STREET LAYOUT AND RESIDENTIAL BURGLARY

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This report summarizes a preliminary study of street layout as a possible deterrent of crime. Basis for the study is the work of Oscar Newman.

In his book, Defensible Space, Newman suggests that residents who perceive an area as their territory have greater concern for what happens there. Newman further states, "It is possible to subdivide the existing fabric of city streets in order to create territorially defined blocks and areas." As the territorial subdivision of streets in an area increases, the residents are more likely to increase surveillance and can better recognize who does and does not belong in the area. Thus, when territoriality increases, surveillance also increases, both of which contribute to a reduction of crime.[1]

Street layout can deter crime by strangers in ways other than increasing the territoriality and surveillance by residents. Interviews with burglars indicated they prefer to be familiar with the areas they victimize and they select targets which are convenient for both access and departure.[2] Burglars (like everyone else) are probably less familiar with, and find less convenience in, those areas which are somewhat isolated from the rest of the city due to inaccessible streets. These interviews additionally indicated that burglars avoid areas where they might be more easily identified as a stranger.

Finally, street layout may indirectly deter crime by local residents.

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[1]Oscar Newman, Defensible Space, (New York: Collier Books, 1973), pp. 60-62.

[2]Based on interviews in 1976 with 45 burglars imprisoned in State of Minnesota institutions.

Blocks less accessible to other streets will probably be traveled most often by local residents. If local residents are the primary users of their streets, those streets can more easily be adapted in a territorial way by the residents. Not only will it be easier to observe strangers on these blocks but greater concern for the area by residents should result in greater surveillance. Residents will be less hesitant to challenge anyone, stranger or known, who is engaged in suspicious or disruptive behavior.

There are examples in several cities of streets being changed for the purpose of reducing crime. Experiments in St. Louis and Brooklyn suggest that a relationship between street arrangements and crime has a basis in fact, not just in the theories and common wisdoms listed above. In St. Louis, several streets were closed at one end. Residents assumed responsibility for road and streetlight maintenance on their streets and, in return, received a slight rebate on their city taxes. The rate of reported crime is lower on these closed streets and residents manifest proprietary feelings by surveilling the street more and questioning the intentions of strangers.[1]

St. Marks Avenue in Brooklyn was redesigned to slow traffic. Symbolic gateways were placed at each end of the street. A mid-block portion of the street was completely closed to traffic, turning it into a play and communal area. Residents reportedly defined the area as their own--illustrated by their cleaning the street every Saturday morning--and felt that crime had lessened significantly.[2]

In Berkeley, California, a complex set of traffic barriers and diverters

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[1] Oscar Newman, "Community of interest - design for community control," Architecture, Planning and Urban Crime (London: NACRO, 1974), pp. 26-35.

[2] Newman, Defensible Space, pp. 60-62.

was designed solely for traffic control. The impact of these barriers on crime was unclear due to concurrent introduction of new police patrol tactics.[1]

The experiments in St. Louis, Brooklyn and Berkeley suggest that the purposeful redesign of streets for reducing crime is a promising strategy. Prior to redesigning streets in parts of Minneapolis, however, it is wise to determine the extent to which existing types of street designs in Minneapolis exhibit differing crime rates.

Police have long contended that there are fewer crimes on cul-de-sacs and dead ends than on other streets[2] but there has been little effort anywhere to statistically document this common wisdom. Newman's theory provides support for this contention.

This initial investigation looks at residential streets and their associated rates of residential burglary. If investigation finds that residences along certain kinds of streets are burglarized less, the experimental use of those street types is more likely to be a successful use of resources.

Of course, redesign of streets in an attempt to reduce crime rates could restrict police patrol and emergency vehicle access to these streets. Thus, any redesign that makes streets less accessible to criminals must also consider unwanted effects on the accessibility of needed city services. In addition, the redesign of streets should not be considered a complete cure, merely one of several crime preventive steps to be used with caution. As such it should be used only after careful analysis of the crime problem

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[1] Six Months Experience-Berkeley Traffic Management Plan, (City of Berkeley: Deleuw, Cather and Company, 1976), pp. ii-v.

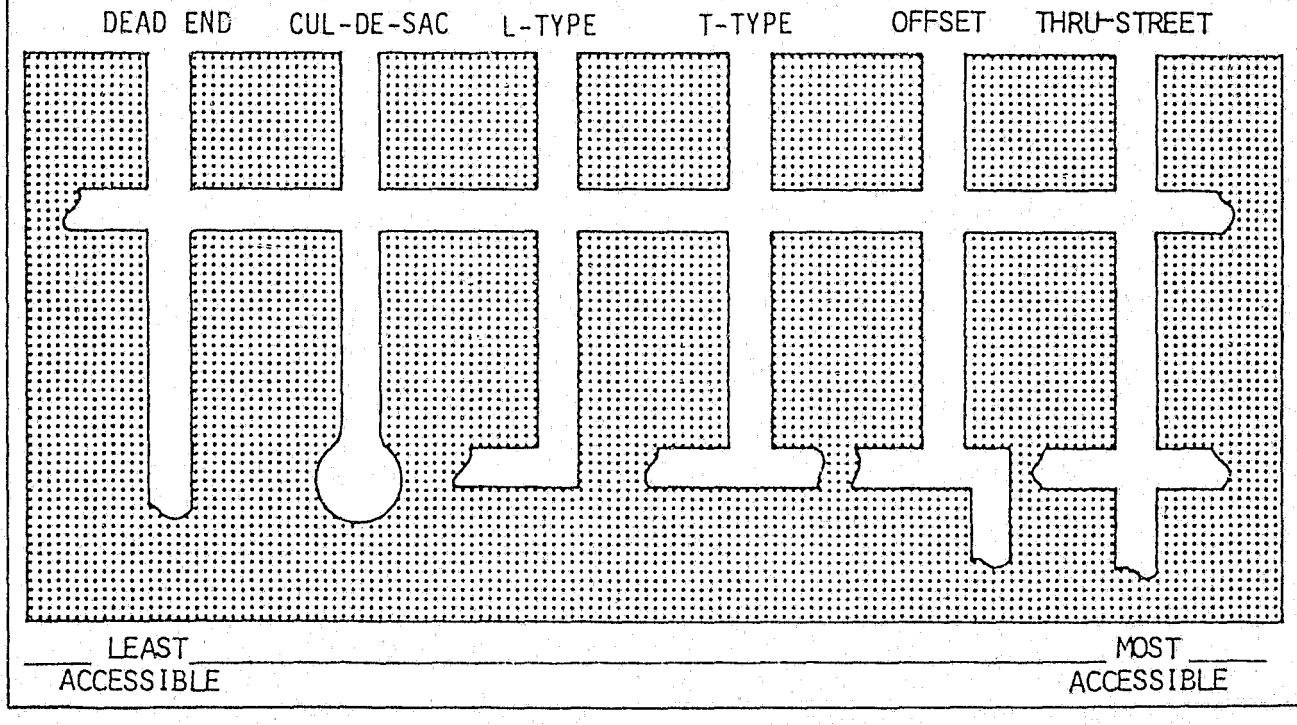
[2] Based on discussions with Minneapolis police officers.

suggests it as a logical strategy.

METHODOLOGY

The analysis for Minneapolis is based on six basic types of streets and the residential burglary rates associated with them. The street layouts considered for this analysis are indicated in Figure 1. The streets are ordered from those which are generally the least accessible to those which are most accessible.

FIGURE 1.
REPRESENTATIVE STREET LAYOUTS



To sample each street layout, a multi-stage random sampling method was used. The stages included randomly selecting 30 census tracts from the 127 tracts in Minneapolis; selecting street types within those tracts; and eliminating selected street blocks which had no residences.

A study sample and a control sample of blocks were selected. The 65

study blocks consisted of 11 dead ends, 13 cul-de-sacs, 13 L-types, 16 T-types and 12 offsets.

For each study block a control block was designated. The control block was defined as the nearest through-street block feeding into the study block.

For both study and control blocks, "block" meant a section of street with an intersection at each end and no intersection between the ends.[1]

After locating study and control blocks, the number of housing units on each block was recorded as was the number of residential burglaries.[2] Both pieces of information were used in this preliminary study.

FINDINGS

As indicated in Figure 2, the data show a noticeable pattern of lower residential burglary rates for housing on those study blocks with lower accessibility. There is an upward trend that relates increasing street accessibility with rising burglary rates.

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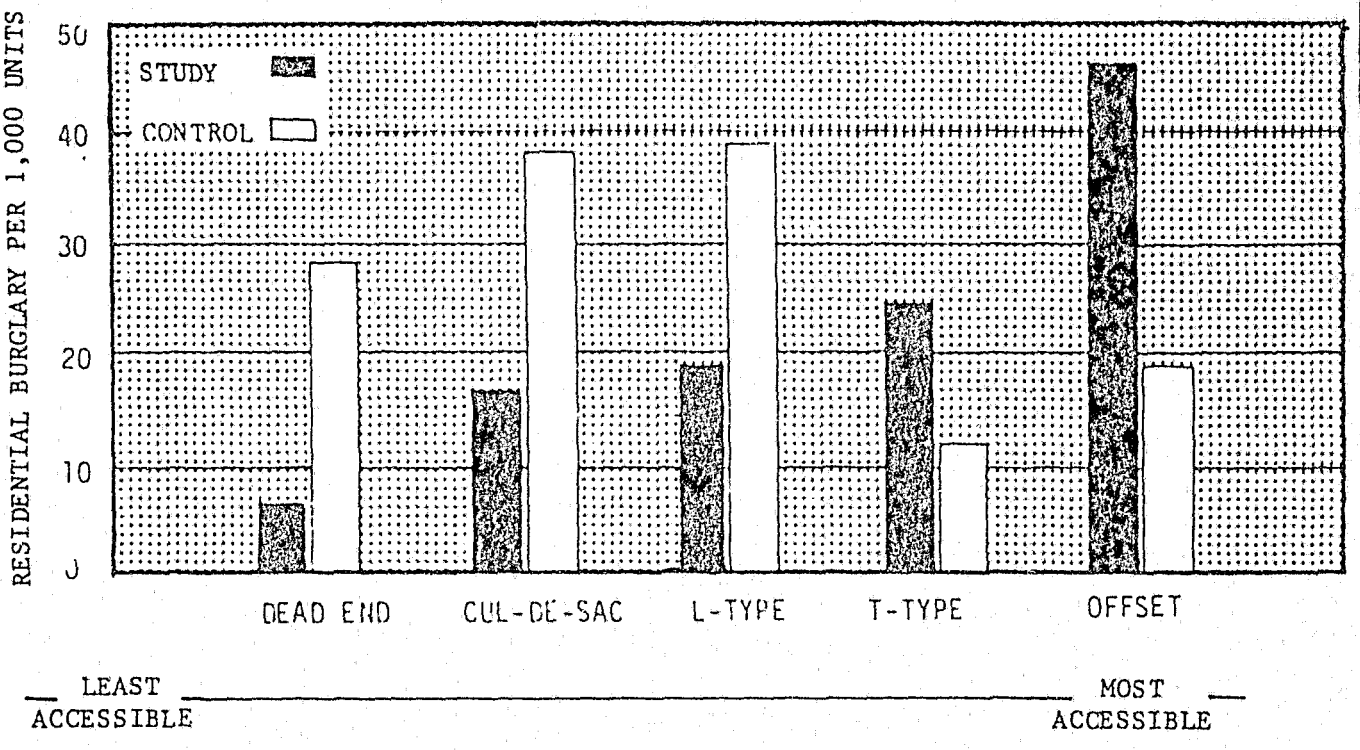
[1]Blocks were classified into a design type according to whichever of the block ends was least accessible.

[2]Residential burglaries recorded by the Minneapolis Police Department from July, 1974 through June, 1975.

FIGURE 2

RESIDENTIAL BURGLARY RATE FOR STUDY AND CONTROL BLOCKS[a]



[a]N = 2,348 residential units upon which burglary rates were based.

Control blocks are the through blocks nearest to their corresponding study blocks.

Figure 2 also compares burglary rates for study blocks with those of the control blocks. Figure 2 shows the residential burglary rates were lower on most study blocks than on their corresponding control blocks. This pattern did not hold for T-types and offsets.

It may be that these findings are a result of chance pairings of study blocks with control blocks. Statistical techniques used indicated that the results would have occurred by chance no more than once in twenty times. This is strong evidence that the results reflect a consistent, not a chance, pattern.[1]

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[1]The techniques compared members of 37 pairs of blocks. Each pair consisted of a study block and its corresponding control block. The relationship between the members of each pair was classified as supporting

In conclusion, the data show that dead end, cul-de-sac and L-type blocks have lower residential burglary rates than do more accessible control streets. The same conclusion cannot be made, at least within the bounds of this study, for T-type and offset streets.

CONCLUSION

This initial study has demonstrated that street layout does affect residential burglary rates in Minneapolis. Our findings indicate that less accessible streets, such as, cul-de-sacs, dead ends and L-type streets have lower residential burglary rates. The findings are consistent with theory, conventional wisdom and experiments in other cities.

This study also indicates Oscar Newman may be too pessimistic when he says:

> The creation of 'community of interest' cannot be accomplished simply by

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the trend noted above if (1) at least one member of the pair had a burglarized residence and if the residential burglary rate was lower for the study block, or if (2) neither member of the pair had a burglarized residence but the study block had a greater number of residences (and hence a greater probability of being burglarized).

Assuming there was no true trend, 50 percent of the pairs should coincidentally fit the trend and 50 percent should not. As it was, 65 percent of the pairs fit the trend:

	Number of Pairs of Blocks Fitting the Trend	Number of Pairs of Blocks Not Fitting the Trend
Dead end	9	2
Cul-de-sac	7	6
L-type	8	5
Total:	24	13

Because we sampled blocks instead of looking at all blocks in Minneapolis, we may have, by chance, oversampled pairs fitting the trend. If we had looked at all block pairs in the city, maybe only 50 percent would have fit the trend. The probability (expressed as a proportion) of our drawing a random sample with 65 percent of the pairs fitting the trend when, overall, only 50 percent of the pairs fit the trend is less than one in twenty (that is, significant at the .05 level based on a binomial probability test).

> setting up zones outside the dwelling for the collective use of proxemic dwellers, it involves as well the setting up of covenants...among groups of residents to somehow guarantee the nature of tenant occupancy and commitment to shared values.[1]

Physical layout of streets can affect crime without burdensome legal agreements and without any more resident homogeneity than already exists.

Present findings, coupled with information from other sources, suggest redesign of streets, properly used, is a promising strategy for crime reduction in urban areas. Application of this strategy should be limited to areas where the crime problems warrant it and should be planned in conjunction with safety and traffic needs of the area. In addition, until further analysis is complete, redesigning streets to control crime should be used on an experimental basis. This limited use will permit analysis of crime data to measure the impact of redesign on crime as well as to measure the impact of redesign on other aspects of neighborhood life.

Further study will concentrate upon street layout at the scale of census tracts. The study will use graph theory and network analysis to calculate indices of accessibility for each tract in Minneapolis. One-way streets, physical barriers to travel, variation in number of lanes and variation in volume of traffic will be some aspects of accessibility considered. Multiple regression will be the principal technique for determining the direction and strength of association between crime rates and accessibility indices. Further study may also expand the sample of individual streets so the interaction between street layout and variables like residential/commercial mix and single/multi family mix can be estimated.

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[1] Newman, "Community of interest - design for community control," Architecture, Planning and Urban Crime (London: NACRO, 1974), p. 9.

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