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An Experimental Application Of The Small World Problem To An Urban Community

Paige Birdsall
This thesis, directed and approved by the candidate's committee, has been accepted by the Graduate Committee of The University of New Mexico in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

AN EXPERIMENTAL APPLICATION OF THE SMALL WORLD PROBLEM

Title

TO AN URBAN COMMUNITY

PAIGE BIRDSELL

Candidate

SPEECH COMMUNICATION

Department

Dean

Date

Committee

Chairman
AN EXPERIMENTAL APPLICATION OF THE SMALL WORLD PROBLEM
TO AN URBAN COMMUNITY

BY
PAIGE BIRDSALL
B.A., UNIVERSITY OF CALIFORNIA, 1971

THESIS
Submitted in Partial Fulfillment of the
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AUGUST, 1974
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Thank you, Wayne Pace, for offering me the space to be myself in the Speech Communication Department, Lawrence Rosenfeld for respecting that space, and Tony for stepping in with me.
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Paige Birdsall
Department of Speech Communication
The University of New Mexico, 1974

The primary purpose of this study was to attempt to generate communication
acquaintance networks in an urban community between randomly selected members
of the population in two areas of the city which differed economically, socially,
and ethnically, using the small world method. Previous research suggested the
importance of interpersonal networks for the flow of information. In earlier studies,
acquaintance networks had been generated across parts of the country, but no in-
quiry had been made into communication acquaintance networks within an urban
community. This study was designed to discover whether viable communication
acquaintance networks existed within one urban community across which information
could easily flow.

Four target persons (two Chicanos and two Anglos) who resided in one
chosen census tract of Albuquerque, New Mexico, were selected. For each of the
four targets, a starting population of 60 people, 30 Anglos and 30 Chicanos, were
randomly selected from another designated area of the city. The starters were given
folders in which were enclosed the name, address, and other pertinent information
about the target, and instructions to mail the folder on to an acquaintance who
would be more likely than the starter to know the target. The folders passed from
acquaintance to acquaintance until some folders reached the targets. Each link in
the chains filled out and mailed in to the researcher a postcard with certain information about himself and the friend to whom he or she mailed the folder. From the postcards, data were collected to study the structure of the chains.

Four times as many Anglo as Chicano starters mailed the folders to a second person. Eighty-seven and one-half percent of the starters did not mail the folders on at all. Three percent of all the folders reached a target. More Anglo than Chicano targets were reached by chains started by both Anglos and Chicanos. Most of the folders went directly to the target's residential area, then occupational information was utilized to find the target.

It appears that unless the starters, the first links in the chains, are highly motivated, only a small percentage of them will choose to participate and begin the flow of information, and, hence, the creation of acquaintance networks. Asking for volunteers appears to be a doubtful way of soliciting starters who will begin chains. Once a folder passes the first link, the probability increases that it will be moved to other links. The small world theory was not clearly demonstrated by this study, but the potential of a small world phenomenon was suggested.
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CHAPTER 1

INTRODUCTION

The study of communication is essential to the understanding of human interaction. One of the primary functions of the communicative process is the flow of information. A strong relationship has been posited between information transmission and the development of a social system. For any group, be it a small task group or a nation of people, to function successfully and maintain its intrinsic structure, there must be an adequate flow of information between its members. This diffusion of information depends upon the existence of open channels, and networks of communication. The pattern of information flow among members of various social groups, in organizations, or communities, indicates the structure of interpersonal relations. Knowing something about who seeks information from whom allows us to understand the processes by which people adopt new ideas and practices, to note the patterns of influence, and to see how people are informed about what is going on.

The capabilities of modern technology have greatly increased the possibilities for large interpersonal networks of communication. The mass media allow for the immediate diffusion of ideas and events to millions of people at one time, spread across the nation, helping to create a community of ideas. Mass communication systems allow for contact across the world in an instant. Mass
transportation systems provide opportunities for large numbers of people to visit all parts of the country, facilitating interaction among different social groups, expanding the network of acquaintances. With this expanded communication of ideas and increased interaction has emerged a society much like a large family, in which any two people, no matter how physically remote from each other, are linked by a distant cousin. The more movement in a society, the greater the probability that the number of intermediate linkages will be quite small. Thus, Stanley Milgram points out, "there is only about one chance in 200,000 that any two Americans chosen at random will know each other. However, when you ask the chances of their having a mutual acquaintance, the odds drop sharply. And quite amazingly, there is better than a 50-50 chance that any two people can be linked up with two intermediate acquaintances." 1

On the other hand, alienation, bred out of isolationism, is one of the horrors of this society. We have lost contact to a great extent with those who live near us. Many people, especially in the large urban areas, live for years in close proximity to others they never meet. Because people who live in cities come into contact with large numbers of people each day, they conserve psychic energy by becoming acquainted with a much smaller proportion of people than their more rural counterparts, and by maintaining more superficial relationships even with these acquaintances (Milgram, March, 1970). Moreover, barriers exist between people, such as race, occupation, and social standing, that create

enormous communication gaps and make the transmission of information between them quite unlikely.

Although mass messages do tend to bridge social groups and create agreement and understanding of ideas among divergent groups of people, personal messages are usually transmitted through personal contacts. From studies of small world acquaintance networks, we have learned that a societal communication network may exist, that the functioning of this network may have powerful implications for the integration of our social system, and that we are potentially bound to one another by a communication system.

**Review of the Literature**

The study of the flow of information through networks is an important dimension of communication research, especially in the areas of mass communication, organizational relationships, and small groups. "Flow of information" defines the situation in which there is an initial source for a message, which is transmitted to a receiver, who in turn passes the message on, creating a communication network. When messages are transmitted from friend to friend, we refer to them as an acquaintance network.

The literature on interpersonal communication networks can be divided into research on small group networks and networks in large populations. Networks can be studied by analysing the message flow or by analysing the structure. The small world method utilized in this study is a technique for analysing the structure of large acquaintance networks. This review of the literature will pro-
vide an overview of research on interpersonal networks, then focus on the acquaintance network studies.

**Interpersonal Communication Networks**

The function of interpersonal relations as communication networks was basically rediscovered out of research on the "two-step flow" of information (Katz, 1957). The two-step flow hypothesis had been derived from the study of voter decision-making in the 1940 presidential campaign by Lazarfield, Berelson, and Gaudet (1948), which suggested that information flows from the mass media to receivers who then pass it on through interaction with others. Those receivers who were exposed to messages by means of the mass media, and passed on what they saw, heard, and read to others with whom they were in contact, were called opinion leaders. The "relay function" in interpersonal relations is accomplished by these kinds of leaders (Katz and Lazarfield, 1955). Thus, opinion leaders emerge as integral links in everyday interpersonal relationships that create community networks of communication. Katz and Lazarfield's research marked the beginning of a new emphasis on the influence of the primary group on the flow of information in communication research.

The two-step flow discovery opened the way for the study of personal influence processes on communication. Mass communication and small group research, and what was originally called rural sociology—the adoption of new agricultural practices by farmers—were among the early investigations to examine the personal influence phenomenon. Most of the research has shown that mass
media are major agents in arousing interest in new methods early in the adoption process of new ideas, but during the later stages, personal contacts are especially influential (Bostian, 1970). The mass media provide information directly, but people then tend to go to opinion leaders before acting.

Interpersonal networks have been studied within the contexts of small groups, and information flow in large populations. Various research techniques exist for analyzing communication networks. One method is to define the flow of a message, by answering these questions:

1) How fast does it move from node to node to node?

2) What proportion of a network has received the message at any given time?

3) What distinguishes those who receive the message from those who do not?

4) How accurate is the transmission?

5) How effective is the message on those who receive it? (Pool and Schramm, 1973)

Another perspective for analyzing networks is to define the flow of multiple messages—the volume and structure of message flow. Research has also inquired into how hierarchical, how connected, how random, and how structured a network may be.
Communication Networks in the Small Group

Communication networks within the small group structure have been studied extensively. Small group research has often used controlled laboratory methods to study communication nets, focusing primarily on the effects of various patterns and positions within a pattern on the task performance of a small group (Bavelas, 1950; Leavitt, 1951). That is, which type of pattern for communication flow is most effective in problem solving—the wheel, circle, or all-channel? The wheel has a central member through which all messages must pass. The circle has no central person and messages must be relayed, since no single member has access to all other members. The all-channel network allows all members access to all other members, including access to the central position.

Studies of communication nets within small groups in the real life situation have been concerned with understanding networks as they exist. The sociometric pattern permits the study of information or message flow in terms of an objectively delineable pattern of individual relationships. Sociograms showing friendship patterns are considered synonymous with communication nets (Pareek and Singh, 1961).

Moreno (1960) demonstrated that rumor follows the paths of sociometric networks. Festinger, et al. (1950), in the Regent Hill and Westgate studies, also showed how friendship ties operate as links in communication networks in the transmission of rumors. In "Regent Hill," a rumor spread to 62 percent of those who had close friends in a community, to 42 percent of those who had only acquaintances, and to 33 percent of those who claimed to have no friends at all
in the neighborhood. In the Westgate study of the students' housing development, sociometric friendship choices accounted for the direction taken by almost 50 percent of the instances in which a planted rumor was passed on. These studies indicate the importance of friendship patterns in the flow of information in communication networks.

Communication Networks in Large Populations: Analysis of Message Flow

Large communication networks can be studied in two ways: 1) by analysis of message flow, or 2) by analysis of an underlying structure of possible communication linkages.

The analysis of message flow in large networks involves research in the diffusion of information. Various studies have explored the diffusion of messages by leaflet drops on a population, the spread of a rumor, the diffusion of knowledge of a news event, and the diffusion of innovations. In Project Revere (DeFleur and Larsen, 1958), which was organized to test experimentally the distribution and effects of airborne messages and their diffusion as they passed by word-of-mouth from recipients of the leaflets to other members of the population, it was found that interaction in a neighborhood and between acquaintances formed an important part of the diffusion process, along with interaction between family members. Diffusion, defined as the percentage of message knowers, waned with the distance the message traveled (Dodd, 1958).

The diffusion of information of major news events marks another area of large network inquiry. Larsen and Hill (1954) studied the diffusion of news of
Senator Robert Taft's death. They found that the degree of interpersonal communication present is a function of interest value in the event. They also suggested that the degree to which a given population is informed of an event can be related to that population's evaluation of the event. Bradley Greenberg (1964) designed a study to examine the diffusion of knowledge of the assassination of President Kennedy. This research concluded that interpersonal communication plays different roles given the importance of the news event; that is, interpersonal networks are the first source of news for events of maximum and minimum attention for the audience. When a news event is of crisis proportion, such as the death of a president, interpersonal channels of communication are as important as the mass media in disseminating initial information.

The process of the diffusion of innovations can be characterized as the 1) acceptance 2) over time 3) of some specific item—an idea or practice 4) by individuals, groups, or other adopting units, linked 5) by specific channels of communication 6) to a social structure, and 7) to a given set of values, or culture (Katz, Levin, and Hamilton, 1963). Contemporary studies of diffusion in the fields of mass communication, rural sociology, and marketing research place much emphasis on channels. Only recently have the students of mass communication and marketing begun to include interpersonal relations among channels of diffusion. This contrasts sharply with the rural sociologists who have long been aware—although they had not formulated it until recently—that there exists a "two-or-more-step flow" from a county agent to an influential farmer to other farmers. Mass media channels are best to create knowledge of an idea, but interpersonal
channels are most important for changing attitudes towards the innovation. The most widely known diffusion study is, of course, the "drug study" of Coleman, Katz, and Menzel (1957), in which they observed the spread of adoption of a new drug among physicians.

All the research discussed above concerning large communication networks involves the analysis of message flow. A leaflet is dropped, a rumor started, an innovation introduced, and a study is made of the flow of the message through the networks. The importance of interpersonal networks for the diffusion of information was emphasized.

Communication Networks in Large Populations: Analysis of Structure

Another manner to explore large interpersonal networks is by analysis of the underlying structure of possible communication linkages. Such questions are asked as: does a path exist between A and B? How many links are in that network? This approach is most exemplified by the research of the small world phenomenon, upon which this particular study is based.

Everyone has heard the coined phrase, "It's a small world!" It may be exclaimed when a person from San Francisco discovers that a visitor from Dallas knows her cousin in Connecticut. This "small world" concept introduces the notion that there may be extensive societal networks of acquaintances linking people together who do not know each other.

Given the existence of such networks, and given that the research says that such interpersonal networks are vital organs for the flow of information and
messages, the exploration of these networks—studying their structure, the nature of the links and the efficiency for carrying information—becomes an important task.

The phrase the "small world" was first employed in the social sciences by Ithiel de Pool and Manfred Kochen (1958). Pool, of MIT, and Kochen, of IBM, built a theoretical model of the small world. They assumed a population of N individuals, each of whom knew, on the average, n others in the population. They attempted to calculate $P_k$, the probability that two persons chosen randomly from the population can be linked by a chain of k intermediaries. Using an estimate of average acquaintance volume obtained by Gurevitch (1961), a graduate student at the time, they deduced that two intermediaries would be required to link typical pairs of individuals in a population of 200 million.

The main obstacle in applying a model of this type is the problem of social structure. Society is not built on random connections among persons, as Kochen and Pool must assume for the purposes of their model, but rather tends toward fragmentation and social classes. Instead of allowing acquaintance nets to define the boundaries of functioning social groups, Pool and Kochen's model conceives of society as being partitioned into a number of hypothetical groups, each with identical populations. From this they could devise a way to predict chain lengths within and between such hypothesized groups. The problem with this model is that even if it can be calculated that people have a certain average number of acquaintances, there may be a lot of inbreeding, in which many of the friends of a friend may be people one already knows, so they do not con-
tribute to a widening net of acquaintances.

The small world problem can be formulated as: what is the probability that any two people, selected arbitrarily from a large population, will know each other? Elaborating, given any two people from this population who do not know each other, how many intermediaries would be necessary to link them in an acquaintance network?

The small world method for tracing acquaintance networks was devised and first tested by Stanley Milgram (1967). The procedure consisted of selecting an arbitrary "target" person and a group of "starter" persons, and attempting to generate an acquaintance chain from each starter to the target. Each starter was given a document and asked to begin moving it by mail towards the target, by sending it to any personal acquaintance whom he considered likely to know the target. The document described the study, named the target, and gave several items of information about the target provided to aid each sender in his choice of recipient. The folder made its way along an acquaintance chain of indefinite length until it reached its target or someone along the way chose not to participate. The document also requested that each person in the chain mail back to the researchers an enclosed postcard stating his own name, address, age, sex, occupation, and relationship to the person to whom he passed the folder. In this way the researchers could compile data on each link in the chains, to study the nature of the networks.  

In Milgram and Travers' 1969 study, individuals (N = 296) in Nebraska and Boston who responded to a mailed solicitation were asked to generate acquaintance chains to a target person in Massachusetts, using the "small world method." The mean number of intermediaries from the starter to the target of the 29 percent of the folders which reached their destination was 5.2. Boston starting chains reached the target twenty-five miles away with fewer intermediaries than those starting in Nebraska; subpopulations in the Nebraska group did not differ among themselves.

Several significant points were generated from analysis of the data collected from the links. Chains which converged on the target principally by using geographical information reached the target's area quickly, but then often circulated before entering a circle of friends. Those chains which approached the target through occupational channels zeroed in on the target with fewer links. How information supplied about the target was used seemed to affect the type of chain generated. Twenty-seven percent of the folders were not passed on by the starters. Similarly, 27 percent of the folders passed on by the starters died at the first remove.

method for producing and tracing the diffusion of messages. The technique of "chain tags" was introduced to permit control of the number of message knowers, the number of links from the message starter, the activity rate or hearer-per-teller ratio, and the amount of time during which and the area and population in which the message diffusion took place. A chain tag was a cellophane-wrapped pack of identical postcards given to each of several starters in several communities. Each starter filled out and mailed in a card and passed the subpack on to another person who completed the same operation. In this manner, message diffusion could be traced. This chain tag technique was revised and incorporated into the small world method for tracing acquaintance networks by having the links return postcards, and was utilized in this study.
It appeared likely that 1) the individuals were not motivated to participate, or 2) they did not know to whom to send the folder to advance it to the target.

The data also showed that as chains converged on the target, common channels appeared; that is, some intermediaries appear in more than one chain. Eighty-six percent of the participants sent the folder to persons described as friends; 14 percent sent it to relatives. Data on patterns of age, sex, and occupation supported the plausible hypothesis that participants chose recipients from a pool of individuals similar to themselves.

In Milgram and Korte's 1970 study, using the same small world technique, acquaintance chains were generated between a randomly selected population of 540 whites in Los Angeles and eighteen targets in New York City, nine white and nine black. Twenty-two percent of the chains reached their targets, with a mean of 5.5 intermediaries for white target chains, and a mean of 5.9 intermediaries for black target chains. The number of completed chains was 2.5 times as great for white targets as black targets. Convergence, or funneling, was evident in nine of the eighteen targets. The gatekeepers, white senders and black recipients who served as points of contact and acquaintanceship, in both races were predominantly males of professional status. The black recipient was most commonly chosen by the white sender because of an occupational similarity with the target (43 percent). The acquaintance chains that were successful in reaching the black target typically remained white until that point where the target became clearly located and the white-to-black crossover occurred. Nearly 80 percent of the incompleted black target chains never crossed the racial line.
Chain lengths for black and white targets did not differ in any important way. Regardless of the race of the targets, the chains run themselves down a fixed number of removes. Unless the target is reached in this number of removes, he or she will not be reached at all, because of the exhaustion of the chains. Thus the efficiency with which the target is reached is what chiefly determines the number of completions. The larger and more varied the pool of acquaintances a participant can draw on, the greater the opportunity of choosing an efficient link. It was noted above in the Milgram (1969) study that participants tended to choose recipients from people similar to themselves. The typical white participant has but few black acquaintances, and a rather deficient knowledge of black social structure. Another factor making chain completion difficult was the participants' uncertainty of the race of the target person. There was no explicit racial identification in the experimental materials.

In summary, Milgram's small world method allows for the creation of a communications acquaintance network between randomly chosen subjects in a large population, and gathering information on the links to study the nature of the structure of that network. This method represents an effective experimental approach for studying the structure of large interpersonal communication networks. Although cities represent vast interpersonal communication networks, neither the research of diffusion nor Milgram's work in acquaintance networks shed light on the social structure and communication networks in urban communities. Therefore, the present study was designed in an attempt to explore the phenomenon of acquaintance networks in an urban community.
Statement of Problem

The intent of this investigation was to apply Milgram’s small world method to study communication acquaintance networks within one urban community. It has been noted that the modern technology of mass communication systems, mass government, mass transportation and mass industry have facilitated the capacity of interaction among large numbers of people in this society. It has also been noted, however, that isolation is a prevalent phenomenon today, and that interaction between people of different cultural and economic backgrounds is often limited. In some parts of the urban community, people have lived for a long time in one neighborhood, with little contact out of the specific area. Other parts of the urban community are new, modern, sprawling housing tracts filled with residents who have recently moved to the area. Perhaps people in today’s urban areas rely mainly on mass media for information. Or, are there acquaintance networks which link different areas of the city across which information can easily and readily flow?

What are the characteristics of these networks if they exist? People in urban areas vary in economic status, occupation, and social standing. Areas of personal influence and networks of communication may be confined to circles of people who are similar in background and economic characteristics. Any attempt to move information from one level of societal status to another may be thwarted. People simply may not have friends who are very different from themselves.
Likewise, within the urban community we also find differences in ethnic background. Familial ties, shared cultural values, and the history of a common heritage may reinforce existing communication acquaintance networks. Thus, attempts to move information out of an interpersonal network across the ethnic boundary to a person of another background may also be impeded by lack of knowledge of many people outside of the ethnic group.

These are some of the problems of studying acquaintance networks in an urban community. The city utilized in this study was Albuquerque, New Mexico. Albuquerque is rather unique among American cities in that its population is a diverse mixture of Anglos and Chicanos (40 percent each), with a smaller number of Native Americans (16 percent), and Blacks (2 percent). It is similar to other cities in the fact of its enormous expansion in the past twenty years, so that it boasts an old established sector and a sprawling new development. A large number of the Chicano population lives in the older sector of the city, which is called the South Valley, along the Rio Grande River, where some of the residents' families settled as early as 1706. This section of the community has consistently voted to remain unincorporated into the city proper, and maintains a rural flavor. One may expect that the strong familial ties of many Chicanos and the shared language and background may create firm communication networks in this area.

Diagonally across Albuquerque sprawls a much newer area, called the Northeast Heights, where the homes are built in tracts, newly developed since 1950. The residents are predominantly Anglo, and to a large extent members of the professional class. Within the Northeast Heights, one specific tract, 1.03
as designated by the *Census of Population and Housing, 1970*, was identified as a target area.

As can be seen in Table 1, the population of tract 1.03 and the population of the tracts which encompass the South Valley differ considerably on some basic ethnic and economic factors. The intent of this study was to attempt to generate acquaintance networks between targets in tract 1.03 in the Northeast Heights and starters in the South Valley, in an experimental application of Milgram's small world method. Anglo and Chicano targets were identified in the Northeast Heights, and Anglo and Chicano starters were selected from the South Valley. The differences in number and type of networks generated and completed between starters and targets of like ethnic background and starters and targets of different ethnic background were analyzed.

In Milgram's 1970 study, acquaintance networks were generated between white starters in Los Angeles and black and white targets in New York. The number of completed chains between white starters and white targets was 2.5 times as great as between white starters and black targets. Will similar results occur within one urban community between people of the same and different ethnic background?

Much of the research on interpersonal networks pointed out that acquaintances and family members form the strong communication links, and that people tend to associate with others similar to themselves. Milgram noted in his 1969 study that participants tended to pick recipients for the folders from people similar to themselves, and that the larger a pool of acquaintances a
### TABLE 1

**A COMPARISON OF CENSUS TRACT 1.03 OF THE NORTHEAST HEIGHTS AND THE CENSUS TRACTS OF THE SOUTHWEST VALLEY ALBUQUERQUE, NEW MEXICO**

<table>
<thead>
<tr>
<th></th>
<th>Tract 1.03</th>
<th>South Valley</th>
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<tbody>
<tr>
<td>General Populations</td>
<td>11,179</td>
<td>29,389</td>
</tr>
<tr>
<td>Occupations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional, technical, and kindred workers</td>
<td>1,376</td>
<td>677</td>
</tr>
<tr>
<td>Managers</td>
<td>626</td>
<td>511</td>
</tr>
<tr>
<td>Laborers, except farm</td>
<td>70</td>
<td>685</td>
</tr>
<tr>
<td>Service workers</td>
<td>299</td>
<td>1,459</td>
</tr>
<tr>
<td>Construction workers</td>
<td>125</td>
<td>1,145</td>
</tr>
<tr>
<td>Median Income</td>
<td>$15,638</td>
<td>$6,181</td>
</tr>
<tr>
<td>Percentage of families with income below poverty level</td>
<td>2.8%</td>
<td>27%</td>
</tr>
<tr>
<td>Persons of Spanish language or Spanish surname</td>
<td>1,300</td>
<td>21,512</td>
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</tbody>
</table>
participant had to draw on, the greater was the likelihood of choosing an efficient link. The question then for this research was, were participants able to find efficient links to move the folder toward the target, generating a network, since the folder must move from one area to another area where the people were quite different economically, ethnically, and socially? If communication acquaintance networks were generated, the structure of the networks could be analyzed by compiling the data from the postcards sent in by each of the links. By answering the questions posed in the following section, there may emerge an understanding of the structure of the networks across which information flows in an urban community.

**Research Questions**

What was the success and character of acquaintance chains generated between starters and targets of different economic strata? between Anglo and Anglo? between Anglo and Chicano? between Chicano and Chicano? between Chicano and Anglo?

1. How many chains were completed?
2. How many links were in each chain?
3. What was the median number of links?
4. Did the chains take different routes depending on which information about the target was utilized?
5. How were people linked in the acquaintance networks?--by occupation? familial ties? friendship?
6. What were the characteristics of the gatekeepers?
7. What were the predominant occupations of people in these acquaintance networks?

8. What were the most prevalent ages?

9. What were the sex similarities and differences in the links?
CHAPTER II

RESEARCH DESIGN

Selection of Subjects

Four volunteer targets were selected who resided within census tract 1.03 of the Northeast Heights of Albuquerque, New Mexico. This is the area bordered by Montgomery Road (N), Eubank Boulevard (E), Candelaria Boulevard (S), and Louisiana Avenue (W). The targets were interviewed in their homes. They agreed to allow the researcher to include in the folders their names, addresses, occupations, wife's maiden name, and names of organizations to which they belonged (the same information requested by Milgram), and they agreed to receive folders in the mail at their homes for one month.

For each of the four targets, two starting populations of 30 Anglos and 30 Chicanos (a total of 240 starters), were randomly selected from census tracts 23, 43, 44, and 45 in the South Valley. That area is bordered by the Rio Grande River (E), Central Avenue (N), Coors Road (W), and Rio Bravo Road (S). Four volunteer assistants, two Chicanos and two Anglos, and the researcher (all together 2 men and 3 women) distributed the folders, with a short verbal description of the study, to those who were willing to serve as starters. Contacts were approached in front of four food stores distributed in the central, north, south, and west parts of the South Valley. Each person invited to participate as a starter was first questioned.
to ascertain that he or she actually lived in the South Valley. The distribution averaged about 15 folders an hour.

**Materials**

Each starter received a 6 x 9 inch stamped manila envelope marked with the return address of the Speech Communication Department in the upper left hand corner. The folder contained a description of the study, a set of instructions for participation, the name and other selected information about the target person, a roster to which each participant and intermediary affixed his or her name, a stack of fifteen reply cards (with a first class permit so that only those mailed would be paid for) asking for information about each intermediary, one to be mailed to the experimenter by each intermediary in each chain, and three extra manila envelopes with stamps, so that the first four links would not have to supply envelopes or postage money. A sample of the forms inside the folder can be found in the Appendix.

**Specific Procedures**

a) Each starter was to hand or mail the manila envelope to a personal acquaintance (someone he or she knew on a first name basis) who was more likely than the starter to know the target person.

b) The rules for participation included in the envelope contained the same instructions for people receiving the envelope from the starter or another intermediary. Each intermediary was instructed to take one of the postcards, fill it out, and mail it back to the experimenter. The intermediary was to add his or her name to the roster included in the envelope to prevent people from sending the
envelope to someone who had already received it and passed it on. The roster
was designed to motivate people to send it on by allowing them to see the name
of a personal acquaintance on the list.

c) The tracer postcards were designed to enable the experimenter to
keep running track of the progress of each chain as it developed. The following
information was requested on each intermediary: name, address, sex, age, and
occupation of the sender and the receiver, and the relationship between the sender
and the receiver—whether friend, relative, business associate, for example, and a
brief explanation of why the sender chose that particular individual.

d) About a month was allowed for the envelopes to arrive at the target.
CHAPTER III

PRESENTATION AND ANALYSIS OF RESULTS

The preceding chapter discussed the procedure by which acquaintance networks could be generated between two areas of an urban community. This chapter presents and explains the results attained from the attempt to generate acquaintance networks in Albuquerque, New Mexico.

Completed Chains

Table 2 indicates that of the 240 folders which were distributed to starters in the South Valley, 30, or 12.5 percent, were passed on by starters in an attempt to reach the target, and 3 percent reached the target. Eighty-seven and one half percent of the folders were not passed on to the second link. Starters simply failed to initiate the chain. This percentage contrasts sharply with the 27 percent of the starters who failed to pass the folders in Milgram's 1969 study between Nebraska and Boston. Of the 30 folders which were passed on by starters, 24 were begun by Anglo starters and 6 by Chicano starters. In other words, 4 times as many Anglos as Chicanos who originally agreed to participate in the experiment actually did so. None of the Chicano starters who were given folders destined for one of the Anglo targets and for one of the Chicano targets passed them on. Of the 24 chains generated by Anglo starters, 4 networks,
### TABLE 2

**ATTEMPTED AND COMPLETED NETWORKS AS A FUNCTION OF STARTER AND TARGET ETHNIC BACKGROUND**

<table>
<thead>
<tr>
<th></th>
<th>ANGLO STARTERS (N = 120)</th>
<th>CHICANO STARTERS (N = 120)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no.</td>
<td>attempted</td>
</tr>
<tr>
<td></td>
<td>no.</td>
<td>completed</td>
</tr>
<tr>
<td><strong>ANGLO TARGET</strong></td>
<td>8</td>
<td>27%</td>
</tr>
<tr>
<td>(teacher)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ANGLO TARGET</strong></td>
<td>7</td>
<td>23%</td>
</tr>
<tr>
<td>(insurance)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CHICANO TARGET</strong></td>
<td>4</td>
<td>13%</td>
</tr>
<tr>
<td>(insurance)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CHICANO TARGET</strong></td>
<td>5</td>
<td>20%</td>
</tr>
<tr>
<td>(barber)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>24</td>
<td>20%</td>
</tr>
</tbody>
</table>

17% of attempted, completed

50% of attempted, completed
or 17 percent, were completed--3 reached Anglo targets, and 1 reached a Chicano target. Of the six chains generated by Chicano starters, 3 networks--50 percent--were completed. Two reached Anglo targets and one reached a Chicano target. Therefore, although one-fourth as many Chicanos originally participated in the generation of links, 3 times as many of the networks begun by Chicanos were completed, as compared to networks begun by Anglos.

Lengths of Chain

Table 3 shows the frequency distribution of lengths of the chains. "Chain length" here is defined as the number of links in a network from starter to target. A starter who mails a folder on to a friend creates a network of two links. The most common number of links in a chain varied from target to target. Most of the chains varied from 2 to 4 links. As revealed in Table 4, the mean chain length for all attempted networks (i.e., chains which moved beyond the starter) was 3.0. The mean chain length for completed networks (i.e., chains which reached the target) was 4.0.

How the Folders Traveled

Table 5 shows the percentage of the folders which starters sent directly to the Northeast Heights, that part of Albuquerque where the target resided. The numbers vary from 43 percent to 100 percent, and the mean was 75 percent. Nineteen percent of the folders were sent to other areas of the city, and 6 percent of the folders were mailed by a starter to an acquaintance residing in the South Valley. On the postcards which each participant in each chain filled out and
TABLE 3

FREQUENCY OF DISTRIBUTION OF CHAIN LENGTH

<table>
<thead>
<tr>
<th>TARGET</th>
<th>Number of links in chains</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Anglo (teacher)</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Anglo (insurance)</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chicano (insurance)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Chicano (barber)</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4

**Comparison of Mean Chain Length for Chains Attempted and Chains Completed**

<table>
<thead>
<tr>
<th>Description of Network</th>
<th>Mean Length of Chains Attempted</th>
<th>Mean Length of Chains Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Starter</strong></td>
<td><strong>Target</strong></td>
<td></td>
</tr>
<tr>
<td>Anglo</td>
<td>A (teacher)</td>
<td>3</td>
</tr>
<tr>
<td>Chicano</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Anglo</td>
<td>A (insurance)</td>
<td>3.6</td>
</tr>
<tr>
<td>Chicano</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Anglo</td>
<td>C (insurance)</td>
<td>3</td>
</tr>
<tr>
<td>Chicano</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Anglo</td>
<td>C (barber)</td>
<td>3</td>
</tr>
<tr>
<td>Chicano</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
mailed to the researcher, one question was, "Why did you select this person to receive the folder?" Fifty percent of the starters stated geographic reasons, that is, their friend lived in the Northeast Heights. Twenty-five percent stated that their friend was of the same occupation as the target, and 25 percent stated that they thought the friend would be interested and continue the chain. When the postcards for all of the links in the chains were examined, 32 percent of the total claimed they picked their friend because of geographic area, 37 percent because of occupation, 30 percent because of interest, and 1 percent because he belonged to the same organizational club as the target. The two chains which reached the Anglo teacher utilized occupational links: a teacher and a secretary in the same school system. One of the chains which reached the Anglo insurance man reached him through another insurance agent. Another came to him from a neighbor, and the other from a fellow Elk. The Chicano insurance man target was reached through insurance connections. The Chicano barber was reached by another barber. That is, 71 percent of the completed networks utilized occupational information to reach the target, 14.5 percent utilized location, and 14.5 percent utilized information on the organizations to which the target belonged. However, all the links which were acquainted with the target, and so were able to pass it on to complete the network, lived in the Northeast Heights. Therefore, before the network links could utilize efficient occupational information, they had to have reached the same area of the city as the target.

Another question each network link responded to on the postcards was, "What is the nature of the relationship to you, of the person to whom you sent the
<table>
<thead>
<tr>
<th>Description of Network</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anglo—A (teacher)</td>
<td>7 out of 8</td>
<td>87.5%</td>
</tr>
<tr>
<td>Chicano—</td>
<td>0</td>
<td>--</td>
</tr>
<tr>
<td>Anglo—A (insurance)</td>
<td>3 out of 7</td>
<td>43%</td>
</tr>
<tr>
<td>Chicano—</td>
<td>2 out of 3</td>
<td>66%</td>
</tr>
<tr>
<td>Anglo—C (insurance)</td>
<td>3 out of 4</td>
<td>75%</td>
</tr>
<tr>
<td>Chicano—</td>
<td>0</td>
<td>--</td>
</tr>
<tr>
<td>Anglo—C (barber)</td>
<td>4 out of 5</td>
<td>80%</td>
</tr>
<tr>
<td>Chicano—</td>
<td>3 out of 3</td>
<td>100%</td>
</tr>
</tbody>
</table>
folder?" Sixty-four percent of the responses indicated friend, 29 percent indicated business associate, and 4 percent indicated relative.

The Gatekeepers

The gatekeepers were those senders and receivers who served as points of contact and acquaintanceship across ethnic lines. Only 2.5 percent of the 120 Chicano starters attempted to pass on folders directed at Anglo targets. However, 100 percent of the folders which were passed on by Chicano starters reached links which managed to find gatekeepers and cross the ethnic line between Chicano and Anglo, and 66 percent of them were successful in reaching the target. On the other hand, 3 times as many—7.5 percent—of the 120 Anglo starters attempted to pass on folders directed at Chicano targets, and only 25 percent of these networks located gatekeepers, and only 11 percent of them were successful in reaching the target. All of the links which passed a folder to an acquaintance of the other ethnic background listed that person as a friend, as opposed to a business associate or relative.

Table 6 lists the sex, age, and occupations of the gatekeepers. In the networks involving a Chicano sender and an Anglo receiver, 5 women and 1 man were involved as links. In the networks involving an Anglo sender and a Chicano receiver, 5 men and 1 woman were involved. In both types of network gatekeepers, the sender sent the folder to an older person. The occupations varied.
# Table 6

**Sex, Age, and Occupation of Gatekeepers**

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>CHICANO SENDERS</th>
<th>ANGLO RECEIVERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Mean Age</td>
<td>28</td>
<td>44</td>
</tr>
<tr>
<td>Occupations</td>
<td>housewife (2)</td>
<td>housewife (1)</td>
</tr>
<tr>
<td></td>
<td>student (1)</td>
<td>teacher (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>ANGLO SENDER</th>
<th>CHICANO RECEIVERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Mean Age</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>Occupations</td>
<td>teacher (1)</td>
<td>insurance (2)</td>
</tr>
<tr>
<td></td>
<td>insurance (1)</td>
<td>barber (1)</td>
</tr>
<tr>
<td></td>
<td>accountant (1)</td>
<td></td>
</tr>
</tbody>
</table>
Characteristics of the Links

Table 7 lists the occupations of the people in the acquaintance networks. The distribution was highly varied. However, some predominant occupations emerged. Seventeen and one-half percent of the links were teachers. Seventeen and one-half percent were housewives. Fourteen percent were students. Ten percent were secretaries. Eight and one-half percent were managers.

Table 8 portrays figures on the mean age of links in all the networks. The mean age for all the participating links was 32.

As Table 8 shows, 55 women and 37 men participated as links in this study. In examining the nature of the links, we found the following distribution:

\[
\begin{align*}
F & \rightarrow F & 28 \\
F & \rightarrow M & 15 \\
M & \rightarrow F & 6 \\
M & \rightarrow M & 18 \\
\end{align*}
\]

That is, a woman is nearly twice as likely to mail on the folder to another woman as to a man, and a man is 3 times as likely to pass it on to another man as to a woman. This supports Milgram's discovery in his study (1969) that subjects were 3 times as likely to send their folder to someone of the same sex as to someone of the opposite sex. These data suggest that certain kinds of communication activities are strongly conditioned by sex roles.
TABLE 7

DISTRIBUTION OF PROFESSIONS IN THE NETWORKS FOR EACH TARGET

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Anglo (teacher)</th>
<th>Anglo (insurance)</th>
<th>Chicano (insurance)</th>
<th>Chicano (barber)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>8</td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Secretary</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Housewife</td>
<td>2</td>
<td>9</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Insurance</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Salesman</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clerk</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Barber</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Nurse</td>
<td></td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Manager</td>
<td></td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cashier</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bartender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Party girl</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Electrician</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Speech therapist</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Missionary</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Professor</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ironworker</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Physical therapist</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Accountant</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 8

MEAN AGE AND SEX OF LINKS IN NETWORKS

<table>
<thead>
<tr>
<th>Description of Network</th>
<th>Number of Men</th>
<th>Number of Women</th>
<th>Mean Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starter</td>
<td>Target</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anglo</td>
<td>A (teacher)</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Chicano</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Anglo</td>
<td>A (insurance)</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Chicano</td>
<td>2</td>
<td>6</td>
<td>39</td>
</tr>
<tr>
<td>Anglo</td>
<td>C (insurance)</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Chicano</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Anglo</td>
<td>C (barber)</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Chicano</td>
<td>4</td>
<td>5</td>
<td>24</td>
</tr>
</tbody>
</table>
CHAPTER IV

CONCLUSIONS, DISCUSSION, RECOMMENDATIONS AND IMPLICATIONS

The results of this study presented in the previous chapter provide some tentative answers to the research questions. This chapter will enumerate the conclusions that seem warranted by the results, discuss some alternative interpretations of the conclusions, and suggest some possible future research directions.

Conclusions

The following conclusions may be drawn from the findings of this study:

1. The generation of large numbers of acquaintance chains in an urban community between two decidedly different population groups did not occur, casting some doubt on a general small world phenomenon.

2. Selecting individuals to begin acquaintance chains by having research personnel distribute folders to contacts in front of food stores appears to result in compliance and subsequent failure of the contacts to continue the chains.

3. Chains which do not complete themselves exhibited a median number of links less than the median number of links of chains which did complete themselves, indicating that if the folders had been passed on further, instead of dying, the possibility existed that they may have reached a target.

4. Chains that were passed on and completed appeared to be based on friendship connections among people who moved the folders quickly to the target's residential
area, then utilized information about the target's occupation. The successful chains were more often initiated by Anglo starters, and were directed at Anglo targets.

Discussion

In research by Milgram (1969, 1970), acquaintance networks were generated between Nebraska and Boston and between whites and blacks in Los Angeles and New York. In the first study, 21 percent of all chains eventually reached the target. In the second study, in which the racial barrier had to be crossed, 22 percent of all the chains reached the target. It had been anticipated that within one urban community, more extensive interpersonal communication networks would exist, and that an even greater percentage of the chains would reach the target. As Conclusion 1 indicates, this did not occur. Only 3 percent of the chains reached the targets. One reason for the low figure of completion is the fact that 87.5 percent of the folders were not passed to the second link, which represents 3 times as many as those who refused to participate in Milgram's 1969 study. The large difference in these figures can be explained in a variety of ways.

As Conclusion 2 suggests, one major difference between this study and Milgram's research was the method by which the starters were selected. Milgram solicited his starters by mail and by newspaper advertisement. This meant that all his starters were volunteers who had responded to a plea for participation. In contrast, in this study, starters were found by approaching people randomly as they went in and out of foodstores, giving them a brief description of the research
and what they would have to do, and asking them if they would take a folder and
serve as a starter. In this way, the 240 folders were distributed over a 2 week
period to a random population which lived in a select area. Although all of these
people had agreed to take the folder, not many of them later mailed it to an
acquaintance. The main difference between Milgram's starters and these was that
his starters volunteered, and these starters initially complied. Volunteers, by
definition, cooperate, whereas compliance behavior can be a response to being
approached, and does not necessarily indicate actual acceptance of what is being
offered or suggested. As Herbert Kelman expresses it,

Some individuals may compulsively try to say the expected thing in all situations and please everyone with whom they
come into contact, out of a disproportionate need for favorable responses from others of a direct and immediate kind.
In any event, when the individual complies, he does what the agent wants him to do—or what he thinks the agent
wants him to do—because he sees this as a way of achieving a desired response from him. He does not adopt the induced
behavior—for example, a particular opinion response—because he believes in its content, but because it is instru-
mental in the production of a satisfying social effect. What the individual learns, essentially, is to say or do the expected
thing in special situations, regardless of what his private beliefs may be.³

Beyond stating that starters were solicited by mail and newspaper ad,
Milgram did not mention the exact method for giving his starters the folders and
instructing them on the study. Since his starters had volunteered, it may be
assumed that he had all their names. In this study, the names of the people who

initially took the folders were not collected. It is possible that once a person had identified himself by name, he or she would be more likely to participate, compared to a person who knew he or she was anonymous.

In this study, the researcher and her assistants made direct contact with the starters, and so, in a sense, were the first links in the network. The problem emerges that no method was conceived to measure the effects of the distributors on the starters. The women handing out the folders appeared to be able to engage the people more readily than the men. It is possible that different reactions occurred to the men and women or to the Chicanos and Anglos who distributed the folders, affecting the willingness or unwillingness of the starters to actually participate after he or she had complied.

The starters received the folders from strangers confronting them in a public place with a request to which they initially complied. Not many of these starters moved the folders on. However, once a folder did reach a second link, the likelihood of the chain continuing from there increased substantially. The second links in the chain received the folders not from a stranger, but a friend. The starters could be considered responsible for starting a network; a second link might perceive himself as only a cog in a system which had already begun, and so be more inclined to participate.

Another perspective on the problem of starter-dropout emerges by reviewing the data on the starters. Of the folders which passed on by the starters, 4 times as many were mailed by Anglo starters than by Chicano starters. The differences in the volume of starters who actually complied between Anglo
and Chicano indicates that motivational factors could have been critical. The Chicanos were less inclined to move the folders on. We can only speculate on the reasons for this. Perhaps some Chicanos were suspicious of literature from the university. Others may have misunderstood the intent of the study. Many may have felt they could not identify an acquaintance who could move the folder towards the target in the Northeast Heights. During the distribution of the folders in front of the foodstores, several of the people approached said they did not know anyone up there. Some people who actually took the folders may have shared that opinion, but complied anyway. At any rate, the very low participation rate of the Chicano starters lowered the overall participation percentage drastically.

The loss of starters can also be explained to some degree as a phenomenon accepted by social scientists as a typical event in the process of serial reproduction. In an experimental study of the transmission of a message from one person to another in serial reproduction, Brissey (1961) demonstrated that the greatest amount of information loss occurs at the first link. This directly corresponds with the development in this study and may offer a partial explanation of the large loss of starters.

It has been anticipated that networks generated between Anglo starters and Anglo targets and between Chicano starters and Chicano targets would have a greater likelihood of success than networks generated across ethnic lines. Milgram (1970), in generating acquaintance networks between Los Angeles and New York, found that chains between white starters and white targets were 2.5 times as
successful as chains between white starters and black targets. The results of this study show that indeed, Anglo starters generated and completed more chains to Anglo targets than to Chicano targets. However, as many networks were generated by Chicano starters to Anglo targets as to Chicano targets, and more networks were completed to Anglo targets. One speculation for this unexpected occurrence was that since a large proportion of the Chicanos in this urban area live in the South Valley, interpersonal networks do not spread extensively to the Northeast Heights, and efficient links to move a folder to a Chicano target were more difficult to find. Indeed, 2.5 times as many folders reached Anglo targets as Chicano targets, and of the two folders which reached a Chicano target, one reached the target via an Anglo business link. On the other hand, 50 percent of the chains attempted by Chicano starters reached a target, whereas only 17 percent of the Anglo-started chains reached a target. From all this evidence it would appear that acquaintance networks generated to Anglos in the Northeast Heights by either Anglos or Chicanos have a greater likelihood of success than networks attempting to reach a Chicano target.

There are factors other than ethnic differences and motivation which could account for the low completion rate of the links. This study attempted to generate acquaintance or friendship networks between two areas of the urban community which were quite dissimilar economically. The median income for people in the target area was 2.5 times greater than for the people in the starter area. The poverty level in the starter area was 10 times as great. Because of a desire for cognitive consistency or social reward, people tend to seek out others who are
similar to themselves in age, sex, religion, nationality, and socioeconomic standing (Barnlund, 1968). Moreover, the body of experimental literature regarding the effects of varying degrees of status differentiation on the character of communication in small groups support the conclusion that status and prestige are influential in controlling the flow of information. In general, the larger the status differential, the more restricted the channels of communication (Barnlund, 1968). Given the evidence that people tend to choose acquaintances among those similar to themselves, that these friendship ties are vital links in the flow of information (DeFleur and Larsen, 1958; Moreno, 1960; Bostian, 1970), Milgram's findings that people tended to chose recipients for the folders from people similar to themselves (1969), and that differences in social standing limit channels of communication, the low rate of completed networks between people of the South Valley and the Northeast Heights begins to become more understandable.

Other aspects of the results can be discussed. As Conclusion 3 indicates, the mean chain length for completed networks was 4.0, while the mean chain length for attempted networks was 3.0. From this we may infer that many of the chains might have been unsuccessful because one of the links was not motivated to send it on, or did not believe he could find an efficient link, although one may have existed. As might be expected, the mean chain length of 4.0 was shorter than the 5.7 of those chains generated by Milgram between Nebraska and Boston, and a bit shorter than the 4.4 between Boston and Sharon, Massachusetts. This study further validates Milgram's suggestion that chain length is sensitive to at least one demographic variable—the place of residence of the starters and targets.
As Conclusion 4 infers, the first information about the targets which the starters utilized in 50 percent of the cases in selecting an efficient link was locale of the target's residence. Moreover, although the other 50 percent of the starters claimed other reasons for their choice of a link, such as interest or occupation, a full 75 percent of the starters actually mailed the folders directly to the Northeast Heights. Once the folders reached the same general area in which the targets resided, occupation similarity was the most successful choice in picking links.

Friendship appeared to be utilized most often by the links in generating acquaintance networks. Surprisingly few starters in the South Valley appeared to have relatives in extended kinship networks to whom they might mail the folder. Unlike Milgram's 1970 findings in which the most prevalent relationship between links serving as gatekeepers was professional, in this study, every pair of gatekeepers indicated their relationship to be friendship. Moreover, the tendency for women to send the folders to women and men to send the folders to other men, occurring across the links and also among gatekeepers, indicates that friendships tend to be between people of the same sex more than of the opposite sex.

Implications

The minimal results of this study in the attempt to generate acquaintance networks between people of two dissimilar areas of an urban center offer two alternative implications for the small world method in the study of the flow of information in acquaintance networks:

1) The small world method only operates effectively under specific conditions, such as having highly motivated starters, or starters and targets of the same social class,
2) Acquaintance networks between areas in which the population is dissimilar are limited and not readily traceable.

Both of these alternatives and their implications for further research in this area will be discussed.

If the low rate of completion in this study can be explained by the failure to motivate the starters to begin the movement of the folders, then the small number of networks generated between the two areas of the city may not be indicative of the potential small world phenomenon which may exist. Definitive conclusions concerning the volume of networks which have the potential for the flow of information cannot be made until an alternative method can be devised for further research. One suggestion may be to interview starters, ascertain to whom they would have chosen to mail a folder, and then mail it off to that person. In this manner, one hundred percent of the folders would be automatically moved beyond that difficult first link. Once the folders have begun, the probability increases that they will be moved on and ultimately reach a target. In this manner, a stronger indication of the potential for a small world phenomenon may emerge.

Since, for the small world method to operate efficiently, the starters must volunteer or otherwise be sufficiently motivated, the argument can be made that if the small world method is representative of how information actually flows through interpersonal networks in the real world, it would appear that the flow of information across a community can be quite limited unless the information sources are highly motivated to move the information. This offers practical implications for people
who communicate in a community, such as public officials, educators, and businessmen. It would seem that since the flow of information across parts of an urban community can be extremely limited, people who wish to diffuse information across a population should not depend on interpersonal networks to spread the messages. From this can be supported the notion that the mass media may be essential in today's large urban centers for starting and diffusing information, and should be utilized by those wishing to communicate with larger numbers of people.

The second alternative suggests that the low results in this study can be explained by the fact that acquaintance networks between dissimilar areas are limited. It had been mentioned that people tend to pass information in interpersonal networks to friends who are similar to themselves, and that in the two areas selected for this study, the people differed considerably. It can be concluded that for these reasons the channels of communication would be limited. If this alternative is accepted, it can be implied that the small world phenomenon cannot be generalized to broad cross sections of the population. Instead of extensive interconnected networks such as Milgram suggested, it may be that many isolated small worlds exist. This implies that within a community, groups of people of similar social class or ethnic background may be integrated, through which information may flow, but the large urban community which contains a diverse mixture of people as a whole may not be integrated. From this it can be speculated that a rumor which is begun in one portion of a community may only extend a limited distance, as far as the network in which it began, and may never reach all parts of the population.
One alternative research design which may offer further light on this matter would be to attempt to contrast networks generated at the same time in the same community between people of the same and different backgrounds, and then be able to determine more realistically if the difference in personal background actually effects the generation of acquaintance networks.

Until these issues are resolved, the small world phenomenon remains an armchair theory which appears to be evident only under specific conditions between similar types of people.

Recommendations

The possibilities for further research in this area are great, since much is still unknown about communication networks in urban areas. The following are suggestions for further study using the small world method:

1. Generate networks between areas in which the people are of similar economic background and contrast with networks generated between areas of dissimilarity.
2. Generate networks between women starters and women targets, and compare to networks of men starters and men targets.
3. Vary the information offered in the folder to the starters to determine if networks take different routes utilizing different information.
4. Acquire the names of the starters and later interview those who failed to send on the folders to inquire why.
5. Generate networks between people of the same and different ethnic backgrounds but of similar economic backgrounds.
6. Generate acquaintance networks asking volunteers to send actual messages. Vary the content or importance of the messages.

7. Interview the starters and ascertain to whom they would have chosen to mail a folder, and then mail it off to that person, thus passing 100% of the folders beyond the first link.
APPENDIX
THIS IS A COMMUNICATION RESEARCH PROJECT

We need your help on an unusual scientific study being conducted by the Department of Speech Communication at the University of New Mexico. We are attempting to find out how certain kinds of information contacts take place. We are wondering whether it is possible for information to be transmitted to a "target person" (see the box below) by someone who has never met the target person. This raises the question as to how many in-between people are necessary to get the information from one person to another if they pass it along only to people who are friends or acquaintances.

You will notice that this letter has come to you from a friend. He or she has aided this study by sending this folder to you. He or she hopes that you will aid this study by forwarding this letter to someone else. The name of the person who sent you this folder is the last person on the list on the next page.

In the box to the right you will find the name and address of an Albuquerque resident who has agreed to serve as the "target person" in this study. The idea of the study is to transmit this envelope to the target person using only a chain of friends and acquaintances.

HOW TO TAKE PART IN THIS STUDY IS DESCRIBED ON THE NEXT PAGE.
FOUR STEPS TO TAKING PART IN THIS STUDY

1. Add your name to the list at the bottom of this sheet, so that the next person who receives it will know who it came from.

2. Take one of the postcards. Fill it out and mail it. No stamp is needed. The postcard is very important. It allows us to keep track of the progress of the envelope as it moves toward the "target person."

3. If you know the target person on a personal basis, mail this folder directly to him or her. Do this only if you have previously met the target person and know each other on a first name basis.

4. If you do not know the target person directly on a personal basis, do not try to contact him or her. Instead, hand carry or mail this envelope, postcards and all, to a personal acquaintance who is more likely than you to know the target person. You may send or give the envelope to a friend, relative, or acquaintance, but it must be someone you know on a first name basis.

ROSTER

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16.

PLEASE SIGN YOUR NAME IN THE NEXT BLANK SPACE
Remember, the aim is to move this envelope toward the target person using only a chain of friends and acquaintances. On first thought, you may think that you don't know anyone who may be acquainted with the "target person." This is natural, but at least you can start it moving in the right direction! Who among your acquaintances might conceivably move in the same social circles as the target person? The real challenge is to identify among your friends and acquaintances a person who can advance the folder toward the target person. It may take several steps beyond your friend to get to the target person, but what counts is to start the envelope on its way! The person who receives the envelope will then repeat the process until the folder is received by the target person. May we ask you to begin now!

Please transmit this folder within 24 hours. Your help is greatly appreciated.

Sincerely yours,

Paige Birdsall
Dept. of Speech Communication
U.N.M.
SAMPLE POSTCARD

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed
In the United States

Postage will be paid by

Department of Speech Communication
The University of New Mexico
1801 Roma, N.E.
Albuquerque, New Mexico 87131

Please fill in this information about yourself.
My name ____________________________
Address ____________________________
Occupation __________________________
Age ___ Sex ___
How long have you lived here? __________
Ethnic background ________________

Please fill in this information about the person you send the folder to:
Name ____________________________
Address __________________________
Occupation _________________________
Age ___ Sex ___
Nature of relationship to you (friend, relative, business associate, etc.)

Why did you select this person to receive the envelope? ______________________
Ethnic background ________________
SELECTED BIBLIOGRAPHY
SELECTED BIBLIOGRAPHY


