The Street - A Social Barrier?

by

Robert S. Bryan

B.A., Yale University

February, 1949

A thesis submitted in partial fulfillment of the requirements for the degree of Master of City Planning at the Massachusetts Institute of Technology.

June, 1951

Head, Dept. of City and Regional Planning

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Dear Dean Belluschi:

This thesis is respectfully submitted in partial fulfillment of the requirements for the degree of Master of City Planning.

Sincerely yours,

Robert S. Bryan
TITLE: The Street - A Social Barrier?

AUTHOR: Robert S. Bryan

Submitted for the degree of Master of City Planning in the Department of City and Regional Planning on May 28, 1951.

QUESTION: Under what design and traffic conditions does the street serve as an attractive influence or as a barrier between the people who live on each side of the street?

DATA: 1. Two large areas of middle income, single family housing, Winn Brook in Belmont, Mass., and Warrendale in Waltham, Mass., were chosen as general areas for study.

2. All of the children in grades 2 through 5 (6 in Warrendale) in the elementary schools in each of the two areas filled out questionnaires asking for their names, ages, addresses and the names of the children they play with at home, circling the names of children played with every day.

3. On 16 streets of varied qualities, 232 housewives were interviewed to determine their length of residence in their houses, ages and sex of their children, and the names of the three housewives on either side of the street or across the rear lot line they talk to most often. They were also asked to name two additional housewives with whom they talk more often than the remainder on the street.

4. The data was analyzed cartographically and statistically to determine what physical qualities of the street affect the locational pattern of social relations.

MAJOR FINDINGS: 1. As the distance between houses increases, the number of social contacts between the housewives decreases.

2. Regardless of street design or traffic volume, over 90% of the three housewives with whom any given housewife talks most often will be within two houses' distance of her house.

3. As the volume of automotive traffic per day increases, the number of social contacts between housewives on a street decreases.

4. As the volume of automotive traffic per day on a street increases, the proportion of social contacts between housewives across a street decreases.

5. As the volume of automotive traffic per day increases, the proportion of housewives with social contacts across the rear lot line increases.

6. Housewives with children under 12 years of age have more social contacts on the street than housewives with children 12 years and over, or none.

7. On streets with very minor traffic volumes, housewives with children under 12 years of age have a greater proportion of their social contacts across the street than housewives with children 12 years and over, or none; but as the volume of automotive traffic per day on a street increases, housewives with children under 12 and those with children 12 and over, or none, tend to reverse their relationship.
8. On streets with very minor traffic volumes, housewives with children 12 and older, or none, have a greater proportion of their social contacts across the rear lot line than housewives with children under 12 years of age; but as the volume of automotive traffic per day increases, housewives with children under 12 and those with children 12 and older, or none, tend to become more alike in the proportion of their social contacts across the rear lot lines.

9. Housewives living in corner houses have as many social contacts on the street as housewives living away from the corner.

10. Housewives living in corner houses tend to have a larger proportion of their social contacts across streets than housewives living away from corners.

11. As the volume of automotive traffic per day on a street increases, the less important become factors such as family composition, topography, vision, etc., in determining the formation of social contacts among housewives on the street.

12. In general, any housewife can name only three other housewives on a street with whom she has more social contact than the remainder of the housewives on the street.

13. Except for short periods, such as a few months, the length of residence of a housewife on a street does not substantially affect the location of the housewives she talks to most often.

14. The older a child is the farther away from home and the home street he goes to play with other children.

15. As the volume of automotive traffic per day on a street increases, the street is used less as a play area for children.

TENTATIVE FINDINGS: 1. On streets with traffic volumes of more than 4500 cars per day, the traffic assumes overwhelming importance in determining the formation of social contacts among housewives on the street.

2. An unobstructed line of vision from the front yards, doors, and windows of one side of a street to the front yards and doors of the other side is a connecting element between housewives on either side of the street, with the result that housewives on the side of a street which has an obstructed view due to trees, landscaping, topography, or other causes will tend to have a smaller proportion of social contacts across the street than housewives with an unobstructed view.

3. A sharp break in the profile of a street, resulting in two distinct groupings of houses, will cause a break in the continuity of social contacts along the street.

4. When a group of housewives with children under 12 years of age live on close proximity across and along the street, there is an intensification of social contacts across the street, compared to a group of housewives with children 12 years and older, or none, living across from each other.
ACKNOWLEDGMENTS

To Kevin Lynch for his thoughtful counsel as my thesis adviser,

To my wife for encouragement, the typing, and grammatical correction,

To Alex Bavelas, Herbert Shepard and Robert Solow for technical aid,

To the principals and teachers of the Winn Brook and Warrendale schools for their careful assistance, and

To the New England housewife, friendly to a stranger but not to her neighbors.
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PURPOSE

This study is intended to add to man's understanding of his relationship with physical environment. Although the city planner's task is the ordering of the urban environment in terms both social and economic, he has little concrete knowledge with which to evaluate the social effects of his plans.

A small part of the socio-environmental relationship is represented by this basic question: Under what design and traffic conditions does the street serve as an attractive influence or as a barrier between the people who live on each side of the street? The answer affects specific elements of the site and city planners' designs which are intended to achieve maximum friendship satisfaction for the people who live on the site, some kind of social integration and control, and social groupings on a geographical basis. Believers in the "neighborhood concept" for purposes of gaining stronger social integration and control on a geographical basis must concern themselves with the elements of neighborhood design which tend to strengthen or break the chain of social contact from one house to another.

Questionnaires and interviews were the techniques used to analyze selected streets in two large areas of
single family housing, one in Belmont and the other in Waltham, Massachusetts. These areas were similar in that each contained an elementary school and varied kinds of streets and each was relatively homogeneous as to lot size, housing type, age of structure, and population and income characteristics.

All of the elementary school children in grades 2 through 5 (through grade 6 in Waltham) answered a questionnaire, noting their names, grades, ages, home addresses, and the names of the children they play with at home, circling the names of the children they play with every day. This data was plotted on property line and structure maps of the areas and was also analyzed statistically. Analyzed similarly was the data collected by interviewing 232 housewives on selected streets. The housewives answered questions on how long they had lived in their houses, the age and sex of their children, and the names of the three housewives on either side of the street, or across the back lot line, they talked to most. They were also asked to name two housewives in addition to the first three with whom they talked more often than the remainder on the street or in back. Results of the questionnaire and interviews were studied with relation to traffic volumes, street widths, topography, trees, location of the house on the street, and the age or lack of children in the house.
FINDINGS

Tempering the major conclusions which follow are the facts that some housewives were not interviewed or refused to reply; some streets had too few houses on them to lend themselves to reliable statistical analysis; and streets with intermediate automotive traffic volumes, between 200 and 1,000 cars per day, were not studied.

1. As the distance between houses increases, the number of social contacts between the housewives decreases.

2. Regardless of street design or traffic volume, over 90% of the three housewives with whom any given housewife talks most often will be within two houses' distance of her house.

3. As the volume of automotive traffic per day increases, the number of social contacts between housewives on a street decreases.

4. As the volume of automotive traffic per day on a street increases, the proportion of social contacts between housewives across a street decreases.

5. As the volume of automotive traffic per day increases, the proportion of housewives with social contacts across the rear lot line increases.
6. Housewives with children under 12 years of age have more social contacts on the street than housewives with children 12 years and over, or none.

7. On streets with very minor traffic volumes, housewives with children under 12 years of age have a greater proportion of their social contacts across the street than housewives with children 12 years and over, or none; but as the volume of automotive traffic per day on a street increases, housewives with children under 12 and those with children 12 and over, or none, tend to reverse their relationship.

8. On streets with very minor traffic volumes, housewives with children 12 and older, or none, have a greater proportion of their social contacts across the rear lot line than housewives with children under 12 years of age; but as the volume of automotive traffic per day increases, housewives with children under 12 and those with children 12 and older, or none, tend to become more alike in the proportion of their social contacts across the rear lot line.

9. Housewives living in corner houses have as many social contacts on the street as housewives living away from the corner.

10. Housewives living in corner houses tend to have a larger proportion of their social contacts across streets than housewives living away from corners.
11. As the volume of automotive traffic per day on a street increases, the less important become factors such as family composition, topography, vision, etc., in determining the formation of social contacts among housewives on the street.

12. In general, any housewife can name only three other housewives on a street with whom she has more social contact than the remainder of the housewives on the street.

13. Except for short periods, such as a few months, the length of residence of a housewife on a street does not substantially affect the location of the housewives she talks to most often.

14. The older a child is the farther away from home and the home street he goes to play with other children.

15. As the volume of automotive traffic per day on a street increases, the street is used less as a play area for children.
TENTATIVE CONCLUSIONS

1. On streets with traffic volumes of more than 4500 cars per day, the traffic assumes overwhelming importance in determining the formation of social contacts among housewives on the street.

2. An unobstructed line of vision from the front yards, doors, and windows of one side of a street to the front yards and doors of the other side is a connecting element between housewives on either side of the street, with the result that housewives on the side of the street which has an obstructed view due to trees, landscaping, topography, or other causes will tend to have a smaller proportion of social contacts across the street than housewives with an unobstructed view.

3. A sharp break in the profile of a street, resulting in two distinct groupings of houses, will cause a break in the continuity of social contacts along the street.

4. When a group of housewives with children under 12 years of age live in close proximity across and along the street, there is an intensification of social contacts across the street, compared to a group of housewives with children 12 years and older, or none, living across from each other.
METHOD

To answer the basic question of this thesis assumptions had to be made and tools for measuring devised.

Two large areas of single-family housing, the Winn Brook section of Belmont, and Warrendale in Waltham, were chosen as the general areas in which to study streets of varied quality. (See Plate 1.) Each area has its own elementary school and is similar to the other with respect to lot sizes, income groups, housing types and quality, and nationality, religious, and racial characteristics. The houses, on lots about 70’ x 100’, were all built within the last 15 or 20 years, and the majority within the last ten. To build new today they would probably cost between $12,000 and $15,000. Although there are nationality and religious differences among the people, they are not geographically grouped on the basis of these differences. The entire population is white. These two residential areas, although suburban in character, are wedded to the core of the Boston metropolitan area.

The first step in the study was to gather data on the relationship of children with the street. In grades 2 through 5 in Winn Brook, and through 6 in Warrendale, each pupil in the elementary schools answered a questionnaire which asked for the pupil’s name, age, grade, home address and the names and addresses of the children that
he plays with at home. The pupils also circled the names of the children they play with every day. Children in the kindergartens and first grades were excluded from the study because of their doubtful writing and memory abilities. The entire process was administered by the school principals and teachers; they were carefully instructed on the purpose of the study and the importance of emphasizing to the children that "at home" does not include school, church, playground, and club. The questionnaires were filled out in March of 1951. The returns from 459 pupils in the two schools were plotted on property line and structure maps of the areas. Lines were drawn among playmates and the resultant web pattern studied in relation to the street pattern and density of children. On the map, pupils in grades 2 and 3 were separated from the older children, as were sometimes and everyday playmates, by means of lines of different colors. Although these maps of the entire Winn Brook and Warrendale sections are not presented with the thesis, samples which illustrate the conclusions reached are included.

During four weeks, including the latter part of April and the early part of May, 232 housewives on 16 streets (Plates 2, 3) were interviewed. Most of the interviews were made between 3 and 6 o'clock on fair days. Twenty-seven additional housewives on these streets were never found at home for interview, and four refused to answer.
PLATE 3
WINN BROOK

STREETS ON WHICH HOUSEWIVES WERE INTERVIEWED
The housewives, during a three minute interview, were asked how long they had lived in the house, the ages and sex of any children living at home, and what three housewives, on either side of the street or across the rear lot line, they talked to most often. They were also asked to name two additional housewives with whom they talked more often than the remainder on the street. As an aid for recalling names and selection among them, each respondent was shown a sketch map of the street which showed the surnames of the occupants of each house. The results of these interviews were studied statistically and by means of diagrams which showed visually the social contacts among housewives as related to their position on the street.

Street qualities were recorded during the period the interviews were made. Fences, landscaping, street curvatures and profiles were noted for the streets on which housewives were interviewed. Some traffic counts were obtained from the engineering departments in Belmont and Waltham and others were made personally where necessary. Traffic flow for minor streets was estimated on the following basis: four car movements per day for each house on or served by the street, one service vehicle per day for each house, and an extra figure varying from 15 to 50 cars per day for strays and mistakes, depending upon the street's relationship with the entire street pattern.
Single family housing of the type found in Winn Brook and Warrendale was chosen for study because it involved fewer complicated problems than other densities. These particular areas were chosen because they were well known to the author, easily accessible, and devoid of special racial, nationality, income and religious problems. Although there are nationality and religious differences among the people of these areas, these differences were assumed to be unimportant in affecting the two means of social measurement employed. These two areas were also chosen because it was known that they each included at least one major street, in addition to variations in the quality of minor streets.

In order to study the relationship between two things, a functional dependence must exist between them. Since people of all ages use the streets in these areas for movement of vehicles, play, walking, conversing with neighbors, and so on, an assumption as to the functional dependence between the people and the street was easily made.

An important point, however, is that people of different ages and sexes do different things on the street; therefore, there are different kinds of people with particular functional relationship with the street who must be taken into account. From this analysis stemmed the decision to study children separately from the adults.
Time limitations necessitated confining the study of children to those who were easily accessible in the elementary schools. The five year age span of the pupils, however, represented a long enough period during which the relationship of children with the street could change, so that possible conclusions could be derived for children of other ages.

Pupils in the schools were asked about their playmates because this simple question gets at the most fundamental relationship among children. It was also thought that it would be easily understood and could quickly be administered by the teacher. The pupils were asked to circle the names of the children played with every day so that an order of relative importance among playmates could be established.

This operation was performed first because of its simplicity and because streets with special significance might be found which would aid in the selection of streets on which housewives would be interviewed.

In studying adult relationships with the street it was necessary to choose a group of adults which, within itself, would have a uniform functional relationship with the street. Although housewives were chosen partly for this reason, the decision was also made because they would be readily accessible for interviews during a long period of the day.
Although adult males may have a different functional relationship with the street and a different pattern of social contacts, the husbands were omitted from the study for time reasons.

It was possible that there might be variations in functional relationships with street even among housewives. This possibility was partly accounted for by asking the housewife about the ages and sex of her children. It was found in the study of children aged 7 through 12 that the street is a focus for play, with the result that housewives with young children might focus their attention on or spend more time in the street. Other personal variations among housewives which might pertain to their functional relationship with the street were assumed to be relatively unimportant or to balance themselves out among all of the streets.

Several assumptions were involved in the decision to ask the housewife what three wives she talked to most often. As the study was originally organized, each interviewee was to tell how often she talked to each housewife on the street on the basis of an absolute scale, such as every day, every other day, once a week, and so on. A pretest of this question resulted in its abandonment, because the answers, varying from season to season, would be given during a period of seasonal change. Additional reasons were
that the housewife did not readily understand the question, and that the interviews would have taken 15 minutes. Such a lengthy interview would have demanded more willingness to cooperate on the part of the housewife and certainly would have increased the number of callbacks necessary. Also discovered in the pretest was the respondent's inability to apply the scale to more than three or five housewives, indicating that she talked frequently only to a very few wives.

Knowing then the general range of social contacts that the New England housewife has on the street, I decided to limit the total number of choices to five. As in the pretested question, however, frequency of conversation was considered to be significant. Three names were asked because it was thought every housewife should be able to name such a minimum number. Two names were not asked since it might have prejudiced the study in favor of the two immediate neighbors.

There were several reasons for using the term "talked to". In the first place, the term is less personal than one implying a friendship association and would therefore facilitate interviewing. It was also felt that persons talked to would be more likely to vary with the quality of the street than friendship patterns which might have been investigated. Another reason was that the term would be
easily understood, and would have the same meaning to all the housewives. Finally, it was assumed that a query about conversations would tend to be prejudiced less by differences in religion, income, nationality and personality than an investigation of some other form of social relationship.

One other factor which might affect the answer to the basic question was accounted for in the interview. Each respondent was asked how long she had lived in her house, so that a possible correlation between length of residence and location of social contacts could be found.

Data on the housewife's social contacts was analyzed in two ways. In the first, statistical in nature, each of the housewife's choices was given one of the three following general locational designations:

A - along the street on the same side
B - back, across the rear lot line
C - across the street

With these general designations, streets were compared by noting the percentage of the total choices on the street in each of these three categories. A ratio of \( \frac{A+B}{C} \), or total choices on the same side of the street to the total choices across the street, was computed so that streets of varied qualities could be compared. Percentages and ratios of A, B, and C were also computed for two categories of
housewives on each street; wives with children under 12 years of age, and wives with children 12 or older, or none. An additional location factor was introduced to discover how far the housewives travelled to talk with someone. The first on either side of the street adjacent to the interviewee were given a value of 1; a house beyond the first was given a value of 2, and so on, so that the percentages of the total choices on the street could be computed for each distance.

The second method of analyzing the housewife data was pictoral. For each street diagrams were drawn which showed the position of each house on the street, its orientation, and the family composition. Then arrows representing choices of persons talked to were drawn between houses and the pattern compared with the particular physical quality of each street.

A theoretical index was also devised in order to gain a better understanding of the statistics. The three housewives that each respondent talked to most often were assumed to have only six possible locations: three houses immediately across the street, the house on either side of the respondent, and the one immediately to the rear.
The object of the analysis was to obtain a theoretical ratio of choices on the same side of the street to those across the street, or \( \frac{A+B}{C} \). The theoretical ratio was used to estimate the significance of the actual ratios for each street.

With a simple assumption as to the relative probability for each of the six locations, the chance that the three choices of the housewife will be one of four possible combinations was calculated. Those combinations were:

1. A or B; A or B; A or B
2. A or B; A or B; C
3. A or B; C; C
4. C; C; C

Knowing the chances for each of these possibilities, the average ratio \( \frac{A+B}{C} \) was computed.

Three assumptions were made as to the relative probability for each A, B and C. They were designed to establish ratios for the street in terms of connecting, neutral, and barrier influences. In the case of a street as a connector, A's and C's were assumed to be equal with values of 2, and B was given a value of 1. The resultant ratio of \( \frac{A+B}{C} \) was 0.98. Assuming the street is neutral, a value of 2 was given to each A, and 1 to each C and each B. The A's were given a higher value because of their greater proximity to the housewife making the choices. Here the
resultant ratio was 1.74. Finally, accounting for the street as a barrier, a value of 3 was given to the A's, 2 to the B's, and 1 to the C's, resulting in a ratio of 2.67.

These theoretical ratios are not intended for use in determining what streets are connectors, neutral, or barriers; they are intended to give the reader a sense of proportion with which to estimate the significance of the actual ratios for the 16 streets.
CONCLUSIONS AND DATA

The following is a presentation of statistical data and map analysis which substantiate the conclusions already stated. Only certain portions of the total information collected were carefully analyzed. In the case of play relationships among children, only "every day" playmates were analyzed in detail, since the lists of children played with at home once in a while varied greatly in length from child to child. This variation probably depended more on personal whim and memory ability than facts which pertain to the basic question of this study. Because so many housewives were unable to add two persons to the first three that they talked to most often, only these first three choices have been carefully analyzed. Many of the housewives who could name two extras did so in an unsure manner, thus casting doubt upon the reliability of their answers.

1. As the distance between houses increases, the number of social contacts between the housewives decreases.
2. Regardless of street design or traffic volume, over 90% of the three housewives with whom any given housewife talks most often will be within two houses' distance of her house.

Although the first conclusion has already been well established by the Group Dynamics Research Center's study
Table 1

Percent of housewife choices
1, 2, and 3 houses distant

<table>
<thead>
<tr>
<th>NAME OF STREET</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>1+2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albert (B)</td>
<td>50.0</td>
<td>41.7</td>
<td>8.3</td>
<td>91.7</td>
</tr>
<tr>
<td>Little Pond</td>
<td>68.8</td>
<td>28.1</td>
<td>3.1</td>
<td>96.9</td>
</tr>
<tr>
<td>Canterbury (A)</td>
<td>54.5</td>
<td>36.3</td>
<td>9.2</td>
<td>90.8</td>
</tr>
<tr>
<td>Ellery (A)</td>
<td>78.6</td>
<td>21.4</td>
<td>0.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Gilmore</td>
<td>79.2</td>
<td>4.2</td>
<td>8.3</td>
<td>83.4</td>
</tr>
<tr>
<td>Canterbury (B)</td>
<td>53.3</td>
<td>43.7</td>
<td>3.0</td>
<td>97.0</td>
</tr>
<tr>
<td>Farnham</td>
<td>72.3</td>
<td>21.3</td>
<td>2.1</td>
<td>93.6</td>
</tr>
<tr>
<td>Wilmot</td>
<td>58.1</td>
<td>32.3</td>
<td>3.2</td>
<td>90.4</td>
</tr>
<tr>
<td>Hagar</td>
<td>55.5</td>
<td>30.6</td>
<td>5.6</td>
<td>86.1</td>
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<tr>
<td>Winn</td>
<td>73.5</td>
<td>17.6</td>
<td>8.8</td>
<td>91.1</td>
</tr>
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<td>Ellery (B)</td>
<td>66.7</td>
<td>26.7</td>
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<td>93.4</td>
</tr>
<tr>
<td>Albert (A)</td>
<td>50.0</td>
<td>40.0</td>
<td>10.0</td>
<td>90.0</td>
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<tr>
<td>Cross (B)</td>
<td>78.6</td>
<td>14.3</td>
<td>7.1</td>
<td>92.9</td>
</tr>
<tr>
<td>Cross (A)</td>
<td>65.6</td>
<td>18.7</td>
<td>3.1</td>
<td>84.3</td>
</tr>
<tr>
<td>Warren</td>
<td>80.8</td>
<td>14.9</td>
<td>2.1</td>
<td>95.7</td>
</tr>
<tr>
<td>Pleasant</td>
<td>83.3</td>
<td>12.5</td>
<td>4.2</td>
<td>95.8</td>
</tr>
</tbody>
</table>
of Westgate and Westgate West at M. I. T., Table 1 establishes further proof in a different situation. Distances of 1, 2, and 3 houses do not account for all of the social contacts among housewives, but the figures given substantiate the conclusions.

3. As the volume of automotive traffic per day increases, the number of social contacts between housewives on a street decreases.

In addition to the fact, already mentioned, that many housewives could not name more than three housewives with whom they talked most often, some were unable to name even three. The streets on which interviewing was done are grouped in two categories: minor, with traffic volumes under 200 cars per day, and major, with traffic volumes of 4000 cars per day or more. Of the total housewives on minor and major streets the proportions unable to name three housewives talked with most often are:

Minor - 26 of 119 housewives, or 21.8%
Major - 17 of 50 housewives, or 34.0%

The assumption made to arrive at the conclusion was that the proportions of housewives unable to make three choices gave an indication of the total number of social contacts. This assumption seemed reasonable since the proportions of such housewives were large and therefore unlikely to be caused by individual personalities.
4. As the volume of automotive traffic per day on a street increases, the proportion of social contacts between housewives across a street decreases.

As explained in the section on method, the three choices which each housewife made were located on the street. The simple designations for the locations were:

- **A** - along the street, on the same side
- **B** - back, across the rear lot line
- **C** - across the street

When all choices were located on each of the sixteen streets, the ratio of the total choices on the same side of the street to those across the street, \( \frac{A+B}{C} \), was computed for each street. This ratio was intended to give an estimation of effects of traffic upon social contacts across streets. A comparison of the ratios for streets of varying traffic volume indicates the reason for the conclusion. (See Table 2)

Housewives in corner houses, excluded from Table 2, were analyzed separately because of their special position on the street. All corner housewives were grouped for analysis in two categories: those at the intersections of streets with minor traffic volumes, under 200 cars per day, and those on major streets with traffic volumes of 4,000 cars per day or more. By computing the ratio of \( \frac{A+B}{C} \) for corner houses the following difference in the two categories of
<table>
<thead>
<tr>
<th>Name of street</th>
<th>House to house width</th>
<th>Cars/day</th>
<th>A+B/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albert (B)</td>
<td>80'</td>
<td>75</td>
<td>0.71</td>
</tr>
<tr>
<td>Street - connecting</td>
<td>--</td>
<td>--</td>
<td>0.98</td>
</tr>
<tr>
<td>Little Pond</td>
<td>90'</td>
<td>100</td>
<td>1.00</td>
</tr>
<tr>
<td>Canterbury (A)</td>
<td>90'</td>
<td>85</td>
<td>1.20</td>
</tr>
<tr>
<td>Ellery (A)</td>
<td>100'</td>
<td>85</td>
<td>1.33</td>
</tr>
<tr>
<td>Gilmore</td>
<td>90'</td>
<td>125</td>
<td>1.40</td>
</tr>
<tr>
<td>Canterbury (B)</td>
<td>90'</td>
<td>150</td>
<td>1.50</td>
</tr>
<tr>
<td>Street - neutral</td>
<td>--</td>
<td>--</td>
<td>1.74</td>
</tr>
<tr>
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<td>90'</td>
<td>150</td>
<td>1.77</td>
</tr>
<tr>
<td>Wilmot</td>
<td>90'</td>
<td>125</td>
<td>1.82</td>
</tr>
<tr>
<td>Hagar</td>
<td>90'</td>
<td>165</td>
<td>2.60</td>
</tr>
<tr>
<td>Street - barrier</td>
<td>--</td>
<td>--</td>
<td>2.67</td>
</tr>
<tr>
<td>Winn</td>
<td>90'</td>
<td>125</td>
<td>3.25</td>
</tr>
<tr>
<td>Ellery (B)</td>
<td>100'</td>
<td>140</td>
<td>3.29</td>
</tr>
<tr>
<td>Albert (A)</td>
<td>90'</td>
<td>140</td>
<td>4.00</td>
</tr>
<tr>
<td>Cross (B)</td>
<td>90'</td>
<td>4200</td>
<td>3.67</td>
</tr>
<tr>
<td>Cross (A)</td>
<td>100'</td>
<td>4000</td>
<td>5.40</td>
</tr>
<tr>
<td>Warren</td>
<td>100'</td>
<td>5500</td>
<td>14.66</td>
</tr>
<tr>
<td>Pleasant</td>
<td>110-120'</td>
<td>9700</td>
<td>23.00</td>
</tr>
</tbody>
</table>
corners was found:

Minor streets, 22 corners - 1.00
Major streets, 36 corners - 2.11

In this case A designates houses on the same side of the street, either on the street on which the house fronts or around the corner. B choices are across rear lot lines, and C designates choices across either of the two intersecting streets.

These ratios were intended to give some estimation of the effect of traffic upon social contacts across streets. There is no absolute basis upon which to found a statistical analysis to show that some streets are barriers and others connectors. The estimation can only be made on a comparative basis and applies only to one general locality and climate.

The only visible explanation for Hagar Street's high ratio of \( \frac{A+B}{C} \) is that its volume of automotive traffic per day is slightly higher than the rest because of a larger number of through cars and strays estimated for it than for the other minor streets. Children, during three days of interviewing housewives, were never seen playing in the street the way they were on Wilmot, Canterbury (B), Farnham, and others. In addition to the fact that the number of housewives interviewed on Albert (A) was too small to make its ratio statistically significant, it, like Winn, had a special landscaping problem which will be treated later. The explanation for Ellery (B)'s high ratio was found in the
location of one house, set far back on a double lot. The result of this was that housewives on the opposite side of the street completed their three choices by choosing across the rear lot line, thus affecting the ratio.

5. As the volume of automotive traffic per day increases, the proportion of housewives with social contacts across the rear lot line increases. Here again the conclusion was reached by grouping the streets into major and minor categories. The proportions of housewives making rear lot choices were:

- Minor - 35 of 116 housewives, or 30.2%
- Major - 18 of 49 housewives, or 36.7%

It should be noted that these statistics pertain to proportions of Housewives and not proportions of all choices, since the proportions of choices across rear lot lines varied widely, and without consistent pattern, among all streets. It seems that this increase, although small, in the proportion of housewives making rear lot choices would be a natural consequence of the barrier effects of a heavily trafficked street.

6. Housewives with children under 12 years of age have more social contacts on the street than housewives with children 12 years and older, or none.

This conclusion, like number 3, was interpolated from data on housewives giving less than three choices.
The proportion of each of the two groups of housewives who gave less than three choices was assumed to be an indicator for the total number of social contacts which each group had on the street. The proportions of housewives giving less than three choices for all streets are:

With children under 12 - 12 of 69, or 17.4%
With children 12 and over, or none - 31 of 90, or 34.5%

7. On streets with very low traffic volumes, housewives with children under 12 years of age have a greater proportion of their social contacts across the street than housewives with children 12 and over, or none; but as the volume of automotive traffic per day increases housewives with children under 12 and those with children 12 and over, or none, tend to reverse their relationship.

Again the analysis was carried out in terms of minor and major streets, as previously defined. The statistics include all housewives on the 16 streets with the exception of the corners. Ratios of the total choices on the same side of the street to choices across the street, \( \frac{A+B}{C} \), were computed for housewives on major and minor streets. Housewives with children under 12, and those with children 12 and over, or none, were separated for each kind of street.
With children under 12

With children 12 and over, or none

The explanation for these statistics is that women with children under 12 have their attention focused more strongly on the street than those with older children or none. The street is play area for young for young children who do not go far from home for their playmates. The major streets, however, are not play areas for young children, so that the mother's attention is focused on other play spaces. For mothers with young children the functional relationship with the street varies with different traffic volumes, whereas this is not true for housewives with older or no children.

8. On streets with very minor traffic volumes, housewives with children 12 and older, or none, have a greater proportion of their social contacts across the rear lot line than housewives with children under 12, but as the volume of automotive traffic per day increases, housewives with children under 12 and those with children 12 and older, or none, tend to become more alike in the proportion of their social contacts across the rear lot line.
For streets of minor and major traffic volumes the proportion of housewives with social contacts across the rear lot lines are:

**Minor Streets**
- With children under 12 - 14 of 57, or 24.6%
- With children 12 and over, or none - 20 of 59, or 33.9%

**Major Streets**
- With children under 12 - 7 of 20, or 35.0%
- With children 12 and over, or none - 11 of 28, or 39.3%

The explanation for this conclusion is suggested by the difference in total number of contacts which the two groups of housewives have on the street. Since housewives with children under 12 have more social contacts on the street and if streets with high traffic volumes are social barriers, it is to be expected that housewives with younger children would go somewhere, as across the rear lot line, to make their greater number of social contacts.

9. Housewives living in corner houses have as many social contacts on the street as housewives living away from the corner.

As in conclusions 3 and 6, the total number of social contacts of women in corner houses was estimated from the proportion of those housewives who were unable to give three choices. The proportions for minor and
major streets and for minor and major corners are:

Minor streets - 26 of 119 housewives, or 21.8%
Minor corners - 5 of 26 housewives, or 19.2%
Major streets - 17 of 50 housewives, or 34.0%
Major corners - 14 of 37 housewives, or 37.8%

10. Housewives living in corner houses tend to have a larger proportion of their social contacts across streets than housewives living away from corners.

When the corner wives are grouped in minor and major street categories, the \( \frac{A+B}{C} \) ratios are:

- Minor corners, 22 cases - 1.00
- Major corners, 36 cases - 2.11

By comparing these ratios with those for housewives away from the corner, it was found that wives in corner houses have a greater proportion of their social contacts across streets. Only Albert (B) and Little Pond had a ratio as low as that of the minor street corners, and none of the major street ratios approximated that of the major street corners.

11. As the volume of automotive traffic per day on a street increases, the less important become factors such as family composition, topography, landscaping, etc. in determining the formation of social contacts among housewives on the street.
This conclusion was reached by analysis of the accompanying graph. (See Plate 4). The range in the ratios of $\frac{A_t B}{C}$ for streets of minor traffic volume was 0.71 to 4.00, and two streets of major traffic volume, Cross (A) and Cross (B) had ratios within or near this range. (See Table 2) The large range of ratios for minor streets could partly be explained on the basis of family composition, topography, landscaping, etc., but on Warren Street with 5500 cars per day and Pleasant with 9700 the traffic seems to have assumed overwhelming importance in determining the location of social contacts among housewives.

12. In general any housewife can name only three other housewives on a street with whom she has more social contact than the remainder of the housewives on the street.

About 28% of all housewives interviewed were unable to name three housewives to whom they talked most often; 64% of all housewives named only three or less. This situation may be true only for the Massachusetts climate and the particular income and social classes characteristic of the streets studied.

13. Except for short periods, such as a few months, the length of residence of a housewife on a street does not substantially affect the location of the housewives she talks to most often.
This conclusion was drawn from the data in Table 1 and from impressions gained while interviewing housewives. While it is true that the quality of friendship might be significantly affected by length of residence on the street, conversations among housewives are more informal in nature, and less easily affected by historical factors. Referring to Table 1 it should again be mentioned that over 90% of the social contacts were within two houses' distance of the interviewee. The location of contacts, therefore, was clearly dependent more upon distance than length of residence. During the interviews a handful of wives were found to have moved in within recent months. These wives tended to be unable to give three choices.

14. The older a child is, the farther away from home and the home street he goes to play with other children.

As mentioned in the section on methods, Plates 5 and 6 are only samples of the large scale maps showing the relationships among children. The samples illustrate the conclusion.

15. As the volume of automotive traffic per day on a street increases, the street is used less as a play area for children.

This obvious conclusion was reached by observation of the streets while interviewing housewives.
PLATE 5

WILMOT

● —— CHILD IN 2nd OR 3rd GRADE
○ —— CHILD IN 4th, 5th, OR 6th GRADE
TENTATIVE CONCLUSIONS

Because of insufficient evidence, the following conclusions are listed as tentative. Diagrams were made for all streets to show the positional relationships of the houses, the family composition in each, and the pattern of social contacts among the housewives. Conclusions were drawn from noteworthy social contact patterns as they are related to the physical qualities of the street.

1. On streets with traffic volumes of more than 4500 cars per day, the traffic assumes overwhelming importance in determining the formation of social contacts among housewives on the street.

This conclusion was reached by comparing the $\frac{A \cdot B}{C}$ ratios of Cross (A) and (B) and Warren Street. Although Cross (A) and (B) carry about 4000 cars per day and Warren carries only 1500 more, there is a marked difference in their ratios. (See Table 2 and Plate 4) At 4500 cars per day there are four cars on the street each minute during the period between 12 noon and 1 o'clock. The ratios for Cross (A) and (B) are more nearly like those for the minor streets than the high ratio for Warren Street.
2. An unobstructed line of vision from the front yards, doors, and windows on one side of a street to the front yards and doors of the other side is a connecting element between housewives on either side of the street, with the result that housewives on the side of a street which has an obstructed view, due to trees, landscaping, topography, or other causes will tend to have a smaller proportion of social contacts across the street than housewives with an unobstructed view.

The houses on the left side of the diagrams for Winn and Farnham Streets (see Plates 7 and 8) sit on a bank about four feet above the level of the street; houses on the right side are on the same level as the street. Both streets are lined with oak trees in the parking strips. The trees on the left side of Farnham are trimmed up high, whereas the trees on Winn are not. The effect of this variation in the trimming of the trees is that people on the left side of Winn cannot see, from their own yards and windows, the front yards on the right side of the street. The people on the right side, on the other hand, can see the front yards across the street. Counting the number of housewife choices across the street we find:

Winn - 1 from the left, 8 from the right
Farnham - 11 from the left, 10 from the right

The difference between the two streets in the origin of choices that crossed the street led to the conclusion that
PLATE 7

WINN

- HOUSEWIVES WITH CHILDREN UNDER 12
- HOUSEWIVES WITH OLDER CHILDREN OR NONE
- NO INTERVIEW
PLATE 8
FARNHAM

\[\text{\#} \text{ - Housewives with children under 12}\]
\[\text{\#} \text{ - Housewives with older children, or none}\]
\[\text{\#} \text{ - No interview}\]
vision is an important connecting element across streets. It may be that the more often the housewife sees the person she talks to, the greater feeling of relationship she has toward that person. Albert (A) is also lined with thick-foliaged oak trees and the vision is blocked. This fact may account for its very high ratio of $\frac{A+B}{C}$.

3. A sharp break in the profile of a street, resulting in two distinct groupings of houses, will cause a break in continuity of social contacts along the street.

The diagram for Gilmore Street suggested this conclusion. (See Plate 9) The grade from Gilmore Street starts with a very gentle slope from Cross (B) at the top. After the third house there is a marked downward break in the grade which continues to the end of the block. The result of this break is a division of the street into two distinct special units and also, according to the diagram, two social units.

4. When a group of housewives with children under 12 years of age live in close proximity across and along the street there is an intensification of social contacts across the street, compared to a group of housewives with children 12 and older, or none, living across from each other.

The diagrams of Wilmot, Canterbury (A) and (B) and Hagar Streets illustrate this intensification of social contacts among housewives with younger children. (See Plates 10, 11, 12)
PLATE 9
GILMORE

- HOUSEWIVES WITH CHILDREN UNDER 12
- HOUSEWIVES WITH OLDER CHILDREN, OR NONE
- NO INTERVIEW
PLATE 11  CANTERBURY

- HOUSEWIVES WITH CHILDREN UNDER 12
- HOUSEWIVES WITH OLDER CHILDREN, OR NONE
- NO INTERVIEW
Plate 12

- Housewives with children under 12
- Housewives with older children, or none
- No interview
On the diagrams shown housewives with older children, or none, tend to keep to their own side of the street. This intensification may result from the concentration of children who probably play in the street in front of these groups of houses.
CRITICISMS AND RECOMMENDATIONS

After the data had been collected and analyzed certain deficiencies appeared in the method of approach to the study. Although two fundamental conclusions were culled from the children questionnaires, the questions asked seemed too crude and their results difficult to assess. The questions used were probably detailed as possible considering the wholesale method to be used for obtaining the answers, but a more detailed approach on a few streets might have been more fruitful.

As has already been mentioned, streets of intermediate traffic volumes were not studied; the reason was that such streets simply did not exist in these two residential areas. It would have been wiser to check more carefully the traffic volumes on streets in the residential areas before selecting them for study. Another problem was that automotive traffic on minor streets was only estimated, when actually careful counts and observations of car movements on such streets might have revealed significant differences among them.

Noting the wide variation in the ratio of $\frac{A+B}{C}$ on the minor streets leads to the suggestion that streets for detailed study might have been more carefully chosen. If it had been known that factors such as topography, historical background and landscaping could be significant, streets could have been chosen intentionally to account for those
factors. The total number of interviews, however, would have to have been increased to gain statistical reliability on so many different kinds of streets.

Although the essential question asked of housewives seemed to accomplish its task, additional information about the individual housewives would have been helpful. Information on the extent to which the primary social associations of each housewife are located on her street might have shed significance upon the answer to the thesis question. Some implications of this problem were estimated by analyzing housewives in terms of the ages of their children, but a more direct means of evaluation might have been devised.

Two other deficiencies should be mentioned. The relationship of the husband to the street was left untouched. It is possible that he would have a pattern of social contacts very different from that of his wife and would be affected in a different way by the quality of the street. Finally, it would have been desirable to interview more housewives on additional streets. The question of statistical reliability would not have cast doubt upon some of the conclusions.

Although some recommendations for further study have already been implied, they are here enumerated and appended:
1. Other densities should be studied because the street assumes different roles in the life of the residents at different densities.
2. Streets of intermediate traffic volumes from 200 to 4000 cars per day should be surveyed to fill the gap left by this study.

3. A more detailed consideration should be given to planting, topography, curvature, and other characteristics of the street.

4. In light of the fact that the findings of this study hold true only for the Boston area, or perhaps even New England, similar studies in other climates or parts of the country are to be desired.

5. Other income groups, special nationalities, other racial and religious groups, and different family compositions might also be accounted for by further study.
SOME IMPLICATIONS FOR PLANNING PRACTICE.

Although the conclusions reached in this study may be interpreted in many ways, some of them have implications for common planning practice.

One of the objects of the neighborhood concept is to create a physical environment in which social control can function in an informal manner. In the planned neighborhood the residents will know and understand each other well and the individual will feel his relationship with and duties to the community. This end can partly be achieved by strong community organizations in which the people meet to exchange ideas or satisfy their social needs. The neighborhood unit plan, however, also relies on a physical plan to bring people together for informal social exchange. It is expected that with a good plan ideas and attitudes will pass from house to house with the result that the ethical norms of the community are understood by all. The conclusions in this study which involve traffic volumes indicate that cars can cause a break in the chain of social contacts along streets and in the neighborhood. Major streets of the kind here described would tend to split residential areas into two groups and thus very materially block the path to strong community organization and social contact.
A second implication concerns the size of the functional neighborhood. The feeling gained from the statistics and from conversation with the housewives is that the functioning neighborhood is very small. It should be recalled that many women could not name three housewives whom they talked to often. Something like one-third of the wives interviewed remarked that they did not talk much with their neighbors or were not "intimate" with any of them. Their real friends lived elsewhere and are met at churches, clubs, places of employment, and so on. One interesting sidelight on the subject is that all of the housewives who complained about the unfriendliness of the neighborhood, some ten in number, said that they used to live in the Midwest. As an indication of what the functioning neighborhood means to most of the housewives interviewed, my impression is that many of them said they had very nice neighbors who could be called upon for help in an emergency.

Another implication pertains to the oft-discussed problem of orientation of houses, front to the street or rear. Those who favor turning the house with the rear to the street hope that friendships will form across and pedestrian movement take place in the protected green space between the fronts of the houses. This study has indicated that the success of the idea may depend upon the functional relationship between the people and the green space. It was found that housewives with children under 12 had more social contacts on and across the street than housewives with older
children. If, then, the green space were a play area for young children social relationships could be expected to form across that green space. As for housewives with older children or none, the theory is that the street is a locus for service and coming and going, so that their social contacts in the "ideal" plan would continue to be on the service street. This conclusion may be emphasized for New England where so little time of the year is available for outdoor recreation and leisure which might take place in the green spaces.

The difference between housewives with young children and those with older children or none in their total number of social contacts on the street indicates that the family cycle may affect the location of the housewife's primary friendships. The statistics indicate that as the children grow older, do not play in the street, and travel longer distances in search of playmates, the housewife becomes less attached to the street for her social contacts.

Several of the tentative conclusions which pertain to the effects of very simple decisions are frightening and need further and more careful study. Decisions about a street grade, planting in the parking strips, the trimming of trees, and so on may affect more than is generally realized the happiness and personalities of the people who live with those decisions.
BIBLIOGRAPHY


Dahir, James. The neighborhood unit plan - its spread and acceptance; a selected bibliography with interpretive comments. New York, Russell Sage, 1947.


Perry, Clarence A. Housing for the machine age. New York, Russell Sage, 1939.

APPENDIX

Contained in this appendix is a dialogue to illustrate the interview technique used with housewives and a specimen of the questionnaires, including instructions to the teacher, given to the elementary school children.

Although every interview did not follow exactly the same pattern, the following dialogue illustrates the order of events and general character of a vast majority of the cases.

INTERVIEWER. [After ringing the doorbell and the housewife has answered] Hello, Mrs. Regan?

HOUSEWIFE. Yes, what is it?

INTERVIEWER. I am a graduate student at M.I.T. and I am doing a thesis on this section of Belmont. I have a couple of quick questions I am asking of housewives around here; it will only take a minute.

HOUSEWIFE. Well, all right, if you hurry.

INTERVIEWER. [Standing at the front door] First, how long have you lived in this house?

HOUSEWIFE. Aaa ... about nine years, next September.

INTERVIEWER. Do you have any children living at home?

HOUSEWIFE. Yes.

INTERVIEWER. Boys, girls?

HOUSEWIFE. A boy and a girl.

INTERVIEWER. And how old are they?

HOUSEWIFE. The boy is nine and the girl sixteen. [The interviewer notes the information on a clean sheet of paper for each housewife.]
INTERVIEWER. Now the main question is this: you live here on the street [Pointing to a sketched property-line map of the street which shows the approximate relationship of the houses and the family names in each] and I would like to know what three housewives, on either side of the street or across the back fence, [Pointing to those three general locations on the map] what three housewives you talk to most often?

HOUSEWIFE. [Looking at the map and at the houses on the street] Well, Mrs. Corcoran, Mrs. Lindstrom, and Mrs. Baker.

INTERVIEWER. Now, can you name two additional housewives whom you talk to more often than the remainder on the street?

HOUSEWIFE. Well, Mrs. Nolan, but that's all. I guess I'm not very neighborly. My neighbors are all very nice and we are all friendly, but I'm not intimate with any of them. What's this all about anyway?

INTERVIEWER. Well, I'm in the Department of City Planning at M.I.T. and I am trying to find out what effect a major street, like Cross Street over there, has upon whether or not you get to know the people who live on the other side of the street. I am asking the same questions on Cross Street and will compare the results with minor streets like this one.

HOUSEWIFE. I see.
INTERVIEWER. That's all there is. Thank you very much.

[Backing away from the door.]

HOUSEWIFE. [Closing door.] You're welcome.

A few housewives demanded to know the purpose of the study before answering any questions. In such cases the same explanation of the thesis was given. To housewives who appeared to feel that their personal life was being revealed to the public, I said that I was not interested in their best friends, just the housewives they talk to most often.

The questionnaires were filled out by the children with the exception of two classes of three in grade 2 at the Winn Brook School, where the teachers questioned each pupil and also did the writing. With a sample of the questionnaire the instructions given each teacher follow.

TO THE TEACHER:

The questionnaires you are distributing are part of a survey in connection with a masters thesis in the Department of City and Regional Planning at M.I.T. The basic question of the thesis is: Are streets social barriers between the people who live on each side of the street? The information obtained from these questionnaires will be plotted on a street and property-line map of the Winn Brook section and the resultant pattern or web formation correlated with the street and traffic pattern.

Two points are crucial. Children played with at home, meaning in the pupil's house, yard, or street, are to be listed; playmates at school, playgrounds, churches, clubs, etc., are to be excluded. Secondly, it would be very helpful for the pupil to try to remember at least the names of the streets his playmates live on even if the house number cannot be recalled.

Thank you for your assistance.
1. What is your name? ______________________________________________________________________
2. How old are you? _____________________________________________________________________
3. What grade are you in? __________________________________________________________________
4. What is your home address? ___________________________________________________________________
5. Write down the first and last names and addresses of all the boys and girls you play with at home.
   Then draw a circle around the names of the boys and girls you play with every day.