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Effects of system and social variables on gender differences in communication and team decision making[1]

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Effects of system and social variables on gender differences in communication and team decision making[1]

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Abstract

This report presents two studies of gender differences within mixed-sex problem-solving teams. The first study compared teams working face-to-face to teams utilizing a novel telecommunication system. The second examined the consequences of assigning a woman to a team leadership role. Altering the communication system did not alter the tendency for women to participate less than men. However, the system did affect the quality of interactions, as well as members' perceptions of the dynamics within the team. Altering status relationships by appointing a women to a dominant role reversed the tendency for men to dominate discussions. Teams also made effective use of the unique knowledge available to female leaders. Nevertheless, these women did not generally view themselves as leaders. Modifying established differences in participation levels and psychological reactions within work teams will require additional research on the interactive effects of system, task, and social-personal factors on team processes and products.

When individuals work together as a team on a common task, a variety of factors affect their performance. One set of factors involves the communication system used by the team--who can talk with whom, how tightly interactions are structured, how information is transmitted, and so forth. Another set of factors involves the characteristics of team members. Both personal traits of individuals and social relationships among them affect their interactions. Such traits as competence and motivation and such social variables as power hierarchies and friendship patterns affect both the manner in which teams carry out their assigned tasks and the quality of their final products.

In our earlier research on team performance (Zimbardo, Linsenmeier, Kabat, & Smith, 1982) we studied both system and social-personal influences. We varied particular characteristics of a special telecommunication system used by teams attempting to reach consensus on a series of decisions. We also focused on the roles of two personal factors, shyness (or communication apprehension) and gender. We looked at how different variations of our telecommunication system affected the behavior and reactions of individuals differing on these dimensions. In addition, we looked at overall differences between shy and not-shy participants and between men and women.

A striking finding in our earlier work was that in teams containing both men and women, the women talked less than the men. They also considered themselves more passive and were less often seen as playing a leadership role. A number of explanations for these differences seem plausible. An informal survey indicated that the survival tasks used in our research were perceived as primarily male-oriented. Women might have felt less competent than men at these tasks and have said less because they felt they had fewer useful ideas to contribute. Prior research has, in fact, shown that females are especially open to influence by others when working on a more masculine task (Sistrunk & McDavid, 1971). Alternatively, women may have played a less active role than men because of a general tendency to be passive. Men's domination of discussions may reflect a "nonconscious ideology" (Bem & Bem, 1970) learned through experience in a particular cultural environment. The fact that the task itself was male-oriented might have merely reinforced this pre-existing difference.

There is also reason to believe that our telecommunication setting, as well as our experimental task, was male-oriented, or at least one with which men felt more comfortable than women. In line with this interpretation, when participants in our research were asked how the system affected their participation, males judged it to be somewhat more beneficial than did females. People working in our telecommunication set-up used not only microphones and earphones, but also computer terminals. Instructions and experimental tasks were presented on the terminals' CRT display screens, and participants answered various questions by typing responses on their terminal keyboards. A recent report summarized research indicating that women are more likely than men to feel afraid of computers and uncomfortable when forced to deal with them (Wrege, 1982). School-age girls are less likely than boys to have experience with computers (Targ, 1981), and this difference occurs both at

the college level and among the general population. In fact, a marketing director of a leading manufacturer of personal computers was recently quoted as saying that 98% of those buying these computers are male (Smith, 1982). A recent survey revealed gender (and socioeconomic) differences in enrollment at computer classes and courses throughout the United States during the summer of 1982. Three times as many males participated as did females, a disproportion that grew larger the more advanced the course level (Miura & Hess, 1983). If women using our telecommunication system did, indeed, feel uncomfortable with it or intimidated by it, this would probably contribute to a tendency to avoid actively using it.

On the other hand, there is also reason to expect use of a telecommunication system to minimize sex differences in degree of participation. Research comparing all-male problem-solving teams in face-to-face and telecommunication settings has found participation levels to vary less in the latter (Strickland et al., 1978). In discussing the advantages of communicating via computer networks, Uhlig (1977) called computer conferencing "the great equalizer" (p.123) because of its tendency to increase the participation levels of users whose status in an organization's hierarchy is low. If telecommunication systems tend to equalize participation levels, yet sex differences still emerge, then we would expect to find an even larger difference between males and females communicating directly with each other. In fact, many studies of face-to-face interactions have demonstrated that women generally participate less than men. (See Thorne & Henley, 1975, and Henley & Thorne, 1977, for reviews of this research.) Men talk more, interrupt more, give more opinions, are more likely to assume leadership, and assert more control over the content of conversations than do women.

Study One

The first study included in this report was designed to see if working within a telecommunication environment was a macro-level system factor influencing the magnitude of sex differences in our earlier research. The answer to this question has clear relevance for team leaders and organizers who want to minimize differences in participation level. If women in a telecommunication setting defer to men more than those in a direct, face-to-face one, then leaders of mixed-sex teams might want to avoid the use of telecommunication media despite their increasing availability. On the other hand, if women participate less actively in face-to-face discussions than in electronically-mediated ones, then leaders of mixed-sex teams might want to increase their use of telecommunications.

All teams in this study were composed of two men and two women and all worked on the same problem-solving task. In half of the teams participants were physically separated and discussed the task using our computer-mediated telecommunication system. Those in the other teams were exposed to the same standardized materials, response measures and time parameters, but sat around a table and were able to talk freely with one another.

Method

Subjects and experimenters

Ten mixed-sex teams participated in this study. Each contained one shy woman, one not-shy woman, one shy man, and one not-shy man. As in our previous studies, shyness level was assessed by using the Personal Report of Communication Apprehension (PRCA) (McCroskey, 1970) and also asking potential participants how shy they felt themselves to be. Those classified as shy both described themselves as shy and scored above average in communication apprehension. The not-shy individuals did not feel that they were shy and also had below-average communication apprehension scores. The responses used for classifying participants as shy or not-shy were obtained several weeks before they participated in our study and were included in a set of questionnaires distributed in their introductory psychology course. Some participants received credit toward their course research requirement for participating; others were paid $4.00. For most teams in this study, the experimenter was a female student. A male student conducted three of the telecommunication sessions.

Independent variables

One within-groups variable and one between-groups variable were of primary interest in this study. The within-groups variable was subject gender. The between-groups variable was group setting. Five teams worked on the survival tasks under the constraints of the telecommunication system used in our previous studies. Participants were seated in separate booths and could communicate using only their computer terminals and an intercom system. The other five teams were placed in a more familiar face-to-face situation. Team members sat around a table (in the laboratory where the four booths were housed) and were able to see one another. While they were permitted to speak only during official discussion periods, they could talk freely and directly with one another during those specified times.

The tasks used in this research were the survival problems used in our earlier work and based on simulations developed by Human Synergistics (Eady & Lafferty, 1975; Lafferty & Webber, 1978).[2] Within both the telecommunication and face-to-face conditions, three teams discussed the arctic survival situation and two discussed how best to survive in the desert.

Procedure

Telecommunication teams

The teams constituting the telecommunication condition of this study are simply the mixed-sex, no prompts teams in the third study reported by Zimbardo et al. (1982). The experimental procedure used for these teams is described in detail in that report, so only a brief description will be provided here. When the four individuals scheduled for a session had arrived, the experimenter told them that they would be working together as a team and that their task would be to decide how to survive in a

dangerous situation. Participants were urged to imagine that they were actually in the situation they would be discussing and were also told that the team making the best decisions would earn a cash prize. Each participant was then assigned an identification number. Next, team members were told they would be using a computerized telecommunication system, and the rules of the system were explained. They learned that they would be in separate booths and would have microphone-earphone headsets. They were to press special request buttons whenever they wished to speak; messages on their computer display screens would let them know when the computer had chosen them as the next speaker. Team members were also told to hold down special talk buttons while speaking. This would activate their microphones and transmit their voices to their teammates.

Participants were then seated in their booths, each of which contained a headset, a computer terminal, and request and talk buttons. The experimenter started a computer program, which printed further instructions and information on the terminal display screens. Team members were told to imagine that they were survivors of a plane crash, and the site where they had crashed was described. Each member was asked to decide which of six strategies would be best to follow and which four of eight problems were the most serious they faced. When all team members had typed responses to these questions on their terminal keyboards, a message on their display screens indicated that they were now to discuss their responses and reach a team consensus. The request and talk buttons were used during this discussion. Whenever more than one person wanted to speak, the computer automatically chose the one who had spoken least thus far to be the next speaker (in an attempt to equalize participation levels). The computer program also timed each talking turn, kept a record of talking turns and requests to speak, and displayed a clock on participants' screens to let them know how much discussion time remained. In addition, each team discussion was tape-recorded for later analysis. When the allotted discussion time had elapsed, team members entered their agreed-upon decisions on their terminal keyboards.

Next, participants studied a list of ten items supposedly salvaged from the plane. Each individual ranked the items according to their importance for the team's survival. They then discussed the items, again using the telecommunication system, in order to reach a team consensus on the rankings. During this discussion, each person's individual rankings were displayed on all four terminal screens. To facilitate agreement, team members were permitted to communicate freely while typing in their team decisions at the end of the allotted discussion period. Following this, participants worked on their own to complete a group process questionnaire designed to assess their perceptions of and reactions to the dynamics in their team. Finally, they left their separate booths and met with the experimenter to discuss the aims and results of the study.

Face-to-face teams

In moving the experiment to a face-to-face setting and substituting printed forms and oral instructions from the experimenter for the computer displays, we attempted to alter other aspects of the situation as little as possible. The experimenter's initial description of the experimental

task was changed only where necessary, and the survival situation descriptions and strategy, problem, and item options were worded identically. The discussion lengths were altered only to take account of the fact that, in the telecommunication situation, participants had to spend time waiting for the system to respond to their actions and to print messages on their screens. The only change in the wording of the group process questionnaire was to remove references to the telecommunication system. Appendix 1 contains the statements which the experimenter made to the subjects during face-to-face sessions, and Appendix 2 contains all forms viewed by participants in the arctic situation. Appendix 3 contains a photograph of subjects working in our face-to-face set-up. (Copies of the materials used in the telecommunication setting may be found in the appendices of our earlier technical report.)

When the students scheduled for a session arrived at the laboratory, the experimenter (always a female student) asked them to sit in a semicircle around a table. No attempt was made to assign specific individuals to specific positions. As in the telecommunication version, the experimenter began by greeting participants and explaining that they would be working on a survival problem. She urged them to try to imagine that they were actually in the situation they would be discussing and promised a cash prize for the team which did best. She also assigned subject numbers; the person in the left-most seat was always Subject #1, the person in the adjacent seat was always Subject #2, and so on. These numbers were subsequently referred to in the group process questionnaire.

Next, participants were given additional information about the procedure they would be following. Each received a packet of papers, and the experimenter explained that the packets contained both information about the survival situation and various forms which participants would be asked to complete. She pointed out that a message at the bottom of each page would let participants know whether to proceed to the next page when they felt ready or, instead, wait until the experimenter told them to go on. (The computerized system sometimes allowed each participant to work at his or her own pace, but sometimes held participants at a certain stage until a specified amount of time had elapsed or until all four members of the group were ready to proceed. These messages at the bottoms of pages allowed the experimenter to perform an analogous function in the face-to-face setting.)

The experimenter told the team members that they would often be reading and answering questions on their own, but that there would also be special discussion periods during which they would be able to talk with one another. She emphasized that it was important that they talk with one another only during these official discussion periods. She also informed them that their group discussions would be videotaped. They were then told that they could turn over the cover sheets on their packets and begin reading about the situation which they would be discussing.

When the experimenter saw that all team members were done reading the description of the situation, she told them that they could turn the page and answer some questions about it. The next two pages in the packets, like the corresponding displays in the telecommunication set-up, asked participants to choose one strategy to follow and to decide which four of

eight specified problems were the most serious ones they faced. When all four participants had answered these questions on their own, the experimenter explained that they would have 400 seconds to discuss their decisions with their teammates and to reach agreement on their choices. She showed them a large timer which they could refer to in order to see how much of the 400 seconds still remained. (In the telecommunication set-up a display on participants' terminals served this function.) Then she started the timer. During the 400 seconds team members had in front of them a list of the six possible strategies and eight specific problems. They were free to speak to each other whenever they wished and to reach a consensus in any way they chose. At the end of the discussion period the experimenter interrupted the team and recorded the decisions they had made. (If necessary, they were allowed one minute more to reach their final decisions.)

At this point, participants turned to a page containing a list of the ten items supposedly salvaged from the plane crash. They studied the list for 60 seconds and then wrote down their individual rankings of the importance of the items. The experimenter then had all four team members write down their rankings on a special four-page carbonless copy form so that each could see what decisions the others had made. After the completed pages were distributed, the experimenter told the team that they would have 400 seconds to reach agreement on the ranks and then started the timer which let them know how much time remained. As in the telecommunication set up, this discussion period was followed by an open discussion during which participants had to indicate their team's decisions. In the face-to-face setting they simply filled out a special team consensus form instead of typing responses on computer terminals. The experimenter allowed the team a maximum of six minutes for completing this form.

After the team recorded their agreed-upon item rankings, they turned to the next page in their packets and completed a group process questionnaire similar to that used in the telecommunication setting. After collecting all forms, the experimenter asked participants if they had any questions about the study and discussed the aims of our research with them. She told them what decisions the experts recommended for people in the survival situation which they had discussed. Finally, she urged them not to discuss this information with others who might be in our study and thanked them for their own participation. The entire experimental session lasted for approximately one hour.

Dependent variables

The main dependent variables for this study were a subset of those used in our earlier work. Team members did not use talk or request buttons in the face-to-face condition, but we do have one important measure of the extent to which different members participated in the discussion. A research assistant viewed the videotape of each session and used a special electronic signalling system to keep track of how much each participant spoke. The assistant worked with a set of four buttons connected to our laboratory microprocessor. When any of the four team members spoke, the assistant pressed the corresponding button. The microprocessor kept track

of how long each button was pressed and provided a printout of the total amount of talking done by each team member.

All the "performance" (quality of decision) measures used in our earlier studies were available for this study as well. Strategy and problem choices and team rankings of available survival items were compared to responses recommended by experts. Also, most items on the group process questionnaire used in the telecommunication setting were also included in the questionnaire used with face-to-face teams. Thus, nearly all the "perception" measures used in our other studies to reflect participants' views of and feelings about the activities of their teams were available for this study too.

In addition, because we were particularly interested in what males and females said when they participated in face-to-face and computer-mediated discussions, the tape recordings of the discussions held by the ten groups in this study were analyzed in detail. A research assistant listened to each tape, determined by whom each statement was made, and coded the content of each statement using a modified version of the Bales Interaction Process Analysis (Bales, 1950). Each "unit" (defined as "the shortest verbal utterance which seems meaningful to the coder") was assigned to one of eight categories, grouped in the following manner:

I. Task - Answers

Category	1.	Gives Solution Assertively
Category	2.	Gives Solution Tentatively
Category	3.	Gives Information

II. Task - Structure

Category	4.	Attempts to Structure Decision Process
Category	5.	Calls on Specific Person
Category	6.	Seeks Solutions from Group as a Whole

III. Social-Emotional

Category	7.	Expresses Positive Feelings
Category	8.	Expresses Negative Feelings

Units which fit into none of these eight categories were assigned to a residual "other" category; this ninth category was hardly ever used. Complete descriptions of all the coding categories are contained in Appendix 4.

After listening to the tape for each team, the coder also filled out a questionnaire to indicate her perceptions of the dynamics in the team. She indicated how well she thought team members worked together, how much they seemed to enjoy the task, who, if anyone, seemed to be the team's leader, and so forth.

Results

The behavior of team members in the face-to-face situation was compared to that in the telecommunication situation using t-tests. Changes in overall behavior, in that of females, in that of males, and in the difference between males and females were analyzed. Because of the small cell sizes, along with the variability of teams within each experimental condition, patterns which fell short of statistical significance will also be discussed if they present trends of interest.

Effects on participation

Moving our experimental paradigm from a novel telecommunication setting to a more usual face-to-face setting had no effect on the degree to which males and females participated in their teams' discussions of the survival tasks. Females did 40 percent of the talking in the telecommunication setting ($\bar{X}$ = 144 sec. for females vs. 218 sec. for males) and 44 percent in the face-to-face setting (means of 154 vs. 197 sec. respectively), a slight increase which fell far short of statistical significance.

Changing the setting did, however, affect the sorts of statements which males and females made. Table 1 shows the categories to which an observer assigned their statements. (Our coding categories 4, 5, and 6 are combined in the table under the label "structuring group process.")

Insert Table 1 about here

Percentages in columns labeled "females" and "males" in this table indicate how often, when a certain type of statement was made within a given setting, the speaker was a woman ("females" column), or a man ("males" column). Numbers in the columns headed "n" show how many statements in each setting fell into each category, while those in the columns labeled "%" show what percentage of the statements made in each setting fell into each category.

Looking first at the overall frequencies of the different types of statements, it is clear that task-oriented statements (the first three categories) were most common. Assertive statements and expressions of positive feelings were more common in the telecommunication setting than in the face-to-face one. More statements made in the face-to-face setting involved the presentation of task-relevant information; fully 41 percent of all statements fell into that single category.

Not surprisingly, since females talked for less time than males in both settings, they also made fewer categorizable statements. Indeed, the percentage of total talking time attributable to women and the percentage of statements made by women are nearly identical. Within the telecommunication setting women were especially unlikely to make assertive statements and express negative feelings. Within the face-to-face setting

women offered four times as many task solutions assertively as did men, a not significant effect because only a total of five statements of this sort were made. Females also made relatively more attempts to structure the decision process and expressed more negative feelings and fewer positive feelings in the face-to-face setting than in the telecommunication setting. Thus, while working in a novel telecommunication setting did not change the overall level of women's participation, it did change the quality of their verbal behavior. In the telecommunication setting women's contributions were more consistent with their stereotypical role as the persons responsible for improving the group climate and making their teammates feel good.

Some additional findings of interest concern the types of statements made by shy and not-shy team members. As would be expected, shys were less likely than not-shys to offer solutions to the team tasks in an assertive manner. They also expressed fewer emotions, and this was true for both positive and negative feelings. These differences all held in both the telecommunication and the face-to-face setting.

Effects on performance

Analysis of the quality of the survival item rankings agreed upon by each team revealed that teams working in the telecommunication setting made better decisions ($\bar{X}$ = 20.0 in the telecommunication setting and 30.0 for face-to-face teams, with lower scores indicating better decisions; $t(8) = 2.28$, $p<.10$). The quality of strategy and problem choices was about the same in the two settings, however. As in our earlier work, these measures seemed less sensitive to changes in the dynamics within the team.

Effects on perceptions of group process

Our analysis of the types of statements made by team members in the two settings suggested that women played a more active role in face-to-face interactions than in the telecommunication set-up. The women also tended to feel more involved when interactions were face-to-face ($\bar{X}$ = 4.0 vs. 3.5, $t(8) = 1.41$, $p<.20$). In addition, when asked about their primary contribution to the team, all five shy women in the face-to-face setting reported that it was an active, task-relevant one (providing information and ideas, for example). This was true for only two of the five shy women in the telecommunication setting. On the other hand, women in the face-to-face setting also felt more influenced by others ($\bar{X}$ = 3.3 vs. 2.5, $t(8) = 2.67$, $p<.05$) and tended to feel that the team decisions reflected their contributions less ($\bar{X}$ = 3.3 vs. 3.6, t not significant). In contrast, males tended to feel more influenced by others in the telecommunication setting ($\bar{X}$ = 3.1 vs. 2.8, t not significant), leading to a marginally significant setting by sex interaction ($t(8) = 2.27$, $p<.10$).

Team members in both the telecommunication and face-to-face settings were asked who, if anyone, was the leader of their team. Participants in the two settings were equally likely to say that there was no leader; more than half (58%) gave this response. A striking finding is that every one of the 16 people who did name a leader chose one of the males in the group. Females were never seen as team leaders. This effect occurred

even though four individuals in the telecommunication setting and eight in the face-to-face setting specified a female teammate as the person who most influenced their own evaluations. These apparently influential women were still not judged to be leaders.

Both males and females tended to feel their teams' decisions were worse in the face-to-face setting than in the telecommunication setting (though they generally rated their performance as rather good in both environments). Analysis of mean evaluations yielded a marginally significant effect of setting ($t(8) = 1.81$, $p<.15$). This difference corresponds, of course, to a true difference in how close teams' rankings of survival items came to those recommended by survival experts; telecommunication teams actually did make better decisions.

Finally, the setting in which participants worked appeared to affect how comfortable they felt. Compared to the telecommunication setting, the traditional face-to-face one made females feel more frustration, but made males feel less, as shown in Table 2 ($t(8) = 3.36$ for the setting by sex interaction, $p<.01$). A similar, though non-significant, effect emerged for participants' evaluations of the degree of tension in their groups.

Insert Table 2 about here

One additional type of information on team interactions was available Recall that a research assistant listened to tape recordings of all team discussions in order to code participants' statements. After listening to each team, the assistant also completed a questionnaire to indicate her perceptions of the interactions and feelings of team members. For most of the questions on this questionnaire, setting had no effect on the coder's responses. However, all differences which did emerge suggest that the more natural, face-to-face setting was also a less comfortable setting in which to work on our experimental tasks. In the face-to-face setting people seemed to enjoy themselves less ($\bar{X}$ = 2.8 vs. 3.6, $t(8) = 1.46$, $p<.20$), experience more frustration ($\bar{X}$ = 2.2 vs. 1.0, $t(8) = 1.63$, $p<.20$), and view their teams' decisions less favorably ($\bar{X}$ = 3.2 vs. 4.4, $t(8) = 2.19$, $p<.10$).

Discussion

Our comparison of face-to-face and telecommunication settings revealed several effects on participation. However, changing the setting had no effect on the asymmetrical participation levels of men and women; women did only about 40% of the talking in both conditions. The telecommunication setting includes both features which may increase sex differences in participation and features which may decrease them. Thus, for example, the necessity of using electronic devices might make women using our telecommunication system feel more reluctant to participate, but the knowledge that they cannot be interrupted or shouted down by others might make them more willing to share their ideas. With more experience, a woman's fear of the novel apparatus should dissipate,

while the advantages of the "insured" talking turn should increase. As telecommunication becomes more prevalent, future research should seek ways to overcome its potential inhibiting effects on women and other minority members. Our own research on the effect of turn-taking rules and informational prompts (Zimbardo et al., 1982) has been a start in this direction.

While women did not talk a greater percentage of the time in face-to-face settings, there was some evidence that when they did talk, their presentational style was altered; they were more directive and assertive, and less passive and gentle, than in the telecommunication setting. Looked at another way, while working with sophisticated electronic equipment in a novel, impersonal setting did not decrease the amount of talking done by women, it did induce the Stanford women who participated in this research to behave in more stereotypically feminine ways than they normally do. This again suggests the need for the development of interventions designed to lessen detrimental effects of initial exposure to a telecommunication situation on women participants.

But if women felt somewhat inhibited by the presence of unfamiliar electronic equipment in our telecommunication setting, why, then, did they not report greater feelings of frustration or tension there? Instead, as noted, women's self-reports suggested that they found the face-to-face setting less comfortable, and a female observer, who was especially sensitive to the feelings of women, also felt that team members working in that situation seemed less at ease. Again, several factors may be at work here. Knowing that more dominant male teammates could not interrupt them or prevent them from speaking may have made women feel more comfortable in the telecommunication setting. Another important factor may be "social presence." According to Short, Williams, & Christie (1976), an important quality of any communication medium is its social presence, i.e., the salience of the other participants and of relationships among individuals. Media high in social presence are typically rated by users as warm, personal, and sociable. Not surprisingly, factor analysis of ratings of different systems indicated that face-to-face settings are higher in social presence than audio-only telecommunication settings such as the one we have used in our research (Christie, 1974).

What are the consequences of variations in social presence? One consequence is that the degree of social presence affects how people feel about their interactions with others. As Short et al. (1976) have noted, social presence of the communication media is an important contributor to the intimacy of an interaction. Other contributors include the topic under consideration and the response styles of participants. Individuals may feel most comfortable within a particular range of intimacy (Argyle & Dean, 1965). In our research, team members were asked to imagine themselves in a dangerous situation and required to resolve disagreements about how to deal with it. The nature of the hypothetical setting and the necessity for hurried resolution of interpersonal conflicts might be expected to create feelings of tension, arousal, and dependence on others. In this sort of interpersonal situation individuals might feel most comfortable using a communication medium which tends to reduce feelings of intimacy and thus counteracts the intimacy created by task demands. Other research has suggested that people enjoy face-to-face interactions more

when the interaction is, by nature, relatively relaxed and pleasant, while for more intense interactions, such as those involving conflict resolution, a less personal, telecommunication setting is preferred (Williams, 1975, 1977). An important question, given our initial focus on shyness, is to what extent people differing in shyness differ in their perceptions of the social presence of telecommunication media or the intimacy of interactions. If shy individuals generally perceive any interaction as more intimate, they may feel most comfortable with media low in social presence.

One other way in which our telecommunication and face-to-face settings differed was in how well participants working in these settings performed their given task. Those in the face-to-face setting made worse decisions about the relative importance of the salvaged items. This difference, too, may relate to the social presence levels of the two media. When people remote from one another interact using microphone-earphone headsets, rather than face-to-face, they are not distracted by irrelevant visual cues. In addition, the personalities and presentational styles of participants may play a smaller role. The focus is away from the people involved and toward the task on which they are all working. Thus, a recent review of research on telecommunication by Johansen, Valle, & Spangler (1979) notes that audio-only systems may have distinct advantages when the task at hand requires negotiation among individuals with different aims and preferences: "The findings suggest that audio may allow conferees to concentrate on the substance of the negotiations rather than the interpersonal dynamics" (p. 101). This focus on the informational value of contributions, rather than on how they were presented or who presented them, can lead to qualitatively better outcomes. Objectively better arguments have a better chance of winning out over objectively weaker, but effectively presented, ones (Morley & Stephenson, 1969, 1970). We might also note that research on exploitative strategies used by people with high Machiavellian personality scores reveals that they are more effective in face-to-face situations (where they can look others in the eye) than in remote contact settings (Christie & Geis, 1970). Their influence over other team members should be neutralized in a telecommunication setting that promotes a task focus and minimizes nonverbal sources of interpersonal dominance.

As Johansen et al. (1979) emphasize in their review of telecommunication research, the common assumption that communication media closer to face-to-face communication are better is clearly an oversimplification. Which media are best depends upon the task involved, the people who are participating, and the response measures employed. Changes in a communication system can interact with, or fail to override, the influence of other factors. A clear example is the persistent tendency for women to participate less than men in both types of communication settings we have studied, the familiar face-to-face and the novel telecommunication one. To modify that pattern may require a more direct intervention than variations in media. Our next study included such an intervention.

Study Two

In the previous study and in our earlier work on problem-solving teams, characteristics of the communication system were varied in an effort to counteract the tendency for participation levels to be unequal. We compared different variations of an audio-only telecommunication network and, in addition, compared teams using this system to teams engaged in more normal, face-to-face interactions. While we achieved some success at eliminating communication differences between shy and not-shy individuals, we were unable to reduce the difference in the amount of talking done by men and women. Men dominated team discussions among mixed-sex teams in the prompts and no-prompts versions of our telecommunication system (see Zimbardo et al., 1982), as well as in our face-to-face arrangement. About 60 percent of the talking in each condition was done by men.

In the study to be reported next, we took another approach to altering this gender difference. We focused not on characteristics of the communication system, but on social-personal characteristics of team members, i.e., on their individual characteristics and on the relationships among them. Two social-personal factors which influence participation levels and leadership behaviors are status and competence. Team members with higher status do more talking and make more attempts to influence their teammates. This occurs whether their higher team status stems from manipulations within an experimental setting, positions in an organizational hierarchy, or relative status in a larger social system (e.g., Caudill, 1958; Strodtbeck, Simon, & Hawkins, 1958; Gerard, 1957). Similarly, those who are better at a task, or, at least, believe that they are better, tend to dominate group efforts (Levinger, 1959; Tedeschi, Schlenker, & Lindskold, 1972).

These two factors of relative status and perceived competence may contribute to the tendency for women to participate less than men in discussions held by mixed-sex teams. In our society as a whole, the status of women is typically lower than that of men (Hacker, 1975; Henley, 1977). Also, both men and women often consider women to be less competent at a wide range of tasks (Broverman et al., 1972; Frieze, 1975). Both women and men may feel that their team will be better off if it is led by a man. In fact, women may often be reluctant to assume leadership of problem-solving teams because they feel that their lack of skill both at leading others and at the problem-solving task would be most detrimental in that role (cf. Stake & Stake, 1979). The best way to serve their team, they may think, is to play a relatively passive role instead. (They also serve who sit and listen to dominant talkers.)

If our analysis is correct, then one way to induce women to participate more fully in team discussions is to increase their status and their perceived competency within the team. That was the approach adopted in this study. Mixed-sex teams worked on the survival tasks in a face-to-face setting. Women in some of these teams were the targets of a two-pronged intervention. First, the team was told to imagine that one of the women had been the pilot of the plane in which they had been flying. This elevated her status relative to that of her teammates, who were only "passengers." Secondly, we told all team members that the pilot would have more information than the others about the hypothetical survival

situation--and she actually did receive this extra information. Thus, the three "passengers" knew that the pilot was likely to have useful information to contribute to the group, and she herself also knew that she had unique knowledge from which others could benefit. Giving special information to one member of a team does not always help the team to do its job better (Shaw & Penrod, 1962). However, we hoped that raising the estimates of her teammates regarding her competence and status would cause them to allow the pilot's ideas to influence their choices more and, therefore, improve the quality of these choices. We tested these predictions by comparing the behaviors of female pilot teams to those of teams in which members were undifferentiated with respect to both their assigned status and the information provided to them.

Method

Subjects and experimenter

Ten mixed-sex teams participated in this study. Each contained one shy woman, one not-shy woman, one shy man, and one not-shy man, with shyness measured as in our earlier studies. Again, all participants were currently taking or had recently completed an introductory psychology course, and they received either $4.00 or credit toward their course research requirement for participating. All sessions in this study were conducted by the same female undergraduate experimenter.

Independent variables

As in Study One, this study included two within-groups independent variables, shyness and gender, but our primary focus was on gender differences. In addition, there was one important between-groups variable. In the control condition, as in all our computer-mediated studies, the four members of each team were told to imagine that they had been passengers on a plane that had crashed. Thus, all were equal in assigned status. In the female pilot condition, however, one female member of the team was randomly assigned the role of pilot. The team was also told that the pilot would have special knowledge which the others would not share, and she was, in fact, given some key information which was not given to the others. Within both the standard and female pilot conditions, three teams were randomly assigned to the arctic survival task, while two teams discussed desert survival.

Procedure

The teams constituting the standard, control condition in this study are the same five face-to-face teams which were compared to the computer-mediated teams in Study One. Thus, the experimental procedure followed for these teams has already been described. This procedure was modified for the female pilot teams so that one of the participants could be assigned this special role. Modifications included the following:

1. At the start of the session, when the experimenter explained to team members what they would be doing, she added that "in order to make the situation more realistic and involving," team members would be assigned special roles. In particular, she told them that one of them

would be assigned the role of pilot, while the others would be told to imagine that they had been passengers in the plane.

2. Team members were also told to imagine that their plane had supposedly crashed because of the sudden malfunction of its engine. This was done in order to minimize the likelihood that the woman chosen to be the pilot would be blamed for the crash.

3. After participants had been assigned subject numbers, the experimenter pretended to consult a prepared schedule to determine who should be the pilot for that team. She acted as though the decision was an arbitrary one, based entirely upon the individual's subject number. (This number, in turn, depended only upon which seat that person happened to choose to sit in--which is why we allowed participants to freely choose where to sit). Instead, the role of pilot was always randomly assigned to one of the women in the group. The experimenter made sure that all four team members understood which of them was to be the pilot before proceeding. She also pointed out that because of her special position, the pilot would be given some extra information about the situation which would not be available to the others.

4. Two different versions of the description of each survival situation were used. The passengers' version, labelled "Passenger's Briefing Sheet," was identical to the description used in the telecommunication setting and the standard face-to-face sessions except that the statement that the pilot had died in the crash was, of course, eliminated. Participants read instead that the co-pilot had died. The "Pilot's Briefing Sheet" differed in two respects from that read by the other team members. First, the phrase "the pilot" was replaced by the word "you," and analogous changes were made in all pronouns referring to the pilot. More importantly, the following key paragraph was inserted in the description (for the desert situation the word "arctic" was simply changed to "desert"):

> Because you are a pilot who often flies in isolated arctic regions, you have thought about what you would do in case of a crash and have discussed the possibility with fellow pilots. It is the general opinion among experienced pilots with whom you have spoken that you should resist the desire to try to make it back to civilization on your own. Instead, they feel that your chances of survival are better if you stay with the plane. If you leave the crash site, you will have trouble finding your way and protecting your body from the harmful effects of this inhospitable area. Your best bet, then, would be to stay where you are, take good care of yourself, and do whatever you can to let others know you are there.

Thus, the pilot was given information favoring the strategy choice actually recommended by experts and, in addition, she was provided with explanations which supported this choice.

From this point on, the procedure for the female pilot condition was identical to that for the standard face-to-face condition. Team members chose strategies and problems individually, discussed their choices, reached a consensus, and then repeated this sequence for the rankings of the salvaged items. They then completed the group process questionnaire used with the other face-to-face teams. Finally, during the debriefing period, they learned from the experimenter what choices the experts would recommend and received additional information about the aims of the research.

Dependent variables

Again, three different types of dependent measures were available for this study. A research assistant viewed the videotapes to determine how much each team member had spoken. The tapes were also viewed a second time so that members' specific statements could be analyzed in greater detail. Each statement was assigned to one of the eight coding categories used in the previous study. Team decisions were compared to those recommended by experts in order to determine how well team members performed their assigned task. Finally, responses to the group process questionnaire provided data on team members' perceptions of the dynamics in their group.

Results

The behavior of team members in the female pilot condition was compared to that in the standard face-to-face condition using t-tests. Changes in overall behavior, in females' behavior, in males' behavior, and in male-female differences were examined. As in the previous study, the small cell sizes and the variability among teams made traditional levels of statistical significance difficult to attain. Thus, several patterns which fell short of statistical significance will be discussed.

Effects on participation

Assigning one female team member to a leadership role had a dramatic effect on the degree to which males versus females participated in team discussions. In all other conditions containing mixed-sex teams (the standard face-to-face condition and the telecommunication versions included in our earlier report), male team members did about 60% of the talking done in the team, while females did only 40%. This pattern was dramatically reversed in the female pilot condition; females did 63% of the talking (196 sec.), while males did only 37% (116 sec.). Comparing talking times of males and females in the two face-to-face conditions, the interaction of sex and condition was marginally significant ($t(8) = 1.76$, $p<.20$), with females talking somewhat more in the female pilot condition than in the standard one and males talking significantly less ($t(8) = 3.01$, $p<.05$). Similarly, if we look at the number of occasions on which males and females spoke, we see that males took fewer talking turns in the female pilot condition than in the standard condition ($\bar{X} = 16.1$ vs. 27.3, $t(8) = 2.24$, $p<.10$). However, there was essentially no change in the number of talking turns taken by women ($\bar{X} =$ 20.9 in the standard condition and 18.9 in the female pilot condition). Incidentally, we should note in passing that these figures are markedly

higher than the figures for the number of talking turns people took with our telecommunication system. In the face-to-face set-up there was much more turnover in speakers. In the telecommunication set-up it probably seemed harder to get a chance to speak, and people said more when they actually got a turn and had the floor for a guaranteed time period.

Of course, appointing one female member to a team leadership role would be expected to affect her participation more than that of the other woman on her team. In line with this expectation, while PRCA scores indicated that the woman chosen as pilot was the more shy of the pair of women in three out of five teams, the pilot spoke as much as or more than the non-pilot in four of them. In addition, in four out of five teams, the pilot spoke more than the male teammate whose shyness level corresponded most closely to her own, and in three teams she spoke more than her not-shy male teammate. In contrast, only two of the ten women in the standard face-to-face condition spoke more than the not-shy male members of their teams.

While women in female pilot teams spoke more, overall, than men, this difference did not hold for all types of statements. Table 3 shows the percentage of statements in each coding category which were made by male and female participants. (Again, our coding categories 4, 5, and 6 have been combined into a single category.) Men and women were equally likely to suggest tentative solutions to the team task, to offer relevant information, and to express positive feelings. Men were more likely than women to express feelings which were categorized as negative. However, for the two categories most clearly related to the leadership role, women dominated men. Women were more likely than men to present solutions to the task in an assertive manner, and they were much more likely than men to make attempts to structure the process by which team members arrived at a consensus ($X^2_c(1) = 27.19$, $p<.01$). In most cases (73%), when the female pilot attempted to structure the decision process, she did so by focusing the team on a particular question and soliciting answers to it (coding category 6).

Insert Table 3 about here

Comparing statements made by the pilot to those made by her female teammate revealed that the pilot made more assertive statements, gave more information, tried to structure the decision process more often, and more often expressed positive feelings. Interestingly, the dominant role played by the female pilot had the unexpected effect of erasing the usual differences between shy men and not-shy men. The shy and not-shy male participants in female pilot groups showed nearly identical patterns of participation. For four of the six categories listed in Table 3, shy and not-shy males made exactly the same number of statements, and for the other two categories, the not-shy males made only one more statement than the shy males. In contrast, in the standard face-to-face condition, not-shy males expressed more feelings (both positive and negative), made more attempts to structure the decision process, and, overall, did a

larger percentage of the talking. Perhaps the presence of a high status, competent female liberates shy males while suppressing the traditional controlling influence of not-shy males.

Effects on performance

In the female pilot condition, the woman assigned the role of pilot received extra information which supported the strategy choice recommended by experts. She was provided with arguments suggesting that their chances for survival would be best if the team chose to remain at the crash site. In all other mixed-sex conditions in our research, four out of five teams decided to leave the site and only one decided to stay. In the female pilot condition this pattern was reversed. Only one team decided to leave; the other four teams made a decision consistent with the pilot's special information and decided to stay at the site. When all strategy choices of face-to-face teams were scored (according to rules provided by Human Synergistics) a nearly significant difference favoring the female pilot teams emerged. On a scale ranging from 1 to 4 (with lower scores indicating better choices) the average score for pilot condition teams was 1.6, while that for the standard condition teams was 3.4 ($t(8) = 2.12$, $p<.10$). Thus, when one member of a team was provided with information useful to the team as a whole, the team was generally able to use that information to improve the quality of its decisions, despite the fact that the person with the special information was always a woman and women were rarely seen as performing a leadership role in our other mixed-sex conditions.

In addition to choosing a survival strategy, each team was required to identify the four most serious problems they faced and to rank the importance of ten different items. The female pilot received no information directly related to these issues, and the introduction of the special pilot role had no effect at all on these decisions. The standard face-to-face teams and those with female pilots were identical with respect to both their average score on the problem choices and their average score on the item ranks.

Effects on perceptions of group process

One difference between the responses of female pilot teams and standard face-to-face teams on our group process questionnaire was that female pilot teams thought their decisions were better ($\bar{X} = 4.6$ vs. 4.2, $t(8) = 2.53$, $p<.05$). The most favorable evaluations were given by women in the female pilot condition. Of course, most of the decisions made in the female pilot teams were not actually better than those in the standard teams. Still, participants apparently felt better about them.

The female pilot manipulation had few effects on participants' responses to questions on how much they influenced their teammates. However, males tended to think team decisions reflected their contributions less in the female pilot condition than in the standard condition, while the reverse was true for females ($t(8) = 1.54$, $p<.20$, for the interaction of condition and sex). A related question asked participants to categorize their primary contribution to the team. The

most interesting responses here were those of the women assigned to the pilot role. Since these women generally talked more than their teammates and apparently influenced their strategy decisions, one might expect that most of them would see their primary contribution as an active, task-oriented one. This seems especially likely when we consider the fact that nine of the ten women in the standard face-to-face condition gave a response which fell into this category. Instead, three out of five female pilots saw their prime contribution as improving the atmosphere in their group and/or making their teammates feel comfortable. None of the females in the standard face-to-face condition gave this sort of response, and only one non-pilot female in the pilot condition did so. Apparently the female pilots did not see themselves as active, task-oriented leaders.

In line with this perception, when asked who, if anyone, was the leader of their team, only one of the five pilots named herself. In two other teams at least one participant thought the woman playing the role of pilot was the leader. Overall, members of female pilot teams were no more likely than members of standard face-to-face teams to feel that their team had a leader. However, among those who did name a leader, those in female pilot groups were more likely to name women. In fact, in the standard condition teams, all participants identified as leaders by team members were men, while in the female pilot teams only women (usually, though not exclusively, the pilot) were identified as leaders. Despite the more dominant role played by women in the female pilot condition, men were still named more often than women as the person whom respondents felt had influenced their own decisions the most. This difference, though not statistically significant, reveals a subjective tendency to perceive men as more influential than women even when the objective evidence suggests otherwise.

An additional way in which our female pilot manipulation affected team members was to influence their emotional reactions to their experience with the survival task. Both males and females tended to perceive less tension in their group in the female pilot condition than in the standard face-to-face condition; average group means were 1.7 and 2.2, on a 1 to 5 scale, $t(8) = 1.59$, $p<.20$. Females also felt less frustrated in the female pilot condition, although this difference did not approach significance. Finally, males tended to enjoy working on the task less in the female pilot condition, the condition in which they played a less dominant role ($\bar{X} = 3.6$, vs. 4.1, $t(8) = 1.62$, $p<.20$). Though females participated more in the female pilot condition and also apparently felt less frustrated and tense, they did not report any greater enjoyment of their experience in this condition ($\bar{X} = 3.6$ for both female pilot and standard face-to-face teams).

Discussion

Assigning a female team member to the role of pilot and giving her extra information about the situation clearly affected the roles played by men and women in the team. Instead of doing only 40 percent of the talking (the average in all other conditions), women in the female pilot condition made more than 60 percent of the contributions to the team. The pilot herself played a dominant role. She was more likely than her teammates to engage in such leadership activities as speaking assertively

and trying to structure the decision-making process. Teammates often saw her as the team leader. A curious finding, however, is that it was the amount of talking done by men, rather than the amount done by women, that was most strongly affected by our manipulation. It seems as though women played a relatively larger role in the female pilot teams more as a consequence of their male teammates' holding back and allowing them to talk than because the women themselves actively seized the leadership position.

In addition to allowing the pilot to do relatively more talking than she otherwise might, her team members also allowed what she said to influence their decisions. Giving the pilot information on what strategy to choose and why to choose it dramatically affected the team's strategy choice; all but one team made the choice recommended by her special information. The effect of our manipulation on performance was very specific. No decisions besides the strategy choice were affected. The effect should be more general, however, in cases where the quality of an initial decision is more closely linked to the quality of subsequent ones, i.e., where a bad initial decision leads people to make other decisions which are incorrect, while starting out with a good choice makes it more likely that later choices will also be good. The fact that early decisions frequently do affect later ones, plus the fact that female pilot teams knew their initial decision was supported by experts, may account for the more favorable evaluation of their decisions given by members of these teams.

While pilots were more likely than women in our other experimental conditions to be seen as leaders by teammates, they rarely identified themselves as playing this role. Similarly, other research has shown that female team leaders are relatively unlikely to choose themselves as the ones to lead their teams on future tasks (Eskilson & Wiley, 1976). Pilots seemed to see themselves not primarily as task leaders (which is what they probably thought the questionnaire items on leadership referred to), but rather as social-emotional leaders (Bales & Slater, 1955). They saw themselves as supporting others, improving the group climate, and thus trying to make participation on the team a positive interpersonal experience for themselves and for their teammates. Why might this be so? One reason is that social-emotional leader is a more usual female role, one which the women pilots are more likely to play in their informal interactions with others and in other task-oriented teams (e.g., Strodtbeck & Mann, 1956; Nemeth, Endicott, & Wachtler, 1976; Johnson, 1976). In addition, the pilots may have learned through past experience that they are liked better by others when acting in a more passive and unassertive manner (Zellmann & Connor, 1973; Johnson, 1974).

Even if the female pilots were directly trying to influence others to adopt their viewpoints, they seemed to have tried at the same time to keep the team experience a relaxed and enjoyable one for all involved. While presenting their ideas, they may also have tried to make it clear that they valued others' ideas too. For example, in one team the pilot said which strategy she had picked and why, and then she added, "If that sounds totally unreasonable, then maybe we should reconsider, but what do you all think?" Research on both laboratory work teams and real-life small groups has shown that even when women take on traditionally male roles, they

often try to continue fulfilling their traditional female roles as well (Eskilson & Wiley, 1976; Katz, 1975).

An unexpected finding was that women tended to feel less frustration and tension in the pilot condition than in the standard face-to-face condition. One might anticipate that having a woman play a more prominent role than usual might be associated with increased anxiety and tension in the team. In fact, some of our own work on telecommunication suggests that manipulations designed to increase talking among chronically low participators sometimes make them feel more uncomfortable. Perhaps this did not occur among female pilots because they continued to perform their usual social-emotional roles. Another important factor may be that the experimenter assigned them to the pilot role. This role assignment legitimized their increased participation. Pilots could think of themselves as playing a part rather than being "themselves." When the leadership position is situationally determined rather than established on the basis of dispositional qualities, it becomes more possible for someone who is usually a follower to function as a leader without being self-conscious. Similarly, shy people often feel more comfortable speaking to others if they are playing an assigned role or following a script (Zimbardo, 1977). Despite the considerable body of research on leadership (Bons, Bass & Komorita, 1970; Stogdill, 1974; Fiedler, 1978, Hollander, 1978), we need to know more about the circumstances and processes by which those people who ordinarily are not leaders can begin to assume leadership roles.

Conclusions

The effectiveness of a team's problem-solving performance depends upon the interaction of task characteristics, communication system variables, and social-personal characteristics of team members. Too often, research has focused on manipulated differences within only one of these classes of input to the final product, while ignoring the contributions of the others. But our current and prior research (Zimbardo et al., 1982) clearly demonstrates that within an audio-only teleconferencing system, the process and product are changed as a function of the turn-taking rules, the availability of informational prompts, the level of shyness and sex of the team members, as well as assigned status positions. We would expect further that changing the nature of the task might alter participation levels if certain classes of team members approach the problem-solving task with differences in confidence and prior experience. Changes in the perceived masculinity-femininity of the task, for example, should alter the tendency for certain members to initiate discussions, structure solutions, and dominate the conversation. In general, on the survival tasks we used, males took the lead, and females played more passive, listening roles. This was true even though the females who served as experimental subjects were extremely gifted intellectually and equal to their male counterparts on measures of academic ability. The gender difference in participation might have been reduced, eliminated, or reversed if we had used a different task.

Thus it becomes important in designing any communication system to take account of who will be using it and what their aims will be. Telecommunication systems, or any interpersonal system used by small

groups to exchange messages as part of their problem-solving task, need to be tailored to the specific task and participants. In addition, the novelty of any non-traditional communication system should be reduced by repeated exposure to it prior to comparing its effectiveness to more standard systems of information exchange. This is especially apparent for "technologically-rich" communications systems that employ computers and other apparatus. Assessment of the users' perception of "system friendliness" is called for as a means to separate actual competence from self-induced inhibitions due to low efficacy expectations (Bandura, 1982).

This distinction between what one can do and what one feels comfortable with, or believes is appropriate and expected in a given situation, was apparent in the change in women's participation when assigned a high-status role. Without instruction in how to do so, their new role enabled the female pilots to disinhibit a variety of response systems for actively directing the problem-solving activities of their teams. We would expect the same behavioral transformation in shy males assigned a position that reflected competence and high status.

Of considerable importance is the finding that teams made better decisions under the constraints imposed by our telecommunication system than in the standard face-to-face problem-solving setting. Team members also tended to believe their decisions were better when they had used teleconferencing. Interestingly, females felt less frustrated with the telecommunication system. Perhaps they responded to the relatively high level of frustration experienced by their male teammates in that setting by playing a more traditionally feminine role and trying to create a positive social climate.

In addition to acknowledging the interactive effects of system, task, and social-personal factors on a variety of outcome measures, we should also note that over time these factors can affect each other. The system can alter social relationships and self perceptions by socializing its users into accepting and using new patterns of communications. Observing one's self contributing more to the group process and being more valued by others should, in turn, enhance self esteem. With a more positive self-image, a normally reticent team member may become more active in directing team efforts. In addition, those people with a history of low participation may bring to the task and the team setting special leadership qualities, such as interpersonal sensitivity and a concern for social-emotional issues. It is also possible that, over time, social-personal factors and task demands will lead to new group norms which may override static system factors; participants may discover ways to "get around" the system.

On the other hand, there are some powerful belief systems that individuals carry into any communication system which can direct (or misdirect) their perceptions of the nature of team members' participation. Even when we successfully altered the asymmetry of male-female communication patterns, strong forces of resistance still operated. The female pilots assumed the role of leader, directing their groups toward the best strategy decisions--yet, they themselves refused to accept the designation of "leader". Similarly, in the standard telecommunication setting, even when women were identified as the most influential team

members, their teammates--both male and female--did not extend this evaluation to acknowledge them as team leaders.

Future research needs to vary both the gender-quality of problem-solving tasks and also other aspects of the communication setting that might result in more balanced, democratic participation. Women could be given more prior training with hi-tech communication systems, be rewarded for making more assertive contributions, be encouraged to be the initiator who starts team discussions, and be given practice in effectively handling interruptions by males (Zimmerman & West, 1975).

In our research the proportion of males to females was balanced, while in many work settings and problem-solving teams women are in the minority. Although majority opinion and action tends to exert greater influence than that of the minority, recent research reveals the subtle power of the minority (Moscovici, 1976). The majority controls the process of compliance, that is, overt public agreement with its expressed position. However, the minority's influence emerges in the delayed, private changes in judgment described as conversion (Moscovici, 1980).

Women and others in minority positions need to be taught to maintain their strongly held positions publicly despite adverse majority reactions because often their impact will be realized subsequently in private conversions of some of the majority. Inhibited minority team members whose only contribution is to listen silently and acquiesce to decisions proposed by others deprive the team of divergent viewpoints while promoting false perceptions of reasoned consensus (Janis & Mann, 1977). It is only through the fullest participation of all team members that an on-going group benefits from the potentially unique and valuable contributions of each of its constituents. Helping all team members realize that fact should be a high priority goal for systems managers, task leaders, and especially those low participators who have traded the freedom of taking risks as an active decision-maker for the false security of being a passive follower (Fromm, 1941). Such "self-sacrifice" does not work to the benefit of the person, the team, or the national purpose of democratic involvement of all citizens in matters of personal concern.

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Footnotes

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[2] We thank the staff of Human Synergistics for permitting us to use their materials.

Table 1

Types of statements made by male and female team members within each communication setting

		Telecommunication				Face-to-Face			
	Category	females	males	n	(%)	females	males	n	(%)
(1)	Giving solutions assertively	29%	71%	48	(12%)	80%	20%	5	(2%)
(2)	Giving solutions tentatively	40%	60%	96	(25%)	38%	62%	94	(29%)
(3)	Giving information	48%	52%	82	(21%)	47%	53%	133	(41%)
(4,5,6)	Structuring group process	42%	58%	62	(16%)	55%	45%	51	(16%)
(7)	Expressing positive feelings	45%	55%	73	(19%)	33%	67%	18	(6%)
(8)	Expressing negative feelings	17%	83%	24	(6%)	43%	57%	21	(7%)
Total number of statements (100)%		40%	60%	386	(100%)	45%	55%	322	(100%)

Table 2

Mean ratings of personal frustration as a function of sex and communication setting

	Telecommunication	Face-to-Face
Females	1.4	2.1
Males	2.6	2.0

Table 3

Percentage of statements in each coding category made by male and female members of female-pilot condition teams

	Category	females	males	n	(%)
(1)	Giving solutions assertively	56%	44%	45	(17%)
(2)	Giving solutions tentatively	49%	51%	35	(13%)
(3)	Giving information	51%	49%	53	(20%)
(4,5,6)	Structuring group processes	82%	17%	68	(26%)
(7)	Expressing positive feelings	52%	48%	52	(20%)
(8)	Expressing negative feelings	22%	78%	9	(3%)
Total number of statements		59%	41%	262	(100%)

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Appendix 1. Experimenter's introductory speech and subsequent statements (face-to-face version).

Introduction to Session

Hello. My name is _____ and I work with Dr. Zimbardo. We'd like to thank you for coming to participate in our study. As you already know, we're interested in how groups go about solving problems presented to them. Before you actually begin your discussion, let me give you some information.

Your group -- the four of you -- will be faced with the problem of deciding how best to survive in [an arctic / a desert] situation. The four of you should pretend that you are the actual people faced with this difficult survival problem. That is, you should approach the task as if your "life or death" really depended on what you do. Your "life or death" will be determined by how well you share information and ideas so that your team can come to a consensus and make good decisions which will help you to survive.

At the end of the session today, I'll compare your responses to those suggested by experts on survival techniques, so you can find out how well you would have done if you were actually in the situation. One other thing I should mention is that in addition to giving you research credit for your participation in our study, at the end of the experiment we'll be awarding a cash bonus to the team which has made the best decisions.

Are there any questions so far?

For convenience I'll assign each of you a subject number. You should remember this number as it will be referred to in later instructions. Your subject numbers are on the signs taped to the table in front of you and are also written on the top pages of these packets, which contain various forms we'll be using during the session today. I'll give you each a packet now. You should fill out the top page, but please don't turn the page until I tell you to do so. You only need to fill in the information above the first row of asterisks. I've already filled in the bottom section to indicate what experiment you're in, what condition of that experiment, and so forth. [Hand out packets. Person at your far left, as you face the group should be Subject #1, the person next to her should be Subject #2, and so forth. Wait till all have completed the Informed Consent form before proceeding.]

Now, let me tell you some more about the procedure you'll be following in this study. Detailed information about the situation you'll be discussing is contained in your packets, and the packets also contain forms on which you'll have to indicate your decisions about what to do in the situation. Sometimes you'll each be working privately on your own, reading information, answering questions, and so forth. At other times, you'll be discussing the situation publicly with one another. You should talk with one another ONLY during these official discussion periods. You should be careful not to say anything to your teammates unless you have been told that it is okay to do so at that time.

At the end of each page in your packet there will be instructions about whether you should turn the page when you are ready, or should wait till the experimenter tells you to proceed. Sometimes you will work at your own speed, and sometimes you will be held at a certain stage until all your teammates are ready to go on. You should NEVER turn to the next page in your packet unless I, or the instructions in the packet, tell you to do so. In addition, once you have turned a page, you may never turn back to it again. When you have gone on to another page, you cannot go back and reread previous pages.

Are there any questions?

Your group discussions will be videotaped so that our research team can go back and study the dynamics in your group. So that we'll be able to tell which voice goes with each subject number, and so forth, it will be helpful if you each just say your subject number out loud, and also tell us where you live here at Stanford. First, let me turn on the camera and tell the videotape machine what your group number is. [Remove the lens cap from the camera and pretend to turn the camera on. Then, announce to the camera: "It's (date) and we're running group number __ ."] Now, let's have Subject 1 go first, then Subject 2, and so on. When it's your turn, just tell the others what your subject number is and where you live. You can begin now, Subject 1. [Have each subject in turn give this information.] Thank you.

I'll be in the room during the session to time things, to give additional information, and so forth. However, you should not ask me for information once we get started. Of course, you will be able to ask for and receive information from each other during the discussion periods. The four of you will be pretty much on your own, and most of the information and instructions you need will be found in your packets.

There are just three rules which you must remember to follow. Your team will be penalized for violations of these rules:

1. You may turn a page in your packet only when the instructions on the page, or the experimenter, tell you to do so.

2. Once you have turned a page, you may not go back to it later.

3. Most important, you may not discuss the situation, or any of the specific questions, with your teammates unless I have told you that it is time for you to have your public group discussion. Do not talk with your teammates at any other time.

You may turn the page now and begin reading about the situation which you will be discussing later. Remember not to discuss the situation with your teammates at this time.
[Experimenter should now walk around to the side of the table. Watch to see when all four subjects have finished reading about the situation and have turned to the blank page which follows it.]

During the Session

1. When subjects are done reading the "situation" :

"Now that you're all done reading about the situation, you can begin to answer some questions about it. You may turn the page when I say 'Begin' and then read and answer the questions in your packet. Be sure to follow the instructions at the bottom of each page which tell you if you should proceed to the next page or wait until the experimenter tells you to go on. Also, be careful not to talk with your teammates at this point or to glance at the responses they are giving. We want all your answers at this point to be independent and not influenced by what other people want to do. You may turn the page and begin now."

[Wait till everyone has answered two pages of questions and is on a page listing the strategies and problems, but containing no spaces for responses.]

2. When subjects are ready to begin their FIRST DISCUSSION :

"Your team will now have 400 seconds to discuss and reach agreement on which one strategy to follow and which four problems will be the greatest you face in your efforts to survive. By the end of the discussion you all have to agree on which strategy is best and which problems are greatest. I'll start this clock when it is time for you to begin speaking. The 400 seconds will be up when this hand of the clock reaches this red line. [Point to the minute hand and the red line.] If you look at the clock, then you'll be able to tell how much discussion time you have left. You may refer to the list of strategies and problems which you have in front of you during the discussion. I'll get the timer started, so you can begin your discussion now."

[Start the timer. Watch it, and stop the discussion after 400 seconds are up. Be sure to stay behind the subjects, out of the way of the video camera, while the discussion is going on. Return to the front of the table at the end of the 400 seconds. Be firm about stopping them now!]

3. When subjects are done with the first discussion (i.e., when 400 seconds are up, or when it is clear that they have reached agreement, whichever comes sooner):

ALTERNATIVE 1 (used when agreement is reached in about 400 seconds):

The discussion time is up now. It seems as if you've agreed that the best strategy to follow is to _____ and that the four greatest problems are ____, ____, ____, and ____ . Is that right? [Wait for subjects to agree with you.] Okay, then, I'll just note that down and we can proceed. [You should now fill out the Stategies and Problems Consensus Form to indicate their choices.]

ALTERNATIVE 2 (used when agreement is reached in less than 400 seconds):

The time's not up yet, but it seems as if you've agreed that the best strategy to follow is to _____ and that the four greatest problems are ____, ____, ____, and ____ . Is that right? [Wait for subjects to agree with you.] Okay, then, I'll just note that down and we can proceed. [You should now fill out the Stategies and Problems Consensus Form to indicate their choices.]

ALTERNATIVE 3 (used if they haven't agreed after 400 seconds):

The discussion time is up now. It seems as if you've reached agreement on some of the questions, but not all of them. You have agreed that _____, but you still have to (pick a strategy / pick _ more problems). I'll give you one more minute to discuss it. You will have to reach a consensus during that minute. You can begin the discussion now. [Time them to see when a minute is up.]

NOTE: What you say after this discussion depends upon what

happens during the discussion. Choose appropriate phrases from among the following:

Okay, so you've agreed that _____. Is that right?
It seems as if you haven't been able to agree on ___ . Is that right?
I'll just write down what you have agreed on (and make a note of what you couldn't agree on), and then we can proceed. [Do this.]

4. When subjects are ready to study the list of survival items :

"The next thing you'll be reading is a list of ten items which your team was able to salvage. Your task will be to rank these items according to their importance for your survival. First, I'll give you 60 seconds to look over and think about the list of items before you have to make any decisions. You can turn the page now."
[Use small stopwatch -- or second hand on your watch -- to see when 60 seconds have elapsed.]

5. When subjects are ready to do their individual rankings of the items:

"That's 60 seconds. When I tell you to, you should turn the page and rank the ten items according to their importance for your survival. You should assign a "1" to the most important item, a "2" to the item you think is next most important, and so forth. Thus, the item you think is least important will be assigned the rank of "10". Please be sure not to discuss your rankings with your teammates at this point. You may turn the page now".
[Wait till all subjects have made their ratings and are on the next page, which is blank.]

6. When subjects are ready to begin their SECOND DISCUSSION :

"The next thing you'll be doing is having another discussion, during which you will have to reach agreement on the ranks of the ten items. After the discussion you will have to indicate the team's decision. During the discussion you will each be able to see what ranks the others just gave to the ten items. The way we will do this is that I'll have each of you write down your rankings on this special paper, which will make four copies of what you write. Just copy down the numbers you just wrote on your own form, and then pass the paper on to the next person. You should all use this ball-point pen and press down firmly while you're writing so that all the copies of your rankings can be read easily. Don't change your ratings to match those made by other people. You're just supposed to copy down whatever rankings you entered on your own rating form.
[Hand the special rankings form to Subject #1, and have each subject write down her rankings and pass the form to the next person. When all ranks have been entered, take the form, separate the pages, and give one page to each subject. (First, make sure all pages are legible; if they're not, write in the rankings so they can be read.) Keep the extra copy for our files.]

Okay. Now we're ready for the second discussion. Your team will have 400 seconds to discuss and agree on the ranks of the ten items. Remember, you will have to indicate a team decision about the ranks when you are done. I'll reset and start the clock, and the 400 second discussion period will be over when this hand reaches the red line. [Point out the minute hand and the red line.] Looking at the clock will let you know how much more time you have. I'll get the timer started, so you can begin your discussion now."
[Start the timer. Watch it, and stop the discussion after 400 seconds are up.

Be sure to stay behind the subjects, out of the way of the video camera, while the discussion is going on.]

7. When subjects are ready to begin the OPEN DISCUSSION and fill out the team consensus form :

" The 400 seconds are now up. Your team must now indicate its final decisions on this form. [Place form in center of table.] You may continue to talk with one another while you fill out the form. You should first put a "1" beside the item the team considers most important, then a "2" next to the second most important item, and so forth. Each team member should agree on a response before you move on to the next item. You can start working on the form now. You'll have a maximum of 6 minutes to fill out the consensus form." [Again, stay out of the way of the camera. Another thing you should do is to keep track of the time and hurry them up if a minute has gone by since the last time a decision was entered on the "team consensus" form. Also, when 3 minutes are up, say "You have 3 minutes left," a minute later, say "2 minutes left," etc. If they're not done after 6 minutes, say "I can give you a little more time," and try to get them to finish quickly. Also, make a note of which subject filled out the form. Take the form when they're done and write at the top the S# of the person who filled it out.]

8. When subjects are ready to fill out their Group Process Questionnaires :

" The last two pages of your packet contain a number of questions we'd like you to answer about what has gone on in your group during this experiment. Please turn to this Group Process Questionnaire and answer the questions in it. Be careful not to talk to each other while you are doing this, because we want everyone's answers to be independent. Just close up your packet when you are all done with the questionnaire."

[While subjects are filling out this form, you should put the lens cap back on the camera and pretend to turn the camera off. When everyone is done with the questionnaires, you should collect their packets. Now it's time to give out credits, do the debriefing, etc.]

9. When the subjects have left (after the debriefing), you should write each persons PRCA score on the front of her forms packet. Then, put all the forms for the session into their folder.

10. Now you can relax!

Appendix 2. Stimuli viewed by members of face-to-face teams (arctic situation).

THE SITUATION

It is approximately 2:30 p.m., October 5th and you have just crash-landed in a float plane on the east shore of Laura Lake in the subarctic region of the northern Quebec-Newfoundland border. The pilot was killed in the crash, but the rest of you are uninjured. Each of you is wet up to the waist and has perspired heavily. Shortly after the crash, the plane drifted into deep water and sank with the pilot's body pinned inside.

The pilot was unable to contact anyone before the crash. However, ground sightings indicated that you are 30 miles south of your intended course and approximately 22 air miles east of Schefferville, your original destination, and the nearest known habitation. Schefferville (pop. 5,000) is an iron ore mining town approximately 300 miles north of the St. Lawrence, 450 miles east of the James Bay/Hudson Bay area, 800 miles south of the Arctic Circle, and 300 miles west of the Atlantic Coast. It is reachable only by air or rail; all roads end a few miles from town. Your party was expected to return from northwestern Labrador to Schefferville no later than October 19th and filed a Flight Notification Form with the Department of Transportation via Schefferville radio to that effect.

The immediate area is covered with small evergreen trees (1 to 4 inches in diameter). Scattered in the area are a number of hills having rocky and barren tops. Tundra (arctic swamps) make up the valleys between the hills and consist only of small scrubs. Approximately 25 percent of the area in the region is covered by long, narrow lakes which run northwest to southeast. Innumerable streams and rivers flow into and connect the lakes.

Temperatures during October vary between 25 and 36 degrees Farenheit, although it will occasionally go as high as 50 and as low as zero. Heavy clouds cover the sky three quarters of the time, with only one day in ten being fairly clear. Five to seven inches of snow are on the ground; however, the actual depth varies enormously because the wind sweeps the exposed areas clear and builds drifts three to five feet deep in other areas. The wind speed averages 13-15 miles per hour and is mostly out of the west-northwest.

You are all dressed in insulated underwear, socks, heavy wool shirts, pants, knit gloves and caps, sheepskin jackets, and heavy boots. Collectively, your possessions include: $153 in bills; $2.28 in change; 1 pocket knife (2 blades and an awl which resembles an ice pick); and one lead pencil.

Before the plane drifted away and sank, you were able to salvage 10 items. One of your tasks will be to rank these items according to their importance to your survival.

You may assume—

1. the number of survivors is the same as the number on your team;
2. you are the actual people in the situation;
3. all items are dry and in good condition.

[You may reread this description of the situation now, but once you have turned the page, you may not go back to it. Turn the page when you are ready to go on.]

DO NOT TURN THE PAGE UNTIL THE EXPERIMENTER TELLS YOU TO DO SO.

First, please decide which ONE strategy you feel will be best for your survival. Place a checkmark next to the best strategy. (Be sure to check exactly one strategy.)

____ 1. Start walking out toward the town now.

____ 2. Wait at the crash site until morning and then all start walking out.

____ 3. Send one or two people for help.

____ 4. Stay at the crash site indefinitely.

____ 5. Stay at the crash site for 2 days and then start walking.

____ 6. Stay at the crash site for 4 days and then start walking.

PLEASE TURN THE PAGE WHEN YOU ARE READY.

Now, please decide which four of these problems you feel will be the greatest you face in your efforts to survive. Put checkmarks next to the four greatest problems. (Be sure to check exactly four problems.)

____ 1. Obtain more fire wood.

____ 2. Obtain more food.

____ 3. Decide who should go for help.

____ 4. Figure out how to navigate.

____ 5. Construct signalling devices.

____ 6. Construct a shelter.

____ 7. Minimize body heat loss.

____ 8. Calm down after crash and stay calm.

PLEASE TURN THE PAGE WHEN YOU ARE READY.

PICK THE BEST STRATEGY:

Strategy 1 Start walking out toward the town now
Strategy 2 Wait till morning and then all start walking out
Strategy 3 Send one or two people for help
Strategy 4 Stay at the crash site indefinitely
Strategy 5 Stay at the crash site for 2 days and then start walking
Strategy 6 Stay at the crash site for 4 days and then start walking

PICK THE FOUR GREATEST PROBLEMS YOU FACE:

Problem 1 Obtain fire wood
Problem 2 Obtain more food
Problem 3 Decide who should go for help
Problem 4 Figure out how to navigate
Problem 5 Construct signalling devices
Problem 6 Construct a shelter
Problem 7 Minimize body heat loss
Problem 8 Calm down and stay calm

FOR INFORMATION PURPOSES ONLY – DO NOT RESPOND ON THIS SHEET.
DO NOT TURN THE PAGE UNTIL THE EXPERIMENTER TELLS YOU TO DO SO.

You now have 60 seconds to look over and think about the importance of these ten items. You will then have to rank the items from most important to least important. Please do not discuss the ranks with your teammates at this point.

1. A gallon of maple syrup
2. A sleeping bag per person (arctic type down-filled with liner)
3. A 20' x 20' piece of heavy duty canvas
4. 13 wood matches in a metal screwtop, waterproof container
5. 250 ft. of 1/4 inch braided nylon rope, 50 lb test
6. An operating 4 battery flashlight
7. 3 pairs of snowshoes
8. Safety razor shaving kit with mirror
9. A hand axe
10. One aircraft inner tube for a 14 inch wheel (punctured)

DO NOT TURN THE PAGE UNTIL THE EXPERIMENTER TELLS YOU TO DO SO.

Now please evaluate the importance of these survival items. Rank the items from 1 to 10. Put a "1" next to the most important item, a "2" next to the second most important item, and so forth. (Each number between 1 and 10 should be used exactly once; ties are not permitted.)

____ 1. A gallon of maple syrup

____ 2. A sleeping bag per person (arctic type down-filled with liner)

____ 3. A 20' x 20' piece of heavy duty canvas

____ 4. 13 wood matches in a metal screwtop, waterproof container

____ 5. 250 ft. of 1/4 inch braided nylon rope, 50 lb test

____ 6. An operating 4 battery flashlight

____ 7. 3 pairs of snowshoes

____ 8. Safety razor shaving kit with mirror

____ 9. A hand axe

____ 10. One aircraft inner tube for a 14 inch wheel (punctured)

PLEASE TURN THE PAGE WHEN YOU ARE READY.

DO NOT TURN THE PAGE UNTIL THE EXPERIMENTER TELLS YOU TO DO SO.

Group Process Questions

Before continuing with the next part of the session, please answer the following questions about the dynamics in your group while you were working on the survival task you just completed. (Write in the number corresponding to your answer.)

____ 1. How much did you enjoy this survival situation task?
1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

____ 2. How involved were you in the survival situation task?
1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

____ 3. Can you imagine yourself being in such a survival situation?
1 = yes
2 = no

____ 4. How good do you think your team's decisions were?
1 = poor
2 = fair
3 = acceptable
4 = good
5 = very good
6 = excellent

____ 5. Do you feel your group had a leader?
1 = yes
2 = no

____ 6. If you feel your group had a leader, what was that person's subject number?
1 = Subject #1
2 = Subject #2
3 = Subject #3
4 = Subject #4
5 = there was no leader

____ 7. Did all team members contribute equally to the final decision process?
1 = yes, all contributed equally
2 = no, I contributed more than others
3 = no, some other person contributed most
4 = no, a subgroup (including me) contributed most
5 = no, a subgroup (excluding me) contributed most

____ 8. How much did the team's decisions reflect your contributions?
1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

____ 9. Of how much value were your contributions to the team's decision-making process?
1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

* * * PLEASE TURN THE PAGE * * *

____ 10. In which one way did you contribute most to your team?

1 = listened carefully to others
2 = gave constructive criticism to others
3 = gave new information
4 = encouraged others to contribute
5 = helped create a positive group atmosphere
6 = raised pertinent questions
7 = none of the above

____ 11. Which was the next most important way you contributed to your team?

(use the seven categories listed above)

____ 12. To what extent did the others pay attention to your contributions?

1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

____ 13. How frustrated did you become while reaching the team decisions?

1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

____ 14. How much tension do you think there was in the group?

1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

____ 15. How much did you influence the team's final decisions?

1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

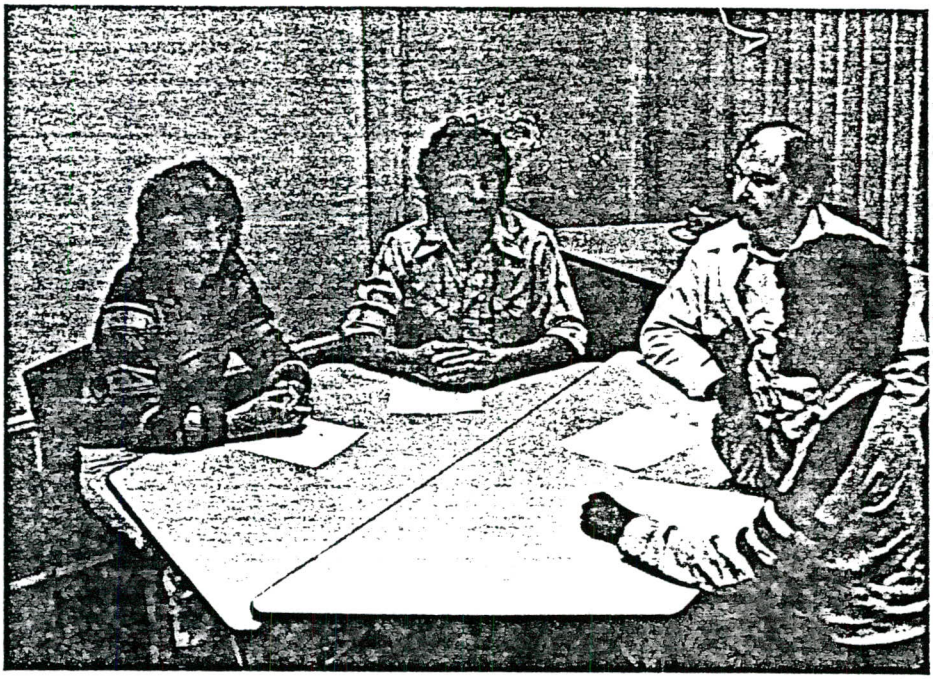
____ 16. How much were your evaluations of the strategies, problems, and items changed as a consequence of your discussions with the others?

1 = very little
2 = little
3 = some
4 = quite a bit
5 = very much

____ 17. Which team member most influenced your evaluations? (exclude your own subject number)

1 = Subject #1
2 = Subject #2
3 = Subject #3
4 = Subject #4
5 = none did

Appendix 3. Photograph of team members in our face-to-face arrangement.



Appendix 4. Categories used for coding interactional statements of team members.

I. TASK - ANSWERS

NOTE: The first two categories are to be used whenever a person directly suggests (or asserts) that the group should agree on particular strategy, problem, or item choices.

(1) Gives Solution Assertively – Use this category when someone proposes a solution to the group task as definitely the correct answer, i.e, as a fact instead of an opinion. The person may use such key phrases as "We should ...," "Clearly, ...," "The best thing to do is ...," etc.

(2) Gives Solution Tentatively – Use this category when someone proposes a solution to the group task as an opinion, rather than as definitely the right choice. The person may use such key phrases as "I think ...," "It seems to me ...," "Maybe we should ...," etc.

(3) Gives Information – Use this category when someone shares general knowledge relevant to the task, repeats information given in the description of the survival situation, etc.

II. TASK - STRUCTURE

(4) Attempts to Structure Decision Process – Use this category for units dealing with HOW the group should go about reaching a consensus. Include comments about how the time should be budgeted, what issue should be discussed next, the order in which people should speak, etc. Attempts to direct others and and to guide the decision-making process should be included here. (Do not include units in which someone asks a specific other person to make a contribution – see category 5.)

(5) Calls on Specific Other – Use this category when someone asks a specific other person to make a contribution, i.e., when the person calls on someone else or asks someone else to speak. Whenever you use this category, you should also indicate who was called on.

(6) Seeks Solutions from the Group – Use this category when someone asks the group as a whole (NOT a specific other person) for opinions, solutions, or information. Units included here should be aimed directly at soliciting possible solutions to the group's tasks or at obtaining information relevant to those solutions.

III. SOCIAL-EMOTIONAL

(7) Expresses Positive Feelings – Use this category when someone says something that increases the positive feelings in the group or expresses his or her own good feelings. The person may praise others, agree with others, make jokes, express satisfaction with the group and/or their performance, etc.

(8) Expresses Negative Feelings – Use this category when someone says something that increases the negative feelings in the group or expresses his or her own bad feelings. The person may criticize or disagree with others, express dissatisfaction with the group and/or their performance, withdraw from the group, etc.

IV. OTHER

(9) Use this residual category for units that don't seem to fit into any of the other eight categories.

* * * * * * * * *

Definition of a Unit. A "unit" is the shortest verbal utterance which seems meaningful to the coder. It can be part of a sentence, a complete sentence, or more than one sentence. A unit expresses a single idea. It is the smallest statement which you feel you can understand and assign to a category. Each unit in the discussion should be assigned to one of the coding categories.