dimensions would
have provided important evidence on two of the questions
left unanswered by the study.

APPROPRIATENESS OF THE SAMPLING PROCEDURE

The sampling of the 150 sites from a larger pool of
potential sites was appropriate. Further, the randomization
of the treatment was an important ingredient in the success
of the study. It does not significantly detract from the
study that in four locations cameras were removed due to false
activations and in other locations cameras could not be in-
stalled due to inadequate lighting or other physical inade-
quacies of the site.

APPROPRIATENESS OF THE STATISTICAL PROCEDURES

The two-way tables are appropriate. The use of the chi-
square methods on the suspects is likely to be biased since
the subjects do not meet the assumption of independence re-
quired and were nested within the robberies. There is not
enough information to evaluate the author's use of regression
analysis.

The use of analysis of covariance for non-random assign-
ment samples is controversial. In addition, the author failed
to report the means of the covariate. If they are different,
it is likely that the result of the analysis of covariance
should be taken with extreme care since the two groups are
not uniformly formed. Also, as the author cautioned, cor-
relation should not be taken too seriously since the

observational units, the cumulative number of persons, do not meet the test of independence.

CONCLUSIONS

- Monthly robbery rates decreased 38 percent in the eleven months after installation compared to the eleven months preceding installation.

- Forty-eight percent of the offenders involved in robberies at hidden camera sites were convicted compared to only nineteen percent of the offenders at the control sites.

- Fifty-five percent of robberies at the treatment sites were cleared by arrest compared to only twenty-five percent in the control sites.

DISCUSSION OF CONCLUSIONS

The conclusions are supported by the data. It appears that the installation of hidden cameras had a deterrent effect and increased arrest and conviction rates. As stated earlier, the study sheds little light on potentially important intervening variables such as police patrol and surveillance. It remains possible that some of the positive results of the program are a result of the treatments associated with the hidden camera program (e.g., greater police patrol, greater employee awareness of suspicious activity) rather than the simple installation and use of hidden cameras. In spite of this limitation, the research and demonstration effort has provided generalizable results and a replicable planning and implementation process.