1

CANADIAN THESES ON MICROFICHE

I.S.B.N.

THESES CANADIENNES SUR MICROFICHE

National Library of Canada
Collections Development Branch

Bibliothèque nationale du Canada
Direction du développement des collections

Canadian Theses on
Microfiche Service

Service des thèses canadiennes
sur microfiche

Ottawa, Canada
K1A 0N4

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE

National Library
of Canada

Bibliothèque nationale
du Canada

CANADIAN THESES
ON MICROFICHE

THÈSES CANADIENNES
SUR MICROFICHE

0-315-04878-6

52772

NAME OF AUTHOR/NOM DE L'AUTEUR Joan E. FERGUSON

TITLE OF THESIS/TITRE DE LA THÈSE Cohesiveness and Influence in Dyads Under Face-To-Face and
Mediated Communications Conditions.

UNIVERSITY/UNIVERSITÉ Carleton University

DEGREE FOR WHICH THESIS WAS PRESENTED/
GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE Master of Arts

YEAR THIS DEGREE CONFERRED/ANNÉE D'OBTENTION DE CE GRADE 1981

NAME OF SUPERVISOR/NOM DU DIRECTEUR DE THÈSE Dr. L.H. Strickland

Permission is hereby granted to the NATIONAL LIBRARY OF
CANADA to microfilm this thesis and to lend or sell copies
of the film.

The author reserves other publication rights, and neither the
thesis nor extensive extracts from it may be printed or other-
wise reproduced without the author's written permission.

L'autorisation est, par la présente, accordée à la BIBLIOTHÈ-
QUE NATIONALE DU CANADA de microfilmer cette thèse et
de prêter ou de vendre des exemplaires du film.

L'auteur se réserve les autres droits de publication; ni la
thèse ni de longs extraits de celle-ci ne doivent être imprimés
ou autrement reproduits sans l'autorisation écrite de l'auteur.

DATED/DATE

August 31, 1981

SIGNED/SIGNÉ

Joan E. Ferguson

PERMANENT ADDRESS/RÉSIDENCE FIXE

Ms. Joan Ferguson

2201 Riverside Drive, Apt. 202

OTTAWA, Ontario

COHESIVENESS AND INFLUENCE IN DYADS
UNDER FACE-TO-FACE AND MEDIATED COMMUNICATIONS CONDITIONS

by Joan E. Ferguson

Thesis presented to the Faculty of
Graduate Studies of Carleton University
in partial fulfillment of the require-
ments for the degree of Master of Arts.

Ottawa, March, 1981

The undersigned recommend to the Faculty
of Graduate Studies and Research acceptance of the thesis
"Cohesiveness and Influence in Dyads Under Face-To-Face
and Mediated Communications Conditions"

submitted by Joan E. Ferguson
in partial fulfillment of the requirements for
the degree of Master of Arts

R. H. Strickland.....
Thesis Supervisor

D. H. Hepburn.....
Chairman, Psychology Department

Carleton University
March 1981

ABSTRACT

Studies have shown tasks which are high on interpersonal involvement, (e.g. conflicts of opinion, getting to know someone), are sensitive to the use of a mediated form of communication. In this study, dyads (N=40), under varying levels of cohesiveness, (high versus low), participated in an involving task under different conditions of communication. The measure of influence was the change in dyadic agreement from pre-test to post-test. It was predicted that dyads in the high cohesive condition would show progressive increment in intra-dyadic uniformity of judgement from pre-test through post-test. Results showed no group differences in intra-dyadic index of agreement from pre-test through post-test. Subjects in the high cohesive condition did rate themselves significantly more attracted to their partners than the low cohesive subjects. The implications of these findings for mediated communication research was considered.

ACKNOWLEDGEMENT

This thesis was prepared under the supervision of professor, Lloyd Strickland, PhD, of the Department of Psychology of Carleton University, Ottawa.

TABLE OF CONTENTS

Chapter

INTRODUCTION	vi
I. REVIEW OF THE LITERATURE	1
1. Face-to-Face Communication	1
2. Audio Communication	4
3. Co-operative versus Conflictive Tasks	10
4. Cohesiveness	11
5. Social Processes	15
II. EXPERIMENTAL DESIGN	17
1. The Experimental Paradigm	17
2. Purpose of this Study	18
3. Statement of Hypothesis	18
4. Subjects	18
5. Design	19
6. Apparatus	19
7. Procedure	19
III. PRESENTATION OF RESULTS	24
1. Sociometric Measure of Cohesiveness	24
2. The Influence Measure	25
3. Individual Opinion Change	27
4. Analysis of Taped Discussion	28
a. Amount of time discussing	29
b. Channel control	29
c. Disturbances	30
d. Leadership	30
5. Intersubjectivity Measure	31
6. Summary of Results	32
IV. DISCUSSION OF RESULTS	33
1. Dyads versus Groups	33
2. Studies of Cohesiveness	34
3. Effects of Mediated Communications	35
CONCLUSION	37
FOOTNOTES	38
BIBLIOGRAPHY	40
Appendix	
1. 'THE "PERSONALITY PROFILE" QUESTIONNAIRE	51
2. BLUE COLLAR BLUES EXERCISE	53
3. COHESIVENESS QUESTIONNAIRE	56
4. INTERSUBJECTIVITY SCALE	57

Appendix

5. COMPUTER PROGRAM	58
6. SAMPLE COMPUTER DISPLAY	59

Tables

1. NEW TECHNOLOGICAL ADVANCES	60
2. MEAN GROUP RESPONSE TO EACH QUESTION OF THE COHESIVENESS MEASURE	61
3. MEAN GROUP COHESIVENESS RESPONSE	62
4. ANOVA SUMMARY TABLE: RESPONSE TO COHESIVENESS QUESTIONNAIRE	63
5. P TO z TRANSFORMATIONS OF INTRA-DYADIC CORRELA- TIONS IN THE FACE-TO-FACE GROUP	64
6. P TO z TRANSFORMATIONS OF INTRA-DYADIC CORRELA- TIONS IN THE AUDIO GROUP	65
7. ANOVA SUMMARY TABLE: INTRA-DYADIC AGREEMENT CHANGE FROM PRE TO POST TEST	66
8. ANOVA SUMMARY TABLE: INDIVIDUAL OPINION CHANGE FROM PRE TO POST TEST	67
9. PERCENTAGES OF ANALYSIS OF TAPES	68
10. ANALYSIS OF "TIME DISCUSSING"	69
11. ANALYSIS OF "SIMULTANEOUS SPEECH"	70
12. ANALYSIS OF AMOUNT OF TIME "NO-ONE TALKED"	71
13. ANALYSIS OF RATIOS OF UNINTERRUPTED SPEECH	72
14. ANALYSIS OF INTERSUBJECTIVITY MEASURE	73

Figures

1. THE EXPERIMENTAL ROOMS	74
2. THE COMPANION UNIT	75

This thesis examines the relationship between interpersonal influence and mode of communication under differing conditions of dyadic cohesiveness. The face-to-face and audio communication modes are of specific interest here; underlying this concentration, however, is the awareness that other forms of mediated communication may exert other interpersonal influence.

Effects of a Technological Change

The current "technological revolution" has thrust upon a largely unaware society a plethora of communications technology. Table 1 describes new interactive technological advances, as outlined in Short, Williams, and Christie (1976). Hiltz and Turoff (1978) anticipate the demise of the post-industrial era and the emergence of an information based society. The exact form of an information based society is impossible to predict; what Hiltz and Turoff (1978) believe is emerging is a society wherein class structure is based on access to information and control of decision-making processes.

The advent of sophisticated computer and telecommunication technologies does not threaten to exclude entirely the person from communication and information exchange. These machines are alleged to be valuable tools to facilitate the considered use of human judgements in the evaluation of increasingly complex problems. However, the man/machine interface poses an important question for social psychologists. What happens to outcomes of basic social processes when they are mediated by communication technology?

Attempts to answer this question have resulted in hundreds of often conflicting studies in the burgeoning area, "mediated communications". Most have reached one or another conclusion which either has not been or cannot be replicated. Many of these studies emanated from the Communications Studies Group, University College, London. This group was established in 1969 to examine the effects of media on task outcomes, where the standard methodology of laboratory experiments was used to compare the outcome of various tasks according to the medium of communication that was used by the participants in the experiment. The CSG existed for 7 years, presumably because of the practical usefulness of their research to large organizations interested in the use of telecommunications for efficiency and cost reduction. A useful overview of CSG's research into effectiveness and acceptability can be found in Short, Williams and Christie (1976) and Williams (1977). Johansen, Vallee, and Spangler (1979) offer a more comprehensive summary of this important body of literature, combining the evaluation results of the CSG with similar but scattered studies.

The advent of the telephone in 1876 and its current installation in most businesses and 90% of the homes in Canada has been largely taken for granted:

We have accepted the interposition within our communication networks of a mechanical device, which may alter the form or nature of our communications in various unidentified ways, without as much as a second thought.

(Short, Williams, and Christie, 1976)

Voice telephone calls represent not only the bulk of electronic communication but exceed all other categories by a wide margin (Hough, 1979). During the next few years, a diverse range of consumer products and services is predicted to transform the telephone line into a multi-functional tool which will meet a variety of communication requirements. By combining the capabilities of telecommunications and data processing, communication between individuals and groups is expected to undergo drastic change. In a few years, telephone customers should be able to choose among the following services:

1. An electronic telephone directory (already in operation in parts of France);
2. Shopping from home -- a TV screen on the telephone will display a selection; the customer will order by pushbutton;
3. Electronic mail -- the customer will send and receive letters by a printing device in the telephone;
4. A telephone information bank, enabling the customer to call up data from central files from pushbutton;
5. Banking by telephone -- the telephone will flash the checking account balance, and let the customer pay bills from his/her chair;

6. Newspaper by telephone -- a machine in the telephone will receive and print the morning paper while the customer sleeps;
7. Long distance business conferences -- the customer will "meet" with business associates over a phone that carries picture as well as voice;
8. Instant travel service -- the telephone will flash updated train and airline schedules on computer screen (and then book seats);
9. Telephone alarm system -- will automatically signal police or fire department when the customer's home alarm goes off.

(Stratte-McClure, 1980)

The proliferation of new telecommunications devices presently being designed, tested, or marketed has prompted the realization that psychology has no sound body of knowledge on which to predict media effects on human interaction. While many technical questions remain unanswered, more important questions of psychological value also remain unanswered. How do people communicate naturally with one another? How is human communication affected by the medium used to communicate? Common sense would suggest that face-to-face and mediated communication must differ in many psychologically significant ways; yet, as will be discussed below, consistent evidence to support this viewpoint has not been forthcoming.

CHAPTER 1

REVIEW OF PERTINENT LITERATURE

The following literature review focuses on two main areas of relevance to the present thesis -- face-to-face communication and those studies comparing face-to-face and audio communication.

Face-to-Face Communication

Communication is generally embedded in a rich, multifarious context with meaning partially derived from a shared understanding of the social setting (Fraser, 1978).

During a conversation this social setting is relatively stable but the dynamic features of the communication are constantly changing. Thus study of the linguistic and non-linguistic components of communication, and their interrelations, is necessary in order to understand how people communicate naturally.

Mehrabian (1972) combined the results of two previous studies in which he assessed the impact of verbal, intonational, and visual components. Mehrabian is often quoted as claiming that 55 percent of what is communicated is communicated by the face, 38 percent by the voice and only 7 percent by the words spoken.

However, Mehrabian (1972) limits the messages of non-verbal cues to interpersonal communications to others of the attitudes of the speakers. In Mehrabian's research, the same or different emotional messages were communicated in different channels (verbal, vocal, and facial) and he measured subjects' reactions to the communication as a whole. Despite interpretations which suggest something different, Mehrabian never claimed he was measuring anything other than feelings (Schneider, Hastorf, and Ellsworth, 1979).

In a similar manner, a study by Bugental, Kaswan and Love (1970) separated the dynamic features of communication into three components:

1. A verbal component
2. A vocal or intonational component
3. A visual or facial component

By producing messages consisting of all possible combinations of friendly and unfriendly verbal, vocal and visible components, Bugental et al (1970) demonstrated that information available in one system could be completely discounted if contradicted by information in another. Specifically, Bugental, Kaswan and Love (1970) found that when a person's non-verbal behavior contains both positive and negative

elements, observers tend to interpret the sender's feelings as primarily negative, regardless of the verbal behavior.

The Mehrabian (1972) studies and the study by Bugental, Kaswan, and Love (1970) were concerned with the communication to others of the attitudes of the speakers, with what Fraser (1978) called interpersonal communication. These studies show that when the verbal and non-verbal components of a message conflict, much more weight is given to the non-verbal part. However, non-linguistic components have little role to play in transmitting topical information; when the message itself is being measured the communication in question can be described as representational (Fraser, 1978).

Argyle, Salter, Nicholson, Williams, and Burgess (1970) studied the effects of verbal and non-verbal messages conveying superiority, neutrality, or inferiority of the speaker. All combinations of the three verbal and three non-verbal components were presented on videotape to subjects who rated the communication on a series of scales; from these ratings Argyle et al (1970) concluded that the non-verbal cues were more important than the verbal ones.

A summary by Argyle (1969) suggests there are five main ways in which non-verbal signals are used during discussion:

1. Mutual attention and responsiveness (eye movements, head nods, etc.);
2. Channel control (whose turn it is to speak);
3. Interpersonal attitudes (facial and postural cues);
4. Illustrations (gestural movements illustrating speech);
5. Feedback (raised eyebrows, mouth and eyes showing pleasure or displeasure).

From this summary, one might infer that a comparison of audio with face-to-face contact would result in significant differences in communicative behavior, attributable to the absence of visual exchange in the audio condition. In fact, such evidence as exists suggests that the differences in outcome of communicative behavior under audio and face-to-face conditions tend to be comparatively small, and even this evidence is weak and contradictory (Williams, 1977).

Audio Communication

As pointed out some time ago by Chapanis, Ochsman, Parrish, and Weeks (1972) "there are almost no studies which have been concerned with how persons naturally

communicate with each other or how their natural communications are affected by the devices through which they converse". As noted above, the majority of studies which have been done exist as technical reports of the Communications Studies Group and have focused on outcome variables, (e.g. agreement), rather than process variables.

For the most part, it appears that when tasks were mainly concerned with information exchange, there is little effect of media on outcomes. In spite of some evidence to the contrary, it is generally agreed that information transmission and co-operative problem solving are activities in which interpersonal relationships are relatively less important; they are activities for which no differences appear between mediated interaction and face-to-face interaction (Short, Williams, and Christie, 1976). However, activities such as bargaining, persuasion, and attitude change can only be carried out by interacting in an affective manner with another person.

Williams (1977) reported that medium of communication can affect the impressions people form of each other, with the effect generally being that the medium richer in non-verbal cues leads to more favourable impressions. However, Short (1972b) used twenty-two seven point rating scales to assess subjects' perceptions of one another in face-to-face, video and audio conditions; he found people in the audio condition were generally rated more favourably

than those in the other two conditions.

In an experiment simulating management-union wage negotiations, Morley and Stephenson (1969, 1970) gave one side a stronger case to argue. They found the dyad member with the stronger case tended to resist the other side more in the telephone condition than in the face-to-face condition. Morley and Stephenson interpreted their results to show that the constrained telephone channel favours an objective appraisal of the case, while the richer face-to-face mode permits the weaker side to enhance its position. However, Short (1974) had pairs of subjects argue as to which of a number of areas of expenditure for a hypothetical company should be reduced. One argued a case that corresponded to his own opinion, and the other argued the converse. The person who argued the case in which he believed was more successful, in a face-to-face meeting, in persuading his partner to agree with him on which expenditures should be reduced; the person who was arguing a brief did better over the audio-only link. At first sight, the findings might appear to contradict those of Morley and Stephenson, whose 'strong' case was more successful under telephone conditions. However, Short (1974) believes the apparent conflict arises from the different meanings for the term 'strength'. He suggests that "strength of a case" may be a misleading term with which to describe such

results -- the important difference between the two sides which interacts with medium appears to be simply the extent to which they are dependent on interpersonal or interparty considerations (Short, 1974).

Turnbull, Strickland, and Shaver (1976) combined three different communication modes (audio, audio/visual, face-to-face), three levels of power (high, equal, low), and three prior concession-phasing strategies (alternating, increasingly co-operative, and decreasingly co-operative), to determine their effect on negotiation outcomes and negotiator attributions in a disarmament task. Only the communication and power manipulations produced significant results; negotiating face-to-face produced the greatest reduction in armaments with the least reduction agreement in the audio-only condition.

These, and other reported findings (Reid, 1976, Craig and Jull, 1974, Christie and Elton, 1975, Connors, Lindsey, and Miller, 1976, Thomas and Williams, 1975, Young, 1974a, Davies, 1971a, Holloway and Hammond, 1976) suggest that some situations are more sensitive to the medium of communication than others, but they do not indicate why. They do document the fact that outcome measures of opinion change and impression formation appear to be affected by the nature of the media.

A counter-intuitive finding which has attracted some attention in the mediated communications literature is that of greater individual opinion change after audio-only interactions. It could be suggested that this effect is a typical conforming behavior, in that an isolated individual brings his stated views into line with those of his partner(s). However, it is well established in the conformity literature that conformity is reduced under anonymous conditions (Deutsch and Gerard, 1955, Mouton, Blake, and Olmstead, 1956). However, Gerard (1964) hypothesized that, despite waning confidence in his judgement, a subject who has once publicly committed himself to a discrepant position would remain independent. From this hypothesis he predicted and found that subjects tested in anonymous conditions would subsequently show more yielding than those tested in a public condition. Perhaps the relative anonymity of audio communication may help explain the results described next.

Returning to studies of the Communications Studies Group, four experiments (Short, 1972b, 1972c, 1973b, and Young, 1974b) all found opinion change, in terms of the differences between initial and final individual opinion, to be greater after audio discussions than after face-to-face discussions, although it should be noted that in only

two of these experiments was this effect statistically significant (Short, 1972b, and Short, 1972c). In one of these, Short (1972c) asked subjects to rank order the "seriousness of eight problems in Britain today". They then discussed the issues to reach an agreed ranking and again ranked them privately. There was a significant effect of medium of communication on the extent to which people had changed their minds after the discussion; that is to say there was more individual opinion change after an audio than after a face-to-face discussion.

These studies suggest that when one doesn't want to change one's opinions towards another, audio media will tend to produce such results. However, there are two studies using highly non-informational communication tasks in which the above was found not to be true. Heilbronn and Libby (1973), using an automated prisoners' dilemma game, reported that whether or not one stated he would co-operate more (there were no differences in actual co-operation) depended not only on the medium of communication but on the particular experimenter the subject was interacting with. In another study Janofsky (1971) had strangers role play either as therapists or as clients using telephone or face-to-face communication. She reported that there were

no differences in the total number of self-disclosures of the "client" over a 10-minute period.

Co-operative versus Conflictive Tasks in Mediated Communications

Williams (1977) has classified relevant mediated communications studies into those using either co-operative or conflictive tasks. Co-operative tasks (which are generally low on interpersonal involvement) are relatively insensitive to the use of audio instead of face-to-face communication. In asserting that results obtained with different communication modes hold for all different problems tested, Chapanis (1978) admitted that these experiments involved factual problems that could be solved co-operatively. Where the relationship between the people involved is not a critical factor, medium of communication has no great influence on tasks such as information transmission, problem-solving, and generation of ideas.

Tasks which are high on interpersonal involvement seem to be sensitive to medium of communication. Conflictive communication tasks typically involve arguments, bargaining, or persuasion and may range from mild disagreement on how to achieve a mutual goal to outright mental combat to win over an opponent (Weeks and Chapanis, 1976). Here the relationship between the participants is important and medium of communication, which tends to alter this relationship, affects the task outcome (Morley and Stephenson,

1969, 1970, Short, 1974, Short, Williams, and Christie, 1976). However, Weeks and Chapanis (1976) employed two conflictive problems, issue ranking and budget negotiation, and structured them to provide the setting for argumentative discourse between the communicators. They found the effects of medium of communication were largely independent of the kind of task assigned to the teams of subjects.

In summary, conflictive tasks may show media differences but this seems to be because the exact relationship between the participants is particularly important in conflict situations. In contrast with co-operative situations, the extent to which participants like, trust, dominate, and impress the other is likely to have an effect on the task outcome (Williams, 1977).

Cohesiveness

It is alleged here that the dynamics of the social interaction between two communicators may be even more important than the nature of the task in determining media differences. One group characteristic which has not yet been investigated in mediated communications, but which may be very important, is group cohesiveness. This

neglect is, in a way, surprising; cohesiveness was probably the most potent and heavily investigated variable in the flood of group research in the 1950s, although it currently receives rare attention. Cohesiveness has often been defined so vaguely, e.g. "the sum of all the forces acting on all the members to remain in the group" (Festinger, Schachter, and Back, 1950), that it is difficult to decide to which features of group functioning it relates at any one time. In the study proposed here, cohesiveness is construed, still, however, vaguely, as "that property which is inferred from the number and strength of mutual positive attitudes among the members of the group" (Lott and Lott, 1965).

The technique for manipulating group cohesiveness, by persuading subjects that they will probably like, or not like, one another has been used in many investigations of the attraction-uniformity hypothesis. The "cohesiveness-attraction" theory of Schachter (1951) and Berkowitz (1954) has been used to demonstrate that, at least as far as productivity is concerned, the greater the cohesiveness the greater the power of the group to influence its members. Festinger, Gerard, Hymovitch, Kelly, and Raven (1952) told members of some groups that they would find

each other compatible, congenial, and interesting, and would most likely get along very well. Such groups were found to exert greater pressures for uniformity of member opinion with regard to a particular issue under discussion than groups given the opposite orientation. Berkowitz (1957) used similar instructions in a study in which subjects worked under simulated group conditions, and conformity to the responses of partners on a task was found to be significantly related to liking of the partners. Festinger and Thibaut (1951) reported that among group members told that they were with others similar to themselves in interest in, and knowledge about, a given problem there was greater change in the direction of opinion uniformity than among group members given the opposite instructions. Festinger (1954) hypothesized that the greater the attractiveness of a group, the more important it is as a standard of comparison with respect to abilities and opinions. Social communication, according to Festinger, is a means by which individuals compare their opinions with one another; influence attempts toward a common group opinion would presumably be greater in a more cohesive group.

The cohesiveness-attraction theory does not stipulate the sources of the attractiveness of a group for its members, however levels of similarity are often varied to produce attraction and thence cohesiveness.

Festinger (1950), Goodnow and Tagiuri (1952), and French (1951) have all reported approval and acceptance into existing groups on the basis of religion, ethnic background, and occupation. Other sources of liking which have been examined and seemingly lead to increased group cohesiveness are status (Thibaut, 1950, Seashore, 1954), interaction-propinquity (Kipnis, 1957, Sherif and Sherif, 1953) and acceptance by others (Kelley and Shapiro, 1954, Dittes and Kelley, 1956, and Dittes, 1959).

A widely cited study by Back (1951) tends to support the conclusion that different sources of attraction do have similar consequences. The main purpose of the Back (1951) experiment was to measure the effect of strength of cohesiveness on the pressure toward uniformity within groups and the consequences of this effect. Back had pairs of individuals work on a story-writing task under different instructions with regard to personal attraction, task direction, or prestige. By varying the strength of attraction for each group, Back reported that an increase of attraction for any one group led to a similar increase in the power of the group to influence its members. Back concluded that consequences produced by an increase in attraction are "independent of the nature of that attraction" (Back, 1951). It should be added that Back found, when the dyad as a whole was considered, barely

significant differences between the high and low cohesive pairs on a measure of change following influence attempts; however, in high cohesive groups, there was reliably more change on the part of one partner within each dyad.

Social Processes in Mediated Communication

As noted above, the frequent finding of "no difference" between face-to-face and audio groups may seem counter-intuitive, however welcome it may be from an applied standpoint (Guild and Strickland, 1980). In addition, it brings into question widely accepted assumptions about the importance of both non-verbal cues in effective communication (Duncan, 1969) and the contextual complexity of interpersonal relations (Williams, 1977). If visual non-verbal cues are so important, one would expect that audio interaction without visual contact, would be markedly different from face-to-face interaction with visual contact. As has been noted, audio interaction is seen as less 'rich' and more impersonal than a face-to-face interaction (Short, Williams, and Christie, 1976).

The review of the mediated communications literature has thus far dealt primarily with the outcome of interactions; there have been fewer finding of differences in the communication processes between audio-only and face-to-face discussions. The only clearly identified difference has been in the frequency of interruptions, which, despite an

early finding that they were more frequent in audio-only conversations (Argyle, Lalljee, and Cook, 1968) have subsequently shown to be less frequent in audio-only than in face-to-face conversations (Cook and Lalljee, 1972). A series of other hypotheses advanced by Cook and Lalljee (1972) relating to filled-pause ratio, proportion of questions, number of attention signals, speech rate, and speech disturbances, were all unconfirmed by their experimental test.

CHAPTER II

EXPERIMENTAL DESIGN

The Experimental Paradigm

In an attempt to lessen the prospect of yet another difficult-to-interpret result, it was decided to pattern an experimental procedure after one established study in the social psychological literature: the "Influence through Social Communication" study of Kurt Back (1951), discussed above. Implicit in this decision is the conviction that the immediately post-Lewinian experimental social psychologists, as opposed to most present-day ones, discerned and investigated basic social psychological questions (for a review of this issue, see Back, 1963). It is the belief of the present author that modified replications of these ancestral studies would be more fruitful than would creation of yet another new experimental paradigm -- one at least tests the importance of a basic finding, an important question for those who construe social psychology as history.

This strategy is not without precedent in the study of mediated communication. Strickland, Guild, Barefoot and Paterson (1976) have studied groups of four persons, who met face-to-face or via an audio-visual system on five separate occasions. The task and measures were patterned on those used by Bales (1958) in his studies of leadership. The classic findings reappeared in the face-to-face condition, while role differentiation was both

less pronounced and more unstable in the mediated conditions.

Purpose of this Study

This study attempted to determine whether mode of communication affected opinion change under varying levels of cohesiveness.

Statement of Hypothesis

Subjects in High Cohesive conditions will show progressive increment in uniformity of judgement from Pre-test through Post-test, as compared with subjects in the Low Cohesive conditions. Since group cohesiveness has not, to date, been examined in a mediated communications context, and since both outcome and process studies surveyed in the mediated communications literature produced a bewildering array of results, it is not possible to predict, with confidence, an effect for medium of communication.

Subjects

Eighty subjects were randomly assigned to same sex dyads. Approximately half of the subjects were full or part-time students at Carleton University and half were hired as casual workers from the Canada Employment Center in Ottawa. All were paid \$4.00 per session. Subjects' ages ranged from 18 to 65 years. Some of the subjects had met briefly before but, in general, the experimental situation in which they were engaged was the first

occasion on which they had met.

Experimental Design²

This experiment was designed as a 2 x 2 x 2 split plot factorial with two between group variables (face-to-face/mediated communications, high/low cohesiveness) and one within group variable (Pre/Post test).

Apparatus

The laboratory in which the experiment was carried out consisted of three adjoining rooms, opening onto a wide corridor. For a sketch of the experimental rooms, see Figure 1. Each of the discussion rooms contained a table, chair, and the communication node: a Bell Telephone "Companion" unit (Model No. QUSIC2:50-77). A diagram of the companion unit is shown in Figure 2. In the audio mode each member of a dyad sat in one of these discussion rooms and conversed freely via the companion unit. In the face-to-face mode, both members of the dyad sat comfortably in the room containing node one, as shown in Figure 1. From the control room, the investigator monitored and recorded the discussion.

Procedure

Upon arriving at the laboratory, partners in a dyad were introduced to one another and seated at separate desks in the corridor adjoining the experimental rooms. As the basis of the manipulation necessary to induce group

cohesiveness, all subjects were asked to complete a "Personality Profile" questionnaire (Toch and Smith, 1968, see Appendix 1). Although designed by the authors to have nearly universal validity, and intended for use as an object lesson to demonstrate peoples' tendency to endow the diagnostician with an unwarrantedly high degree of insight, in this case subjects were told the questionnaire was designed to assess the degree of similarity in their attitudes and this information would give the investigator an indication of how much they could be expected to agree or disagree, like or dislike one another. In actual fact, subjects were assigned randomly to the 40 same sex dyads and these dyads were assigned randomly to the four experimental conditions.

All subjects then completed the pretest³ to constitute a baseline measure not confounded by the cohesiveness manipulation. In this task⁴ subjects ranked a list of 16 items in their order of importance to a group of blue-collar workers in their early 20's. "The Blue-Collar Blues" exercise (Yankelovich, 1974) is shown in Appendix 2. This particular task was chosen to fit the description of a conflictive problem, used in other telecommunications studies, i.e., it is "a problem that provides a setting for argumentative discourse among communicators...relevant to the subject population" (Chapanis, 1978). As in the Thibaut and

Strickland (1956) study of the effects of induction of a "group set" by conformity, a degree of commitment to an original ranking was ensured by telling subjects prior to the pretest that they would have an opportunity to discuss their ranking with their dyadic partners -- the anticipation by the person that his initial opinion must later be publicly defended is a technique long used to secure commitment.

Upon completion of the pretest, all dyads were told:

You now have 20 minutes to discuss, with your partner, any differences you may have in ranking and see if you can come up with a joint marking. Do not feel you must agree -- differing positions should be presented as lucidly and logically as possible. It is unlikely each ranking position will be approved by both of you.

Continuing this instruction, each of the 20 dyads in the high cohesive condition were told:⁵

On the basis of the personality profile you completed, you two seem very similar and should make a highly compatible pair. Since this task is primarily one of discussion, you two should have an interesting time and possibly reach a high rate of agreement.

Each of the 20 dyads in the low cohesive condition were told:

I have just checked for similarities in the personality profiles you completed. Unfortunately you two are not as well matched as we would like but since we are interested in how people in groups reach agreement, it is every bit as informative if your group is not expected to agree a great deal. In spite of the fact that you don't agree on the personality questionnaire, let's see how you make out with the rankings.

Subjects were then shown to their assigned places for discussion, told their discussions would be recorded for future analysis and reminded that while discussion was limited to 20 minutes they could terminate at any time by simply coming out of the experimental room(s). Subjects had their

pretest ranking sheets with them for discussion but were asked not to change them in any way. Following discussion, dyads were again seated at their desks in the corridor and exchanged their pretests for a blank ranking sheet on which to record any changes they wished to make.

Subjects also completed two brief postexperimental questionnaires. The first, a cohesiveness questionnaire, was designed to test the success of the cohesiveness manipulation. Appendix 3 shows the sociometric questionnaire, designed to measure cohesiveness in terms of the attractiveness of the dyad for its members.

The second questionnaire, shown in Appendix 4, was designed to assess the extent of "intersubjectivity". The concept of intersubjectivity, a condition of shared impressions or communality of experience between individuals, is currently being developed and methodologies are being devised for use in communication studies (Guild, 1980).

Subjects were then given a typed account of the significant features of the experiment and all their questions answered truthfully.

CHAPTER III

PRESENTATION OF RESULTS

Sociometric Measure of Cohesiveness

Before examination of findings related to the prediction, it is appropriate to assess the success of the main experimental manipulation.

As has been stated above, from almost the beginning of experimental work in the group dynamics area, an accepted method for inducing high and low cohesiveness was by varying the attractiveness of the group members and a sociometric questionnaire has been the accepted measuring instrument. As an end-of-experiment check on this tradition, each subject filled out a cohesiveness questionnaire designed to test the success of the manipulation (Appendix 3). All 3 questions were answered on a 5-point rating scale to determine how much the subject liked her/his partner and how much she/he would like to work with that person again.

Table 2 presents data from the cohesiveness questionnaire. All scores represent the mean position of subjects in each of the four experimental conditions: the higher the score, the greater the cohesiveness. The scores on each question are higher for the high cohesive than for the low cohesive groups. Although it might be argued the binomial expansion is not strictly applicable here, the binomial probability of all 6 differences being

in the same anticipated direction would be 1/128, or .0078.

Ratings for each question were summed across these 3 questions to give each individual a score on the cohesiveness questionnaire. Table 3 presents the mean cohesiveness score in each of the four conditions. Analysis of variance reveals that in both the mediated and face-to-face conditions, high cohesive subjects were generally more attracted to their partners than the corresponding low cohesive subjects although, in absolute terms, the differences between high/low cohesive groups are not large.

A summary of the analysis of the data from the cohesiveness questionnaire is shown in Table 4. There is a significant main effect of the induced "set", that is, those subjects in the high cohesive condition rated themselves significantly more attracted to their partners than the low cohesive subjects ($p=.007$). On the basis of these comparisons, the cohesiveness manipulation appears to have been successful.

The Influence Measure.

Spearman's rank order correlation (ρ) was used as the measure of the correlation between the pre-manipulation rankings of partners in a dyad, providing a baseline measure of the amount of agreement within that dyad. These correlation coefficients constitute the pretest scores.

Post discussion rankings were the raw data from which a second measure of correlation with each dyad was derived.

The appropriate method of analysis seemed to be the analysis of variance. However, one of the assumptions of the analysis of variance is that observations are drawn from normally distributed populations. Although the distribution of ρ is symmetrical, it does not approach normal form unless N is large (Ferguson, 1976). Difficulties resulting from the skewness of the sampling distribution of the correlation coefficient are resolved by the r to z transformation, where

$$z_r = \frac{1}{2} \log_e (1+r) - \frac{1}{2} \log_e (1-r)$$

Since Spearman's ρ is but a particular case of Pearson's , product-moment correlation coefficient (Ferguson, 1976), ρ and r may be used interchangeably in this formula. Tables 5 and 6 display the results of this r to z transformation.

Table 7 presents the results of analysis of the transformed correlation coefficients. Not unexpectedly, the within group variable (Pre/Post test) yielded a massive main effect, illustrating the general tendency for partners in a dyad to agree, rather than disagree, with one another after discussion. There was no indication of a significant effect for either the mode or cohesiveness comparisons nor any interaction thereof.

Thus, the main hypothesis, that subjects in the high cohesive conditions would show an increment in agreement from Pre-test through Post-test, and that subjects in the low cohesive conditions would show no such increment, was not confirmed.

Individual Opinion Change

Back (1951) had concluded that, in the high cohesive groups, the members made more effort to reach an agreement; however, his data showed that when both partners were considered, significant differences were not obtained between the high and low cohesive pairs on a measure of change following influence attempts. However, in high cohesive groups the discussion was more effective in that it produced influence; that is, one group member changed more toward the partners' positions than he/she did in the less cohesive groups (Back, 1951).

In order to determine, in the present study, whether there was reliably more change on the part of one partner in a dyad, individual opinion change was measured by summing the absolute differences obtained from the before/after change in ranking for the 16 items on the Pre and Post tests for each individual in a dyad. This procedure gives a score for each person indicative of the extent to which his ranking has altered after the discussion.

The larger the difference between individual No. 1 and individual No. 2 on this measure of change, then the more change was unevenly distributed between partners in a dyad. To test the null hypothesis that this difference will be zero ($d=0$), an analysis of Individual Opinion Change was carried out, with results shown in Table 8. The mean individual opinion change for the Face-to-face/high cohesive group was 20.5, for the Face-to-face/low cohesive group 12.3, for the Audio/high cohesive group 22.3, and for the Audio/low cohesive group 15.2. This ANOVA showed a single individual in dyads in the high cohesive groups changed more than did individuals in low cohesive groups ($p=.08$). There was not significantly more opinion change after an audio than after a face-to-face discussion.

Analysis of Taped Discussions

A computer program, written in Basic,⁶ tabulated the amount of time during a session in which no-one spoke, the amount of time each person in a dyad spoke uninterruptedly, and the amount of time they spoke simultaneously. The program used is found in Appendix 5. The computer displayed these four columns, timed to one minute segments. For a sample of the computer display, refer to Appendix 6.

The data from the computer scoring of the tapes was converted to percentages for computational ease and appear in Table 9.⁷

Amount of Time Discussing

The total number of one-minute segments for each dyad gave the length, in minutes, of that dyad's "time discussing" before signalling completion. There is some previous evidence, although contradictory, to suggest that speaking time (as measured by lines of transcript) might be significantly greater face-to-face than over the telephone (Davies, 1971a). As shown in Table 10, in this case there was no significant difference between the length of discussion time in the face-to-face and audio modes.

Channel Control

In the usual face-to-face interaction, head nods and eye movements are used in determining who will speak and for how long. Thus it would seem reasonable to assume "channel control" to be one of the non-verbal cue functions more seriously affected in a mediated condition. Jaffe and Feldstein (1970) found less simultaneous speech in a no-vision condition and suggested subjects in the "visible" condition were more confident in placing their interruptions. Analysis of the amount of time partners

in a dyad talk simultaneously found significantly less simultaneous speech in the audio condition ($p=.002$).

It seems, in the audio condition, individuals are less confident in interrupting their partner's conversation.

Results of this analysis are shown on Table 11.

Disturbances in Conversational Behavior

The mediated communications literature shows frequently conflicting evidence of changes in conversational behavior with the removal of the visual channel. As reported above, results from the Jaffe and Feldstein (1970) study and from this study indicate less simultaneous speech (fewer interruptions) in the audio condition. Cook and Lalljee (1972), Williams (1975b), and Rutter and Stephenson (1974), also found fewer interruptions in the audio condition but their results showed more pauses in telephone conversations than in face-to-face conversations. Analysis of the amount of time no-one spoke (refer to Table 9) did not detect a difference between the face-to-face and audio groups (Table 12).

Leadership

Guild and Strickland (1980) suggest that, while there may be some fundamental changes in social processes stemming from technological mediation, measurable adjustments in communication can be elusive. Many studies have documented strong correlations, running around .95,

between amount of talking in a face-to-face discussion group and the likelihood of being perceived as a "leader" (Hiltz, 1977). Strickland, Guild, Barefoot, and Paterson (1976) show role differentiation less pronounced and more unstable in the mediated conditions, i.e., no permanent leaders emerge. Thus it might be hypothesized that, in the mediated condition, there will be less tendency for a single dominant individual to emerge. To test this ratios were constructed of the percentage of time "talked most" to percentage of time "talked less" for each dyad (columns labelled 1 and 2 in Table 9). Analysis of these ratios (Table 13) reveal no significant tendency towards domination in the face-to-face or audio groups.

Intersubjectivity Measure

The method used to attempt to demonstrate intersubjectivity focused on intradyadic differences in the semantic differential scale responses. In situations where two persons have performed a communications task together, the average absolute difference between their ratings of this event is calculated and used to test for group differences in dyadic agreement (Guild, 1980). This index of intradyadic agreement in perceptions of communication medium does not discriminate the two communications conditions. Table 14 illustrates the absence of intersubjectivity in the face-to-face and audio conditions.

To the extent that this is a valid measure, one may argue that the reason media differences did not appear in the present study was because differences in intersubjectivity were not created.

Summary of Results

The index of agreement between individuals in a dyad on the Pre-test increased massively, following a discussion, on the Post-test. It was not possible to differentiate among the groups on the basis of the experimental variables: Medium of Communication and Cohesiveness.

However, analysis of the sociometric measure of cohesiveness demonstrated that subjects in the high cohesive condition rated themselves significantly more attracted to their partners than the low cohesive subjects. Also, Back's (1951) hypothesis of realibly more change on the part of one partner, in the high cohesive group, was confirmed in this study, albeit tentatively.

Proof of changes in social processes in a mediated context remained elusive; only findings of less frequent interruptions in audio conversations were confirmed.

CHAPTER IV

DISCUSSION OF RESULTS

The results were consistent with Back's (1951) findings with respect to cohesiveness; while it is mildly gratifying that the present study did not produce another difficult-to-interpret mediated communications result, several interesting points for discussion have emerged.

Dyads versus Groups

The apparent inconsistencies in the mediated communications literature might have been less frequent had the distinction between the social processes of groups and dyads been considered in previous reviews; nowhere is this distinction made in the reviews of mediated communication studies. Indeed, only rarely in Small Group research (e.g., Bales and Borgatta, 1967) is it demonstrated that the difference between the dyad and larger groups rests in the fact that the dyad has a different relation to each of its elements than have larger groups to their members. The complexities involved in moving from the dyad to a larger group is discussed as well by Thibaut and Kelly (1959) but ignored by other small group researchers.

A re-review of the present relevant literature indicates that, generally, studies that report differences between communication conditions involve groups while studies that report no differences involve dyads. A study

by Weston, Kristen and O'Connor (1975) also bears on this oversight; they note that these inconsistencies should be seen as mounting evidence "that group and dyadic interaction, regardless of the medium, do not generalize very well to each other".

Studies of Cohesiveness

One finds an identical situation in the use of references in studies examining Cohesiveness. Normally, cohesiveness would be described as an emerging group property, interacting with the size of the group to affect outcomes. If one acknowledges the interaction processes of the dyad to be empirically different from the interaction processes in a group, there may be slight reason to expect a vague construct such as "Cohesiveness" to apply in the same way to both dyads and groups.

Nevertheless, Back (1951) did use dyads in the study of cohesiveness upon which the present study is based. Back's task was different (the topic of discussion was the interpretation of a set of pictures) and his main dependent measures attempted to assess the influence process within the dyad. However, on a measure of change, Back found this change quite unevenly distributed between the members of the high cohesive dyads; the present results are basically similar to his of three decades ago. This is a gratifying near-replication of one of social

psychology's "classics".

Effects of Mediated Communications

Most people seem to believe that the "best" form of communication is, and always will be, face-to-face contact. Yet the advent of mediated communications has shown much communication is effective with a voice channel alone and, as we have seen, some studies show the voice-only channel to be more effective. While in no way implying that all human interaction can be stripped of the visual component and still be effective, we are forced to recognize that people are exposed to increasingly sophisticated levels of technology without much premeditation and that both society and the individual continue to adapt.

The telephone came into existence over 100 years ago; in Canada today there is virtually no home without one. It is to be expected that in this process of adaptation and change people have assimilated forms of non-visual communication into their behavior, creating linguistic alternatives to visual cues for regulating speech and conveying meaning. Systems which can measure intonation, inflection, and other voice-only cues are currently being developed by research laboratories; such sophisticated, sensitive equipment will make it possible to examine subtle differences in voice-only communication.

A fundamental error in mediated studies may be the

assumption that differences arise from vision or no-vision conditions. Yet, it has been alleged (Strickland, Guild, Barefoot, and Paterson, 1976) that some of the differences in media outcomes might be due to novelty effects. Maybe other differences might be due to the effort involved in coping with different media, what Langer and Imber (1980) call "mindfulness". This conceptualization involves the notion that, when "mindless", the individual interacts successfully with the environment in a passive, reactive fashion. In the present study, it is likely that the desk top telephone required few new coping mechanisms and task completion could occur without excess effort.

During the past fifteen years laboratory research in the area of mediated communications has yielded many findings of interest. Some of these studies and their conclusions stand alone and cannot easily be integrated with the rest of the research, others approached underlying themes in sufficient numbers to warrant integration of their results. Any claim to the validity of the generally unsystematic body of knowledge thus accumulated must remain modest; one must also question whether more mediated communications laboratory experiments will add significantly to this body of knowledge, particularly if they are not concerned with basic social psychological processes.

There is no doubt that laboratory experiments can add to our understanding of behavior in real-life situations but empirical findings from the laboratory must be validated in field situations to determine how they apply there.

Without a backlog of applicable scientific knowledge, social scientists are no better at solving social problems than anyone else. An extensive (and sometimes confusing) array of information exists on how medium of communication affects behavior and attitudes under laboratory conditions; it is time to find out how these variables interact with other measurable variables in real-life situations.

FOOTNOTES

1. A full list of the reports of the Communications Studies Group, together with addresses of where they may now be obtained is available from Sandy Hammond, University College, 22 Gordon Street, London W1.
2. Among the hundreds of articles in recent years critical of experimental social psychology have been a significant subset attacking the frequent use of simple factorial designs. In view of the complex of alternatives offered in more recent methodology papers and books, it may be questioned why research in a relatively new area like mediated communications employs a relatively "old-fashioned" design. One obvious answer is that the Back study, of which this is a modified replication, employed such a design. A second is the design remains the most appropriate for an initial investigation employing such a major independent variable manipulation as communication mode.

3. The test-retest method was used to determine the consistency of rankings on the pre and post tests. Before the experiment was conducted, the experimental task (see Appendix 2) had been administered twice, with a two-day interval, to 22 volunteers who were not part of the experimental group. The correlation between the first and second ranking of these individuals resulted in a test-retest reliability coefficient of .80.

The initial rankings of the 22 volunteers were randomly paired (11 pairs) to evaluate an expected degree of agreement between partners in a dyad prior to the experimental manipulation. The average correlation coefficient within each pair was .26, ruling out the possibility of a ceiling effect.

4. In view of the stated aim of this study to attempt a modified replication of Back's (1951) pioneering study, it may be questioned why such a drastic change in task, from an ill-defined story construction exercise to one of ranking concepts along a continuum of importance, was employed. First, it seemed desirable to avoid the sensitive issue of interpretations about the relative change of different authors. Second, a ranking task such as that employed here offers a dependent measure - change in rank - that is easily tabulated and analysed with reliability. Finally, the results of neither Back's nor the present experiment would be of much interest if their generality were limited to story-writing situations.

5. It may, on first reading, appear that these instructions have demand properties which might serve to bias ultimate task performance as well as interpersonal affect. It should be remembered, however, that Back's study demonstrated a variety of "routes to cohesiveness," said "set" being attainable through instructions which stressed either interpersonal attraction, task direction, or group prestige. In the present study, it was intended, through a combination of these inductions, to maximize the strength of the set to agree (among high cohesive dyads) and thus to examine any subsequent interaction effect involving communication mode. This decision makes the untroublesome assumption, then, that much of the laboratory research on "cohesiveness" may be appropriately viewed as involving demand characteristics. These are, in turn, themselves imperfectly understood.
6. Thanks are extended to Dr. Warren Thorngate for writing the program and the generous use of his Challenger 4P computer in the tape analyses.
7. Due to a variety of technical problems, 8 tapes were inaudible. Face-to-face/high cohesive: 2, Face-to-face/low cohesive: 1, Audio/high cohesive: 2, Audio/low cohesive: 3.

BIBLIOGRAPHY

- Argyle, M. Social Interaction, London, England: Methuen, 1969.
- Argyle, M., Lalljee, M., and Cook, M. The effects of visibility in a dyad. Human Relations, 1968, 21, 3-17.
- Argyle, M. Salter, V., Nicholson, N., Williams, M., and Burgess, P. The communication of inferior and superior attitudes by verbal and non-verbal signals. British Journal of Social and Clinical Psychology, 1970, 9, 222-231.
- Back, K. Influence through social communication. Journal of Abnormal and Social Psychology, 1951, 46, 9-23.
- Back, K. The proper scope of social psychology. Social Forces, 1963, 41, 368-375.
- Bales, R.F. Task roles and social roles in problem solving groups, 1958. Referred to by Strickland, L.H., Guild, P.D., Barefoot, J.C., and Paterson, S.A., Teleconferencing and leadership emergence. Human Relations, 1978, 31, 583-596.
- Bales, R.F. and Borgatta, E.F. Size of group as a factor in the interaction profile. In A.P. Hare, E.F. Borgatta, and R.F. Bales, Small Groups: Studies in Social Interaction, New York: Alfred A. Knopf, 1967.
- Berkowitz, L. Group standards cohesiveness, and productivity. Human Relations, 1954, 7, 509-519.

Berkowitz, L. Liking for the group and the perceived merit of the group's behavior. Journal of Abnormal and Social Psychology, 1957. 54, 353-357.

Bugental, D.E., Raswan, J.M., and Love, L.R. Perception of contradictory meanings conveyed by verbal and non-verbal channels. Journal of Personality and Social Psychology, 1970, 16, 647-655.

Chapanis, A. Interactive communication: A few research answers for a technological explosion. Text of an invited address given at the Eighty-Sixth Annual Convention of the American Psychological Association, Toronto, Canada, 1978.

Chapanis, A., Ochsman, R., Parrish, R., and Webs, G. Studies in interactive communication: the effects of four communication modes on the behaviour of teams during co-operative problem solving. Human Factors, 1972, 14, 487-509.

Christie, B., and Elton, M. Research on the differences between telecommunications and face-to-face communication in business and government, 1975.

Abstracted from R. Johansen, J. Vallee, and K.

Spangler, Electronic Meetings: Technical Alternatives and Social Choices. California: Addison-Wesley Publishing Co., 1979.

- Connors, M.M., Lindsey, G., and Miller, R.H. The NASA Teleconferencing System: An Evaluation, 1976. Abstracted from R. Johansen, J. Vallee, and K. Spangler, Electronic Meetings: Technical Alternatives and Social Choices. California: Addison-Wesley Publishing Co., 1979.
- Cook, M., and Lalljee, M. Verbal Substitutes for Visual Signals in interaction. Semiotica, 1972, 3, 212-222.
- Craig, J.G. and Jull, G.W. Teleconferencing Studies: Behavioral Research and Technological Implications. Ottawa: Communications Research Centre, Department of Communications, 1974.
- Davies, M. Co-operative problem solving: An exploratory study, 1971a. Abstracted from R. Johansen, J. Vallee, and K. Spangler, Electronic Meetings: Technical Alternatives and Social Choices. California: Addison-Wesley Publishing Co., 1979.
- Deutsch, M. and Gerard, H.B. A study of normative and informational influence upon individual judgement. Journal of Abnormal and Social Psychology, 1955, 51, 629-636.
- Dittes, J.E. Attractiveness of a group as a function of self-esteem and acceptance by group. Journal of Abnormal and Social Psychology, 1959, 59, 77-82.

Dittes, J.E. and Kelly, H.H. Effects of different conditions of acceptance upon conformity to group norms. Journal of Abnormal and Social Psychology, 1956, 53, 100-107.

Ferguson, G.A. Statistical Analysis in Psychology and Education. New York: McGraw-Hill, 1976.

Festinger, L. Laboratory experiments: The role of group belongingness. In J.G. Miller (Ed.), Experiments in Social Process. New York: McGraw-Hill, 1950.

Festinger, L. A theory of social comparison processes. Human Relations, 1954, 7, 117-140.

Festinger, L., Gerard, H., Hymovitch, B., Kelley, N., and Raven, B. The influence process in the presence of extreme deviates. Human Relations, 1952, 5, 327-346.

Festinger, L., Schachter, S., and Back, K. Social Pressures in Informal Groups. New York: Harper and Bros., 1950.

Festinger, L. and Thibaut, J. Interpersonal communication in small groups. Journal of Abnormal and Social Psychology, 1951, 46, 92-99.

Fraser, C. Communication in interaction. In H. Tajfel and C. Fraser (eds.), Introducing Social Psychology. Ontario: Penguin Books, 1978.

French, R.L. Sociometric status and individual adjustment among naval recruits. Journal of Abnormal and Social Psychology, 1951, 46, 64-72.

Gerard, H.B. Conformity and commitment to the group.

Journal of Abnormal and Social Psychology, 1964,
68, 209-211.

Goodnow, R.E. and Tagiuri, R. Religious ethnocentrism and
its recognition among adolescent boys. Journal of
Abnormal and Social Psychology, 1952, 47, 316-320.

Guild, P.D. Intersubjectivity: A concept and methodology
for communication studies. Paper presented at the
Ninth International Symposium on Human Factors in
Telecommunication, New Jersey, 1980.

Guild, P.D. and Strickland, L. Social processes of mediated
communications. Paper presented at the International
Congress of Psychologists, Leipzig, D.D.R., July, 1980.

Heilbronn, M. and Libby, W.L. Comparative effects of techno-
logical and social immediacy upon performance and
perceptions during a two-person game, 1973. Abstrac-
ted from J. Short, E. Williams, and B. Christie,
The Social Psychology of Telecommunications. Great
Britain: John Wiley and Sons Ltd., 1976.

Hiltz, S.R. Computer conferencing: assessing the social
impact of a new communications medium. Technological
Forecasting and Social Change, 1977, 10, 225-238.

Hiltz, S.R. and Turoff, M. The Network Nation: Human
Communication via Computer. Reading, Mass.: Addison-
Wesley Publishing Co., 1978.

- Holloway, S. and Hammond, S. A case study of users' reactions to two telephone teaching systems at the Open University, 1976. In L.A. Parker and B. Riccomini, (Eds.). The Status of the Telephone in Education. Madison: University of Wisconsin-Extension Press, 1979.
- Hough, R.W. and Associates. A Pilot Study to develop a methodology to forecast Canadian demand for new home and business telecommunications services in the period 1980-1990. A report prepared for the Department of Communications, Ottawa, Canada, May, 1979.
- Jaffe, J. and Feldstein, S. Rhythms of Dialogue. New York: Academic Press: 1970.
- Janofsky, A.I. Affective self-disclosure in telephone versus face-to-face interviews. Journal of Human Psychology, 1971, 11, 93-103.
- Johansen, R., Vallee, J., and Spangler, K. Electronic Meetings: Technical Alternatives and Social Choices. California: Addison-Wesley Publishing Co., 1979.
- Kelly, H.H. and Shapiro, M.M. An experiment on conformity to group norms where conformity is detrimental to group achievement. American Sociological Review, 1954, 19, 667-677.
- Kipnis, D.M. Interaction between members of bomber crews as a determinant of sociometric choice. Human Relations, 1957, 10, 263-270.

- Langer, E.J. and Imber, L. Role of mindlessness in the perception of deviance. Journal of Personality and Social Psychology, 1980, 39, 360-367.
- Lott, A.J. and Lott, B.E. Group cohesiveness as interpersonal attraction: A review of relationships with antecedent and consequent variables. Psychological Bulletin, 1965, 64, 259-309.
- Mehrabian, A. Non verbal Communication. Chicago: Aldine-Atherton, 1972.
- Morley, I.E. and Stephenson, G.M. Interpersonal and inter-party exchange: A laboratory simulation of an industrial negotiation at the plant level. British Journal of Psychology, 1969, 60, 543-545.
- Morley, I.E. and Stephenson, G.M. Formality in experimental negotiations: A validation study. British Journal of Psychology, 1970, 61, 383-384.
- Mouton, J.S., Blake, R.R., and Olmstead, J.A. The relationship between frequency of yielding and the disclosure of personal identity. Journal of Personality, 1956, 24, 339-347.
- Reid, A.L. Comparing telephone with face-to-face contact, 1976. Referred to in J. Short, E. Williams, and B. Christie, The Social Psychology of Telecommunications. Great Britain: John Wiley and Sons, Ltd., 1976.
- Rutter, D. and Stephenson, G.M. The Role of visual communication in synchronising conversation, 1974. Paper read at British Psychological Society, Social Section, London.

Schachter, S., Eltertson, N., McBride, D., and Gregory, D.

An experimental study of cohesiveness and productivity. Human Relations, 1951, 4, 229-238.

Schachter, S. Deviation, rejection, and communication.

Journal of Abnormal and Social Psychology, 1951, 46, 190-207.

Schneider, D.J., Hastorf, A.H., and Ellsworth, P.C. Person Perception. California: Addison-Wesley Publishing Co., 1979.

Seashore, S.E. Group cohesiveness in the industrial work

group, 1954. Abstracted from A.J. Lott and B.E.

Lott in Group cohesiveness as interpersonal attraction. Psychological Bulletin, 1965, 64, 259-309.

Sherif, M. and Sherif, C. Groups in Harmony and Tension. New York: Harper, 1953.

Short, J.A. Medium of Communication and Concensus, 1972b.

Unpublished Communications Studies Group paper no.

E/72210/SN. Communication Studies and Planning, 21 Tichfield St., London, England.

Short, J.A. Medium of Communication, Opinion Change, and

Solution of a Problem of Priorities, 1972c. Unpubli-

shed Communications Studies Group paper no. E/72245/SN.

Communication Studies and Planning, 21 Tichfield St., London, England.

Short, J.A. The effects of medium of communication on persuasion, bargaining, and perceptions of the other, 1973b. Unpublished Communications Studies Group paper no. E/73100/SN. Abstracted from J. Short, E. Williams, and B. Christie, in The Social Psychology of Telecommunications. Great Britain: John Wiley and Sons Ltd., 1976.

Short, J.A. Effects of medium of communication on experimental negotiations. Human Relations, 1974, 27, 225-234.

Short, J., Williams, E., and Christie, B. The Social Psychology of Telecommunications. Great Britain: John Wiley and Sons, Ltd., 1976.

Stratte-McClure, J. French telecommunications: Digital Technology and the telematique program. Scientific American, September, 1980.

Strickland, L.H., Guild, P.D., Barefoot, J.C., and Paterson, S.A. Teleconferencing and leadership emergence. Human Relations, 1978, 31, 583-596.

Thibaut, J.W. An experimental study of the cohesiveness of underprivileged groups. Human Relations, 1950, 3, 251-278.

Thibaut, J.W. and Strickland, L.H. Psychological set and social conformity. Journal of Personality, 1956, 25, 115-129.

Thomas, H.B. and Williams, E. The University of Quebec
Audio Conferencing System: An Analysis of Users
Attitudes, 1975. Communications Studies Group,
paper No. P/75190/TN. Abstracted from J. Short,
E. Williams, and B. Christie in The Social Psychology
of Telecommunications. Great Britain: John Wiley and
Sons, Ltd., 1976.

Toch, H. and Smith, H.C. Social Perception: The Development
of Interpersonal Impressions. Toronto: D. Van
Nostrand Co., Inc., 1968.

Turnbull, A.A., Strickland, L.H., and Shaver, K.G. Medium
and communication, differential power, and phasing
of concessions: Negotiating success and attributions
to the opponent. Human Communications Research, 1976,
2, 262-270.

Weeks, G.D. and Chapanis, A. Co-operative versus conflictive
problem solving in three telecommunication modes.
Perceptual and Motor Skills, 1976, 42, 879-917.

Weston, J.R., Kristen, C., and O'Connor, S. Teleconferencing:
A Comparison of Group Performance Profiles in Mediated
and Face-to-face Interaction. Report prepared for
the Social Policy and Programs Branch of the Depart-
ment of Communications, Ottawa, April, 1975.

Williams, E. Speech patterns during mediated communication
within small groups, 1975b. Unpublished Communications
Studies Group paper no. E/75275/WL. Abstracted from
J. Short, E. Williams, and B. Christie in The Social
Psychology of Telecommunications, Great Britain: John
Wiley and Sons, Ltd., 1976.

Williams, E. Experimental comparisons of face-to-face and mediated communications: A review. Psychological Bulletin, 1977, 84, 963-976.

Yanbelovich, D. The New Morality: A Profile of American Youth in the 1970's. New York: McGraw-Hill, 1974.

Young, I. Telecommunicated interviews: An exploratory study, 1974a. Unpublished Communications Studies Group paper no. E/74165/YN. Abstracted from J. Short, E. Williams, and B. Christie in The Social Psychology of Telecommunications. John Wiley and Sons, Ltd., 1976.

Young, I. Understanding the other person in mediated interactions. Unpublished Communications Studies Group paper no. E/74266/YN. Abstracted from J. Short, E. Williams, and B. Christie in The Social Psychology of Telecommunications. John Wiley and Sons, Ltd., 1976.

APPENDIX 1

"PERSONALITY PROFILE" QUESTIONNAIRE

Rate on a scale of zero to five the degree to which the personality description following reveals basic characteristics of your personality:

1. You have a great need for other people to like and admire you.
0 1 2 3 4 5
2. You have a tendency to be critical of yourself.
0 1 2 3 4 5
3. You have a great deal of unused capacity which you have not turned to your advantage.
0 1 2 3 4 5
4. While you have some personality weaknesses, you are generally able to compensate for them.
0 1 2 3 4 5
5. Your sexual adjustment has presented problems for you.
0 1 2 3 4 5
6. Disciplined and self-controlled outside, you tend to be worrisome and insecure inside.
0 1 2 3 4 5
7. At times you have serious doubts as to whether you have made the right decision or done the right thing.
0 1 2 3 4 5
8. You prefer a certain amount of change and variety and become dissatisfied when hemmed in by restrictions and limitations.
0 1 2 3 4 5

9. You pride yourself as an independent thinker and do not accept others' statements without satisfactory proof.

0 1 2 3 4 5

10. You have found it unwise to be too frank in revealing yourself to others.

0 1 2 3 4 5

11. At times you are extroverted, affable, 'sociable, while at other times you are introverted, wary, reserved.

0 1 2 3 4 5

12. Some of your aspirations tend to be pretty unrealistic.

0 1 2 3 4 5

13. Security is one of your major goals in life.

0 1 2 3 4 5

APPENDIX 2

BLUE COLLAR BLUES EXERCISE

It is 6:30 AM and just a few minutes ago you were awakened by a phone call from your boss, Harry Stoner. He is president of the Muddy Waters Pump Corporation of which you are the Industrial Relations Manager in charge of negotiations.

When you answered the phone you hardly expected to hear Mr. Stoner's voice, let alone have him start philosophizing about worker alienation and disenchantment! He said he'd been reading a book called Work in America which talked about "Blue-Collar Blues" and the dissatisfactions and frustrations of the blue-collar worker in America. According to Mr. Stoner some sociologists claim that workers want more than good wages and fair treatment in a job. They want "to become masters of their immediate environments and to feel that their work and they themselves are important".....

Mr. Stoner wanted to know your views, and made it clear that you had better be ready to discuss this matter when you arrive at the breakfast meeting of the corporation's Bargaining Committee!

What do your company's employees want? Even though not highly educated, they are fairly skilled, as they have to be to manufacture precision water pumps. And they are almost all young, 18-25 years old, since in your employment area there are few skilled older workers. You know that the president of the National Union recently said that this business of workers wanting to make decisions, and have interesting work is so much bull! He said that the men want good

pay and job security. "The time for fun and enjoyment comes after hours. The job is where you get the wherewithal to finance your recreation after working hours."

So later this morning you and the rest of the Bargaining Committee will have to reach a concensus on this question before you go into the negotiating meeting with the Union at 10:30 AM. But first you need to get your position clear. Just what would most of your workers want in their jobs? Your task is to rank order the following list of possible items Mr. Stoner read to you so you will be ready at the breakfast meeting to determine what is most important to your workers.

Rank order the following list of 16 items in their order of importance to the group of blue-collar workers in their early 20s, holding jobs requiring moderate skill and intelligence, but only high school graduates. Place the number 1 beside the item which in your judgment the greatest number of employees would include in their list of things as important in a job. Place the number 2 beside the item which the next largest number of employees would include in their list and so on to number 16 for the item which the fewest number of employees would count as important. Be certain to number all items without ties.

THINGS MOST YOUNG, NONCOLLEGE EMPLOYEES WOULD WANT IN A JOB

- _____ Seeing the results of their work.
- _____ Chance to make a lot of money later on.
- _____ Not too demanding job.
- _____ Chance to use their minds.
- _____ Interesting work.
- _____ Not expected to do things not paid for.
- _____ Job in growing field/industry.
- _____ Good pay.
- _____ Having a job that does not involve hard physical work.
- _____ Chance to develop skills/abilities.
- _____ Recognition for a job well done.
- _____ Socially useful work.
- _____ Participation in decisions regarding job.
- _____ Good Pension Plan.
- _____ Not being caught up in big impersonal organization.
- _____ Friendly co-workers.

APPENDIX 3

COHESIVENESS QUESTIONNAIRE

Please rate your replies to the following questions on the scale provided:

1. How did you like your partner?

Very Little

Very Much

1

2

3

4

5

2. If you were taking part in another experiment, how much would you like to work with this same person?

Very Little

Very Much

1

2

3

4

5

3. If it involved any effort on your part, would you care to know your partner better?

Very Little

Very Much

1

2

3

4

5

"INTERSUBJECTIVITY" SCALE

relaxed	:	:	:	:	:	:	uneasy
friendly	:	:	:	:	:	:	unfriendly
unreliable	:	:	:	:	:	:	reliable
intimate	:	:	:	:	:	:	remote
untrustworthy	:	:	:	:	:	:	trustworthy
agreeable	:	:	:	:	:	:	disagreeable
comfortable	:	:	:	:	:	:	uncomfortable
informal	:	:	:	:	:	:	formal
insensitive	:	:	:	:	:	:	sensitive
rough	:	:	:	:	:	:	smooth
cold	:	:	:	:	:	:	warm
personal	:	:	:	:	:	:	impersonal
free	:	:	:	:	:	:	constrained
public	:	:	:	:	:	:	private
emotional	:	:	:	:	:	:	unemotional
cooperative	:	:	:	:	:	:	uncooperative
pleasant	:	:	:	:	:	:	unpleasant
hazy	:	:	:	:	:	:	clear
good	:	:	:	:	:	:	bad
unsatisfactory	:	:	:	:	:	:	satisfactory

APPENDIX 5

COMPUTER PROGRAM DESIGNED FOR SCORING TAPED DISCUSSIONS

10POKES30,1:K=57038:R=128:E=3999

30POKEK,R

35FORI=1TO20

40T=0:T(0)=0:T(1)=0:T(4)=0:T(6)=0

50S=PEEK(K)

60IFPEEK(K)=STHENT(S)=T(S) 1:T=T 1:IFT EGOTO80

70GOTO50

80PRINTT(0),T(4),T(2),T(6)

90NEXT

RUN

APPENDIX 6

SAMPLE COMPUTER DISPLAY

1092	2264	642	2
552	2296	1118	34
328	2922	723	27
344	2873	783	0
280	1988	1721	11
328	2747	925	0
84	1386	2470	60
107	1974	1910	9
420	2861	672	47
285	2295	1371	49
429	2188	1149	240
225	2016	1671	88
791	1724	1364	121

TABLE 1

NEW TECHNOLOGICAL ADVANCES

1. GROUP AUDIO SYSTEMS:

- a. Conference calls, by which several people, each at separate locations with their own telephone, can be connected together for a multiperson conversation.
- b. Loudspeaking telephones, allowing several conferees to be at one location. Often utilized in a "conference" setting to allow maximum flexibility.

2. VIDEOPHONES:

- a. Utilizes closed circuit television for person-to-person communication, essentially a telephone with vision. Allows limited use of graphic material.

3. CONFERENCE TELEVISION SYSTEMS:

- a. Essentially the video equivalent of the conference call. Unlikely to be equivalent to conversation with life-sized image.

4. COMPUTER MEDIATED CONFERENCE SYSTEMS:

- a. Computerized conferencing most simply involves a group of people communicating by typing into and reading from computer terminals, rather than by speaking and listening.
- b. Conferences may be "asynchronous" -- comments may be typed in, stored in the computer, and subsequently read out from the computer.

TABLE 2

MEAN GROUP RESPONSE TO EACH QUESTION OF THE COHESIVENESS MEASURE

		Question 1 "Like Partner"	Question 2 "Work with same partner"	Question 3 "Effort to know partner better"
N				
Face-to-face	20	4.15	4.15	3.7
High Cohesive				
Face-to-face	20	3.75	3.7	3.2
Low Cohesive				
Audio	20	4.0	4.1	3.5
High Cohesive				
Audio	20	3.5	3.6	3.3
Low Cohesive				

TABLE 3

MEAN GROUP COHESIVENESS RESPONSE

	Face-to-face		Audio	
	High Cohesive	Low Cohesive	High Cohesive	Low Cohesive
N	20	20	20	20
Mean	12	10.65	11.6	10.4
F. Ratio	4.31		3.39	
P	.045		.074	

TABLE 4

ANOVA SUMMARY TABLE OF
RESPONSE TO COHESIVENESS QUESTIONNAIRE

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F ratio</u>	<u>p</u>
Medium	1	2.1125	.50	.482
Cohesiveness	1	32.512	7.67	.007
Medium x Cohesiveness	1	.1125	.03	.871
within cells	76	4.2388		
TOTAL	79			

TABLE 5

P TO *z* TRANSFORMATIONS OF INTRA-DYADIC CORRELATIONS
IN THE FACE-TO-FACE GROUP

<u>HIGH COHESIVE</u>			
Pretest (<i>P</i>)	Pretest (<i>z</i>)	Post test (<i>P</i>)	Post test (<i>z</i>)
.07	.070	.74	.950
.05	.052	.69	.848
.45	.485	.65	.775
.41	.436	.53	.590
.74	.950	.98	2.298
.57	.648	.71	.887
.39	.412	.42	.448
.32	.332	.57	.648
.28	.288	.71	.887
.57	.648	.75	.973
	$\bar{z} = .4321$		$\bar{z} = .9304$

<u>LOW COHESIVE</u>			
Pretest (<i>P</i>)	Pretest (<i>z</i>)	Post test (<i>P</i>)	Post test (<i>z</i>)
.57	.65	.43	.460
.69	.85	.75	.973
-.39	-.41	.95	1.832
.03	.03	.78	1.045
.36	.38	.72	.908
.27	.28	.64	.758
.56	.63	.57	.648
.59	.68	.63	.741
.43	.46	.39	.412
.75	.97	.51	.563
	$\bar{z} = .452$		$\bar{z} = .834$

TABLE 6

 ρ TO z TRANSFORMATIONS OF INTRA-DYADIC CORRELATIONS

IN THE AUDIO GROUP

<u>HIGH COHESIVE</u>			
Pretest ρ	Pretest (z)	Post test ρ	Post test (z)
.73	.929	.79	1.071
.07	.072	.23	.234
.41	.436	.53	.590
.64	.758	.88	1.376
.48	.523	.90	1.472
.10	.100	.44	.472
.46	.497	.76	.996
-.09	-.090	.69	.848
.24	.245	.56	.633
.44	.472	.52	.577
	$\bar{z} = .3942$		$\bar{z} = .8269$
<u>LOW COHESIVE</u>			
Pretest ρ	Pretest (z)	Post test ρ	Post test (z)
.57	.648	.57	.648
.69	.848	.84	1.221
-.39	-.412	.22	.224
.03	.030	.75	.973
.36	.377	.59	.678
.27	.277	.56	.633
.56	.633	.87	1.333
.59	.678	.81	1.127
.43	.460	.63	.741
.75	.973	.80	1.099
	$\bar{z} = .4512$		$\bar{z} = .8677$

TABLE 7

Anova Summary Table of Intra-Dyadic Agreement Change
from Pre to Post Test

Source	df	MS	F	SIG
Mode	1	.0147	.08	.780
Cohesiveness	1	.00056	.00	.956
Mode x Cohe	1	.0379	.20	.654
error	36	.18630		
Test	1	3.7390	32.00	.001
Mode x Test	1	.0012	.01	.920
Cohe x Test	1	.0219	.19	.667
Mode x Cohe x Test	1	.0125	.11	.745
error	36	.11683		
Total	79			

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/High/Pre-test	.432	.273
Face-to-face/High/Post-test	.930	.509
Face-to-face/Low/Pre-test	.452	.409
Face-to-face/Low/Post-test	.834	.409
Audio/High/Pre-test	.394	.316
Audio/High/Post-test	.827	.400
Audio/Low/Pre-test	.451	.410
Audio/Low/Post-test	.868	.340

TABLE 8

Anova Summary Table of Individual Opinion Change
from Pre to Post Test

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F ratio</u>	<u>p</u>
Medium	1	55.225	.29	.59
Cohe	1	585.23	3.09	.08
Medium x Cohe	1	3.0250	.02	.90
error	36	189.45		
total	39			

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/High Cohe	20.5	17.1
Face-to-face/Low Cohe	12.3	9.7
Audio/High Cohe	22.3	15.2
Audio/Low Cohe	15.2	11.9

TABLE 9

PERCENTAGE OF TIME NO-ONE TALKS, FIRST PERSON TALKS,
SECOND PERSON TALKS, BOTH TALK SIMULTANEOUSLY

<u>Face-to-Face</u>							
<u>High Cohesive</u>				<u>Low Cohesive</u>			
<u>0</u>	<u>1</u>	<u>2</u>	<u>1&2</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>1&2</u>
18	52.82	23.86	5.32	14.10	34.90	47.11	4.49
9.44	60.83	23.16	6.57	34.46	28.91	35.07	1.55
31.89	22.22	41.03	4.86	15.01	41.39	35.79	7.97
16.94	33.76	46.71	2.59	19.05	38.32	40.43	2.19
8.84	29.30	60.08	1.79	22.20	39.12	35.56	3.12
18.62	21.17	59.54	.67	10.23	41.23	42.38	6.16
10.88	36.20	49.41	3.51	28.09	57.95	13.58	.38
8.11	23.82	64.31	3.77	9.70	51.01	33.62	5.60
				35.71	22.53	38.91	2.86
$\bar{X}=15.05$ $\bar{X}=36.92$ $\bar{X}=44.49$ $\bar{X}=3.54$				$\bar{X}=21.87$ $\bar{X}=38.87$ $\bar{X}=35.98$ $\bar{X}=3.28$			

<u>Audio</u>							
<u>High Cohesive</u>				<u>Low Cohesive</u>			
<u>0</u>	<u>1</u>	<u>2</u>	<u>1&2</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>1&2</u>
10.12	56.79	31.77	1.32	5.79	60.07	32.91	1.23
13.86	40.84	44.54	.75	21.89	42.26	33.55	2.29
11.18	60.13	24.38	4.35	16.51	52.68	30.53	.28
20.58	30.01	47.79	1.62	9.82	38.60	50.43	1.15
30.25	21.14	48.36	.26	6.14	28.38	63.71	1.77
13	39.31	43.38	4.30	10.76	47.44	41.62	.18
12.63	47.53	39.46	.36	15.94	40.43	42.94	.69
15.65	45.54	37.15	1.66				
$\bar{X}=15.82$ $\bar{X}=42.21$ $\bar{X}=40.17$ $\bar{X}=2.58$				$\bar{X}=12.41$ $\bar{X}=44.28$ $\bar{X}=42.25$ $\bar{X}=1.06$			

TABLE 10

ANALYSIS OF "TIME DISCUSSING"
IN EACH EXPERIMENTAL CONDITION

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Medium	1	3.0250	.17	.68
Cohe	1	21.025	1.20	.28
Medium x Cohe	1	7.2250	.41	.53
error	36	17.558		
total	39			

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/high cohesive	17.80	3.824
Face-to-face/low cohesive	15.50	4.528
Audio/high cohesive	16.40	4.300
Audio/low cohesive	15.80	4.077

TABLE 11

ANALYSIS OF "SIMULTANEOUS SPEECH"
IN EACH EXPERIMENTAL CONDITION

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Medium	1	40.704	11.98	.002
Cohe	1	.6247	.10	.67
Medium x Cohe	1	1.6714	.47	.470
error	28	3.4157		

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/high cohe	3.635	1.937
Face-to-face/low cohe	3.813	2.433
Audio/high cohe	1.824	1.622
Audio/low cohe	1.084	.771

TABLE 12

ANALYSIS OF AMOUNT OF TIME "NO-ONE TALKED"
IN EACH EXPERIMENTAL/CONDITION

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Medium	1	126.17	2.03	.17
Cohe	1	8.82	.14	.70
Medium x Cohe	1	164.74	2.65	.16
error	28	62.22		

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/high cohe	15.34	7.96
Face-to-face/low cohe	20.95	9.88
Audio/high cohe	15.91	6.62
Audio/low cohe	12.407	5.94

TABLE 13

ANALYSIS OF RATIOS OF UNINTERRUPTED SPEECH
BETWEEN PARTNERS IN A DYAD

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Medium	1	.78839	1.59	.22
Cohé	1	.74185	1.49	.23
Medium x Cohé	1	.36206	.73	.40

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/high cohesive	2.124	.57
Face-to-face/low cohesive	1.604	1.026
Audio/high cohesive	1.595	.545
Audio/low cohesive	1.503	.44

TABLE 14

ANALYSIS OF MEASURE OF INTERSUBJECTIVITY

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Medium	1	.0033	.02	.88
Cohe	1	.0754	.50	.49
Medium x Cohe	1	.0672	.44	.51
within cells	27	.1515		

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/High Cohe	2.124	.57
Face-to-face/Low Cohe	1.604	1.026
Audio/High Cohe	1.595	.545
Audio/Low Cohe	1.503	.44

Table

Chair

Companion Unit

Figure 1. The Experimental Rooms

Volume Control

On-Off Light

Voice switching controls (not used
in this experiment)

Figure 2. The Companion Unit

FOOTNOTES

1. A full list of the reports of the Communications Studies Group, together with addresses of where they may now be obtained is available from Sandy Hammond, University College, 22 Gordon Street, London W1.
2. Among the hundreds of articles in recent years critical of experimental social psychology have been a significant subset attacking the frequent use of simple factorial designs. In view of the complex of alternatives offered in more recent methodology papers and books, it may be questioned why research in a relatively new area like mediated communications employs a relatively "old-fashioned" design. One obvious answer is that the Back study, of which this is a modified replication, employed such a design. A second is the design remains the most appropriate for an initial investigation employing such a major independent variable manipulation as communication mode.
3. The test-retest method was used to determine the consistency of rankings on the pre and post tests. Before the experiment was conducted, the experimental task (see Appendix 2) had been administered twice, with a two-day interval, to 22 volunteers who were not part of the experimental group. The correlation between the first and second ranking of these individuals resulted in a test-retest reliability coefficient of .80.

The initial rankings of the 22 volunteers were randomly paired (11 pairs) to evaluate an expected degree of agreement between partners in a dyad prior to the experimental manipulation. The average correlation coefficient within each pair was .26, ruling out the possibility of a ceiling effect.

4. In view of the stated aim of this study to attempt a modified replication of Back's (1951) pioneering study, it may be questioned why such a drastic change in task, from an ill-defined story construction exercise to one of ranking concepts along a continuum of importance, was employed. First, it seemed desirable to avoid the sensitive issue of interpretations about the relative change of different authors. Second, a ranking task such as that employed here offers a dependent measure - change in rank - that is easily tabulated and analysed with reliability. Finally, the results of neither Back's nor the present experiment would be of much interest if their generality were limited to story-writing situations.

5. It may, on first reading, appear that these instructions have demand properties which might serve to bias ultimate task performance as well as interpersonal affect. It should be remembered, however, that Back's study demonstrated a variety of "routes to cohesiveness," said "set" being attainable through instructions which stressed either interpersonal attraction, task direction, or group prestige. In the present study, it was intended, through a combination of these inductions, to maximize the strength of the set to agree (among high cohesive dyads) and thus to examine any subsequent interaction effect involving communication mode. This decision makes the untroublesome assumption, then, that much of the laboratory research on "cohesiveness" may be appropriately viewed as involving demand characteristics. These are, in turn, themselves imperfectly understood.
6. Thanks are extended to Dr. Warren Thorngate for writing the program and the generous use of his Challenger 4P computer in the tape analyses.
7. Due to a variety of technical problems, 8 tapes were inaudible. Face-to-face/high cohesive: 2, Face-to-face/low cohesive: 1, Audio/high cohesive: 2, Audio/low cohesive: 3.

BIBLIOGRAPHY

Argyle, M. Social Interaction, London, England: Methuen, 1969.

Argyle, M., Lalljee, M., and Cook, M. The effects of visibility in a dyad. Human Relations, 1968, 21, 3-17.

Argyle, M. Salter, V., Nicholson, N., Williams, M., and Burgess, P. The communication of inferior and superior attitudes by verbal and non-verbal signals. British Journal of Social and Clinical Psychology, 1970, 9, 222-231.

Back, K. Influence through social communication. Journal of Abnormal and Social Psychology, 1951, 46, 9-23.

Back, K. The proper scope of social psychology. Social Forces, 1963, 41, 368-375.

Bales, R.F. Task roles and social roles in problem solving groups, 1958. Referred to by Strickland, L.H., Guild, P.D., Barefoot, J.C., and Paterson, S.A., Teleconferencing and leadership emergence. Human Relations, 1978, 31, 583-596.

Bales, R.F. and Borgatta, E.F. Size of group as a factor in the interaction profile. In A.P. Hare, E.F. Borgatta, and R.F. Bales, Small Groups: Studies in Social Interaction, New York: Alfred A. Knopf, 1967.

Berkowitz, L. Group standards cohesiveness, and productivity. Human Relations, 1954, 7, 509-519.

Berkowitz, L. Liking for the group and the perceived merit of the group's behavior. Journal of Abnormal and Social Psychology, 1957. 54, 353-357.

Bugental, D.E., Raswan, J.M., and Love, L.R. Perception of contradictory meanings conveyed by verbal and non-verbal channels. Journal of Personality and Social Psychology, 1970, 16, 647-655.

Chapanis, A. Interactive communication: A few research answers for a technological explosion. Text of an invited address given at the Eighty-Sixth Annual Convention of the American Psychological Association, Toronto, Canada, 1978.

Chapanis, A., Ochsmann, R., Parrish, R., and Webs, G. Studies in interactive communication: the effects of four communication modes on the behaviour of teams during co-operative problem solving. Human Factors, 1972, 14, 487-509.

Christie, B., and Elton, M. Research on the differences between telecommunications and face-to-face communication in business and government, 1975.

Abstracted from R. Johansen, J. Vallee, and K.

Spangler, Electronic Meetings: Technical Alternatives and Social Choices. California: Addison-Wesley Publishing Co., 1979.

Connors, M.M., Lindsey, G., and Miller, R.H. The NASA Teleconferencing System: An Evaluation, 1976.

Abstracted from R. Johansen, J. Vallee, and K.

Spangler, Electronic Meetings: Technical Alternatives and Social Choices. California: Addison-Wesley Publishing Co., 1979.

Cook, M., and Lalljee, M. Verbal Substitutes for Visual Signals in interaction. Semiotica, 1972, 3, 212-222.

Craig, J.G. and Jull, G.W. Teleconferencing Studies: Behavioral Research and Technological Implications. Ottawa: Communications Research Centre, Department of Communications, 1974.

Davies, M. Co-operative problem solving: An exploratory study, 1971a. Abstracted from R. Johansen, J. Vallee, and K. Spangler, Electronic Meetings: Technical Alternatives and Social Choices. California: Addison-Wesley Publishing Co., 1979.

Deutsch, M. and Gerard, H.B. A study of normative and informational influence upon individual judgement. Journal of Abnormal and Social Psychology, 1955, 51, 629-636.

Dittes, J.E. Attractiveness of a group as a function of self-esteem and acceptance by group. Journal of Abnormal and Social Psychology, 1959, 59, 77-82.

- Dittes, J.E. and Kelly, H.H. Effects of different conditions of acceptance upon conformity to group norms. Journal of Abnormal and Social Psychology, 1956, 53, 100-107.
- Ferguson, G.A. Statistical Analysis in Psychology and Education. New York: McGraw-Hill, 1976.
- Festinger, L. Laboratory experiments: The role of group belongingness. In J.G. Miller (Ed.), Experiments in Social Process. New York: McGraw-Hill, 1950.
- Festinger, L. A theory of social comparison processes. Human Relations, 1954, 7, 117-140.
- Festinger, L., Gerard, H., Hymovitch, B., Kelley, N., and Raven, B. The influence process in the presence of extreme deviates. Human Relations, 1952, 5, 327-346.
- Festinger, L., Schachter, S., and Back, K. Social Pressures in Informal Groups. New York: Harper and Bros., 1950.
- Festinger, L. and Thibaut, J. Interpersonal communication in small groups. Journal of Abnormal and Social Psychology, 1951, 46, 92-99.
- Fraser, C. Communication in interaction. In H. Tajfel and C. Fraser (eds.), Introducing Social Psychology. Ontario: Penguin Books, 1978.
- French, R.L. Sociometric status and individual adjustment among naval recruits. Journal of Abnormal and Social Psychology, 1951, 46, 64-72.

Gerard, H.B. Conformity and commitment to the group.

Journal of Abnormal and Social Psychology, 1964,
68, 209-211.

Goodnow, R.E. and Tagiuri, R. Religious ethnocentrism and
its recognition among adolescent boys. Journal of
Abnormal and Social Psychology, 1952, 47, 316-320.

Guild, P.D. Intersubjectivity: A concept and methodology
for communication studies. Paper presented at the
Ninth International Symposium on Human Factors in
Telecommunication, New Jersey, 1980.

Guild, P.D. and Strickland, L. Social processes of mediated
communications. Paper presented at the International
Congress of Psychologists, Leipzig, D.D.R., July, 1980.

Heilbronn, M. and Libby, W.L. Comparative effects of techno-
logical and social immediacy upon performance and
perceptions during a two-person game, 1973. Abstracted
from J. Short, E. Williams, and B. Christie,
The Social Psychology of Telecommunications. Great
Britain: John Wiley and Sons Ltd., 1976.

Hiltz, S.R. Computer conferencing: assessing the social
impact of a new communications medium. Technological
Forecasting and Social Change, 1977, 10, 225-238.

Hiltz, S.R. and Turoff, M. The Network Nation: Human
Communication via Computer. Reading, Mass.: Addison-
Wesley Publishing Co. 1978.

- Holloway, S. and Hammond, S. A case study of users' reactions to two telephone teaching systems at the Open University, 1976. In L.A. Parker and B. Riccomini, (Eds.), The Status of the Telephone in Education. Madison: University of Wisconsin-Extension Press, 1979.
- Hough, R.W. and Associates. A Pilot Study to develop a methodology to forecast Canadian demand for new home and business telecommunications services in the period 1980-1990. A report prepared for the Department of Communications, Ottawa, Canada, May, 1979.
- Jaffe, J. and Feldstein, S. Rhythms of Dialogue. New York: Academic Press: 1970.
- Janofsky, A.I. Affective self-disclosure in telephone versus face-to-face interviews. Journal of Human Psychology, 1971, 11, 93-103.
- Johansen, R., Vallee, J., and Spangler, K. Electronic Meetings: Technical Alternatives and Social Choices. California: Addison-Wesley Publishing Co., 1979.
- Kelly, H.H. and Shapiro, M.M. An experiment on conformity to group norms where conformity is detrimental to group achievement. American Sociological Review, 1954, 19, 667-677.
- Kipnis, D.M. Interaction between members of bomber crews as a determinant of sociometric choice. Human Relations, 1957, 10, 263-270.

- Langer, E.J. and Imber, L. Role of mindlessness in the perception of deviance. Journal of Personality and Social Psychology, 1980, 39, 360-367.
- Lott, A.J. and Lott, B.E. Group cohesiveness as interpersonal attraction: A review of relationships with antecedent and consequent variables. Psychological Bulletin, 1965, 64, 259-309.
- Mehrabian, A. Non verbal Communication. Chicago: Aldine-Atherton, 1972.
- Morley, I.E. and Stephenson, G.M. Interpersonal and inter-party exchange: A laboratory simulation of an industrial negotiation at the plant level. British Journal of Psychology, 1969, 60, 543-545.
- Morley, I.E. and Stephenson, G.M. Formality in experimental negotiations: A validation study. British Journal of Psychology, 1970, 61, 383-384.
- Mouton, J.S., Blake, R.R., and Olmstead, J.A. The relationship between frequency of yielding and the disclosure of personal identity. Journal of Personality, 1956, 24, 339-347.
- Reid, A.L. Comparing telephone with face-to-face contact, 1976. Referred to in J. Short, E. Williams, and B. Christie, The Social Psychology of Telecommunications. Great Britain: John Wiley and Sons, Ltd., 1976.
- Rutter, D. and Stephenson, G.M. The Role of visual communication in synchronising conversation, 1974. Paper read at British Psychological Society, Social Section, London.

Schachter, S., Elterton, N., McBride, D., and Gregory, D.

An experimental study of cohesiveness and productivity. Human Relations, 1951, 4, 229-238.

Schachter, S. Deviation, rejection, and communication.

Journal of Abnormal and Social Psychology, 1951, 46, 190-207.

Schneider, D.J., Hastorf, A.H., and Ellsworth, P.C. Person Perception. California: Addison-Wesley Publishing Co., 1979.

Seashore, S.E. Group cohesiveness in the industrial work group, 1954. Abstracted from A.J. Lott and B.E. Lott in Group cohesiveness as interpersonal attraction. Psychological Bulletin, 1965, 64, 259-309.

Sherif, M. and Sherif, C. Groups in Harmony and Tension. New York: Harper, 1953.

Short, J.A. Medium of Communication and Concensus, 1972b. Unpublished Communications Studies Group paper no. E/72210/SN. Communication Studies and Planning, 21 Tichfield St., London, England.

Short, J.A. Medium of Communication, Opinion Change, and Solution of a Problem of Priorities, 1972c. Unpublished Communications Studies Group paper no. E/72245/SN. Communication Studies and Planning, 21 Tichfield St., London, England.

22
OF / DE

9

Short, J.A. The effects of medium of communication on persuasion, bargaining, and perceptions of the other, 1973b. Unpublished Communications Studies Group paper no. E/73100/SN. Abstracted from J. Short, E. Williams, and B. Christie, in The Social Psychology of Telecommunications. Great Britain: John Wiley and Sons Ltd., 1976.

Short, J.A. Effects of medium of communication on experimental negotiations. Human Relations, 1974, 27, 225-234.

Short, J., Williams, E., and Christie, B. The Social Psychology of Telecommunications. Great Britain: John Wiley and Sons, Ltd., 1976.

Stratte-McClure, J. French telecommunications: Digital Technology and the telematique program. Scientific American, September, 1980.

Strickland, L.H., Guild, P.D., Barefoot, J.C., and Paterson, S.A. Teleconferencing and leadership emergence. Human Relations, 1978, 31, 583-596.

Thibaut, J.W. An experimental study of the cohesiveness of underprivileged groups. Human Relations, 1950, 3, 251-278.

Thibaut, J.W. and Strickland, L.H. Psychological set and social conformity. Journal of Personality, 1956, 25, 115-129.

Thomas, H.B. and Williams, E. The University of Quebec Audio Conferencing System: An Analysis of Users Attitudes, 1975. Communications Studies Group, paper No. P/75190/TN.. Abstracted from J. Short, E. Williams, and B. Christie in The Social Psychology of Telecommunications. Great Britain: John Wiley and Sons, Ltd., 1976.

Toch, H. and Smith, H.C. Social Perception: The Development of Interpersonal Impressions. Toronto: D. Van Nostrand Co., Inc., 1968.

Turnbull, A.A., Strickland, L.H., and Shaver, K.G. Medium and communication, differential power, and phasing of concessions: Negotiating success and attributions to the opponent. Human Communications Research, 1976, 2, 262-270.

Weeks, G.D. and Chapanis, A. Co-operative versus conflictive problem solving in three telecommunication modes. Perceptual and Motor Skills, 1976, 42, 879-917.

Weston, J.R., Kristen, C., and O'Connor, S. Teleconferencing: A Comparison of Group Performance Profiles in Mediated and Face-to-face Interaction. Report prepared for the Social Policy and Programs Branch of the Department of Communications, Ottawa, April, 1975.

Williams, E. Speech patterns during mediated communication within small groups, 1975b. Unpublished Communications Studies Group paper no. E/75275/WL. Abstracted from J. Short, E. Williams, and B. Christie in The Social Psychology of Telecommunications, Great Britain: John Wiley and Sons, Ltd., 1976.

Williams, E. Experimental comparisons of face-to-face and mediated communications: A review. Psychological Bulletin, 1977, 84, 963-976.

Yanbelovich, D. The New Morality: A Profile of American Youth in the 1970's. New York: McGraw-Hill, 1974.

Young, I. Telecommunicated interviews: An exploratory study, 1974a. Unpublished Communications Studies Group paper no. E/74165/YN. Abstracted from J. Short, E. Williams, and B. Christie in The Social Psychology of Telecommunications. John Wiley and Sons, Ltd., 1976.

Young, I. Understanding the other person in mediated interactions. (Unpublished Communications Studies Group paper no. E/74266/YN. Abstracted from J. Short, E. Williams, and B. Christie in The Social Psychology of Telecommunications. John Wiley and Sons, Ltd., 1976.

APPENDIX 1

"PERSONALITY PROFILE" QUESTIONNAIRE

Rate on a scale of zero to five the degree to which the personality description following reveals basic characteristics of your personality:

1. You have a great need for other people to like and admire you.

0 1 2 3 4 5

2. You have a tendency to be critical of yourself.

0 1 2 3 4 5

3. You have a great deal of unused capacity which you have not turned to your advantage.

0 1 2 3 4 5

4. While you have some personality weaknesses, you are generally able to compensate for them.

0 1 2 3 4 5

5. Your sexual adjustment has presented problems for you.

0 1 2 3 4 5

6. Disciplined and self-controlled outside, you tend to be worrisome and insecure inside.

0 1 2 3 4 5

7. At times you have serious doubts as to whether you have made the right decision or done the right thing.

0 1 2 3 4 5

8. You prefer a certain amount of change and variety and become dissatisfied when hemmed in by restrictions and limitations.

0 1 2 3 4 5

9. You pride yourself as an independent thinker and do not accept others' statements without satisfactory proof.

0 1 2 3 4 5

10. You have found it unwise to be too frank in revealing yourself to others.

0 1 2 3 4 5

11. At times you are extroverted, affable, sociable, while at other times you are introverted, wary, reserved.

0 1 2 3 4 5

12. Some of your aspirations tend to be pretty unrealistic.

0 1 2 3 4 5

13. Security is one of your major goals in life.

0 1 2 3 4 5

APPENDIX 2

BLUE COLLAR BLUES EXERCISE

It is 6:30 AM and just a few minutes ago you were awakened by a phone call from your boss, Harry Stoner. He is president of the Muddy Waters Pump Corporation of which you are the Industrial Relations Manager in charge of negotiations.

When you answered the phone you hardly expected to hear Mr. Stoner's voice, let alone have him start philosophizing about worker alienation and disenchantment! He said he'd been reading a book called Work in America which talked about "Blue-Collar Blues" and the dissatisfactions and frustrations of the blue-collar worker in America. According to Mr. Stoner some sociologists claim that workers want more than good wages and fair treatment in a job. They want "to become masters of their immediate environments and to feel that their work and they themselves are important".....

Mr. Stoner wanted to know your views, and made it clear that you had better be ready to discuss this matter when you arrive at the breakfast meeting of the corporation's Bargaining Committee!

What do your company's employees want? Even though not highly educated, they are fairly skilled, as they have to be to manufacture precision water pumps. And they are almost all young, 18-25 years old, since in your employment area there are few skilled older workers. You know that the president of the National Union recently said that this business of workers wanting to make decisions, and have interesting work is so much bull! He said that the men want good

pay and job security. "The time for fun and enjoyment comes after hours. The job is where you get the wherewithal to finance your recreation after working hours."

So later this morning you and the rest of the Bargaining Committee will have to reach a consensus on this question before you go into the negotiating meeting with the Union at 10:30 AM. But first you need to get your position clear. Just what would most of your workers want in their jobs? Your task is to rank order the following list of possible items Mr. Stoner read to you so you will be ready at the breakfast meeting to determine what is most important to your workers.

Rank order the following list of 16 items in their order of importance to the group of blue-collar workers in their early 20s, holding jobs requiring moderate skill and intelligence, but only high school graduates. Place the number 1 beside the item which in your judgment the greatest number of employees would include in their list of things as important in a job. Place the number 2 beside the item which the next largest number of employees would include in their list and so on to number 16 for the item which the fewest number of employees would count as important. Be certain to number all items without ties.

THINGS MOST YOUNG, NONCOLLEGE EMPLOYEES WOULD WANT IN A JOB

____ Seeing the results of their work.

____ Chance to make a lot of money later on.

____ Not too demanding job.

____ Chance to use their minds.

____ Interesting work.

____ Not expected to do things not paid for.

____ Job in growing field/industry.

____ Good pay.

____ Having a job that does not involve hard physical work.

____ Chance to develop skills/abilities.

____ Recognition for a job well done.

____ Socially useful work.

____ Participation in decisions regarding job.

____ Good Pension Plan.

____ Not being caught up in big impersonal organization.

____ Friendly co-workers.

APPENDIX 3

COHESIVENESS QUESTIONNAIRE

Please rate your replies to the following questions on the scale provided:

1. How did you like your partner?

Very Little

Very Much

1

2

3

4

5

2. If you were taking part in another experiment, how much would you like to work with this same person?

Very Little

Very Much

1

2

3

4

5

3. If it involved any effort on your part, would you care to know your partner better?

Very Little

Very Much

1

2

3

4

5

"INTERSUBJECTIVITY" SCALE

[illegible]

APPENDIX 5

COMPUTER PROGRAM DESIGNED FOR SCORING
TAPED DISCUSSIONS

10POKES30,1:K=57038:R=128:E=3999

30POKEK,R

35FORI=1TO20

40T=0:T(0)=0:T(2)=0:T(4)=0:T(6)=0

50S=PEEK(K)

60IFPEEK(K)=STHENT(S)=T(S) 1:T=T 1:IFT EGOTO80

70GOTO50

80PRINTT(0),T(4),T(2),T(6)

90NEXT

RUN

APPENDIX 6

SAMPLE COMPUTER DISPLAY

1092	2264	642	2
552	2296	1118	34
328	2922	723	27
344	2873	783	0
280	1988	1721	11
328	2747	925	0
84	1386	2470	60
107	1974	1910	9
420	2861	672	47
285	2295	1371	49
429	2188	1149	240
225	2016	1671	88
791	1724	1364	121

TABLE 1

NEW TECHNOLOGICAL ADVANCES

1. GROUP AUDIO SYSTEMS:

- a. Conference calls, by which several people, each at separate locations with their own telephone, can be connected together for a multiperson conversation.
- b. Loudspeaking telephones, allowing several conferees to be at one location. Often utilized in a "conference" setting to allow maximum flexibility.

2. VIDEOPHONES:

- a. Utilizes closed circuit television for person-to-person communication, essentially a telephone with vision. Allows limited use of graphic material.

3. CONFERENCE TELEVISION SYSTEMS:

- a. Essentially the video equivalent of the conference call. Unlikely to be equivalent to conversation with life-sized image.

4. COMPUTER MEDIATED CONFERENCE SYSTEMS:

- a. Computerized conferencing most simply involves a group of people communicating by typing into and reading from computer terminals, rather than by speaking and listening.
- b. Conferences may be "asynchronous" -- comments may be typed in, stored in the computer, and subsequently read out from the computer.

TABLE 2

MEAN GROUP RESPONSE TO EACH QUESTION OF THE COHESIVENESS MEASURE

		Question 1 "Like Partner"	Question 2 "Work with same partner"	Question 3 "Effort to know partner better"
Face-to-face	N			
High Cohesive	20	4.15	4.15	3.7
Face-to-face				
Low Cohesive	20	3.75	3.7	3.2
Audio				
High Cohesive	20	4.0	4.1	3.5
Audio				
Low Cohesive	20	3.5	3.6	3.3

TABLE 3

MEAN GROUP COHESIVENESS RESPONSE

Face-to-face				Audio			
		High Cohesive	Low Cohesive			High Cohesive	Low Cohesive
N		20	20			20	20
Mean		12	10.65			11.6	10.4
F. Ratio		4.31				3.39	
p		.045				.074	

TABLE 4

ANOVA SUMMARY TABLE OF
RESPONSE TO COHESIVENESS QUESTIONNAIRE

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F ratio</u>	<u>p</u>
Medium	1	2.1125	.50	.482
Cohesiveness	1	32.512	7.67	.007
Medium x Cohesiveness	1	.1125	.03	.871
within cells	76	4.2388		
TOTAL	79			

TABLE 5

P TO *z* TRANSFORMATIONS OF INTRA-DYADIC CORRELATIONS
IN THE FACE-TO-FACE GROUP

<u>HIGH COHESIVE</u>			
Pretest (<i>p</i>)	Pretest (<i>z</i>)	Post test (<i>p</i>)	Post test (<i>z</i>)
.07	.070	.74	.950
.05	.052	.69	.848
.45	.485	.65	.775
.41	.436	.53	.590
.74	.950	.98	2.298
.57	.648	.71	.887
.39	.412	.42	.448
.32	.332	.57	.648
.28	.288	.71	.887
.57	.648	.75	.973
	$\bar{z} = .4321$		$\bar{z} = .9304$
<u>LOW COHESIVE</u>			
Pretest (<i>p</i>)	Pretest (<i>z</i>)	Post test (<i>p</i>)	Post test (<i>z</i>)
.57	.65	.43	.460
.69	.85	.75	.973
-.39	-.41	.95	1.832
.03	.03	.78	1.045
.36	.38	.72	.908
.27	.28	.64	.758
.56	.63	.57	.648
.59	.68	.63	.741
.43	.46	.39	.412
.75	.97	.51	.563
	$\bar{z} = .452$		$\bar{z} = .834$

TABLE 6

ρ TO z TRANSFORMATIONS OF INTRA-DYADIC CORRELATIONS
IN THE AUDIO GROUP

<u>HIGH COHESIVE</u>			
Pretest ρ	Pretest (z)	Post test ρ	Post test (z)
.73	.929	.79	1.071
.07	.072	.23	.234
.41	.436	.53	.590
.64	.758	.88	1.376
.48	.523	.90	1.472
.10	.100	.44	.472
.46	.497	.76	.996
-.09	-.090	.69	.848
.24	.245	.56	.633
.44	.472	.52	.577
	$\bar{z} = .3942$		$\bar{z} = .8269$
<u>LOW COHESIVE</u>			
Pretest ρ	Pretest (z)	Post test ρ	Post test (z)
.57	.648	.57	.648
.69	.848	.84	1.221
-.39	-.412	.22	.224
.03	.030	.75	.973
.36	.377	.59	.678
.27	.277	.56	.633
.56	.633	.87	1.333
.59	.678	.81	1.127
.43	.460	.63	.741
.75	.973	.80	1.099
	$\bar{z} = .4512$		$\bar{z} = .8677$

TABLE 7

Anova Summary Table of Intra-Dyadic Agreement Change
from Pre to Post Test

Source	df	MS	F	SIG
Mode	1	.0147	.08	.780
Cohesiveness	1	.00056	.00	.956
Mode x Cohe	1	.0379	.20	.654
error	36	.18630		
Test	1	3.7390	32.00	.001
Mode x Test	1	.0012	.01	.920
Cohe x Test	1	.0219	.19	.667
Mode x Cohe x Test	1	.0125	.11	.745
error	36	.11683		
Total	79			

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/High/Pre-test	.432	.273
Face-to-face/High/Post-test	.930	.509
Face-to-face/Low/Pre-test	.452	.409
Face-to-face/Low/Post-test	.834	.409
Audio/High/Pre-test	.394	.316
Audio/High/Post-test	.827	.400
Audio/Low/Pre-test	.451	.410
Audio/Low/Post-test	.868	.340

TABLE 8

Anova Summary Table of Individual Opinion Change
from Pre to Post Test

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F ratio</u>	<u>p</u>
Medium	1	55.225	.29	.59
Cohe	1	585.23	3.09	.08
Medium x Cohe	1	3.0250	.02	.90
error	36	189.45		
total	39			

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/High Cohe	20.5	17.1
Face-to-face/Low Cohe	12.3	9.7
Audio/High Cohe	22.3	15.2
Audio/Low Cohe	15.2	11.9

TABLE 9

PERCENTAGE OF TIME NO-ONE TALKS, FIRST PERSON TALKS,
SECOND PERSON TALKS, BOTH TALK SIMULTANEOUSLY

<u>Face-to-Face</u>							
<u>High Cohesive</u>				<u>Low Cohesive</u>			
<u>0</u>	<u>1</u>	<u>2</u>	<u>1&2</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>1&2</u>
18	52.82	23.86	5.32	14.10	34.90	47.11	4.49
9.44	60.83	23.16	6.57	34.46	28.91	35.07	1.55
31.89	22.22	41.03	4.86	15.01	41.39	35.79	7.97
16.94	33.76	46.71	2.59	19.05	38.32	40.43	2.19
8.84	29.30	60.08	1.79	22.20	39.12	35.56	3.12
18.62	21.17	59.54	.67	10.23	41.23	42.38	6.16
10.88	36.20	49.41	3.51	28.09	57.95	13.58	.38
8.11	23.82	64.31	3.77	9.70	51.01	33.62	5.60
				35.71	22.53	38.91	2.86
$\bar{X}=15.05$ $\bar{X}=36.92$ $\bar{X}=44.49$ $\bar{X}=3.54$				$\bar{X}=21.87$ $\bar{X}=38.87$ $\bar{X}=35.98$ $\bar{X}=3.28$			

<u>Audio</u>							
<u>High Cohesive</u>				<u>Low Cohesive</u>			
<u>0</u>	<u>1</u>	<u>2</u>	<u>1&2</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>1&2</u>
10.12	56.79	31.77	1.32	5.79	60.07	32.91	1.23
13.86	40.84	44.54	.7	21.89	42.26	33.55	2.29
11.18	60.13	24.38	4.35	16.51	52.68	30.53	.28
20.58	30.01	47.79	1.62	9.82	38.60	50.43	1.15
30.25	21.14	48.36	.26	6.14	28.38	63.71	1.77
13	39.31	43.38	4.30	10.76	47.44	41.62	.18
12.63	47.53	39.46	.36	15.94	40.43	42.94	.69
15.65	45.54	37.15	1.66				
$\bar{X}=15.82$ $\bar{X}=42.21$ $\bar{X}=40.17$ $\bar{X}=2.58$				$\bar{X}=12.41$ $\bar{X}=44.28$ $\bar{X}=42.25$ $\bar{X}=1.06$			

TABLE 10

ANALYSIS OF "TIME DISCUSSING"
IN EACH EXPERIMENTAL CONDITION

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Medium	1	3.0250	.17	.68
Cohe	1	21.025	1.20	.28
Medium x Cohe	1	7.2250	.41	.53
error	36	17.558		
total	39			

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/high cohesive	17.80	3.824
Face-to-face/low cohesive	15.50	4.528
Audio/high cohesive	16.40	4.300
Audio/low cohesive	15.80	4.077

TABLE 11

ANALYSIS OF "SIMULTANEOUS SPEECH"
IN EACH EXPERIMENTAL CONDITION

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Medium	1	40.704	11.98	.002
Cohe	1	.6247	.10	.67
Medium x Cohe	1	1.6714	.47	.470
error	28	3.4157		

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/high cohe	3.635	1.937
Face-to-face/low cohe	3.813	2.433
Audio/high cohe	1.824	1.622
Audio/low cohe	1.084	.771

TABLE 12

ANALYSIS OF AMOUNT OF TIME "NO-ONE TALKED"
IN EACH EXPERIMENTAL CONDITION

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Medium	1	126.17	2.03	.17
Cohe	1	8.82	.14	.70
Medium x Cohe	1	164.74	2.65	.16
error	28	62.224		

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/high cohe	15.34	7.96
Face-to-face/low cohe	20.95	9.88
Audio/high cohe	15.91	6.62
Audio/low cohe	12.407	5.94

TABLE 13
ANALYSIS OF RATIOS OF UNINTERRUPTED SPEECH
BETWEEN PARTNERS IN A DYAD

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Medium	1	.78839	1.59	.22
Cohe	1	.74185	1.49	.23
Medium x Cohe	1	.36206	.73	.40

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/high cohesive	2.124	.57
Face-to-face/low cohesive	1.604	1.026
Audio/high cohesive	1.595	.545
Audio/low cohesive	1.503	.44

TABLE 14

ANALYSIS OF MEASURE OF INTERSUBJECTIVITY

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>P</u>
Medium	1	.0033	.02	.88
Cohe	1	.0754	.50	.49
Medium x Cohe	1	.0672	.44	.51
within cells	27	.1515		

<u>Cells</u>	<u>Means</u>	<u>S.D.</u>
Face-to-face/High Cohe	2.124	.57
Face-to-face/Low Cohe	1.604	1.026
Audio/High Cohe	1.595	.545
Audio/Low Cohe	1.503	.44

Table

Chair

Companion Unit

Figure 1: The Experimental Rooms

Volume Control

On-Off Light

Voice switching controls (not used
in this experiment)

Figure 2. The Companion Unit

LIBRARY

CARLETON UNIVERSITY

Manuscript Thesis

Unpublished theses submitted for degrees and deposited in the University Library are open for inspection, but are to be used only with due regard for the rights of the authors. Bibliographical references may be noted, but passages may be copied only with the permission of the authors, and proper credit must be given in subsequent written or published work. Extensive copying or publication of the thesis in whole or in part requires also the consent of the Chairman of the appropriate department.

Theses may be reproduced on microfilm for use in place of the manuscript itself provided the rules listed above are strictly adhered to and the rights of the author are in no way jeopardized.

This thesis by FERGUSON, J. E. has been used by the following persons, whose signatures attest their acceptance of above restrictions.

A library which borrows this thesis for use by its patrons is expected to secure the signature of each user.

Name and address

Date

END

0	8	1	2	8	2
---	---	---	---	---	---

FIN