Communication Apprehension in Problem-Solving Dyads

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COMMUNICATION APPREHENSION IN PROBLEM-SOLVING DYADS

A Thesis
Presented to
the Faculty of the Department of Communication and Theatre
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
James D. Harris
September 1977
COMMUNICATION APPREHENSION IN 
PROBLEM-SOLVING DYADS

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Director of Thesis

J. Regis O'Connor
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Approved May 4, 1978

Dean of the Graduate College
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The author wishes to thank many people in the development of this thesis. Special thanks is extended to Dr. Carley Dodd, chairman of the thesis committee, for his significant and insightful contributions, as well as his inexhaustible forbearance and kindness. Thanks is extended to Dr. Carl Kell and Dr. Regis O'Connor for their editorial and rhetorical contributions to the manuscript. Thanks is also extended to Miss Lisa Willoughby for her typing and retyping of the text.

This thesis is dedicated first to my parents, for without their patience, encouragement, guidance, and love this thesis would have never materialized. And secondly, I dedicate this thesis to Kenneth Jenkins for his limitless friendship and to Barbara Baugh for staying by my side through it all.
CHAPTER I
INTRODUCTION, REVIEW OF LITERATURE
AND RATIONALE

Introduction

Communicologists have long focused their research interests on the dynamic interrelationships of various communication elements. For example, such areas as audience analysis and message preparation stand as hallmark considerations for the pedagogical concerns of speech communication theorists. Additionally, traditional concerns with the speaker, message, and audience lend themselves to a treatment of the speaker limited largely toward development of the topic, method of presentation, and practical considerations. However, speech communication specialists have recognized and have carefully examined a significant underlying contingency in communication, namely a fear of communicating. Some researchers argue that apprehension about communicating publicly or interpersonally may even stand as the fundamental theoretical and pedagogical concern antecedent to subsequent concerns over a person’s message preparation, style, audience analysis, and the like.

Recently, communication scholars have developed information aimed at alleviating what earlier scholars termed “stage fright.” As early as 1938, Knower developed the first systematic attempt to measure stage fright.\(^1\)

\(^1\) Randall Capps and J. Regis O'Connor, Fundamentals of Effective Speech Communication (Minneapolis, Minn.: Burgess Publication, 1974).

CORRECTION

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This thesis is dedicated first to my parents, for without their patience, encouragement, guidance, and love this thesis would have never materialized. And secondly, I dedicate this thesis to Kenneth Jenkins for his limitless friendship and to Barbara Baugh for staying by my side through it all.
The purpose of this study was to explore the effects of communication apprehension and sex on task efficiency, satisfaction, liking, and trust following a dyadic problem-solving situation. The experimental design was a $1 \times 3$ analysis of variance determined by the level of communication apprehension (high-low) and by the sex of the dyads (male-male, male-female, female-female). The results indicated that the high communication apprehensive dyads had significantly less task efficiency, less satisfaction, less liking, and less trust than the low apprehensive dyads. Further, male-male dyads had significantly more satisfaction and significantly less trust than the female-female dyads.
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¹ Randall Capps and J. Regis O'Connor, Fundamentals of Effective Speech
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² Franklin H. Knower, "A Study of Speech Attitudes and Adjustments,"
Similarly, Gilkenson developed an instrument to measure differences in susceptibility to anxiety about public speaking.\(^3\) Greenleaf examined both the symptoms and treatments of stage fright.\(^4\) Since these earliest attempts at both describing and measuring stage fright, other researchers have sought to discover ways of measuring, discussing, and reducing not just stage fright but the more severe problem of communication apprehension.

Although the area of stage fright is by no means a new area of investigation for communication scholars, research has been sharply focused. For example, findings concerning the frequency of stage fright have been insightful. One recent survey noted that public communication is the single most feared experience by Americans.\(^5\) McCroskey has found that ten to twenty percent of all Americans suffer from speech apprehension, with estimates as high as forty percent.\(^6\) Gilkenson indicated that college women reported more public speaking fear than did college men.\(^7\) However, observer ratings of speakers consistently reveal men as more anxious, even though women report more fear.\(^8\) Shaw found that fifteen to twenty percent of


children in an elementary school study were affected by stage fright, with higher percentages occurring in the upper grades. Therefore, the magnitude of this problem is well documented in our society.

Although stage fright is a normal reaction to a threatening situation experienced by everyone, a more severe communication problem is experienced by a smaller percentage of the population. This phenomena is referred to as "communication apprehension." Its debilitating effects have been well documented while its scope remains broad. Researchers, therefore, have recently examined the causes, effects, measurement, and treatment of communication apprehension.

The purpose of this research investigation is to focus even more sharply our understanding about the effects of communication apprehension. Although theory has advanced in measurement, causality, and treatment of communication apprehension, researchers report little in terms of communication apprehension effects on perception of dyadic interpersonal communication. This study explores the effects of communication apprehension of same-sexed and mixed-sex dyads on task productivity and efficiency, satisfaction, liking, and trust. The first chapter of this thesis examines prior literature about communication apprehension as well as the other variables utilized in this study, provides a rationale for the study, and presents the hypotheses tested in the study. Chapter II describes the methodology for the study. Chapter II describes the results from the investigation, and Chapter IV discusses the implications of those results in

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10 McCroskey and Wheeless, Introduction to Human Communication.
light of theory and pedagogy. Chapter V concludes the study with a summary and intuitive insights about the study.

Review of Related Literature

This first section contains findings from prior literature. The section is further partitioned according to the variables utilized in this study.

Communication Apprehension

Communication apprehension has been referred to by a number of labels including "stage fright," "reticence," "speech anxiety," and "speech fright." All of these labels inherently include at least part of the characteristics in communication apprehension. However, many communication scholars specifically define communication apprehension.

Communication apprehension is a broad-based fear or anxiety associated with either real or anticipated face-to-face communication. Clevenger defines communication apprehension as:

Any emotional condition in which emotion overcomes intellect to the extent that communication is hampered, either in audience reception or in speaker self-expression, where the immediate object is the speech-audience situation.

Clevenger adequately explains the psychological implications of communication apprehension, yet limits his research to the public speaking context. As earlier noted, Phillips contends that communication apprehension goes beyond the confines of the public speaking situation by defining the

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11 Ibid., 80.
12 McCroskey, "The Problem of Communication Apprehension in the Classroom."
apprehensive individual as a "person for whom anxiety about participation in oral communication outweights his projection of gain from the situation." 14

Similarly, Giffin and Gilham report that the communication apprehensive is:

A person's unwillingness or reluctance to rely upon himself in a communication situation. His self-concept is at stake and he perceives his speech ability as inadequate to carry him through to the objective, whatever it may be, in that setting, and the speaker is usually painfully aware of his condition. 15

Thoreson gives yet another account of the apprehensive by describing the apprehensive as a person who:

Closely resembles the individual who feels uncomfortable in social group situations, who does not perceive himself as being capable of displaying any social initiative, and who describes himself with such adjectives as timid, awkward, and reserved. 16

As established in these definitions, the communication apprehensive is fearful in any communication situation. It is therefore appropriate to investigate the causes of such apprehension.

Causes. The causes of communication apprehension are not yet fully known. Heredity does not seem to be a significant factor in determining apprehension. 17 Rather, it appears that communication apprehension is a learned, reinforced behavior, usually growing out of childhood. 18 Parents that do

18 Ibid., 88.
not reinforce their children's verbal behavior contribute to this situation.\textsuperscript{19} For example, a quiet child is viewed as "well-behaved" in our culture, thereby reinforcing the apprehensive to remain such.\textsuperscript{20} Therefore, a child suffering from even moderate communication apprehension does not find intrinsic reward for communication itself, making communicating a negative experience. Such children are likely to develop high levels of apprehension.\textsuperscript{21}

While the nature of reinforcement of verbal behavior in childhood remains the principle cause of communication apprehension in adults, such traumatic events as a loss of a relative or friend can precipitate communication apprehension.\textsuperscript{22} Traumatic experiences potentially can produce long-term negative effects, including communication apprehension.

Communication apprehension usually develops in preschool years of growth, yet there are some cases where it develops at a later time.\textsuperscript{23} For example, a child entering school with a moderate level of communication apprehension could receive negative reinforcement from teachers and peers, thereby creating an apprehensive individual. However, these changes are very difficult to observe in a short period, for "patterns which have developed over several years prior to entering school are seldom reversed in a single year."\textsuperscript{24}

\textsuperscript{19}McCroskey, "The Problem of Communication Apprehension in the Classroom."

\textsuperscript{20}McCroskey and Wheeless, Introduction to Human Communications, 89.

\textsuperscript{21}McCroskey, "The Problem of Communication Apprehension in the Classroom."

\textsuperscript{22}Ibid.

\textsuperscript{23}Ibid.

\textsuperscript{24}Ibid.
Effects. Even though the causes are not fully researched, certain effects of communication apprehension on the individual's communication behavior are well documented. Communication apprehension has been shown to produce less self-disclosure, lower participation in small groups, less attraction to peers, less likelihood of being perceived as leaders, more tension exhibition in small groups, less likelihood of being perceived as opinion leaders, and more likelihood of choosing occupations which have lower communication demands even though they offer less income and status. Phillips found that high apprehensives report "shakiness" during classroom activities, felt "butterflies in their stomachs" when asked to speak to the class, found it necessary to end communications because of their fears, reported an inability to talk to their teachers and superiors, considered themselves as extremely quiet, felt compelled to apologize for their ideas when they were challenged, and expressed singular inability to talk to their parents. In a similar study, it was found that the apprehensive had an ability to open conversations with strangers, to extend conversations, or to initiate friendships, to follow the groups' discussion and make relevant remarks, to answer questions that arise on the job or in the class, and a general inability to communicate characterized by a lack or avoidance of participation.

In other investigations, apprehension has been further researched. Wells and Lashbrook, as reported by McCroskey, found that high apprehensives

25 Ibid.
interacted less in small groups than did low apprehensives and that their interactions were less relevant than those who were not apprehensive.  

High apprehensives have been found to show more tension and less interest in both zero-history and intact groups. McCroskey reported that high apprehensives were perceived by other group members as less extroverted, composed, competent, socially attractive and task-attractive than low apprehensives. McCroskey and Richmond reported similar results concerning peer perception of apprehensives.

Measurement. The research of the causes and effects of communication apprehension necessitates consideration of what types of measuring instruments are used in determining varying levels of apprehension. Three main categories of communication apprehension assessment have been employed: observer rating scales, introspective measures, and devices for measuring physiological changes during speaking.

Although observer rating techniques have a long history, their use seems to produce inconsistency. Dicken and others found the true reliability of judges in observing and recording communication apprehension in a five category system was quite low. Similarly, Eckert found that...
groups of three and four judges produced reliability coefficients of .68 on scales similar to that of Dicken. Furthermore, Clevenger concludes that observer ratings are not always accurate representations of the communication apprehensive speaker. Only those behaviors that are visually observable can be evaluated, yet those behaviors related to communication apprehension are at best extremely difficult to observe. Additionally, there would be a need to observe individuals across a broad spectrum of communication situations to accurately determine the level of a person's apprehension.

Physiological techniques of measuring communication apprehension have been successfully employed. However, the relative expense of the mechanical devices necessarily precludes practical use. Equally important, mechanical devices have many of the same drawbacks as the observer rating techniques. For example, it is improbable if not impossible to obtain physiological indices during every communication transaction. Accordingly, to obtain a reliable index of communication apprehension via physiological measure, a variety of communication transactions must be measured.

Introspective or "self-report" scales have traditionally been the most widely used of any index of communication apprehension. Many scholars have developed techniques to measure communication apprehension. Even though the self-report technique reliability has been questioned, it seems to have an advantage related to the validity of measurement. The advantage lies in the concept of communication as a fear, as stated by Wheeless:

If the person understands that he is apprehensive and why he is apprehensive, then his own report of his fear ought to be the most valid. To the extent that a person knows why he is apprehensive, his self-report may well be an index of how he has cognitively integrated his past physiological cues and physical behavior under conditions of fear arousing stimuli.

Self-report scales are currently the most frequently used type of measures. Researchers, furthermore, report consistency in reliability and accuracy in validity.

Treatment. Communication apprehension treatment techniques have largely developed from psychotherapy. In recent years, scholars have taken a great interest in applying behavior therapies to human neurosis and anxiety. By far the most productive of these techniques is systematic desensitization. Systematic desensitization is a process of pairing incompatible responses with those associated with the conditioned response. For example, the subject selects from his own experience a neutral or pleasant experience which is paired with an anxiety arousing event. If the individual is able to hold

the relaxed feeling while placing himself in the anxious state, the person has then overcome his anxiety. McCroskey and others found that students who underwent systematic desensitization significantly reduced their speech anxiety when compared to a control group.

Even though systematic desensitization has been very successful in illuminating communication apprehension, scholars have not limited their research to this one therapeutic technique. Russell and Wise compared the relative effectiveness of group administered cue-controlled relaxation and group systematic desensitization in treatment of communication apprehension with professional and paraprofessional counselors. Results indicated that the cue-controlled relaxation and systematic desensitization treatments to be significantly more effective than no treatment but not different from each other. Barker and others suggest that hypnosis may be beneficial in illuminating communication apprehension, but detrimental to the majority of individuals whose arousal serves as a "readiness, facilitative function."

Phillips has developed yet another therapeutic technique called "rhetoritherapy." In this technique, the rhetoritherapist attempts to

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11 McCroskey, Ralph, and Barrick, "The Effect of Systematic Desensitization on Speech Anxiety," 22-36.


obtain from the subject the best possible description of the behavior of
the subject under communication as well as a description of how others
respond to him. Learning goals are then established and training begins
in an attempt to reach these goals. However, no attempt is made to dis-
cover the causes of the apprehension as is the case with the other types
of therapies.¹⁴­¹⁵

In summary, the communication apprehensive individual is viewed of-
ten in more negative terms than a low apprehensive. Their behaviors are
more restricted, more anxious and reserved than those of low apprehe-
sives. The high apprehensive will experience severe apprehension in a pub-
lic speaking environment, but will not fear everyday communication situations.
The causes of communication apprehension are not fully known. The effects
of communication apprehension in the interpersonal communication situation
seems a fitting starting point to answer these and other questions. One
variable that could account for such effects is the relationship of appre-
hension to mixed- or same-sex dyadic communication.

Sex Differences and Communication Apprehension

Sex differences have long been an area of interest in communication
research. The self-disclosure patterns of males and females may shed in-
sight to problems in communication apprehension. Research in self-disclosure
shows that women tend to be higher self-disclosers than men.¹⁵ While not all

¹⁴Phillips, "Rhetoritherapy Versus the Medical Model: Dealing With
Reticence," 344-343.

¹⁵Howard J. Ehrlich and David B. Graeven, "Reciprocal Self-Disclosure
studies confirm this, no study has found men to be higher self-disclosers. Additionally, self-disclosure is more likely to occur in dyads than in any other group situation. As reported by Ehrlich and Graven:

When the relationship between two people is socially as well as psychologically supportive and reinforcing, higher levels of self-disclosure are facilitated.

Self-disclosure has also been researched from the areas of proxemics and information content with the general findings that females are more sensitive to their surroundings when determining information to disclose.

Many studies have investigated other areas of verbal interaction in an effort to discover sex differences. Males have consistently tended to initiate activity, have been more goal-oriented, less opinionated, more informative, more objective, and more task-oriented than females. Females tend to be more socio-emotive, more expressive of "warmth, helpfulness, and affiliation, and more effective in social dimensions of group interaction."

Lunneborg and Rosenwood found that traditional sex-role stereotypes are disintegrating. Their survey requesting open-ended answers indicated that males are becoming more concerned with loving and close interpersonal relationships while women are becoming more concerned with pride in school and work achievement. Sistrunk and David questioned whether the social behavior of men and women is changing or whether experimental procedures have changed to account for findings that females are no longer yielding to

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47 Ehrlich and Graeven, "Reciprocal Self-Disclosure in a Dyad," 390.


49 Ibid., 181-182.

conforming pressure more than males. Results showed that males and females conformed equally to majority pressure and equally in areas of judgement typically considered sexually biased. Therefore, experimental conditions could account for the past differences in male and female sex-role behavior.51

Communication apprehension and the sex variable have been correlated in recent investigations. Lustig and Grove composed four six-member groups, three of which were balanced for sex and communication apprehension, to solve by consensus one of two ranking problems. Results indicated that the mixed groups interacted slightly less in socio-emotive areas and more in task areas than the non-communication apprehensive groups. Also, non-communication apprehension groups had more speech acts than apprehensive groups and mixed-sex groups interacted with relatively more statements and fewer questions than non-communication apprehensive groups.52

The present study will investigate the sex variable and communication apprehension among interacting dyads in terms of their differential effects. Research relevant to communication apprehension and the sex variable seems logically related on four factors often studied in group communication research: task efficiency and productivity, satisfaction, trust, and liking. Therefore, these four factors will be examined in light of past research.

Task

Task investigations of group processes have dealt with those variables which are associated with individual and group performance in problem-solving


ability. In problems designed to produce emotional conflict, the mixed-sex groups generally outperformed the same-sex groups.  

Another investigation variable in the area of task is risk. In general, men have been found to be bolder and more willing to take risks than females, yet females became slightly more adventurous when placed in all-female groups. Mixed-sex groups have been found to be significantly greater risk takers than all-male groups, who were in turn significantly greater risk takers than all-female groups.

As earlier noted, members of dyads were more satisfied and more intensely involved with the task than larger groups. Yet, the type of task has been found as a very important element in the problem-solving situation. Frank and Anderson made a distinction between conjunctive tasks (those whose solution is a function of the weakest member) and disjunctive tasks (those whose solution is a function of the best group member). Dyad members tended to be more satisfied when the task was conjunctive, but were less satisfied when the task was disjunctive. They also preferred disjunctive tasks over conjunctive tasks, and demonstrated more satisfaction and liking regardless of task type than groups of three or more members.

In examining group size, Slater found that members of dyads were more


55 Ibid.


likely to feel that the group was too small to complete the task as did members of larger groups. Dyads particularly expressed that they felt the group was too small to carry out the task in "optimum fashion." Hackman and Vidmar report similar findings. These investigations indicate that dyads experienced fewer difficulties in solving the task than did larger groups and seem to enjoy it more.

Conflicting evidence is found in relation to task time and group size. Husband and Klugman found that dyads produce greater quality and quantity of solutions than individuals working alone. Further, dyads were found to take more time per problem than individuals. However, Taylor and Faust found that dyads were faster than four-person groups in determining correct responses to a problem.

In general, research indicates that dyads tend to perform less efficiently and less effectively than larger groups. Porter found that dyadic performances were inferior to groups of four or eight members. Ziller found that dyads neither performed particularly better or worse than large

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59 Hackman and Vidmar, "Effects of Size and Task Type on Group Performance and Member Reactions," 37-54.


groups in a dot judging exercise. Gibb has stated that "the number of ideas produced (by a group) was found to increase in a negatively accelerated function of (the) size of (the) group." In summary, it appears that mixed-sex groups perform better than same-sex groups, that dyads are somewhat inferior to larger groups in terms of speed and quality, that satisfaction depends on group size and task type, and that dyads tend to perform less efficiently and effectively than larger groups.

Weaknesses can be found in relation to task type in communication literature. Since so many conflicting results exist between dyads and groups problem-solving quality and quantity, more research is necessary to clarify such conflicts. Also, what combinations of individuals in a dyad would increase efficiency, quality and quantity?

Satisfaction

Satisfaction has been found to be an important variable in small group communication situations. As long ago as 1950, Maier discovered that when an individual is dissatisfied with his group's performance and is unable to alleviate his dissatisfaction, goal achievement is negatively affected. Shaw and Blum found essentially the same tendency.


research on satisfaction has been conducted in many different areas.

One such area is the amount of individual influence in the group and consequent satisfaction. Research has shown that the amount of an individual's influence in the group can be a determinant of satisfaction. For example, Hoffman and Maier presented 16 same-sex and 25 mixed-sex four member groups with five different types of problem-solving situations and found that satisfaction was more strongly correlated with "member's satisfaction with the amount of influence they had than with the objective quality of the solutions or with member's actual amount of influence." 69

However, Crowell and Sheidel found that individual prominence, group goal facilitation and group sociability in relationship to satisfaction was negative. Those individuals rated the highest in each of the three dimensions were "apparently the least satisfied with the discussion." 70

Satisfaction in group participation not only stems from the individual's influence in the group but also from the quality of one's contributions. For example, Gouran had five and seven member groups hold two forty-five minute discussions on researched topics, allowing the subjects to disband their first groups and form new groups before the second discussion. The results indicated that the quality of a person's contributions were consistently but not strongly related on his satisfaction. Gouran suggests that "one places more responsibility on others for effective group discussing making than he does on himself" and quite possibly judges his


responsibility in direct proportion to the number of participants. This implies that the size of the group has a bearing on the degree of satisfaction in group problem-solving.

The effects of group size on member satisfaction is an area of generally consistent findings. Thomas and Fink found that the smaller the group, the more a member will be satisfied with the discussion and his participation in it. Hackman and Vidmar concluded that the larger the group size, the more dissatisfied the members became. Hackman and Vidmar observed that:

- The larger the group size, the more the members complained that the group was too large for effective task performance.
- Larger groups were seen as being highly competitive as having considerable disagreement, and as showing disunity.

Dyads were the most satisfied group size in that the dyads shared less disagreement when working on production and discussion tasks.

Two studies specifically investigated dyadic interaction and satisfaction. Dyadic communication has been studied in the context of member satisfaction. Powell and Kitchens randomly assigned mixed-sex dyads and instructed them to converse on any topic of their choice. Each subject completed a questionnaire at the conclusion of the thirty minute conversation concerning: 1) satisfaction with the conversation, 2) quality of the subject's partner's contribution, 3) quality of the subject's own contribution,

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73 Hackman and Vidmar, "Effects of Size and Task Type on Group Performance and Member Reactions," 37-54.

74 Ibid., 43.
and 4) a short essay on the experience. The results indicated that the sex variable was not a significant factor in member satisfaction. Also, the results indicated that an individual's perception of the other's contributions to a communication experience is a significant factor in determining his own satisfaction with that communication experience. These results are consistent with Gouran's.

Similarly, Hilpert, Kramer and Clark gave mixed-sex dyads a problem-solving discussion and asked the dyads to "attempt to arrive at some solutions" to a problem of campus theft. The variables measured were 1) trust and friendship, and 2) who contributed more to the discussion. Both the men and women equally picked themselves and their partners as the ones who contributed more to the conversation. However, the men actually talked more in 59 percent of the dyads. Yet the women expressed as much satisfaction with the decisions as the men, as well as being as satisfied with the amount of influence they exerted over the decision.

In spite of these findings, some authors have found that too small a group has a negative effect on member satisfaction. Slater found that members react differently if the group is too small. He suggests that members find groups of five the most satisfying. In smaller groups, the members appear to feel that the group is too "intimate" and that they "cannot express disagreements."

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76 Gouran, "Correlates of Member Satisfaction in Group Decision Making Discussions," 95.
of smaller groups tend to feel simultaneously more tension, and yet less hostility than in larger groups.  

Empirical data is consistent with the proposition that members of cohesive groups are generally better satisfied with their group than members of noncohesive groups. Van Zelst found that members of groups formed on the basis of sociometric choice had higher job satisfaction than members of control groups.  

Gross reported a positive relationship between cohesiveness of Air Force groups and their satisfaction with the Air Force goals.  

Shaw observed participants of 72 conferences in business and government and computed a cohesiveness index by observer ratings of liking among group members. Group members rated their satisfaction with several aspects of the conference. The cohesiveness index correlated positively with member's satisfaction with the group process and with the meeting.  

Several interesting findings have appeared concerning the task of a small group and the satisfaction of that group. As earlier noted, Frank and Anderson made comparisons between conjunctive and disjunctive tasks and found that increased group size enhanced disjunctive task quantitative performance but was a detriment to the conjunctive task performance. Disjunctive tasks generally produced greater satisfaction than did conjunctive

tasks. Also, odd-sized groups were generally more satisfied than even-sized groups.

In another study of task and satisfaction, Shaw and Blum had five person groups attempt three tasks differing in difficulty under three different conditions of satisfaction feedback: no feedback, overt feedback, and covert feedback. In the overt condition, subjects publicly indicated their satisfaction with the task process whereas in the covert condition satisfaction was indicated anonymously. Results indicated that group effectiveness increased with increased member awareness of the group’s satisfaction and "this effect is greater for the difficult (tasks) than for easy tasks." It was suggested that "valid communication of satisfaction leads to complete use of member's contributions, and hence improves performance."\(^84\)

Shaw tested authoritarian and nonauthoritarian leaders in groups and found that nonauthoritarian groups reported higher satisfaction. However, the authoritarian groups were more task efficient than the nonauthoritarian groups.\(^85\) Cohen found that satisfaction with task depended "primarily upon freedom from network operating restrictions, a feeling of being challenged, and a sense of achievement."\(^86\) Contrasting Cohen's findings of "being challenged", Shaw found that the morale of groups solving problems was higher in terms of job satisfaction than those groups solving

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\(^{83}\) Frank and Anderson, "Effects of Task and Group Size Upon Group Productivity and Member Satisfaction," 135-149.

\(^{84}\) Shaw and Blum, "Group Performance as a Function of Task Difficulty and the Group's Awareness of Member Satisfaction," 151-154.


difficult problems. Also, Shaw found that the greater the independence of the groups, the greater the satisfaction.

In summary, the amount of satisfaction in a group depends on many important variables. The individual's influence on the group seems at best a very uncertain variable. In general, as the quality of one's interaction increases by holding perceived influence a constant, satisfaction tends to increase. Group size plays a significant role in member satisfaction. Too large a group has a negative correlation with satisfaction, but the dyad appears to have the greatest tension, thereby affecting production output. Individual satisfaction has a high positive correlation to group cohesiveness. Several implications can be drawn from the literature concerning task and satisfaction. First, disjunctive tasks are generally more satisfying than conjunctive tasks. Overt feedback of member satisfaction with other members enhances satisfaction. And generally, the greater the individual and group's freedom from restriction and the simpler the task, the greater the satisfaction.

Satisfaction is a moderately researched area in group dynamics. Furthermore, communication apprehension has been left unexplored in its relation to satisfaction. For example, Hilpert, Kramer and Clark, Powell and Kitchens and others failed to account for the communication apprehension

88 Ibid.
89 Hilpert, Kramer and Clark, "Participants' Perceptions of Self and Partner in Mixed-Sex Dyads," 52-56.
90 Powell and Kitchens, "Elements of Participant Satisfaction in Dyads," 59.
It seems entirely logical that the high communication apprehensive individual would be less satisfied in the communication demands of the dyad.

**Trust**

Trust has been found to positively correlate with effective problem-solving. Deutsch conducted landmark research concerning the effect of trust in small group problem-solving.\(^9^1\) In the game described below, Person I has to choose between Rows X and Y, and Person II has to choose between Columns A and B:

\[
\begin{array}{c|cc}
 X & A & B \\
 (+9, +9) & (-10, +10) \\
 Y & (+10, -10) & (-9, -9) \\
\end{array}
\]

Person I's payoffs are the first numbers in the parentheses and Person II's are the second.\(^9^2\) The number of points earned is a function of the combination of choices by both Person I and Person II. For example, if Person I chooses Row Y and Person II chooses Column B, both lose nine points.

Deutsch conducted many studies using the dyadic non-zero-sum game. Deutsch noted that "the essential psychological feature of the game is that there is no possibility for rational behavior in it unless mutual trust exists." As summarized by Giffin, Deutsch and his associates found that:

When communication is absent and one has to choose without knowledge of the other person's choices (in the game), a

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cooperative orientation will tend to produce trusting and trustworthy behavior. On the other hand, a competitive orientation will tend to result in suspecting rather than trusting behavior, even when situational factors such as communication possibilities are encouraging.\textsuperscript{93}

Other studies have dealt with the influence of communications in the game situations.

Loomis investigated how communication influenced the game matrix previously described. Individually oriented subjects were given five trials of the game with Player II always a confederate of the experiment. Half of the ten experimental groups were "note-senders" and half were "note-receivers," which consisted of standardized forms which expressed four variables: expectation, intention, retaliation, and absolution. The results indicated that communication produced a higher degree of trust in both the senders and receivers. The percentage of trust increased as communication increased.\textsuperscript{94}

Solomon studied the effects of power relationships and motivational strategies upon the development of trust. Dyads interacted in one of three power conditions. The experimental confederate had either absolute, partial, or equal power in one of three game strategies: conditional cooperation, unconditional cooperation, and non-cooperation. The results showed that a subject is more likely to engage in trusting behavior as the amount of power he has over the trusted person increases, and a subject tends to respond to unconditional cooperation by another person with exploitative game behavior.

\textsuperscript{93}Ibid., 270.

more than with a conditionally cooperative person. Deutsch noted that the results of this study indicate that an individual is more likely to trust another if he perceives that the other has nothing to gain from untrustworthy behavior and if he perceives that he is able to exert some control over the other.

Deutsch investigated the relationship between trust, trustworthiness, and the "F" scale. Two situations were employed: one where the subjects were to choose between trusting and suspecting another, and secondly subjects were instructed to choose between acting in a trustworthy or untrustworthy manner. The results indicated that subjects who were more trusting were more likely to be more trustworthy. Also, subjects with low "F" scores were more trusting and trustworthy than subjects with high "F" scores, indicating the possibility that personality traits are associated with low ability to trust others.

In summary, many weaknesses can be found in the literature concerning trust. First, it has been stated that the greater the communications, the greater the trust. However, this finding is limited in that the amount of communication available to each subject was experimentally controlled. Free-flowing communication in relation to trust is a needed area of investigation. Subjects should be allowed to develop their own power structure


is an experiment to discover their trust. Third, other personality variables besides those included in the "F" scale could have a determining factor in the measurement of trust.

Liking

Another factor contingent to communication apprehension and sex is liking. The degree to which we are attracted to another depends on a number of factors. However, two areas seem to account for most of an individual's liking of another; the propinquity of the individual and the similarity of the individuals.

Propinquity refers to the proximity or physical closeness of the individuals: Brooks and Emmert reviewed numerous studies and have concluded that "consistent(ly) proximity is directly related to liking." Proximity is directly related to friendship formation and mate selection. Accordingly, as liking increases, persons decrease their personal space. A classic study by Festinger, Schacter, and Back demonstrates the relationship of propinquity and liking. Their study of a series of small houses which formed a U-shaped court showed that liking is most affected by the distance between houses and the direction the houses faced. The greater the distance, the fewer friendships, therefore producing less liking.

Another factor which determines liking is the similarity between the individuals. Duck demonstrated that friends have similar personal

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99 Ibid.
constructs and that this similarity leads to liking because "cognitive similarity leads to communication effectiveness, communication effectiveness leads to rewards and these to interpersonal attraction." Wilmont concluded that attraction to others is built "because a successful transaction is rewarding and we like those who reward us." Accordingly, Reader and English gave a battery of tests to friends and nonfriends and found a significantly higher correlation between friends' personalities than between nonfriends' personalities. In support of Reader and English's findings, Broxton found that friends perceive each other as being more similar in personality than do nonfriends.

Communication behavior has been investigated in terms of liking between individuals. McCroskey and McCain reviewed the research literature on interpersonal communication and have drawn two important conclusions from the literature: "(1) the more people are attracted to one another, the more they will communicate with each other; and (2) the more we are attracted to another person, the more influence that person has on us in interpersonal communications."

---

In summary, propinquity and similarity are prominent factors in determining the amount of liking between individuals. However, more empirical research is needed to draw further conclusions. Also, researchers have failed to account for the amount of perceived liking of others in a dyadic problem-solving situation.

Summary

In summary task, satisfaction, trust and liking have been shown to play an integral part in interpersonal communication. Dyads tend to be inferior to large groups in speed and quality of task completion, and seem to be less efficient and effective than larger groups. The smaller the group, the greater the satisfaction, yet individual satisfaction increases with cohesiveness and greater individual influence, disjunctive tasks, overt feedback, and greater individual freedom in group. The greater the communications, the greater the trust; and the greater the power one has over another, the greater the trust. Propinquity and similarity are the major determinants of liking, with positive increases in the others. However, how these variables interrelate with communication apprehension is not clearly indicated in past research, thus leading to the rationale for the present study.

Rationale and Hypotheses

The limitations of previous studies are highlighted by the fact that no study has considered communication apprehension as a variable in dyadic problem-solving. This monumental oversight stems partially because of the relatively recent interest in communication apprehension and partially because of the narrow focus of dyadic research to only compare dyads to
larger groups instead of to each other. Therefore, the need for dyadic research that investigates the differences among dyads in respect to task efficiency and satisfaction, with consequent comparisons of liking and trust, is well warranted.

This study, therefore, combines those variables (communication apprehension and sex to task, satisfaction, liking, and trust in dyadic problem-solving) in a unique fashion which will further enhance the field of communication. If communication apprehension is found to be a significant variable in communication dyads, then communication theory can be expanded. It is also extremely relevant to investigate communication apprehension in problem-solving dyads to further our knowledge for the many practical incidents of interpersonal communication.

Therefore, the purpose of this study is to explore the effects of communication apprehension and sex on task efficiency, satisfaction, liking, and trust following a dyadic problem-solving situation. Previous research leads to several plausible hypotheses about the interrelationships of these variables.

**Hypothesis I.** Highly apprehensive dyads will take more time to solve the problem than low apprehensive dyads. This hypothesis stems from the assumption that the greater the individual's apprehension, the less likely they will be to want to communicate, therefore utilizing a greater amount of time necessary to complete the task.

**Hypothesis II.** High apprehensive dyads will be less satisfied than low apprehensive dyads. Assuming that high apprehensive dyads will be more anxious when called upon to contribute, less satisfaction for the high apprehensive is suggested as an outcome indicated by this hypothesis.
Hypothesis III. High apprehensive dyads will have less trust than low apprehensive dyads. This hypothesis arises from the assumption that the high apprehensives will be more anxious. Being more suspicious of their partners, individuals should therefore have less trust toward their partners.

Hypothesis IV. High apprehensive dyads will like their partners less than low apprehensive dyads. High apprehensives who are forced to communicate with another against their will should like their partners less than low apprehensive dyads.

Hypothesis V. Mixed-sex dyads will produce greater satisfaction than the same-sex dyads. It is assumed that male-female pairs will have more pressure for mutual attraction, therefore each member of the mixed-sex dyads will have more satisfaction.

Hypothesis VI. Mixed-sex dyads will produce greater liking than same-sex dyads. Since it is assumed that mutual attraction occurs, mixed-sex dyads will have more liking than the same-sex dyads.

Hypothesis VII. Mixed-sex dyads will have greater trust than same-sex dyads. With the creation of a cooperative environment inducing greater satisfaction and liking, greater trust will occur.

Since the unique combination of variables in this study has not been studied previously, these hypotheses are based on logical inductions of what are assumed to be typical of high and low apprehensive behaviors indicated earlier in this chapter.

Chapter II contains all experimental operations and data collection techniques and analyses used in this study.
SUMMARY

This chapter describes the relevant literature and the rationale and hypotheses for the research presented in this study. Two independent variables, communication apprehension and sex, are examined under conditions of a disjunctive problem-solving task discussed in a dyadic environment. Four dependent variables indicate the effects of the independent variables: task efficiency (measured by three subunits of time, quality, and a ratio of time and quality), satisfaction (including satisfaction with the dyadic system of communication), liking, and trust. The overall uniqueness of this study lies in the fact that communication apprehension has never been employed as a variable in a problem-solving dyadic investigation. The purpose of this study, therefore, was to determine the effects of communication apprehension and sex in a dyadic problem-solving discussion format on task efficiency, member satisfaction, liking, and trust.
CHAPTER II

Method of Data Analysis

This chapter will describe the subjects, the procedure used, the measuring instruments used, and the method of data analysis in this experiment.

Subjects

Seventy-four undergraduate and graduate students enrolled in the summer session of classes in Communication and in Psychology at Western Kentucky University were used in this experiment. The subjects represented an age range of approximately 16 - 40 years in age. The wide age differential provides a broad base for generalizability of the results of this study.

Procedure

Two different sessions lasting approximately fifteen minutes each were required for this experiment. In the first session, each subject was presented with a pamphlet of four interpersonal communication scales (see Measuring Instruments). Before the subjects filled out the pamphlet, the following instructions were read aloud:

Today we are asking for your cooperation in a survey designed to discover how people feel about their personal communication. Please fill out your response to each item in the booklet you have before you. Each person's response is completely confidential. This survey has no bearing on your grade, since it is an independent research project.
All the subject's responses were recorded by one of the following five answers: "strongly agree," "agree," "undecided," "disagree," "strongly disagree."

For the second session, the subjects were divided into dyads according to their sex and level of communication apprehension as determined by the interpersonal communication apprehension scores completed the first session. The following instructions were read at the beginning of the second session:

Today, I'm going to ask you to participate in a problem-solving discussion dealing with theft in Western's (Kentucky University) library. As the old saying goes, "Two heads are better than one," so I'm going to divide you into groups of two to better enable us to come up with good, quality solutions. So first let me divide you into pairs.

Upon dividing the class into the predetermined dyads (based on their pre-test apprehension scores), the experimenter passed out to each subject a copy of the problem as follows:

As you may well know, Western Kentucky University has been plagued by a staggering amount of library theft in recent years. According to most observers, college libraries are the hardest hit of any libraries in the country. Much of the crime consists of stealing books, tearing out of articles from journals, as well as stealing property belonging to the library (pencils, pens, etc.). Since the costs of the stolen university property eventually is passed on to the students, we are interested in finding out what kinds of increased security measures students are willing to tolerate in an effort to diminish the number of thefts. In short, what measures do you suggest be taken to prevent crimes of the nature described above?

The dyads were then instructed to rank order their three best solutions. The experimenter then instructed the dyads to begin and recorded the time. Upon each dyad's completion of the task, the experimenter noted the completion time on the answer sheets for that dyad. Therefore, by subtracting the starting time by the completion time, a measure of each dyad's task
time was computed. When each dyad had finished, the experimenter distributed a postest (see Measuring Instruments) to record each member's reaction to the dyadic encounter.

**MEASURING INSTRUMENTS**

**Independent Variable**

Four interpersonal communication scales were used to determine the subjects' communication apprehension. The instruments (see Appendix) used in order of their presentation were: (1) The McCroskey Personal Report of Communication Apprehension-College (PRCA), consisting of 20 questions;\(^{107}\) (2) The Dodd Interpersonal Inventory (DODD), consisting of 10 questions;\(^{108}\) (3) The Watson and Friend Social Avoidance and Distress Scale (SAD), consisting of 28 questions;\(^{109}\) and (4) The Phillips and Erickson "R" Scale ("R"), consisting of 15 questions.\(^{110}\) An earlier pilot study found a reliability coefficient for each scale. The PRCA had a reliability of .88, the DODD of .77, the SAD of .91, and the "R" of .88. Conditions of high and low apprehension were derived by (1) summating scores across the four communication apprehension scales and (2) taking a median split. Those above the median were high and those below were low communication apprehensives.


\(^{110}\) Phillips and Erickson, "R" Scale."
The sex of each subject was obtained by asking each subject to indicate that person's sex at the top of the first page on the pretest. Also, their names were included so as to enable the experimenter to properly match the sex and apprehension in the respective dyads. Based on the pretest scores, subjects were assigned to the varying experimental dyads of communication apprehension (high with a high, high with a low, low with a high, and low with a low) and sex (same-sex and mixed-sex dyads).

Dependent Variables

The post test included measures of satisfaction, trust, liking, satisfaction with dyad, and task efficiency. A 15-item questionnaire completed by each subject following the experiment provided a measure of the first four variables: satisfaction with partner, liking, trust, and satisfaction with dyad. A Likert-type format (strongly agree to strongly disagree) was used to record the subject's response (see Appendix).

Before the scale items measuring satisfaction, liking, trust, and satisfaction with dyad were employed, two careful procedures were run to insure the objectivity of each of the scales. First, reliability coefficients were computed for these four scales. Second, a factor analysis (varimax rotation) across items from all four scales verified the existence of three of the four scales. The fourth scale, satisfaction with dyad, did not load highly on any of the factors.

Satisfaction refers to each subject's personal satisfaction with his/her own contributions, as well as his/her partner's contributions. The reliability coefficient for the four-item satisfaction scale was .79, supporting its internal reliability and usefulness. Furthermore, a factor analysis indicated that this scale's items cluster on a unique factor (Table 2.1).
### TABLE 2.1

Varimax Rotated Factor Matrix

<table>
<thead>
<tr>
<th>Scale Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satis 1</td>
<td>0.16106</td>
<td>0.17500</td>
<td>0.80370*</td>
</tr>
<tr>
<td>Satis 2</td>
<td>0.48011</td>
<td>0.26439</td>
<td>0.37306</td>
</tr>
<tr>
<td>Satis 3</td>
<td>0.19470</td>
<td>0.28098</td>
<td>0.80571*</td>
</tr>
<tr>
<td>Satis 4</td>
<td>0.70235#</td>
<td>0.22929</td>
<td>0.24702</td>
</tr>
<tr>
<td>Like 1</td>
<td>0.60768</td>
<td>0.66950*</td>
<td>0.32045</td>
</tr>
<tr>
<td>Like 2</td>
<td>0.94339*</td>
<td>0.15236</td>
<td>0.05958</td>
</tr>
<tr>
<td>Like 3</td>
<td>0.53571</td>
<td>0.65356*</td>
<td>0.21489</td>
</tr>
<tr>
<td>Like 4</td>
<td>0.51743#</td>
<td>0.51743#</td>
<td>0.25019</td>
</tr>
<tr>
<td>Trust 1</td>
<td>0.62751*</td>
<td>0.28572</td>
<td>0.25955</td>
</tr>
<tr>
<td>Trust 2</td>
<td>0.83243#</td>
<td>-0.09322</td>
<td>0.08826</td>
</tr>
<tr>
<td>Trust 3</td>
<td>0.33840</td>
<td>0.54864#</td>
<td>0.03524#</td>
</tr>
<tr>
<td>Trust 4</td>
<td>0.58357#</td>
<td>0.35583</td>
<td>0.19456</td>
</tr>
<tr>
<td>Dyad 1</td>
<td>0.2234</td>
<td>0.5616#</td>
<td>0.42013</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>0.11732</td>
<td>0.51759#</td>
<td>0.20243#</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>-0.15252</td>
<td>0.58836#</td>
<td>0.09770</td>
</tr>
</tbody>
</table>

* = loadings of .60 or higher on a factor
# = loadings of .50 or higher on a factor (used only to assess trend and not a substantial loading)
Liking refers to the amount of positive feeling each subject had for that person's partner. The reliability coefficient for the four-item liking scale was .85, supporting its internal reliability and usefulness. As was the case in satisfaction, liking items tended to cluster on one factor (see Table 2.1).

Trust refers to the feeling of mutual respect between the two subjects, as well as the feeling of the ability to self-disclose to the subject's partner. A reliability coefficient of .70 was found on the four-item trust scale, supporting the internal reliability as well as the scale's usefulness. As with satisfaction and liking, items in the trust scale loaded on one unique factor in the factor analysis (see Table 2.1).

Satisfaction with dyad refers to whether the individual would rather work in a dyad, a larger group or by himself. A reliability coefficient of .67 was found for the three-item dyad scale. However, the factor analysis revealed no outstanding factor loadings for this item (see Table 2.1). If anything, this scale factor loads on the same factor as the liking scale items.

Task efficiency was measured by (1) the quality of each dyads' answers, (2) the time of task completion, and (3) a ratio of time over quality. The quality of the responses were determined in the following manner. A panel of eight experienced judges ranked each of the fourteen categories on an individual rating scale from bad = 1 to good = 7 for each of the fourteen categories of answers. The average of all the judges responses to each item determined the quality ranking of each response. The dyads' answers were then compared to the judges' rankings, and the sum of the dyad's responses in correspondence to the judges' rankings determined that dyad's measure of quality. In short, judges offered a numerical score for the quality of
each dyads' answers. Time was determined by subtracting the finishing
time of each dyad by the starting time of the experiment. The third
final measure of the dyad's quality was dividing the time in minutes by
the quality of the response.

Data Analysis and Design

Essentially, the study investigated the effects of communication
apprehension and sex on personal satisfaction, liking, trust, satisfac-
tion with the dyad, and task efficiency. A two-way analysis of variance
was used to analyze the data with the Duncan's Multiple Range Test used
for post-hoc comparisons. The experimental design utilized a 4 x 3 analysis
of variance demonstrated below:

```
          Hi-Hi   Hi-Lo   Lo-Hi   Lo-Lo
                  \ (sex of Female-Female dyad) \\
Male-Male
\       \       \       \       \\
Male-Female
```

This design reveals that varying conditions of communication apprehension
(high with a high, high with a low, low with a high, and low with a low)
were integrated with varying conditions of same or mixed-sex dyads (male
with male, female with female, and male with female) as the subjects con-
ducted a problem-solving task in dyads. Since the male-male and female-
female communication dyads in the high-low and the low-high cells represent
identical conditions, no subjects were included under the low-high condi-
tions of male-male and female-female in order to avoid unnecessary duplica-
tion. Therefore, a high-low communication apprehension condition of mixed-
sex dyad therefore necessarily indicates a high-male with a low-female,
while the low-high condition with mixed-sex indicates a low-male with a high-female. The alpha level for all data analyses was .05.

**SUMMARY**

This chapter described the measuring instruments used in this study, as well as the data analysis techniques. An analysis of variance was used to determine the significant relationships and the Duncan's Multiple Range technique was used to determine where the significance was in the dyads. Coefficients of reliability and a factor analysis were obtained to insure the objectivity of measuring instruments.
CHAPTER III

Results of the Study

The purpose of this chapter is to present the results of the study. Relevant data will be presented under a restatement of each hypothesis. However, discussion of the results is primarily reserved for Chapter IV.

Of the seven hypotheses, six were statistically confirmed. Duncan's Multiple Range test was employed to test each analysis of variance for the specific location of the significance in post hoc comparisons.

Hypothesis I

High apprehensive dyads will have less task efficiency than low apprehensive dyads.

This hypothesis was statistically confirmed using the time measure \( F = 3.95, p < .05, \) Table 3.1). The low-high dyads took significantly longer than all other dyads (see Table 3.2). However, using quality as an efficiency measure, low-high dyads had less quality than the high-low or low-low dyads (see Tables 3.3 and 3.4). No significance emerged using the time/quality ratio.

Hypothesis II

High apprehensive dyads will be less satisfied than low apprehensive dyads.

This hypothesis was statistically confirmed as indicated in Table 3.5 \( (F = 2.01, p < .05 \) using one-tailed hypothesis test). Table 3.6 notes the source of the significance, namely that high-high apprehensive dyads
### TABLE 3.1
Analysis of Variance of Time by Combsex and Appdyad

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>f</th>
<th>Signif of f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex</td>
<td>2.75</td>
<td>2</td>
<td>1.3</td>
<td>0.156</td>
<td>.856</td>
</tr>
<tr>
<td>Appdyad</td>
<td>103.436</td>
<td>3</td>
<td>34.479</td>
<td>3.915</td>
<td>.012</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex x Appdyad</td>
<td>80.75</td>
<td>4</td>
<td>20.187</td>
<td>2.292</td>
<td>.069</td>
</tr>
<tr>
<td>Within</td>
<td>563.594</td>
<td>4</td>
<td>8.806</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>781.995</td>
<td>73</td>
<td>10.712</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 3.2
Comparison of Communication Apprehension Main Effects for Time

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprehension</td>
<td></td>
</tr>
<tr>
<td>Hi-Hi</td>
<td>9.25 a</td>
</tr>
<tr>
<td>Hi-Lo</td>
<td>10.38 b</td>
</tr>
<tr>
<td>Lo-Hi</td>
<td>13.20 abc</td>
</tr>
<tr>
<td>Lo-Lo</td>
<td>9.13 c</td>
</tr>
</tbody>
</table>

*Common subscript denotes significant difference
### TABLE 3.3
Analysis of Variance of Quality by Combsex and Appdyad

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>f</th>
<th>Signif of f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex</td>
<td>8.992</td>
<td>2</td>
<td>4.496</td>
<td>0.456</td>
<td>0.636</td>
</tr>
<tr>
<td>Appdyad</td>
<td>111.035</td>
<td>3</td>
<td>37.012</td>
<td>3.750</td>
<td>0.015</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex x Appdyad</td>
<td>70.425</td>
<td>4</td>
<td>17.606</td>
<td>1.784</td>
<td>0.143</td>
</tr>
<tr>
<td>Within</td>
<td>631.68</td>
<td>64</td>
<td>9.870</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>821.402</td>
<td>73</td>
<td>11.252</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 3.4
Comparison of Communication Apprehension Main Effects on Quality

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprehension</td>
<td></td>
</tr>
<tr>
<td>Hi-Hi</td>
<td>12.13 a</td>
</tr>
<tr>
<td>Hi-Lo</td>
<td>11.25 b</td>
</tr>
<tr>
<td>Lo-Hi</td>
<td>8.80 abc</td>
</tr>
<tr>
<td>Lo-Lo</td>
<td>12.75 c</td>
</tr>
</tbody>
</table>

*Common subscript denotes significant difference
TABLE 3.5
Analysis of Variance of Satisfaction by Combsex and Appdyad

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>f</th>
<th>Signif of f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex</td>
<td>60.079</td>
<td>2</td>
<td>30.039</td>
<td>3.707</td>
<td>0.03</td>
</tr>
<tr>
<td>Appdyad</td>
<td>60.489</td>
<td>3</td>
<td>20.162</td>
<td>2.488</td>
<td>0.068</td>
</tr>
<tr>
<td>2-way Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex x Appdyad</td>
<td>54.579</td>
<td>4</td>
<td>13.645</td>
<td>1.684</td>
<td>0.165</td>
</tr>
<tr>
<td>Within</td>
<td>518.61</td>
<td>64</td>
<td>8.103</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>695.143</td>
<td>73</td>
<td>9.523</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 3.6
Comparison of Communication Apprehension Main Effects for Satisfaction

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hi-Hi</td>
<td>15.5  a</td>
</tr>
<tr>
<td>Hi-Lo</td>
<td>17.06 b</td>
</tr>
<tr>
<td>Lo-Hi</td>
<td>15.9  c</td>
</tr>
<tr>
<td>Lo-Lo</td>
<td>17.69 a</td>
</tr>
</tbody>
</table>

*Common subscript denotes statistical significance
reported significantly less satisfaction than low-low apprehensive dyads.

**Hypothesis III**

High apprehensive dyads will have less trust than low apprehensive dyads.

This hypothesis was statistically confirmed (F=5.57, p .01, Table 3.7). High-high dyads had significantly less trust than high-low or low-low dyads (see Table 3.8).

**Hypothesis IV**

High apprehensive dyads will like their partners less than low apprehensive dyads.

This hypothesis was statistically confirmed as indicated in Table 3.9 (F=6.974, p .01). Post-hoc comparisons further revealed that high-high communication apprehension dyads experienced significantly less liking for each partner than lows working with lows (Table 3.10).

**Hypothesis V**

Mixed-sex dyads will have greater satisfaction than same-sex dyads.

This hypothesis was statistically significant but in the opposite direction of the hypothesis (F=3.11, p .03; Table 3.5). Further comparisons indicated just the opposite occurred from the expected outcome: male-male dyads were more satisfied than the male-female dyads, (Table 3.11).

**Hypothesis VI**

Mixed-sex dyads will produce greater liking than same-sex dyads.

This hypothesis was not found to be statistically significant. Therefore, further analysis was not conducted.

**Hypothesis VII**

Mixed-sex dyads will produce greater trust than same-sex dyads.

This hypothesis was found to be statistically significant, but in
TABLE 3.7
Analysis of Variance of Trust by Combsex and Appdyad

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>f</th>
<th>Signif of f</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex</td>
<td>49.103</td>
<td>2</td>
<td>24.551</td>
<td>4.802</td>
<td>0.011</td>
</tr>
<tr>
<td>Appdyad</td>
<td>85.456</td>
<td>3</td>
<td>28.485</td>
<td>5.572</td>
<td>0.002</td>
</tr>
<tr>
<td><strong>2-way Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex x Appdyad</td>
<td>22.662</td>
<td>4</td>
<td>5.665</td>
<td>1.108</td>
<td>0.36</td>
</tr>
<tr>
<td><strong>Within</strong></td>
<td>327.198</td>
<td>64</td>
<td>5.112</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>476.548</td>
<td>73</td>
<td>6.528</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 3.8
Comparison of Communication Apprehension Main Effects for Trust

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprehension</td>
<td></td>
</tr>
<tr>
<td>Hi-Hi</td>
<td>15.34 ab</td>
</tr>
<tr>
<td>Hi-Lo</td>
<td>17.00 b</td>
</tr>
<tr>
<td>Lo-Hi</td>
<td>16.00 c</td>
</tr>
<tr>
<td>Lo-Lo</td>
<td>17.88 a</td>
</tr>
</tbody>
</table>

*Common subscript denotes statistical significance
### TABLE 3.9

**Analysis of Variance of Liking by Combsex and Appdyad**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>f</th>
<th>Signif of f</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex</td>
<td>78.943</td>
<td>2</td>
<td>39.472</td>
<td>6.241</td>
<td>0.003</td>
</tr>
<tr>
<td>Appdyad</td>
<td>132.333</td>
<td>3</td>
<td>44.111</td>
<td>6.974</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>2-way Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combsex x Appdyad</td>
<td>42.313</td>
<td>4</td>
<td>10.578</td>
<td>1.672</td>
<td>0.167</td>
</tr>
<tr>
<td><strong>Within</strong></td>
<td>404.793</td>
<td>64</td>
<td>6.325</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>630.533</td>
<td>73</td>
<td>8.637</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 3.10

**Comparison of Communication Apprehension Main Effects for Liking**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprehension</td>
<td></td>
</tr>
<tr>
<td>Hi-Hi</td>
<td>14.97 a</td>
</tr>
<tr>
<td>Hi-Lo</td>
<td>16.68 b</td>
</tr>
<tr>
<td>Lo-Hi</td>
<td>16.40 c</td>
</tr>
<tr>
<td>Lo-Lo</td>
<td>17.94 a</td>
</tr>
</tbody>
</table>

*Common subscript denotes statistical significance
**TABLE 3.11**

Comparison of Sex
Main Effects for Satisfaction

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male-Male</td>
<td>17.79 a</td>
</tr>
<tr>
<td>Female-Female</td>
<td>16.66 b</td>
</tr>
<tr>
<td>Male-Female</td>
<td>15.32 a</td>
</tr>
</tbody>
</table>

*Common subscript denotes statistical significance*
the opposite direction of the directional hypothesis indicating a main effect for combination of sex (F=4.80, p = .02; Table 3.7). Follow-up comparisons revealed that female-female dyads had significantly greater trust than male-female dyads (Table 3.12).
TABLE 3.12

Comparison of Sex Main Effects for Trust

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male-Male</td>
<td>16.29 b</td>
</tr>
<tr>
<td>Female-Female</td>
<td>17.13 a</td>
</tr>
<tr>
<td>Male-Female</td>
<td>15.46 a</td>
</tr>
</tbody>
</table>

*Common subscript denotes statistical significance
CHAPTER IV

Discussion

The purpose of this chapter is to further examine results in terms of additional post-hoc analysis as well as past research. The order of analysis will be the same as the presentational order of the hypothesis.

Low-high apprehensive dyads were found to take significantly more time than any other communication apprehension conditions. Conversely, the low-high dyads had significantly less quality than did all other dyads. In other words, subjects in the low-high apprehensive dyads (which necessarily by the study's design indicates a low apprehensive male discussing with a high apprehensive female) took the most time and yet had the least quality in their answers than any other dyad. One plausible explanation seems the most appropriate for this finding. Because of what can be assumed of the high-apprehensive female's quietness, the male could misinterpret this apprehension for apathy to the problem or disinterest in him thereby causing a time delay in beginning the problem and creating a more apathetic task environment, producing less quality. As earlier noted, Hilpert, Kramer and Clark found that even though men talked more in 59 percent of the dyads in a mixed-sex problem-solving discussion, women expressed as much satisfaction with their amount of influence in the group as did the men.111

111Hilpert, Kramer, and Clark, "Participants' Perceptions of Self and Partner in Mixed-Sex Dyads," 52-56.
One possible reason for this result, in accord with the results of this study, would be that the males were low communication apprehensive, while the females were high communication apprehensive. This would account for the greater male participation and also account for the females expressing equal satisfaction, since a high apprehensive would express greater satisfaction when not required to interact.

High-high apprehensive dyads were found to be significantly less satisfied than low-low apprehensive dyads. These results seem logical since individuals who normally refrain from speaking are forced to communicate. Therefore, their satisfaction with that situation will not be high. Low communication apprehensive individuals would find no particular difficulty in the forced problem-solving communication setting. As previously reported, Cohen suggested that satisfaction with the task depended "primarily upon freedom from network operating restrictions, a feeling of being challenged." Therefore, the high apprehensive could have felt restricted in the dyadic encounter, therefore lessening their satisfaction.

However, the sex variable was found to be a significant factor in satisfaction in the dyad. This finding is in opposition to past research. The male-male dyads expressed significantly greater satisfaction than the male-female dyads. One plausible explanation stems from the results on the quality and task time of this dyad. The low-male high-female dyad had significantly less quality yet took significantly longer than any other dyad. Hence, the low-male high-female dyads expressed less satisfaction than other dyads.


High-high apprehensive dyads had less trust than low-low and high-low apprehensive dyads. These results are reasonable to expect since the more communication apprehension, the more suspicious one will be when forced into a communication setting. As previously cited, Deutsch found that an individual is more likely to trust another if he perceives that he is able to exert some control over the other. The high apprehensive could have felt less control over their partner, hence less trust.

The sex variable was found to be significant when dealing with trust, though in the opposite direction. The female-female dyads had significantly greater trust than the male-female dyads. A possible explanation is that in the male-female dyad, aggressiveness or an unusually high amount of interest shown by the male could lead to suspiciousness and therefore less trust by the female.

An interesting comparison can be made between the time and the quality and the trust of the low-high dyads. Even though the time needed to complete the task was significantly greater and the quality was significantly less, the trust of the low-high dyads was not significantly different from any of the other communication apprehension dyads. Also, low-high dyads did not differ significantly from the other dyads in liking of their partner. Therefore, even though the time and quality suffered in the low-high dyads, trust and liking of the partner were not adversely affected. The best explanation for this outcome seems to be that the experiment was administered during the last three weeks of the summer session. Therefore, the subjects could have known their partners before the interaction (creating trust and liking) yet could have been

unable or unwilling to produce quality answers in a short time span. More time could have been spent in socio-emotive areas than task-oriented areas of communication behaviors.

**Limitations**

So far in this chapter, emphasis has been placed on the positive outcomes and results of the investigation. However, certain limitations of the study warrant consideration. The total "n" size of 74 subjects (32 dyads) could have been small enough to have negatively affected some of the results. A larger "n" size is suggested for future research.

Another limitation of the study would be that the experiment was conducted during the last three weeks of class, thereby permitting the subjects to have possibly a close relationship with their partner prior to the experiment. Therefore, these individuals were probably more concerned with socio-emotive than task-oriented behaviors. Also, the post test was administered to half the classes during the last 20 minutes of a one hour and ten minute class, which as we all know, is a time of weary and impatient students. This could have had a determining factor in the results.

One other limitation warrants careful consideration. As the class was divided into dyads, the experimenter allowed the pairs to sit wherever and however they felt the most comfortable. This was advantageous for the problem-solving task. However, during the completion of the post test, their close proxemics could have affected their subsequent responses to the post test questionnaire (see Appendix). For if an acquaintance is proxemically within range to visually determine one's responses, it can be assured that negative responses would be less likely. Therefore, a group response influence could have been operative.
Similarly, the post test scale in its entirety found that satisfaction, liking, and trust actually go together. Then why does most literature describe them as different? This experiment could have had response bias due to the necessity of close proxemics, as stated earlier. However, this experiment points to the fact that research should further investigate the intricate relation between satisfaction, liking, and trust to determine if in fact they are essentially the same phenomenon. The reliability measure of .90 by definition necessarily assesses internal consistency. The factor analysis shows that the scale items can indeed be treated distinctly as one factor. Further investigations will more fully elaborate this result.

Summary

The purpose of this chapter was to expand the results of this study and focus on possible explanations for these results. Mention was also made concerning the possible limitations of the experiment, focusing on proxemics and response bias as two limitations.
CHAPTER V

Conclusion

Communication apprehension is a broad-based fear or anxiety associated with either real or anticipated face to face communication. Past research has concerned itself with studying the treatment, causes, and measurement of communication apprehension. However, communication scholars have failed to investigate effects of communication apprehension on interpersonal communication interactions. This study incorporates the unique variable of communication apprehension in dyadic problem-solving to investigate how communication apprehension affects interaction.

This experiment revealed that an individual's level of communication apprehension significantly influenced problem-solving ability. Dyads with both members being highly communication apprehensive had significantly less satisfaction, less trust, and less liking than their low communication apprehensive counterparts. Dyads consisting of low-apprehensive males and high-apprehensive females had significantly less quality in task completion yet took significantly longer than any other dyadic combination. Male-male dyads were found to have significantly greater satisfaction than the female-female dyads.

One of the positive aspects of this study is the applicability of these results in various communication interactions, such as business communication, clinical settings, and classroom teaching. In a practical sense, determining whether your counterpart is a high or low communication apprehensive allows for adjustments of each individual during the
communication situation. For example, as the results indicated, if an individual is approached by a high communication apprehensive, satisfaction in the dyadic encounter would be more difficult to reach than in other dyads. Therefore, frustration between the individuals could be the effect of communication apprehension.

Another area of application of these results would be in organizational and business communication. For example, if a job supervisor were interested in the quality of work during a given period of time, the supervisor would realize that pairing a low communication apprehensive male with a high apprehensive female would not facilitate high quality and low task time. Therefore, the supervisor would probably pair a low communication apprehensive with another low communication apprehensive, since their quality was high and task time low as compared to other dyads. Similar applications could be extended to counseling and teaching situations.

This study expands the measurement and recognition of communication apprehension by reporting a high positive reliability for simultaneously administering four interpersonal communication scales. The applicability of this finding in the classroom environment is extremely relevant. For if an easy and reliable measure of communication apprehension is available by this method, educators could approach and curtail communication apprehension and its negative effects in the classroom.

Several questions concerning the effects of communication apprehension in dyads have been answered. However, future studies need to incorporate content analysis of what was said in dyadic problem-solving among varying levels of communication apprehension and amount of interaction. Also, post-hoc interviews need to be conducted concerning the high and low communication apprehensive's behaviors and feelings during the dyadic encounter. Likewise, since the estimated age range (16-40) was diversified sufficiently
to apply to a larger portion of society than the typical laboratory study, control for age is suggested for future research in that age could possibly be a significant intervening variable.

Furthermore, while the present study adds significantly to interpersonal communication theory literature, practical applications of these findings needs systematic exploration in a number of settings, such as business, counseling, and classroom settings. Also, future research efforts could be directed of discovering the effects of communication apprehension on other interpersonal measures of outcomes. Finally, researchers may uncover the precise effects of communication apprehension in relation to attitude change.
APPENDIX

PRETEST - The preceding six pages comprised this experiment's pretest.

Please indicate the degree to which the statements characterize you by marking your response to each item as follows:

If you strongly disagree with the statement, write the number "1" in the blank by each item.

If you disagree with the statement, write the number "2" in the blank by each item.

If you are undecided about the statement, write the number "3" in the blank by each item.

If you agree with the statement, write the number "4" in the blank.

If you strongly agree with the statement, write the number "5" in the blank.

Read each statement carefully and record your first impression.

1. While participating in a conversation with a new acquaintance I feel very nervous.
2. I have no fear of facing an audience.
3. I look forward to expressing my opinion at meetings.
4. I look forward to an opportunity to speak in public.
5. I find the prospect of speaking mildly pleasant.
6. When communicating, my posture feels strained and unnatural.
7. I am tense and nervous while participating in group discussions.
8. Although I talk fluently with friends, I am at a loss for words on the platform.
9. I always avoid speaking in public if possible.
10. My hands tremble when I try to handle objects on the platform.
11. I feel that I am more fluent when talking to people than most other people are.
12. I am fearful and tense all the while I am speaking before a group of people.
13. My thoughts become confused and jumbled when I speak before an audience.
14. Although I am nervous just before getting up, I soon forget my fears and enjoy the experience.
15. Converting with people who hold positions of authority causes me to be fearful and tense.
16. I dislike to use my body and voice expressively.
17. I feel relaxed and comfortable while speaking.

18. I feel self-conscious when I am called upon to answer a question or give an opinion in class.

19. I face the prospect of making a speech with complete confidence.

20. I would enjoy presenting a speech on a local television show.
strongly disagree = 1
disagree = 2
undecided = 3
agree = 4
strongly agree = 5

1. I enjoy talking with my father about my future plans.
2. I enjoy mingling with a crowd of people I know.
3. I like to discuss current events with a close friend of the same sex.
4. I like to discuss current events with a close friend of the opposite sex.
5. Conversing with a job supervisor about ways I could improve my job performance is pleasant and sometimes relaxing.
6. Conversing with a teacher at a social affair is relaxing and pleasant.
7. Conversing with a minister about world affairs is an enjoyable experience.
8. Receiving criticism from my closest friend does not usually bother me or make me feel upset.
9. Receiving criticism from my mother usually does not bother me or make me feel upset.
10. Being in a crowd of strangers where I am expected to converse usually does not bother me or make me feel upset.
strongly disagree = 1
disagree = 2
undecided = 3
agree = 4
strongly agree = 5

1. I have difficulty speaking to professors.
2. I tend to avoid office conferences with professors.
3. I am unable to talk to professors after class.
4. I get frightened when professors try to talk to me.
5. I cannot contribute to class discussions.
6. I cannot ask questions in class.
7. I tend to freeze when I am asked questions in class.
8. I am afraid of job interviews.
9. I do not seem to be able to start conversations with strangers.
10. I do not talk much when I am with my friends.
11. I do not meet many new people.
12. I do not contribute much to committees.
13. When I speak in public I forget most of what I want to say.
14. When I talk to people they ask me to repeat what I have said because they do not understand it.
15. I get sick when I have to speak in public.
strongly disagree = 1
disagree = 2
undecided = 3
agree = 4
strongly agree = 5

1. I feel relaxed even in unfamiliar social situations.
2. I try to avoid situations which force me to be very sociable.
3. It is easy for me to relax when I am with strangers.
4. I have no particular desire to avoid people.
5. I often find social occasions upsetting.
6. I usually feel calm and comfortable at social occasions.
7. I am usually at ease when talking to someone of the opposite sex.
8. I try to avoid talking to people unless I know them well.
9. If the chance comes to meet new people, I often take it.
10. I often feel nervous or tense in casual get-togethers in which both sexes are present.
11. I am usually nervous with people unless I know them well.
12. I usually feel relaxed when I am with a group of people.
13. I often want to get away from people.
14. I usually feel uncomfortable when I am in a group of people I don’t know.
15. I usually feel relaxed when I meet someone for the first time.
16. Being introduced to people makes me tense and nervous.
17. Even though a room is full of strangers, I may enter it anyway.
18. I would avoid walking up and joining a large group of people.
19. When my superiors want to talk with me, I talk willingly.
20. I often feel on edge when I am with a group of people.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td>I tend to withdraw from people.</td>
</tr>
<tr>
<td>22.</td>
<td>I don't mind talking to people at parties or social gatherings.</td>
</tr>
<tr>
<td>23.</td>
<td>I am seldom at ease in a large group of people.</td>
</tr>
<tr>
<td>24.</td>
<td>I often think up excuses in order to avoid social engagements.</td>
</tr>
<tr>
<td>25.</td>
<td>I sometimes take the responsibility for introducing people to each other.</td>
</tr>
<tr>
<td>26.</td>
<td>I try to avoid formal social occasions.</td>
</tr>
<tr>
<td>27.</td>
<td>I usually go to whatever social engagements I have.</td>
</tr>
<tr>
<td>28.</td>
<td>I find it easy to relax with other people.</td>
</tr>
</tbody>
</table>
POSTEST - This page represents this experiment's postest.

Please indicate the degree to which the statements characterize you by marking your response to each item as follows:

If you strongly disagree with the statement, write the number "1" in the blank by each item.

If you disagree with the statement, write the number "2" in the blank by each item.

If you are undecided about the statement, write the number "3" in the blank.

If you agree with the statement, write the number "4" in the blank.

If you strongly agree with the statement, write the number "5" in the blank.

1) I feel satisfied with my contributions to solving this problem.
2) I feel satisfied with my partner's contributions to solving this problem.
3) I am happy with the conclusions we reached.
4) I would enjoy working with my partner in the future.
5) I feel that my partner likes me.
6) I like my partner.
7) I would enjoy conversing with my partner over dinner.
8) I feel that I would enjoy future interaction with my partner in solving other problems.
9) I believe my partner was honest with me.
10) I believe I was honest with my partner.
11) I feel now that I could discuss personal feelings and problems with my partner.
12) I would trust my partner in working on solving problems in the future.
13) I enjoyed working in the two-person groups.
14) I would have rather worked alone on the problem.
15) I would have rather worked in a larger group.
BIBLIOGRAPHY


