1998

Determinants of Participation in the Ad Hoc Computer-Supported Workgroup

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DETERMINANTS OF PARTICIPATION IN THE AD HOC COMPUTER-SUPPORTED WORKGROUP

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University

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ACKNOWLEDGEMENTS

I would like to offer my grateful appreciation to those individuals who made possible the completion of this doctoral dissertation including those who participated in either the pilot project or the experiment and those who served as laboratory assistants.

I owe a special debt to each member of my dissertation committee. Their encouragement and support sustained me; their dedication to teaching me the concepts of sound research made the process exciting. Special thanks go to each member of the committee. To Dr. Jean B. Gasen, dissertation committee chair, thank you for sharing your knowledge, enthusiasm, and patience. Thank you also for allowing me my excitement yet attempting to restrain me enough to keep my research and analysis within the bounds of my topic. To Dr. Randall Sleeth, assistant committee chair, thank you for bring your knowledge and experience. Thank you also for your help in designing the experiment, for leading me into discovering new ideas, and for always challenging me to do the best work of which I was capable. To Dr. Don M. Miller, thank you for guiding me through the intricacies of statistical analysis. You have a wonderful ability to make the exact statement that will clarify statistical meaning. To Doctors J. Donelson Forsyth and Peter H. Aiken, thank you for your efforts, your ideas, and your support throughout the dissertation process.

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ABSTRACT

TITLE: DETERMINANTS OF PARTICIPATION IN THE COMPUTER-SUPPORTED, AD HOC WORKGROUP.

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Virginia Commonwealth University, 1998
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The increase of end-user computing, including the use of computer-mediated communication systems (CMCS), is one of the most significant changes to occur in business information systems in recent years. Researchers suggest that changes in technology lead to changes in the way individuals think about work and how they perform it. An important question is how the use of CMCS is changing work and work relationships. This study considers a portion of this question; it asks "What makes individuals willing to participate in a computer-supported workgroup (CSWG)."

This study considered the relationship between three variables (sex, anonymity, and token status) and participation rates in the CSWG. It asked four research questions: (1) is there a significant difference in total participation among males/females, token/non-token individuals, and gender-revealed/non-gender-revealed individuals? (2) In task-oriented participation among these same groups? (3) In socio-emotional participation among these same groups? (4) In the conversational mix among these same groups?

Students from five undergraduate business classes participated in an on-line conference using FocusPoint conferencing software. Participants were divided randomly into 36 groups of four members

each; each workgroup contained volunteers from several classes. The experimental design was a 2 x 2 factorial; factor one was gender-revealed/non-gender-revealed status and factor two was whether token status within each CSWG was token male or token female.
Every group received the same planning task--a 10-year class reunion exercise. All communications were captured and categorized using Siegel's taxonomy for identifying conversational patterns (Siegel, 1986). The results were analyzed using analysis of variance on the main effects and their interactions.

Findings supported the hypotheses that there is a significant difference in both total and task-oriented participation between men and women, with women showing a greater number of remarks in both categories. Results also indicated that there is a significant difference in socio-emotional participation and in conversational mix between based on token status and gender-revealed status with gender-revealed non-tokens and non-gender-revealed tokens showing a greater number of socio-emotional remarks. Differences in total and task-orientation participation were most dependent on the demographic variable "sex" while differences in socio-emotional responses and mix were most dependent on the situation, i.e. token status and gender-revealed status.

Addition stepwise regression analyses, which looked at the role of the ancillary variables (education, experience, computer ownership, locus of control, psychological gender, and attitudes toward computers) were able to improve the model. Further research is needed into the effects of these variables. Research at a more detailed level of participation is also needed.

CHAPTER 1

INTRODUCTION

Background

Researchers have studied the determinants of participation in small workgroups for many years. Unfortunately, they had mixed findings. One reason for this inconsistency has been the importance of social role expectations and the difficulty of masking the cues leading to these expectations. These social role expectations, based on such cues as status, age, and sex characteristics, are difficult or impossible to mask in a face-to-face setting. Because social role expectations may affect participation, suppressing the effects of social cues may clarify the effects of other determinants of participation. Computer-mediated communication systems (CMCS--when used in a non-face-to-face setting--offer an improved way to mask these cues.

A second reason that additional study would be useful is that the introduction of computer-mediated communication systems changes the means--or channel--by which we communicate. Researchers have found that as the communication channel narrows and becomes less able to carry a variety of information--for example, information transmitted by sight or sound--there is a diminishing of commonly available social context cues

such as age or gender (Sproull & Kiesler, 1986, 1991). There also is a decline in the ability of the communicator to establish a personal connection with others (Walther, 1992). Therefore, it is not surprising that researchers have found that reducing the channel richness--the amount of information a communication channel carried--also changed the ways group members interacted (Hiltz & Turnoff, 1978; Siegel et al., 1986; Kiesler et al, 1984). Heimstra described the results as:

> As bandwidth narrows... the communication is likely to be experienced as less friendly, emotional and personal and more serious, business-like, depersonalized, and task oriented. (1982, p 883).

As a result, the attributes of participation such as type and quantity may change.

The increase of end-user computing, including the use of CMCS, is one of the most significant changes to occur in business information systems in recent years (Doll and Torkzadeh, 1988; Benson, 1983; Guimaraes and Ramanvjan, 1986; Torkzadeh and Angulo, 1992). CMCS enable users to share messages, documents, databases, and other files. This has increased the ability of groups to perform cooperative work from diverse sites, changing when and how workgroups are used. This leads to the third reason for studying participation in computer-supported workgroups. As computers move out of information systems departments and onto the desks of users throughout the organization, it is necessary to understand the impact of changing technology on both individuals and groups. Two important questions are how the use of CMCS is changing work relationships and how it is changing work itself.

Researchers have proposed that changes in technology lead to changes in the way individuals think about work and how they perform it. For example, Jessup & Valacich (1993) noted that changing technology causes us to think differently about the ways we do things. Researchers have found that information technologies improve the productivity of knowledge workers (Curley & Pyburn, 1982), change the way organizations compete (Ives & Learmounth, 1986), and boost the overall competitiveness of organizations (McFarlan, 1984). Job descriptions more and more frequently include use of a computer. However, both an employee's willingness and ability determine his or her success in using one. Unfortunately, users have not always responded positively to technological changes. The rise of end-user computing has met with resistance in many organizations (Igbaria & Chakrabarti, 1990; Altewell & Rule, 1984; Zoltan & Chapanis, 1982) or has been accompanied by reduced initiative on the part of employees (Zuboff, 1982). One result is under-utilization of computing resources and increasing concern for better use.

It is obvious that availability does not guarantee use, and--without use--computers can not help boost competitiveness. What then affects an individual's willingness to use a computer? Researchers have found that many factors such as attitude and task requirements affect computer usage. For example, a study of business faculty at 62 schools (Howard and Mendelow, 1991) found several factors related to individual's use of computers including (1)computer literacy, (2)attitude toward computers' impact on society, (3)trait anxiety, (4)the quantitativeness of the functional field, and (5)non-academic professional experience using computers. How and when these factors

affect both computer utilization and employee effectiveness is of concern.

The general question is how to increase willingness to use computers when usage is a part of job requirements. This study considers a portion of this question; it asks "What makes individuals willing to participate in a computer-supported ad hoc workgroup."

Rationale

There are at least 3 reasons for studying determinants of participation in the computer-supported workgroup. First is the importance of workgroups to modern organizations. CMCS frees participants from the constraints of time and place found in face-to-face meetings. Members may work together while remaining at diverse geographic locations; they may participate synchronously or not. Kiesler and Sproull (1986) describe the growth of a new type of group--the "virtual group"--in which members may never have met face-to-face. Writers such as Drucker (1991) and Larson & La Festo (1990) suggest that the group or team, because of its importance in modern organizations, is a key focus for research on technologically induced changes in communications. The on-going growth and importance of group work suggests a need to continue to expand our knowledge about how such teams work and how the decision-making process takes place.

Second, additional research is needed because computer mediated communications change the channels of communications. Computer-mediated communications are thought to be low in social presence. Messages transmitted via these media have been found to differ from those transmitted in a face-to-face setting (Culnan & Markus, 1987; Hiltz et al, 1986; Rice, 1984; Steinfield, 1986; Sproull and Kiesler, 1986). The

differences found in these messages suggests the question of how these messaging changes affect cooperative work and the decision-making process as well as how these changes may affect the quality of the work performed.

Third, research about participation in a face-to-face setting has provided conflicting results. Early researchers attempted to control for the influence of gender in a face-to-face group by using single-sex groups. Unfortunately, research has shown behavior changes when social roles are less influential, such as in single-sex groups (Edinger & Patterson, 1983), making findings not generalizable to mixed-sex groups. In the computer-supported workgroup setting, halo effects such as age, sex, and appearance disappear (Zuboff, 1988) further decreasing the influence of social roles. Computer-supported communication systems provide the opportunity to control the masking of social cues such as age, biological sex, and identity of participants, thereby making it possible to remove their moderating effects. Once the moderating effects of social cues are better controlled, their influences become clearer.

For example, research suggests that the leanness of computer-supported communication channels will lead to increased equality of participation (Hiltz & Turnoff, 1978; Siegel et al., 1986); however, other researchers (Adrianson & Hjelmquist, 1987) have found no evidence that a leaner channel increased the equality of participation. Therefore, it is important for researchers to clarify the effects to expand prior knowledge.

Implications

The implication is that computer-mediated communication systems

may hide the audio and visual cues that reveal sex and social status in face-to-face communications. Although these leaner systems should reduce social cues, they may not. It is possible that linguistic cues may carry more social role information than was previously believed (Mulac & Lundell, 1982; Fowler & Rosenfeld, 1992; Gleser, Gottchalk, & John, 1959; Mulac & Rudd, 1977; Colwell & Szlaba, 1986; Lakoff, 1977; Eakins & Eakins, 1978; Crosby and Nyquist, 1977). Therefore, the effect of sex, token status, and gender-revealed status on participation in the ad hoc computer-supported workgroup may be very similar to that in the face-to-face setting.

Research Questions

Computer-mediated communication systems modify the way we work together. Researchers have proposed several factors as determinants of participation in the ad hoc computer-supported workgroup. The study focused on three: sex, token status, and gender-revealed status. In addition, a review of the literature suggested that several other variables might affect participation. These included: experience, locus of control, psychological gender, and attitude toward computers. Although they were not a part of the hypotheses, they were included in this study and used in an attempt to improve the model.

There are many ways of measuring participation including number of remarks made, words used, and new ideas expressed. Siegel (1986), in a study of the effects of anonymity on conformance pressure and social roles, measured participation by a count of remarks as well as by a count of its sub-categories: task-oriented and socio-emotional remarks. This study used Siegel's system to categorize remarks. It also used a

count of remarks to measure total, task-oriented, and socio-emotional participation. In addition, this study measured conversational mix, which was defined as the percentage of task-oriented and socio-emotional remarks that made up an individual's total remarks. This categorization scheme supported four research questions:

1. Is there a significant difference in total participation between males and females, between token and non-token individuals, and between gender-revealed and non-gender-revealed individuals?

2. Is there a significant difference in task-oriented participation between males and females, between token and non-token individuals, and between gender-revealed and non-gender-revealed individuals?

3. Is there a significant difference in socio-emotional participation between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals?

4. Is there a significant difference in the conversational mix between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals?

A model of these effects follows in FIGURE 1.1.

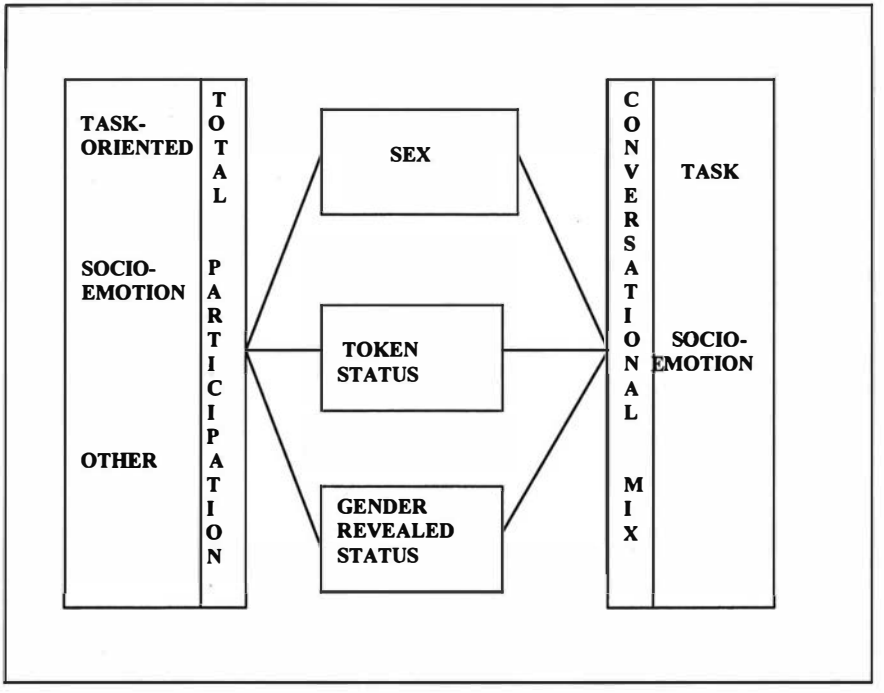


FIGURE 1.1: Model of the effects of sex, token status, and gender-revealed status on participation in the ad hoc computer-supported workgroup.

Limitations

This study had several limitations. First is generalizability. All participants were college students whose reaction to social cues may be atypical of the population at large. In addition, their age and education may make them atypical of the general population in their ability and willingness to use computers.

Second is the generalizability of the participation incentive. Students were rewarded for taking part in the study by receiving extra credit points. These points were received for completion of the project

rather than for individual effort or quality of individual work. There was no penalty for failure to complete the project. The dropout rate suggests that a penalty might have altered the results.

Third is the influence of experience, expertise and efficacy. Participants had similar backgrounds and experience. Variations in experience were controlled by random assignment. Such conditions are unlikely to be duplicated in the workplace.

Fourth, although students were aware that, because of the use of aliases, they could not be identified, they knew that their responses were being monitored. This may have biased their responses.

Fifth, they may have suppressed socio-emotional responses because of fear of being identified.

Finally, this study measured participation only at the overview level of total, task and socio-emotional participation. These categories can be subdivided and, once subdivided, will provide additional and more specific information.

Anticipated Contributions of the Study

This research is exploratory in nature and is intended to provide the basis for research on determinants of participation at the detail level. Types of participation have been shown to be determinants of emergent leadership so this research may provide the basis for additional work on emergent leadership in the ad hoc computer-supported workgroup.

In addition, some evidence exists that cues to the biological sex of individual group members may be passed to other members in spite of attempts to control for knowledge of biological sex. This study may reveal that even when the identity of a participant is

hidden, biological sex may be revealed. For example, it has been proposed that men and women have different communication styles. (Herring, 1995). If biological sex proves to be a determinant of specific types of speech acts, even in an anonymous setting, this research would support the findings of linguistic researchers such as Carol Gilligan (1982), Deborah Tanner (1994), and Anne Moir & David Jessel (1991) who suggested that men and women have different speech or thought patterns. Since speech patterns can be learned, such results may suggest additional areas of leadership training.

Finally, since both participation and task-oriented participation are predictors of emergent leadership, this research provides background information applicable to current emergent leadership theory.

Overview of the Following Chapters

Chapter 2 provides a review of the literature pertaining to the effect of biological sex, anonymity and token status on participation then extends the review by discussing the effects of the ancillary variables: experience, locus of control, psychological gender, and attitude. While these ancillary variables are not a part of the research hypotheses, they are used in exploratory research attempting to improve the model. Chapter 3 describes the research method while Chapter 4 explains the data analysis and results. Conclusions and suggestions for further study are found in Chapter 5.

CHAPTER 2

A REVIEW OF THE LITERATURE

Overview

Computer-supported communication systems continue to grow in importance as the number of workgroups using them increases. Although researchers long have recognized the usefulness of understanding the ways in which workgroups function, much early small group research was carried out in a face-to-face setting. Results of this research may not be applicable to groups communicating by computer networks because these groups frequently operate in a non-face-to-face setting.

The focus of this research is on better understanding how computer-mediated communications affected intra-group communications. In particular, it asked the question "How does sex, token status, and anonymity affect the participation of group members?" However, before this question is considered, it is important to review the literature on group characteristics and task types to understand how they influence participation and how they were selected for this study.

Group characteristics

One way of characterizing a group is by the formality of its structure; other ways include size and group composition, including token status. Since these characteristics may affect member interactions, it is important to select and standardize the characteristics of the groups used. The next three sections discuss the

literature on group structure, size and composition.

Formality of structure

A group may be either formal or ad hoc in structure. Organizations form formal group in order to carry out long-term tasks. Over time relationships within the group change as members learn more about each other, thus changing group members' interactions. Numerous researchers have described these changes in terms of stages that the group goes through (Bales & Strodtbeck, 1951, Tuckerman, 1965, Fisher, 1970). Changes include division of labor, development of group norms and routines, and the formation of personal relationships.

Unlike the formal group with its routine relationships and on-going tasks, an ad hoc group is created to meet a particular, usually short-term, need. Members have less time to learn about each other from working together. Because members of ad hoc groups typically know less about each other than do members of formal groups, social role may exert less influence.

Group size

Early small group research concluded that optimum group size was typically quite small, 3 to 5 individuals (Shaw, 1981). With the introduction of computer-supported communications, much of this research on effective group size has been contradicted.

Research indicates that the optimum size of a group using computer-mediated communication systems may be quite large. One possible reason is that these communication systems decrease the rate at which process losses increase with increasing group size. For example, the introduction of parallel communications eliminates the need to take turns in speaking and listening. Computer-supported communications

provides group memory by capturing dialogue and disseminating it to all members at will. They enable members, freed of the constraints of time and space, to work in diverse times and places.

Group size affects performance as reflected in the number of ideas generated and the group's satisfaction with its performance. Larger groups have been found to generate more ideas (Valacich, Dennis, & Nunamaker, 1992; Dennis, Valacich, & Nunamaker, 1990; Valacich, 1989; Gallupe et al., 1991). Therefore, some researchers recommend that group size should be dependent on the task. For example, Dennis and Gallupe (1993) suggest that the number of group members can be expanded as long as additional members can add value.

Because the number of generated ideas was not an issue in this study, the group size selected was not influenced by these findings. In addition, increasing the number of members in each group would have had the negative effect of decreasing the number of groups available to the study. Therefore, although the size of computer-supported workgroups can be large, a group size of 4 members was selected. Choice of a smaller, four-person workgroup is supported by practice; numerous researchers studying computer-supported groups have chosen to use groups in the 3 to 5 member ranges. (Jessup, Connolly, and Galegher, 1990; Jessup & Tansik, 1991; Connolly, Jessup & Valacich, 1990; Valacich, Dennis and Nunamaker, 1992; Gallupe et al., 1991; Fellers, 1985; Easton, Vogel, & Nunamaker, 1989; Dickson et al., 1989, Easton et al., 1990, Venkatesh & Wynne, 1991).

Token Status

Token members in this study refer to those individuals who are the only male or only female in a group otherwise consisting of members of

the opposite sex. Research indicates that being a token member affects behavior. It has been found to make the token individual more prominent (Taylor, Fiske, & Etcoff, 1978), but it is unclear whether this prominence affects the status of a token female (Eagley & Karau, 1991).

Task type

A task refers to an assigned piece of work; a task type describes the category to which the piece of work should be assigned. Researchers have found that task type is related to the appropriateness of the communication channel. Group tasks differ in how much information must be transmitted and the richness of the information required (Lengel & Daft, 1986; Trevino, Lengel & Daft, 1987). Research indicates that task type affects the appropriateness of the communication channel selected (Lengel & Daft, 1986; Trevino, Lengel & Daft, 1987). For example, negotiation may require the transmission of attitudes, which are more effectively transmitted via a rich channel (Daft & Lengel, 1984). Therefore, the effect of these changes needs to be clearly understood.

The richness of a channel refers to the amount of information that channel can carry, with rich channel such as face-to-face conversations carrying the more (richer) information, while written correspondence carries less (leaner) information.

Tasks requiring a group to negotiate and resolve different views may require the transmission of both information and attitudes, requirements that are more effectively transmitted via a rich channel. Idea generation, on the other hand, requires less richness (Daft & Lengel, 1984).

Researchers have found a relationship between task and sex. Biological sex may affect task participation. Past experiences and

social conditioning may cause males and females not to identify with all tasks with equal ease. Eagley and Karau (1991) found that males and females responded differently to the same task, that male leadership was more pronounced for tasks that were low in social complexity. It has been suggested that performance may be due to sex role stereotyping (Terborg, 1977; Rice et al 1980). More recently, researchers found that the congruence between gender and sex-type of the task influenced participants' expectation of success (Vancouver & Ilgen, 1989). Self-efficacy theory (Bandura, 1986) suggested that these expectations of success, in turn, should influence the decision to participate. Task type may therefore bias participation (Maccoby & Jacklin, 1974).

Since computer-mediated communication channels are relatively lean, tasks requiring the generation of ideas and plans are thought to be a good fit.

Determinants of Participation

Previous studies suggest that task, cognitive, and affective factors influence computer usage (Hill et al, 1987; Igbaria et al, 1987; Igbaria et al, 1989). This chapter discusses the literature on the effect on computer usage of several of these factors including anonymity status, biological sex, background and experience, locus of control, psychological gender, and attitude toward computers.

Anonymity and participation

Although it is easy to speak of anonymity as though it was a bipolar concept, either present (anonymous) or absent (not anonymous), this is not the case. Anonymity refers to the state of lacking individuality, of not being recognizable in the crowd. Social identity theory (Spears and Lea, 1994; McGarty et al, 1994) proposed that

individuals derive their identity from membership in various social categories (Brewer, 1991; Deaux, 1991; Deaux et al., 1995). Anonymity involves the inability to match an individual to the social category to which he or she belongs.

Valacich (1990) proposed that there are degrees of anonymity and that anonymity can be divided into two types: content and process. He defined content anonymity as the extent to which group members can identify the source of a particular contribution by an identifier embedded in the contribution; process anonymity is the extent to which group members can determine who is participating by directly observing who is making a contribution. Hayne et al (1994) suggested that anonymity could be subjectively experienced in two ways; (1) one could not be identified as a participant or--if a participant--what one's role might be, or (2) one could not be identified as the source of particular messages.

McLeod and Elston (1997) proposed a third dimension, which is that the perspective of anonymity is important. They defined perspective as the direction of anonymity -whether the individual is able to identify or make attributions about others, or whether others are able to identify or make attributions about the individual.

Regardless of the perspective on anonymity used, anonymity is believed to change the nature of a group's interpersonal interactions. This results in de-individualized behavior because anonymity separates group members from their contributions (Jessup, Connolly, & Tansik, 1990).

Because of the many types of anonymity, the type used must be carefully defined and will limit the generalizability of the findings.

This study uses two types of anonymity. In both types, participants are identified only by aliases, but in one case a gender revealing alias is used while in the other it is a non-gender-revealing alias.

Although it is somewhat misleading to speak of anonymity without qualifying the type, there are some general findings about its effect. Anonymity has been found to reduce or eliminate evaluation apprehension and conformance pressure and social roles (Siegel et al., 1986). Reduction of conformance pressure may encourage more open discussion but may lead individuals to act in non-socially prescribed ways such as "flaming". In a study of anonymous and non-anonymous 4-member groups, anonymous groups were more critical and probing but no significant differences appeared in their performances (Valacich, Dennis, and Nunamaker, 1992) or in the number of supportive comments made by each (Jessup et al; 1990).

Overall, anonymity is thought to be important in reducing social role expectations where there are power and status differences in the group (Nunamaker et al; 1991). Therefore, groups of peers may perceive anonymity as less important than groups whose members have different power and status (Dennis et al, 1991)

One can be anonymous in the sense one's identity is not known, yet non-anonymous in the sense that other information is known. A related question is "Does it make any difference on participation if one's sex is known?"

Unfortunately, much of the early research was carried out in a face to face setting. Researchers attempted to mask social role influence by changing the composition of the group, for example by using single-sex groups. However, the use of single-sex groups is likely to

have distorted the results because research indicated that knowledge of the gender composition of a group influences behavior (Kanter, 1977; Taylor et al., 1978; Mullen, 1983, Mullen, 1987,). A better method of masking biological sex now exists; computer mediated communication systems allow individuals to communicate without transmitting the visual and auditory cues that typically reveal sex. If sex-identifying information is transmitted, other types of cues are required. One cue may be communication style.

Communication style refers to the way in which language is used. It is especially interesting to note that researchers have found evidence of sex recognition even when overt cues are omitted. McLeod & Elston (1997) noted that groups whose members are well acquainted with each other might believe they could identify the authors of specific comments, even if they can not see each other. Researchers have found that listeners are adept at linking paralinguistic cues to gender identification (Lass, Mertz, & Kinnel, 1979; Sach, 1978; Bates, 1988). Herring (1995) proposed that men and women have different communication styles and ethics.

The possibility of different communication styles raises interesting questions about the possibility of gender being displayed in language itself. A substantial body of research suggests that written and oral communication of men and women reflect these differences in writing style and content. Researchers have found that men use more dynamic language (Mulac & Lundell, 1982); they use more quantitative and objective adjectives (Wood, 1966)and more aggressive verbs (Westmoreland et al, 1977) while women are more socially expressive and use more affilitative language (Fowler & Rosenfeld, 1992).

Women use more descriptive, aesthetic, emotive language (Gleser, Gottchalk, & John, 1959; Mulac & Rudd, 1977); more intensifiers (Colwell & Szlaba, 1986), and more interpretive adjectives, hedges, tag questions, disclaimers, intensifiers, and requests (Lakoff, 1977; Eakins & Eakins, 1978, Crosby and Nyquist, 1977). Two later studies examined written business communications but did not find these style differences (Sterkel, 1988; Smeltzer & Werbel, 1986).

An overview of the literature indicates linguistic differences themselves may provide gender-revealing cues, suggesting that gender may not be as well hidden in CMCS as previously believed.

Biological sex

Research indicates that biological sex influences both the amount and type of participation. Computers are perceived to belong to the "male" domain of mathematics, electronics, and machinery (Naiman, 1982). It is unclear, however, whether this perception affects computer usage. Some researchers (Dambrot et al, 1985) have found that women are more likely to be anxious about computers and to use them less frequently, while others have found no relation between gender and computer usage (Igbaria, Pavri, & Huff, 1989).

Sex affects the types of communication. Men have been found to exhibit more task influence behaviors (Craig & Sheriff, 1986; Smith-Lovin, 1989). In a meta-analysis of leadership studies, Eagley & Karau (1991) found that men had a higher rate of task contribution. Men emerged as leaders in task focused groups more frequently than did women. Women had a higher rate of social contribution and emerged more frequently than men as social leaders. Because computer mediated communication systems are not as efficient at communicating the cues

that lead to social role expectations, some researchers suggest that members may participate more equally (Keisler et al., 1984) and may sample opinions more widely (Hoffman, 1978).

However, it should be noted that group norms do emerge. For example, over time intra-group communications create roles, norms, group structures and climate (Poole, 1983). As the group develops insight on the individuals based on the patterns of interactions within the group, the behavior of one member alters, intensifies, or inhibits the actions of another (Putman, 1983).

A further review of the literature indicated that several other variables might influence participation. These factors included experience, locus of control, psychological gender, and attitude. Although these ancillary variables were not used in the hypotheses, they were used in an attempt to improve the model.

Background and experience

An individual's background and experience in using a computer appears directly to affect his or her computer usage. Cognitive factors—what one knows--influence computer usage (Hill et al, 1987; Igbaria et al, 1987; Igbaria et al, 1989). These cognitive factors include both substantive knowledge and experimental knowledge.

Substantive knowledge --for example, knowledge about how to use a computer--is gained primarily through education. Educational background and experience have been shown to affect the affective variables that influence computer usage. For example, educational background is positively correlated with satisfaction (Igbaria & Nachman, 1990) and negatively correlated with anxiety (Kernan & Howard, 1990; Meier & Lambert, 1991).

Researchers found that computer related training was positively correlated with an individual's ability to use a computer. In turn, the ability to use a computer was positively related to one's use of a computer (Nelson & Cheney, 1987). Researchers found a statistically significant correlation between the amount of computer experience and computer apprehension and between computer apprehension and the amount of education in computer usage (Nykodym et al, 1989).

Experiential knowledge can be divided into two categories; experience and expertise. Experience refers to knowledge gained through participation. Expertise differs from experience in that it indicates that one not only has gained knowledge and skill but that one has attained a high level of that skill or knowledge.

An individual's background and experience in using computers has been found to influence his or her usage. In a study of managers who had easy access to a computer in their daily job, researchers found that education and computer experience are positively related to the duration and frequency of computer use (Igbaria, Pavri, and Huff, 1989).

In summary, the literature suggests that computer usage will vary positively with education about and experience using computers.

Locus Of control

Locus of control refers internal or external orientation of an individual. Rotter describes the difference between internal and external locus of control as:

> When a reinforcement is perceived by the participant as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of lock, chance, fate, as under the control of powerful others, or as unpredictable due to the great complexity of the forces

> surrounding him. When an individual interprets the event in this way, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control.

Locus of control is the extent to which individuals feels able to control the events that affect them (Rotter, 1966). Those with an internal locus of control believe that events are primarily the result of one's own behaviors and actions; those with an external locus of control believe external forces determine much of what happens. Those with an internal locus of control tend to be more proactive while those with an external locus of control tend to be more reactive (Rotter, 1966).

Sauter et al (1983) found that computer users often felt that they had less personal control and that external forces exerted more control. Several other studies reported that an external locus of control contributed to increased computer anxiety or increased computer aversion (Igbaria et al, 1989; Morrow et al, 1986; Arndt et al., 1983).

Locus of control is measured on a continuum, with a low score indicating an internal locus of control and a high score indicating an external locus of control (Rotter, 1966). Based on the research, it is anticipated that computer usage will vary inversely with one's locus of control score.

Psychological gender

Biological sex offers only one perspective on gender; psychological gender offers a second perspective based on behavioral rather than physical characteristics. Whereas individuals are biologically male or female, an individual's psychological gender may be

masculine, feminine, neutral, or androgynous (Bem, 1974).

Early research on behavior-based gender descriptions advanced the theory that male and female are not opposite ends of a continuum; rather, they are independent constructs. Therefore, any individual can be both feminine and masculine in behavior. What classifies an individual as masculine, feminine, neutral, or androgynous in psychological gender is the weight of each element in the behavioral mix (Constantine, 1973). Bem (1974) extended the research by producing a self-rating scale for psychological gender, Bem's Sex Role Inventory (BSRI). The BSRI asks the respondent to describe him or herself in terms of a set of adjectives, then yields 2 independent scores--masculine and feminine--based upon median scores of all individuals taking the test. Respondents are then divided into quadrants and classified based upon their scores as described in FIGURE 2.1.

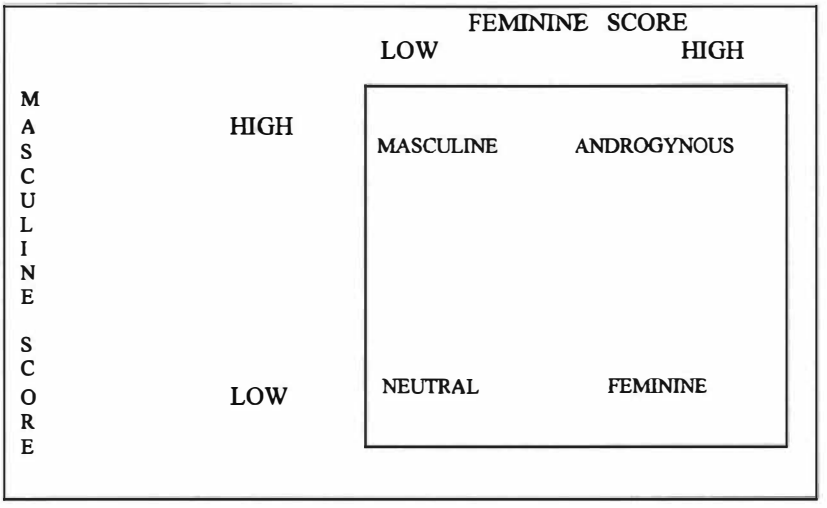


FIGURE 2.1: Classification by psychological gender

A psychologically masculine categorization suggests task-oriented behavior and psychologically feminine implies consideration behavior. Androgynous behavior includes both initiating structure (masculine), and showing consideration (feminine). More importantly, it suggests the ability to adopt whatever role is not already represented in the group (Koralik & Ayman, 1987).

Researchers have found androgyny to be significantly related to more effective behavior in a variety of non-organizational settings (Bem & Lenny, 1976; Heilbrun, 1976). Psychological gender scores on Bem's SRI were found to be superior to sex in explaining differences in managerial level attained, consideration, assertiveness, acceptance of self and acceptance of other (Sleeth & Humphreys, 1980).

Since psychological gender is based on behavior rather than physical characteristics, it appears to be a better indicator of the amount and type of participation. Therefore, it is anticipated that having a masculine or androgynous psychological gender will increase task-participation while having a feminine one will increase socio-emotional participation.

Attitude and aversion

Researchers use three terms--"apprehension," "anxiety," and "aversion"-- to describe the same or very similar constructs. Although anxiety and aversion seem similar constructs, a factor analysis of several computer attitude tests suggests that researchers should treat them separately (Kernan & Howard, 1990). Most recent research uses the term "aversion" rather than "anxiety" to avoid an association of computer anxiety with the clinical phenomenon (Meier & Lambert, 1991). This paper uses "aversion" to describe the construct, which can be defined as a negative affective reaction to computers with concomitant behaviors and cognitions (Meier, 1985). In addition to attitude and aversion, a newer construct referred to as "playfulness" is being studied.

Attitude

Attitude describes one's feelings or orientation toward computers. Attitude theorists propose that individuals' attitudes toward an object play an important role in their subsequent behavior towards it. (Fishbein & Ajzen, 1975), suggesting that one's attitude toward computers is likely to affect one's usage of them.

Numerous studies have attempted to measure the relationship between computer attitude or aversion and demographic factors such as

gender or age; the research showed mixed results. Some research indicated that females have more negative attitudes toward computers (Loyd & Gressard, 1986); however, other research suggested that biological sex is unrelated to either aversion or attitudes (Kernan & Howard, 1990; Igbaria et al., 1989).

Findings on the correlation between age and attitude were mixed. It sometimes correlated positively with attitude (Marshall & Bannon, 1986) or negatively with duration of use (Igbaria et al., 1989). These results may be misleading, however, since the correlation between age and usage may be confounded by the relationship between usage and experience.

Researchers are now studying a new construct called *playfulness* (Webster and Martocchio, 1992; Martocchio & Webster, 1992). Playfulness appears to relate positively to computer attitudes, competence, efficacy, learning, mood, involvement and satisfaction. It relates negatively to aversion, and neutrally to age and gender. Although playfulness is not tested in this study, its ability to combine various affective reactions suggests that it may have predictive efficacy.

Aversion describes a generalized dislike of computers. It is negatively related to end user satisfaction (Igbaria & Nachman, 1990). Since satisfaction is positively related to the duration and frequency of computer use (Igbaria & Nachman, 1990), this suggests that aversion may correlate negatively with duration and frequency of use.

Summary

Biological sex, anonymity status, token status were a part of the hypotheses upon which this study was based. A review of the literature suggests

- Men will make more total remarks and task-oriented remarks than women will.
- Women will make more socio-emotional remarks than men will.
- Men and women using non-gender-revealing aliases will come closer to equal participation than men and women using gender-revealing aliases.

Experience, locus of control, psychological gender, and attitude were not a part of the hypotheses upon which this study was based. Based upon a brief review of the literature, it was anticipated that these ancillary variables might have the following effects:

- Computer usage will vary positively with education about and experience with computers.
- Computer usage will vary inversely with one's locus of control score.
- Psychological gender will be a better indicator than biological sex of the amount and type of participation.
- Having a masculine or androgynous psychological gender will increase task-participation while having a feminine one will increase socio-emotional participation.
- Usage will vary positively with attitude and negatively with aversion.

CHAPTER 3

RESEARCH METHODS

Overview of the Research

This study considered the influence of three variables (sex, gender-revealed status, and token status) on participation rate in an ad hoc computer-supported workgroup. Students from five undergraduate business classes participated in an on-line conference using FocusPoint conferencing software from UKWEB. Students were given a planning task and assigned to a workgroup. Once the conference began, group communications were captured and categorized using Siegel's categorization method (Siegel, 1986). Categorized data then was analyzed using Minitab Statistical Software from Minitab, Inc. A more extensive description of the experimental design, participants, materials, and procedures follows.

Participants

A sample of 144 individuals was drawn from five day-sections of undergraduate business classes. Two classes participated at one university and three at a second located in the same state. Participants, traditional university students, were 51% male, 49% female. Most were between 18 and 30 and represented diverse races and ethnic backgrounds. All participants were volunteers who took part in exchange for extra course credit based upon completion of the study. Since participants worked asynchronously at diverse sites, it is unlikely that their identities were discovered accidentally.

The study asked four general research questions:

1. Is there a significant difference in total participation between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals?

2. Is there a significant difference in task-oriented participation between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals?

3. Is there a significant difference in socio-emotional participation between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals?

4. Is there a significant difference in the conversational mix between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals?

Overview of the Experimental Design

The three variables referred to in the hypotheses--biological sex, token status, and gender-revealed status--are referred to as the "original" variables. A review of the literature suggested several other factors might affect participation. These are referred to as the "ancillary variables." Although not included in the hypotheses, these ancillary variables were measured and later used in exploratory research intended to improve the model. They included:

- Whether or not a participant owned a computer
- Number of computer-related classes taken
- How much a participant used a computer on a weekly basis--not including this exercise
- Psychological gender
- Locus of control

- Attitude, liking and aversion.

Dependent variables were:

- total participation, and its sub-categories of
  - task-oriented participation
  - socio-emotional participation

Another sub-category called "all other participation" was created so that the sum of remarks by sub-category would equal total remarks made. Because all remarks made by participants were either task-oriented or socio-emotional, this sub-category was not used.

Social role influence was reduced through the use of ad hoc groups. A shortened time period, and the diverse physical locations of group members also decreased the likelihood that a group member's identity might be accidentally revealed.

Because this study was concerned with the influence of biological sex on participation, it was important to hide personal identity and to control knowledge of group members' biological sex. Two types of anonymity were used. In both types, participants were identified only by aliases, but in one case a gender revealing alias was used while in the other the alias was non-gender-revealing. All groups were token member groups. One half of the groups contained female token members; the other half contained male tokens.

Because idea generation does not require a rich channel of communications (Daft & Lengel, 1984), a planning task was selected. Groups generated plans for their college graduating class's 10th reunion. This was a gender-neutral, planning task based upon the descriptions of Eagley & Karau (1991).

Materials

FocusPoint Conferencing Software from UKWEB was used. It was maintained and administered at their site in England and was available 24 hours a day. Participants communicated over the Internet, logging on from any available computer with Internet access. These computers most frequently were ones located in the university computer labs.

Procedures

The procedures were lengthy and involved several steps including selection of aliases, pilot testing of materials and procedures, obtaining volunteers, administration of pre- and post-tests, and collection and preparation of data for analysis.

Preliminary procedures--Alias selection

Since aliases were used as a means of limiting social role expectation, it was important that all aliases suggest similar expectations; in this case likability and either a clear indication of gender (gender-revealing alias) or no indication of gender (a non-gender-revealing alias). Therefore, prior to the study, students in a marketing class were asked to list their five favorite female and five favorite male names.

A list was created of all names proposed more than once. In addition, a computer program randomly generated a list of three character "names," each composed of a consonant in the first and third position with a vowel in the middle. An assistant then removed all real names, nicknames, and meaningful and profane words from this list. "Names" remaining were added to the list of students' favorite names. This list then was given to students in another marketing class where each student was asked to select and rank the five names

he or she believed to be most feminine and likable, the five most masculine and likable, and the five most neutral and likable. An overall ranking of name within category was created. Aliases were selected from the highest-ranking names in each category although some names were later eliminated to avoid using multiple names that could be confused due to similar sound or spelling.

Preliminary procedures--Pilot testing

A pilot test occurred approximately one month prior to the study. The participants in this pilot were eight graduate students who volunteered to form two groups. Although strict anonymity was not maintained, all other procedures were followed and examined. The participants received the same oral and written communications and took the same pre- and post-tests that had been prepared for use in the actual study.

Participants in the pilot study logged on to the conferencing site. The site, located in England, supported intra-group communications with FocusPoint conferencing software. The pilot group used the instructional material prepared and performed the same planning task assigned in the actual study. In addition to providing sample data for analysis, these students evaluated and edited the prepared materials. Their input was then used to evaluate and improve both procedures and documentation by clarifying written instructions. In addition, four of these graduate students then served as lab assistants during the experiment.

Survey administration procedures

Two weeks prior to beginning the study, the instructor in each cooperating class announced the study and called for participation. The

instructor further announced that participation was voluntary, that those wishing to participate would receive extra credit upon successful completion of the study, and that all participants were required to take a preliminary survey to be given at the end of class the following week.

The following week, immediately prior to administration of the preliminary survey, the researcher read a description of the study and gave potential volunteers a copy of the Invitation to Participate (Appendix A). Potential volunteers were told that extra credit would be given upon successful completion, and that to participate in the study it was necessary to take a series of pretests. The researcher announced that agreeing to take these pretests was equivalent to agreeing to participate in the study. She then administered the pretests included in Survey A (Appendix C) to all volunteers.

Pretests included the Bem Sex Role Inventory (BSRI; Bem, 1974), Rotter's 23-item Locus of Control test (1980), and Gressard and Loyd's *Computer Attitude Test* (1984), a thirty-item Likert-type instrument that offers statements of attitudes toward computers and toward their use. Volunteers were also asked some experiential questions. Upon completion of Survey A, volunteers were placed in the pool from which groups were formed.

Participants were divided randomly into 36 groups of four members each, stratified by sex within class to ensure that each workgroup contained volunteers from several classes. All groups were token member groups, approximately one-half male tokens and one-half female tokens.

The experimental design was a 2 x 2 factorial where factor one was gender-revealed/non-gender-revealed status and factor two was the

male/female token. A description of the design appears in Figure 3.1.

FIGURE 3.1: The Research Model

144 participants = 36 groups:

	Token Male	Token Female
Gender-revealing Alias	9 groups	10 groups
Non-gender-revealing Alias	9 groups	8 groups

The original variables are:

- Biological sex
- Anonymity status
- Token status

Ancillary variables are:

- Ownership of a computer (ownership)
- Number of computer-related classes taken (classes)
- How much a participant used a computer excluding this exercise (usage)
- Psychological gender
- Locus of control
- Attitude
- Liking
- Aversion

Dependent variable is:

- Total participation and its sub-categories:
  - task-oriented
  - socio-emotional
  - other

A list of all variables, the method by which each was measured, and the range of values follows in TABLE 3.1.

VARIABLE	MEASURED BY	RANGE OF VALUES
Sex	Self-report	M = 0, F = 1
Token status	Assigned	non-token= 0 token = 1
Gender-revealed status Gender-revealed = 1	Assigned	non-gender-revealed = 0
Ownership of computer (> 1 year)	Self-reported	no = 0 yes = 1
Computer classes taken (> 2)	Self-reported	no = 0 yes = 1
Computer usage	Self-reported	continuous Values 0 – 15
Locus of Control	Rotter, 1966	continuous Values –1.69 to 2.84
Psychological gender	Bem's BSRI, 1974 Median split to divide males score and female score	categories: Androgynous = 0 Undifferentiated = 1 Masculine = 2 Feminine = 3
Anxiety	Loyd and Gressard 's CAS, 1984	continuous Values: 18 to 56
Confidence	as above	Continuous Values: 8 to 55
Liking	as above	Continuous Values 10 to 55

TABLE 3.1 All variables: Measurements and range values

Due to the class and sex mix among participants, it was not possible to form nine workgroups in each category as planned. Instead, categories were:

- ten token female groups with members using gender-revealing aliases. (3 males and 1 token female per group)
- nine token male groups with members using gender-revealing aliases. (3 females and 1 token male per group)
- eight token female groups with members using non gender-revealing aliases. (3 males and 1 token female per group)
- nine token male groups with members used non gender-revealing aliases. (3 females and 1 token male per group)

In forming the groups, the appropriate sex was selected and, as far as possible, no two members of the same workgroup were members of the same class. Each participant was assigned an alias and workgroup; one half of the workgroups were given gender-revealing aliases while the other half had non-gender revealing aliases. Although the group to which an individual was assigned was not a variable in this study, the group name was retained for possible future reference.

Participants with a gender-revealed status were defined in this study as not being known to other members of their group. They had no prior knowledge of and no prior work experience with other members of the group to which they were assigned. An alias hid their identity, class and university affiliation but revealed their biological sex. Non-gender-revealed participants additionally hid biological sex with a non-gender-revealing alias.

Participants received their group assignments in class the week following administration of Survey A. Each group received its own conferencing site, and could not readily access other sites. Participants received a handout on how to use FocusPoint (Appendix F)

and when laboratory assistants would be available.

Task

All participants received a printed handout containing the assigned task, which was to prepare a plan for celebrating their graduating class's 10^{th} reunion. This handout was personalized, containing the participant's conference identifier and his or her alias and password. The researcher instructed participants not to provide any identifying information other than his or her alias until the group completed its task and all members completed their post-test. Participants were informed that all messages would be retained and reviewed; providing any revealing identifying information would be cause for dismissal from the study and loss of participation credit. The researcher announced that four graduate students (participants in the pilot project) would be available at posted hours to provide help using the software. The researcher then announced that, using FocusPoint conferencing software asynchronously, they had seven days to complete the task and return their solution to the conference administrator at the email address provided.

Participants were asked to sign on to the conference site listed on their sheet as soon as possible and to notify the graduate assistants if they encountered any problems.

Upon first signing on, each participant saw a message suggesting that a group's first task should be to determine some turnaround time on responding to messages. Following this initial communication, each participant was free to read and reply to any message. All participants could see all new messages at their site from all four members of their group and could recall messages already read.

Data capture and preparation for analysis

All conference communications were captured by the FocusPoint software, then were downloaded daily. After completion of the conference, communications between participants were coded into remarks (Siegel 1986) for use in determining each member's participation scores (Appendix H). Although Siegel had approximately the same result using word counts to determine total participation, it was necessary to use remarks in order to categorize communications as either task-oriented or socio-emotional for the purpose of determining participation by type of remark.

After the researcher divided the communications into remarks, two independent raters identified the type of participation used in each remark using Siegel's (1986) coding system (Appendix H). A category called "other participation" was included for the purpose of forcing the sum of the sub-categories to equal that individual's total participation, thereby improving accuracy. In analyzing the dialogue, however, it was discovered that no other types of participation--such as meaningless sentence fragments--were used, and the raters included no remarks in this category.

Participation was measured two ways: (1)count of remarks by type and (2)percentage of remarks by type. Count of remarks by type was the number of each type of remarks used by each participant. It was important because it was an unbounded value that could be related to the number of remarks made by all other participants.

The second measure, conversational mix by type of remark, was a percentage. An individual's total count of remarks represented 100% of his or her participation. The percentage of task-oriented or socio-

emotional participation was obtained by dividing that individual's total remarks into his or her task-oriented or socio-emotional remarks. The result was a bounded value, the percentage of task-oriented or socio-emotional remarks in a given individual's conversation.

This system not only provided identification at the overview level of task-oriented vs. socio-emotional, it enabled raters to evaluate each remark at a detail level, identifying the sub-categories of task-oriented or socio-emotional remark.

Rater certification

Before beginning the analysis, each rater received a sheet describing the coding system (Appendix H) and was asked to code the sample dialogue from the pilot study. Upon completion of this sample, the two raters' coding was compared. Raters were then asked to discuss between themselves those remarks that they had coded differently and to come to a consensus on the appropriate code based upon the handout. This was repeated until they arrived at a 94% agreement rate. Each rater then coded another sample conference in order to measure the inter-rater reliability.

Inter-rater reliability for this conference was 95.5% and was based upon number of remarks whose type they agreed upon divided by the total number of remarks in the conference. After all conferences were coded, each rater was asked to again code the remarks in her first conference. Their intra-rater reliability, again measured by dividing the number of remarks coded identically both times by the same rater by the total number of remarks in the conference, was now between 89.6 and 92.9%. Next, raters were asked to code an additional conference in order to obtain ending inter-rater reliability. This was 94%. Although these

statistics are quite high, it should be noted that all inter and intra-rater reliability statistics are at the overview level. At the overview level only two types of remarks were possible so there was little room for disagreement

The data analysis and results are described in CHAPTER 4.

CHAPTER 4

DATA ANALYSIS AND RESULTS

Overview

This chapter describes data analysis and the results of the research study. It begins with a general descriptive analysis of the demographic characteristics of the sample and the groups into which the sample was divided. Next the dropouts from the original sample are discussed and their characteristics compared with those of all participants. Then selected univariate statistics on the independent variables are presented. Next, the hypotheses are tested against total participation and against the two major sub-categories: task-oriented and socio-emotional participation. Although it was anticipated that a third sub-category, other, would be used, no remarks were identified as belonging to this category. The chapter ends with a review of the findings.

Descriptive Analysis

This section presents descriptive information about the participants, the classes from which they were drawn, and the work groups to which they were assigned.

The Participants

There were 144 participants, 51% male and 49% female. Each participant, prior to the study, completed a questionnaire providing information about his or her sex, psychological gender, locus of control, attitude toward computers, and experience using them. Responses to this survey are described in Figures 4.1 and 4.2 as well as Tables 4.1 through 4.4.

Psychological gender

Psychological gender was measured using the BEM test for psychological gender (Bem, 1974) that differentiates by measuring an individual's self-reported identification with an array of gender-typed attributes. It uses a 7 point Leikert type rating scale on which a subject indicates how true each of the characteristics is of him- or herself. The test is based on the concept that masculinity and femininity are two independent dimensions rather than two opposite extremes of the same dimension, thereby making it possible to characterize an individual as masculine (HM/LF), feminine(LM,HF), androgynous (HM/HF)or undifferentiated (LM/LF).

Classification is based upon a median split of the raw scores for both masculinity and femininity scales. This results in a distribution that is close to but not necessarily symmetrical.

Distribution of participants by psychological gender is shown in Figure 4.1. It should be noted that the various types of psychological gender were almost equally distributed, ranging from a low of 22.9% undifferentiated individuals to a high of 26.4% masculine and androgynous individuals.

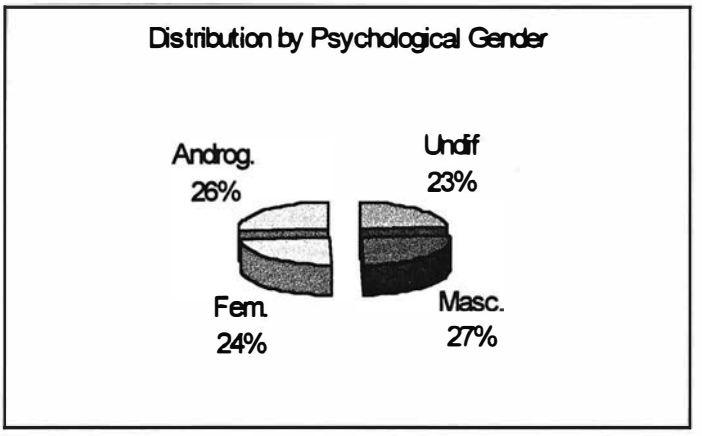


FIGURE 4.1: Distribution of participants by psychological gender.

Both biological sexes were well represented in all psychological gender types.

Participants were tested for locus of control, experience in using computers, and three measures of attitude toward computers: liking, confidence and anxiety.

Locus of Control

Participants were tested for an internal-external locus of control using Rotter's scale (1966). Locus of control (LOC) is of interest because a belief in one's ability to control events could affect one's behavior in relation to those events.

The number of subjects (N), mean, standard deviation, min and max for locus of control appear in TABLE 4.1 along with similar information about the attitudinal variables: anxiety, confidence, and liking.

VARIABLE	NUMBER	MEAN	MEDIAN	STD DEV	MIN	MAX
LOC	144	0.4150	.2441	0.8335	-1.6998	2.8359
Anxiety	144	45.6458	48.0000	8.6433	18.0000	56.0000
Liking	144	39.5764	43.0000	9.0094	10.0000	55.0000
Confid	144	42.4514	40.0000	7.8088	8.0000	55.0000

TABLE 4.1 Selected Univariate Statistics for Locus of Control and Computer Attitude

Experience with computers

Participants were asked questions related to experience with computers. The descriptive summary of these questions is shown in TABLE 4.2.

QUESTIONS	COUNT OF RESPONSES	PERCENT
How long have you owned a computer?		
No response	1	0.7
Never	56	38.9
Less than one year	20	13.9
1 to 2 years	24	16.7
More than 2 but less than 5 years	22	15.3
More than 5 years	21	14.6
Have you ever taken a typing course?		
No response	1	0.7
Yes	117	81.3
No	26	18.1
How many courses have you taken in computer literacy or programming?		
Less than one	21	14.6
One course	32	22.2
Two courses	34	23.6
Three courses	31	21.5
Four courses	13	9.0
Five or more courses	13	9.0
How often do you use a computer?		
No response	1	0.7
About once a month	1	0.7
About once a week	21	16.0
More than once a week	121	84.0
How often do you use email?		
No response	1	0.7
Never	12	8.3
Less than once a month	7	4.9
About once a month	10	6.9
About once a week	17	11.8
More than once a week	97	67.4
How often do you use the Internet except for email?		
No response	1	0.7
Never	3	2.0
Less than once a month	9	6.3
About once a month	20	13.9
About once a week	42	29.2
More than once a week	69	47.9

TABLE 4.2 Experience with Computers

The Classes

Participants were selected from five information systems classes at two universities. Table 4.3 provides the number of participants recruited from each class and the percentage of total participants each class provided. Class 2 was scheduled to participate, but did not.

CLASS ID	NUMBER OF STUDENTS	PERCENTAGE
1	26	18.1
3	32	22.2
4	27	18.8
5	42	29.2
6	17	11.8
TOTAL	**144**	**100 %**

TABLE 4.3 Students by Classes

The Workgroups

After participants were surveyed, each was randomly assigned to a workgroup. A workgroup was composed of four individuals who maintained anonymity throughout the study by the use of aliases. Each workgroup also was assigned to one of the four group types: gender-revealed with male token, gender-revealed with female token, non-gender-revealed with male token and non-gender-revealed with female token.

Although it was anticipated that an equal number of each group type would be created, the number of male and female volunteers resulted

in a slight change to the number of each group type. The number of groups in each category based on original group composition is shown in TABLE 4.4. There was a sizable dropout rate resulting in groups with different compositions than originally assigned. The functioning composition of each category is shown in TABLE 4.5. It should be noted that the use of "balanced" in this table refers to a group consisting of an equal number of males and females while "no token" refers to single-sex groups. Possible causes of the dropout rate are discussed following Table 4.5.

	Token Male	Token Female
Anon	8	9
Not Anon	9	10

TABLE 4.4: Original group composition

	Token Male 3 or 4 person	Token Female 3 or 4 persons	Balanced 2 M/2 F	No Token All same sex	Dropped Out
Anon	3	4	5	5	0
Not Anon	5	5	1	5	3

TABLE 4.5: Composition of functioning groups after dropout

The Dropout Rate

There were two possible ways for participants not to participate. One way was to make no contribution to the group's decision-making process; a participant might volunteer to participate and complete surveys administered in the classroom but make no attributable comments. It is this group of non-participants that was studied in analyzing the dropout rate.

A second way of not participating was for individuals to participate to such a limited degree that their group chose not to give them participation credit. For purposes of this study, these individuals are considered to have participated and are not included in the dropout figures.

Dropouts were compared as a group to non-dropouts to determine whether individuals that dropped out differed from individuals who participated. Variables considered included the three original variables: whether or not the individual was assigned as a token member (token), whether or not the individual was assigned to a gender revealed group (gender revealed), and whether the participant's sex (sex) was male or female. Participants were compared on whether the individual owned a computer (ownership), whether or not the participant had taken a keyboarding class (keyboarding), number of computer- related classes taken (classes), how frequently the individual used a computer (usage), his or her locus of control (LOC), his or her psychological gender (BEM), and three measures of attitude toward computers (anxiety,

confidence, liking). Table 4.6 contains comparative descriptive statistics for these two groups.

Comparison Of Dropouts To Non-Dropouts:

	Non-dropouts	Dropouts
Number of		
Men	49	22
Women	44	25
Number by Bem type:		
Undifferentiated	25	8
Masculine	26	12
Feminine	26	9
Androgynous	20	18
Number of token members	17	13
Number of gender-revealed members	46	21
Ownership of a computer		
No	36	27
Yes	57	20
Had individual taken a keyboarding class?		
No	78	37
Yes	15	10
Had individual taken two or more computer classes		
No	35	2
Yes	58	45
Mean usage score	13	13
Mean LOC score	.36483	.54736
Mean Attitude score (Range 18 to 56)	45	46
Mean confidence score (Range 8 to 55)	42	43
Mean liking score (Range 10 to 55)	39	40

TABLE 4.6 Dropout rate by psychological gender

A nominal logistic regression was run to determine which factors, if any, distinguished dropouts from non-dropouts. TABLE 4.7 contains the results.

Whole-Model Test

Model -	LogLikelihood	DF	ChiSquare	Prob>ChiSq
Difference	27.274029	27	54.54806	0.0013
Full	63.675184			
Reduced	90.949213			

RSquare (U)	0.2999
Observations (or Sum Wgts)	144

Effect Test

Source	Nparm	DF	Wald ChiSquare	Prob>ChiSq
Sex	1	1	0.872996	0.3501
Anon	1	1	0.057092	0.8112
T. member	1	1	0.000064	0.9936
Class	4	4	16.937902	0.0020*
Ownership	5	5	5.037858	0.4113
Keyboarding	2	2	2.106948	0.3487
Classes	5	5	6.193925	0.2878
Avg usage	1	1	0.090970	0.7629
L OF C	1	1	3.014056	0.0825
Bem	3	3	6.028725	0.1102
Anxiety	1	1	0.537544	0.4635
Confidence.	1	1	1.066382	0.3018
Liking	1	1	0.832277	0.3616

TABLE 4.7: Nominal Logistic: Dropouts vs. non-dropouts

Only one variable (Class) was significant at < .05. Class refers to the class from which the participants volunteered. Although the cause of the high dropout rate from two classes can not be explained, several

explanations can be hypothesized: (1) students received a time-consuming assignments after volunteering, (2) students receive high test grades that lessened the need for extra credit, or (3) students believed that they could receive the extra credit without completing the assignment.

Although 97 individuals remained active, four of these individuals were members of groups from which the other three participants dropped out. These four were not included in dropout figures since they chose to participate; however, they are not included in the participation figures because they lacked a group in which to participate.

Selected univariate statistics: Total, Task-oriented, and Socio-emotional participation

Before conducting the hypothesis testing procedures selected univariate statistics (i.e., the mean, standard deviation, sum, minimum, and maximum) were obtained for the research model's dependent measures. They are shown for all participants who did not drop out. They are further subdivided by sex, by gender-revealed status, and by token status.

TABLE 4.8 presents number of participants (N), mean, standard deviation, minimum and maximum for total remarks by an individual. It contains similar statistics for the two subcategories of remarks: task-oriented and socio-emotional. There were many more task-oriented than socio-emotional remarks.

MEASURE	NUMBER	MEAN	STD DEV	MIN	MAX
All remarks	93	31.58	21.99	2	109
Task-oriented remarks		26.37	18.39	2	84
Socio-emotional remarks		5.20	5.85	0	42

TABLE 4.8 Number of remarks: All participants

Selected univariate statistics for total remarks: all participants

Table 4.9 presents selected univariate statistics based on the number of total remarks made by individuals in several categories: by sex, by gender-revealed status, by token status, and by the crossing of these categories: sex within gender-revealed status, and sex within token status. Similar statistics follow for the sub categories of task-oriented and socio-emotional remarks by count and task-oriented and socio-emotional remarks by percentage of the conversational mix.

Results indicated that females made more remarks that males overall (36 vs. 27). Token males and females were closer in the total number of remarks made, because the token males make more remarks than the non-token males while the token females made slightly fewer remarks than the non-token females.

MEASURE	NUMBER	MEAN	STD DEV	MIN	MAX
All participants by sex					
Males	49	27.14	16.67	3	76
Females	44	36.52	26.03	2	109
By gender-revealed status					
Anon	47	31.96	23.06	3	109
Non-anon	46	31.20	21.09	2	89
By token status:					
Token	16	31.58	26.25	4	109
Non-token	77	31.59	21.20	2	94
Sex within gender-revealed status—all anon:					
Males	25	27.56	18.28	3	76
Females	27	35.52	23.75	2	89
Sex within gender-revealed status—all non-anon:					
Males	25	27.84	15.91	4	65
Females	22	36.64	28.86	3	109
By sex within token status—all non-tokens					
Males	41	27.00	17.52	3	76
Females	36	36.94	24.02	2	94
By sex within token status—all token					
Males	9	27.88	9.03	11	55
Females	7	34.89	10.24	4	109

TABLE 4.9 Selected univariate statistics: total remarks

Selected univariate statistics for task-oriented remarks

Task-oriented remarks include any remarks that are directly related to the assigned task and emotionally neutral. Although Siegel's coding scheme recognizes task-oriented remarks, socio-emotional remarks and six sub-categories of each, the sub-categories are not used in the aggregate in this study. Selected univariate statistics for task-oriented remarks appear in TABLE 4.10.

Maximum and minimum in the following tables refer to the maximum and minimum number of a given type of remark made by an individual during the entire conference. For example a 0 minimum in a given measure of task-oriented remarks indicated that one or more individuals made no task-oriented remarks during the entire conference.

Female participants made a higher number of task-oriented remarks than did male participants. While differences in token status and gender-revealed status resulted in a noticeable difference in the means, the means for all token members were similar and appeared to be less influenced by the sex of the participants.

MEASURE	N	MEAN	STD DEV	MIN	MAX
All participants by sex					
Males	49	22.76	15.0825	2	65
Females	44	30.41	20.9255	2	84
By gender-revealed status					
Anon	47	27.49	18.94	2	84
Non-anon	46	25.24	17.95	2	65
By token status:					
Token	16	25.06	18.58	2	67
Non-token	77	26.65	18.46	2	84
Sex within gender-revealed status-all anon					
Males	25	22.28	16.67	2	65
Females	27	28.76	19.16	2	64
Sex within gender-revealed status—all non-anon:					
Males	25	24.16	14.04	2	54
Females	22	31.27	23.07	2	84
By sex within token status—all non-tokens					
Males	41	22.90	15.99	2	65
Females	36	31.37	20.31	2	84
By sex within token status—all tokens					
Males	9	22.00	12.26	10	46
Females	7	26.67	25.73	2	67

TABLE 4.10 Selected univariate statistics: Task-oriented remarks by count

Selected univariate statistics for socio-emotional remarks

Selected univariate statistics for socio-emotional remarks appear in Table 4.11. The mean of socio-emotional remarks for females again exceeded the mean for male participants. Token status appeared to affect the number of socio-emotional remarks with the mean of non-tokens 160% that of tokens. Combining sex and token status resulted in decreasing the difference between non-token males and non-token females while increasing the difference between token males and token females.

MEASURE	N	MEAN	STD DEV	MIN	MAX
All participants by sex					
Males	49	4.388	3.21984	0	12
Females	44	6.114	7.74661	0	42
By gender-revealed status					
Anon	47	4.468	6.05034	0	30
Non-anon	46	5.957	5.05945	0	42
By token status:					
Token	16	7.563	9.67449	0	42
Non-token	77	4.714	4.65924	0	30
Sex within gender-revealed status—all anon					
Males	25	5.280	2.79165	0	11
Females	27	6.762	6.85496	0	30
Sex within gender-revealed status—all non-anon:					
Males	25	3.680	3.53223	0	12
Females	22	5.363	8.75892	0	42
By sex within token status—all non-tokens					
Males	41	4.098	0.72184	0	11
Females	36	5.571	0.77037	0	30
By sex within token status—all tokens					
Males	9	5.875	3.2938	0	12
Females	7	8.2222	3.7348	2	42

TABLE 4.11 Selected univariate statistics: Socio-emotional remarks by count

Selected univariate statistics for percentage of task-oriented remarks

The percentage of remarks measures the conversational mix of an individual by type of remark. Table 4.12, which appears on the following page, presents selected univariate statistics based on percentage of use for task-oriented remarks.

The standard deviations for all measures of task-oriented remarks were large, running between 12 and 21% of the mean. The sizable difference in the count is not present in the percentage of remarks by sex. Although females made a greater number of task-oriented remarks, this difference did not extend to percentages. Females used a higher number but a lower percentage of task-oriented remarks than males. Both gender-revealed status and token status appear to make a greater difference than sex in the percentage of task-oriented remarks made. The most sizable difference in use of task-oriented remarks appeared to be between non-gender-revealed and gender-revealed tokens. Non-gender-revealed tokens used the lowest percentage of task-oriented remarks of any category while non-token, non-gender-revealed individuals used the highest percentage.

MEASURE	N	MEAN	STD DEV	MIN	MAX
Percentage by sex:					
Males	50	81.54	12.84	47.06	100.00
Females	43	83.68	13.41	50.00	100.00
Percentage by gender-revealed status					
Anon	47	85.44	12.38	50.00	100.00
Non-anons	46	79.52	13.10	47.06	100.00
Percentage by token status					
Tokens	16	76.35	12.79	50.00	100.00
Non-tokens	77	83.79	12.77	47.06	100.00
Percentage by sex within anonymity—all gender-revealed					
Males	25	85.01	11.99	50.00	100.00
Females	22	85.92	13.08	50.00	100.00
Percentage by sex within anonymity—all non- gender-revealed					
Males	25	77.99	12.67	47.06	100.00
Females	21	81.33	13.67	55.56	100.00
Percentage by sex within token status—all tokens:					
Males	9	79.74	9.87	66.67	100.00
Females	7	75.96	15.13	50.00	92.73
Percentage by sex within token status—all non-tokens:					
Males	41	81.79	13.34	47.06	100.00
Females	36	85.66	11.87	55.56	100.00
Percentage by token status within anonymity—all gender-revealed					
Tokens	7	72.40	13.21	50.00	87.50
Non-tokens	40	87.72	10.87	50.00	100.00
P ercentage by token status within anonymity—all non-gender-revealed					
Tokens	9	79.42	12.32	61.90	100.00
Non-tokens	37	79.54	13.44	47.06	100.00

TABLE 4.12: Selected univariate statistics: Task-oriented remarks by percentage

Selected univariate statistics for percentage of socio-emotional remarks

Table 4.13 describes the usage of socio-emotional remarks. The mean of percentages is the mean of individuals' percentages. Some individuals used no socio-emotional remarks during the entire conference as indicated by the 0 minimum. Males made fewer than did females. Anonymity appeared to decrease the number of socio-emotional remarks made, as did non-token status.

MEASURE	N	MEAN	STD DEV	MIN	MAX
Percentage by sex:					
Males	50	18.54	12.84	0.00	52.94
Females	43	16.32	13.26	0.00	50.00
Percentage by anonymity					
Anons	47	14.56	12.38	0.00	50.00
Non-anons	46	20.48	13.10	0.00	52.94
Percentage by token status					
Tokens	16	23.65	12.79	0.00	50.00
Non-tokens	77	16.21	12.77	0.00	52.94
Percentage by sex within gender-revealed status—all non-gender-revealed					
Males	25	14.99	11.98	0.00	50.00
Females	22	14.10	13.0829	0.00	50.00
Percentage by sex within gender-revealed status—all gender-revealed					
Males	25	22.01	12.67	0.00	52.94
Females	21	18.67	13.67	0.00	44.44
Percentage by sex within token status—all tokens:					
Males	9	19.82	9.87	0.00	33.33
Females	7	24.57	15.13	7.27	50.00
Percentage by sex within token status—all non-tokens:					
Males	41	18.22	13.34	0.00	52.94
Females	36	13.94	11.87	0.00	44.44
Percentage by token status within gender-revealed status—all non-gender-revealed					
Tokens	7	27.60	13.21	12.50	50.00
Non-tokens	40	12.28	10.87	0.00	50.00
Percentage by token status within gender-revealed status—all gender-revealed					
Tokens	9	20.58	12.32	0.00	38.10
Non-tokens	37	20.46	13.44	0.00	52.94

TABLE 4.13 Selected univariate statistics: Socio-emotional remarks by percentage

Summary of Findings at the Overview Level

At the time of group formation, only one measured variable was statistically significant in determining whether or not an individual would drop out--the class from which the student volunteered. This suggests that something related to the class rather than the participants affected the decision to drop-out.

When remarks were measured by count, sex appeared important in determining the number of remarks made. In comparing the total number of remarks (as measured by count) made by males and females, the mean number of remarks made by females always exceeded that of males. Females made approximately 9 more remarks than males, 7.7 more task-oriented and 1.2 more socio-emotional remarks.

In addition, token status seemed to make some difference in participation, serving as an equalizer on the effect of sex. Men who were tokens made more remarks than men who were not tokens did; women who were tokens made fewer remarks than women who were not.

When remarks were measured as percentage of the conversational mix, both token status and gender revealed status appeared to have more of an effect than sex. The effect of both token status and gender-revealed status was particularly noticeable among token members where non-gender-revealed tokens used the lowest percentage of task-oriented remarks of any category while gender-revealed non-tokens used the highest percentage. The significance of these differences is analyzed in the section that follows.

Evaluation of Hypotheses: Total, Task-oriented and socio-emotional Participation

The objective of hypothesis testing in this study is to statistically test the significance of the hypotheses in order to describe better the determinants of participation in the ad hoc computer-supported work group. Four primary hypotheses were proposed in Chapter 3. The three discussed in this section stated in the null are:

> $H1_0$ There is no significant difference in total participation between males and females, between token and non-token individuals, and between gender-revealed and non-gender revealed individuals.
>
> $H2_0$ There is no significant difference in task-oriented participation between males and females, between token and non-token individuals, and between gender-revealed and non-gender revealed individuals.
>
> $H3_0$ There is no significant difference in socio-emotional participation between males and females, between token and non-token individuals, and between gender-revealed and non-gender revealed individuals.

A fourth, in which the dependent variable is measured by percentage of the conversational mix, is discussed in the next section.

In addition to the three variables referred to in the hypotheses, a number of ancillary variables were collected and included in the analysis in an attempt to improve the model.

Standard practices were followed in the analysis. All variables appearing in a significant interactive effect were also retained as main effects in the model. In addition, any categorical variable with more than two categories retained all dummy variables for the sake of completeness when one or more was significant.

This section evaluates the effect of the variables on total, task-oriented, and socio-emotional participation measured by count of remarks.

The study recorded and analyzed nine ancillary variables including: (1) length of ownership (ownership), (2) whether or not the participant had taken a keyboarding class (keyboarding), (3) number of computer related classes taken (classes), (4) frequency of computer usage (usage), (5) locus of control (LOC), (6) psychological gender (BEM type), (7) computer anxiety (anxiety), (8) confidence in ability to use a computer (confid), (9) and a positive attitude toward computers (liking). Once these ancillary variables were added, the model was improved. Because of the large number of variables and because the original analysis had found no interaction effect in two of the models, these interactions were omitted from the expanded model in these two cases.

The analysis is divided into three sub-sections:

- A regression was run using the original three variables: gender-revealed status (gender- revealed), token membership status (token), and sex (sex). Their interactions are included.
- A backward, stepwise regression was run eliminating, one at a time, those variables with a p of > .10.
- Finally, the ancillary variables were introduced into the model, and a second series of backward, stepwise regressions was run. Interactions are added when revealed by the stepwise regression.

The result of each regression is described in the next three sections followed by the appropriate output table. Similar analyses are performed for task-oriented and socio-emotional participation, as well as conversational mix.

Total participation

In order to analyze the statistical significance of the variables on task-oriented participation, the following hypothesis was tested:

> $H1_0$ There is no significant difference in total participation between males and females, between token and non-token individuals, and between gender-revealed and non-gender revealed individuals.

To test this hypothesis, three regressions were performed as described above with total participation. The results of each regression are described in the next three sections preceding the appropriate output table.

Total participation: original variables

As Table 4.14 indicates, this model explained little variation in total participation. Nothing is significant at < .10 when all original variables are retained. The RSquare Adjusted is microscopic (0.1%)

Total Remarks

The regression equation is
Total = 26.6 + 8.88 SEX + 10.7 Token + 0.96 GendRev - 4.1 Sex*Token
+ 2.14 Sex*Gend - 16.0 Token *Gend

Predictor	**Coef**	**StDev**	**T**	**P**
Constant	26.554	4.596	5.78	0.000
Sex	8.880	6.684	1.33	0.188
Token	10.72	11.18	0.96	0.341
GendRev	0.962	6.595	0.15	0.884
Sex*Token	-4.10	11.89	-0.34	0.731
Sex*GendRev	2.145	9.187	0.23	0.816
Token*GendRev	-15.99	12.00	-1.33	0.186

S = 21.98 **R-Sq = 6.7%** **R-Sq(adj) = 0.1%**

Analysis of Variance

Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	6	2961.5	493.6	1.02	0.417
Residual Error	86	41545.2	483.1		
Total	92	44506.6			

Source	DF	Seq SS
SEX	1	2039.7
Token	1	5.7
GendRev	1	15.5
Sex*Token	1	31.3
Sex*GendRev	1	11.1
Token*GendRev	1	858.3

TABLE 4.14: Regression on Original Model: Total remarks

Total participation: original variables with backward, stepwise regression

In an attempt to improve the model, a stepwise, backward regression was run on the original model. The results follow in Table 4.15.

RSquare Adjusted (3.5%) improved slightly following a stepwise regression to eliminate those variables that were not significant. In addition, Sex became a significant main effect (P = 0.039). If all other variables are held constant the effect of Sex on the intercept (27.1) was:

Value	Effect
0	No change
1	adds 9.38

indicating that--all other variables held constant--women contributed 9.38 more remarks than men did.

The regression equation is
Total = 27.1 + 9.38 SEX

Predictor	**Coef**	**StDev**	**T**	**P**
Constant	27.143	3.086	8.80	0.000
SEX	9.380	4.487	2.09	0.039

S = 21.60 **R-Sq = 4.6%** **R-Sq(adj) = 3.5%**

Analysis of Variance

Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	1	2039.7	2039.7	4.37	0.039
Residual Error	91	42467.0	466.7		
Total	92	44506.6			

TABLE 4.15: Backward, stepwise regression on the original model--Total remarks

Total participation: ancillary variables added after backward, stepwise regression

Adding the ancillary variables to the model (TABLE 4.16a & b) improved the RSquare Adjusted considerably (52.5%). Sex remained a significant main effect (P = .025). In addition, several of the ancillary variables (ownership, classes, usage, LOC, BEM, anxiety, and liking) had a P < .05.

The ancillary variables also produced several significant interactive effects with the original variables. The effects on total remarks of these interactions appear in TABLE 4.16c.

The regression equation is

Total = - 38.5 - 53.9 SEX - 27.0 token + 7.04 GendRev + 116 Owner
+ 27.2 Classes + 6.86 Usage - 71.5 LOC + 58.9 BEM - 4.06 Anxiety
- 0.379 Confidence - 2.89 Liking - 36.0 Sex*Own - 28.2 Sex*Class
+ 2.01 Sex*Conf + 16.0 Sex*LOC + 4.49 Usage*LOC + 2.49 Token*Anx
+ 2.74 Token*Conf - 5.16 Token*Like + 29.3 Token*Bem1
- 24.2 Token*Bem2 - 7.0 Token*Bem3 - 21.3 Own*Class
- 9.60 Own*Usage + 1.25 Own*Like + 0.0507 Anx*Like + 3.47 Bem1*Anx
+ 2.26 Bem2*Anx + 1.19 Bem3*Anx + 23.1 Sex*Bem1 + 19.1 Sex*Bem2
+ 25.4 Sex*Bem3 - 33.8 Gend*Bem1 - 6.5 Gend*Bem2 - 19.1 Gend*Bem3

Predictor	**Coef**	**StDev**	**T**	**P**
Constant	-38.47	37.35	-1.03	0.307
SEX	-53.93	23.50	-2.29	0.025
token	-27.02	35.85	-0.75	0.454
GendRev	7.040	6.687	1.05	0.297
Owner	115.63	41.17	2.81	0.007
Classes	27.180	9.280	2.93	0.005
Usage	6.862	1.895	3.62	0.001
LOC	-71.48	15.72	-4.55	0.000
BEM	58.88	11.35	5.19	0.000
Anxiety	-4.0605	0.9698	-4.19	0.000
Confidence	-0.3791	0.6043	-0.63	0.533
Liking	-2.8902	0.9451	-3.06	0.003
Sex*Own	-36.027	8.406	-4.29	0.000
Sex*Class	-28.156	8.936	-3.15	0.003
Sex*Conf	2.0100	0.5808	3.46	0.001
Sex*LOC	16.010	5.141	3.11	0.003
Usage*LOC	4.488	1.117	4.02	0.000
Token*Anx	2.494	1.022	2.44	0.018
Token*Conf	2.742	1.359	2.02	0.048
Token*Like	-5.158	1.709	-3.02	0.004
Token*Bem1	29.28	21.37	1.37	0.176
Token*Bem2	-24.20	22.23	-1.09	0.281
Token*Bem3	-7.05	22.46	-0.31	0.755
Own*Class	-21.283	8.024	-2.65	0.010
Own*Usage	-9.596	2.824	-3.40	0.001
Own*Like	1.2504	0.5582	2.24	0.029
Anx*Like	0.05071	0.02251	2.25	0.028
Bem1*Anx	3.4668	0.7114	4.87	0.000
Bem2*Anx	2.2559	0.5178	4.36	0.000
Bem3*Anx	1.1860	0.2807	4.22	0.000
Sex*Bem1	23.13	10.78	2.15	0.036
Sex*Bem2	19.11	10.13	1.89	0.064
Sex*Bem3	25.44	11.09	2.29	0.025
Gend*Bem1	-33.81	10.70	-3.16	0.003
Gend*Bem2	-6.51	10.07	-0.65	0.520
Gend*Bem3	-19.06	10.08	-1.89	0.064

Table 4.16a: Regression equation from backward, stepwise regression with ancillary variables added --Total remarks

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	35	31404.9	897.3	3.90	0.000
Residual Error	57	13101.8	229.9		
Total	92	44506.6			

Source	**DF**	**Seq SS**
SEX	1	2039.7
Token	1	5.7
GendRev	1	15.5
Owner	1	46.9
Classes	1	1274.8
Usage	1	1830.8
LOC	1	7.3
BEM	1	996.7
Anxiety	1	58.6
Confidence	1	252.6
Liking	1	249.8
Sex*Own	1	1410.9
Sex*Class	1	192.7
Sex*Conf	1	770.4
Sex*LOC	1	1474.1
Usage*LOC	1	1253.5
Token*Anx	1	819.5
Token*Conf	1	294.3
Token*Like	1	100.5
Token*Beml	1	2458.8
Token*Bem2	1	309.6
Token*Bem3	1	15.5
Own*Class	1	867.8
Own*Usage	1	3063.1
Own*Like	1	2426.8
Anx*Like	1	437.9
Beml*Anx	1	5.5
Bem2*Anx	1	464.5
Bem3*Anx	1	4191.2
Sex*Beml	1	341.5
Sex*Bem2	1	91.9
Sex*Bem3	1	900.5
Gend*Beml	1	1909.4
Gend*Bem2	1	5.2
Gend*Bem3	1	821.6

Table 4.16b: ANOVA from backward, stepwise regression with ancillary variables added—Total remarks

Intercept = -38.5

Sex and Classes		Var. A	Var. B	Inter.	Total effect
0	0	0	0		0
0	1	0	27.18		27.18
1	0	-53.93	0		-53.93
1	1	-53.93	27.18	-28.16	-54.91
Sex and Confidence					
0	0	0	0		0
0	1	0	-0.38		-0.38
1	0	-53.93	0		-53.93
1	1	-53.93	-0.38	+2.01	-52.30
Sex and LOC					
0	0	0	0		0
0	1	0	-71.48		-71.48
1	0	-53.93	0		-53.93
1	1	-53.93	-71.48	+16.01	-109.40
Token and Anxiety					
0	0	0	0		0
0	1	0	-4.06		-4.06
1	0	-27.02	0		-27.02
1	1	-27.02	-4.06	+2.49	-28.59
Token and Confidence					
0	0	0	0		0
0	1	0	-0.38		-0.38
1	0	-27.02	0		-27.02
1	1	-27.02	-0.38	+2.74	-28.59
Token and Liking					
0	0	0	0		0
0	1	0	-2.89		-2.89
1	0	-27.02	0		-27.02
1	1	-27.02	-2.89	-5.16	-35.07
GendRev and Bem 1(Undifferentiated)					
0	0	0	0		0
0	1	0	58.88		58.88
1	0	7.04	0		7.04
1	1	7.04	58.88	+3.47	69.39

TABLE 4.16c: Significant main and interaction effects involving original variables--Total participation.

Task-oriented Participation

In order to analyze the statistical significance of the variables on task-oriented participation, the following hypothesis was tested:

$H2_0$ There is no significant difference in task-oriented participation between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals.

To test this hypothesis, three regressions were performed with task-oriented participation as the response variable. The result of each regression is described preceding the appropriate output table.

Task-oriented participation: original variables

As Table 4.17 indicates, this model explains minimal variation in total participation. The R-Square Adjusted had a zero value and the P-value was .519. No variables were significant at $p < .10$ when all original variables are retained. The RSquare Adjusted is 0.0%.

The regression equation is
Task = 23.7 + 7.72 SEX + 3.43 token - 1.83 GendRev
- 4.53 Sex*Token + 1.62 Sex*Gend - 6.5 Token*Gend

Predictor	**Coef**	**StDev**	**T**	**P**
Constant	23.749	3.861	6.15	0.000
SEX	7.725	5.615	1.38	0.172
Token	3.426	9.394	0.36	0.716
GendRev	-1.827	5.541	-0.33	0.742
Sex*Token	-4.531	9.990	-0.45	0.651
Sex*GendRev	1.616	7.718	0.21	0.835
Token*GendRev	-6.45	10.08	-0.64	0.524

S = 18.46 **R-Sq = 5.7%** **R-Sq(adj) = 0.0%**

Analysis of Variance

Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	6	1783.7	297.3	0.87	0.519
Residual Error	86	29322.2	341.0		
Total	92	31105.8			

Source	**DF**	**Seq SS**
SEX	1	1358.1
Token	1	113.9
GendRev	1	106.6
Sex*Token	1	55.4
Sex*GendRev	1	9.9
Token*GendRec	1	139.7

TABLE 4.17: Regression on Original Model: Task-oriented remarks

Task-oriented participation: original variables after backward, stepwise regression

In an attempt to improve the model, a stepwise, backward regression was run on the original model. The results follow in Table 4.18.

RSquare Adjusted (3.3%) improved slightly following a stepwise regression that eliminated those variables that were not significant at $p < .10$. In addition, Sex was a significant main effect ($P = 0.044$). If all other variables are held constant, the effect of Sex was that a female made 7.65 more task-oriented remarks than a male.

The regression equation is
Task = 22.8 + 7.65 SEX

Predictor	**Coef**	**StDev**	**T**	**P**
Constant	22.755	2.583	8.81	0.000
SEX	7.654	3.755	2.04	0.044

S = 18.08 **R-Sq = 4.4%** **R-Sq(adj) = 3.3%**

Analysis of Variance

Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	1	1358.1	1358.1	4.15	0.044
Residual Error	91	29747.7	326.9		
Total	92	31105.8			

TABLE 4.18: Backward, stepwise regression on the original model--Task-oriented remarks

Task-oriented participation: ancillary variables added with backward, stepwise regression

Adding the ancillary variables to the model (TABLE 4.19a & b) improved the model. P became 0.000 and RSquare Adjusted increased to 46.6%. Sex ceased to be a significant main effect but gender-revealed status was moderately significant at p = .078. All other variables remaining the same, a gender-revealed individual used 14.75 fewer task-oriented remarks than a non-gender-revealed individual. In addition, several of the ancillary variables (usage, BEM, and anxiety) had a P < .05.

The ancillary variables also produced several significant interactive effects with the original variables. The effects of these interactions on task-oriented remarks appear in TABLE 4.19c.

The regression equation is

Task = - 166 + 16.1 SEX + 22.3 token - 14.8 GendRev + 67.4 Owner + 35.5 Classes
+ 18.7 Usage - 15.9 LOC + 49.9 BEM - 3.44 Anxiety - 0.69 Liking
- 25.8 Sex*Own - 27.0 Sex*Class - 4.26 Sex*Usage + 19.7 Sex*Bem1
+ 16.3 Sex*Bem2 + 24.4 Sex*Bem3 + 1.59 Sex*Anxiety + 1.28 Token*Anx
- 6.38 Token*Usage + 21.7 Gend*Class - 19.9 Gend*Bem1
+ 0.26 Gend*Bem2 - 16.4 Gend*Bem3 - 3.38 Own*Usage - 18.9 Own*LOC
- 9.04 Class*LOC - 0.536 Class*Anx - 0.238 Usage*Like
+ 6.15 Loc*Bem1 + 13.6 Loc*Bem2 + 0.36 Loc*Bem3 + 0.630 Loc*Like
+ 2.73 Bem1*Anx + 1.78 Bem2*Anx + 0.088 Bem3*Anx + 0.0541 Anx*LIke
- 1.84 Usage*Bem1 - 4.75 Usage*Bem2 - 1.07 Usage*Bem3
+ 0.66 Bem1*LIke + 1.30 Bem2*Like + 1.42 Bem3*Like

Predictor	Coef	StDev	T	P
Constant	-166.21	82.39	-2.02	0.049
SEX	16.09	37.14	0.43	0.667
token	22.28	40.70	0.55	0.586
GendRev	-14.752	8.193	-1.80	0.078
Owner	67.42	35.46	1.90	0.063
Classes	35.55	21.36	1.66	0.102
Usage	18.655	4.884	3.82	0.000
LOC	-15.88	13.31	-1.19	0.239
BEM	49.88	18.56	2.69	0.010
Anxiety	-3.441	1.143	-3.01	0.004
Liking	-0.695	1.781	-0.39	0.698
Sex*Own	-25.794	7.774	-3.32	0.002
Sex*Class	-26.958	8.013	-3.36	0.001
Sex*Usage	-4.261	2.366	-1.80	0.078
Sex*Bem1	19.72	10.63	1.85	0.070
Sex*Bem2	16.302	9.200	1.77	0.082
Sex*Bem3	24.44	10.28	2.38	0.021
Sex*Anxiety	1.5864	0.4691	3.38	0.001
Token*Anx	1.2828	0.5853	2.19	0.033
Token*Usage	-6.376	2.803	-2.27	0.027
GendRev*Class	21.730	9.268	2.34	0.023
Gend*Bem1	-19.89	10.72	-1.86	0.069
Gend*Bem2	0.258	9.514	0.03	0.978
Gend*Bem3	-16.435	9.542	-1.72	0.091
Own*Usage	-3.380	2.580	-1.31	0.196
Own*LOC	-18.855	4.913	-3.84	0.000
Class*LOC	-9.041	5.205	-1.74	0.089
Class*Anx	-0.5364	0.4454	-1.20	0.234
Usage*Like	-0.2383	0.1233	-1.93	0.059
Loc*Bem1	6.146	8.191	0.75	0.457
Loc*Bem2	13.620	6.818	2.00	0.051
Loc*Bem3	0.364	6.314	0.06	0.954
Loc*Like	0.6301	0.3096	2.04	0.047
Bem1*Anx	2.734	1.094	2.50	0.016
Bem2*Anx	1.7790	0.6711	2.65	0.011
Bem3*Anx	0.0878	0.8726	0.10	0.920
Anx*LIke	0.05405	0.02118	2.55	0.014
Usage*Bem1	-1.835	3.985	-0.46	0.647
Usage*Bem2	-4.755	2.960	-1.61	0.115
Usage*Bem3	-1.074	1.914	-0.56	0.577
Bem1*LIk	0.659	1.006	0.66	0.515
Bem2*Lik	1.2961	0.7131	1.82	0.075
Bem3*Lik	1.4199	0.7702	1.84	0.071

S = 13.44 **R-Sq = 71.0%** **R-Sq(adj) = 46.6%**

TABLE 4.19a: Regression equation from backward, stepwise regression with ancillary variables added--Task-oriented remarks

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	**42**	**22080.3**	**525.7**	**2.91**	**0.000**
Residual Error	**50**	**9025.5**	**180.5**		
Total	**92**	**31105.8**			

Source	**DF**	**Seq SS**
SEX	1	1358.1
Token	1	113.9
GendRev	1	106.6
Owner	1	0.1
Classes	1	426.4
Usage	1	1428.5
LOC	1	14.9
BEM	1	1001.6
Anxiety	1	262.4
Liking	1	50.7
Sex*Own	1	1153.1
Sex*Class	1	59.7
Sex*Usage	1	4.4
Sex*Bem1	1	0.1
Sex*Bem2	1	73.4
Sex*Bem3	1	558.1
Sex*Anxiety	1	1231.4
Token*Anx	1	1267.5
Token*Usage	1	55.8
GendRev*Class	1	171.1
GendRev*Bem1	1	160.1
GendRev*Bem2	1	343.2
GendRev*Bem3	1	517.2
Own*Usage	1	573.5
Own*LOC	1	735.9
Class*LOC	1	352.7
Class*Anx	1	101.9
Usage*Like	1	536.1
Loc*Bem1	1	1074.9
Loc*Bem2	1	0.5
Loc*Bem3	1	55.6
Loc*Like	1	793.4
Bem1*Anx	1	1394.6
Bem2*Anx	1	77.2
Bem3*Anx	1	2615.2
Anx*LIke	1	1992.0
Usage*Bem1	1	142.4
Usage*Bem2	1	345.5
Usage*Bem3	1	57.2
Bem1*LIk	1	17.0
Bem2*Lik	1	242.8
Bem3*Lik	1	613.5

TABLE 4.19b: ANOVA from backward, stepwise regression with ancillary variables added—Task-oriented remarks

Intercept = -166

		Var. A	Var. B	Inter.	Total effect
Gender-Revealed					
0		0			0
1		-14.75			-14.75
Sex and Ownership					
0	0	0	0		0
0	1	0	67.42		67.42
1	0	16.09	0		16.09
1	0	16.09	67.42	-25.79	57.72
Sex and classes					
0	0	0	0		0
0	1	0	35.55		35.55
1	0	16.09	0		16.09
1	0	16.09	35.55	-26.96	24.68
Sex and Anxiety					
0	0	0	0		0
0	1	0	-3.44		-3.44
1	0	16.09	0		16.09
1	0	16.09	-3.44	1.59	14.24
Sex and Bem3					
0	0	0	0		0
0	1	0	49.88		49.88
1	0	16.09	0		16.09
1	0	16.09	49.88	24.44	90.41
Token and Anxiety					
0	0	0	0		0
0	1	0	-3.44		-3.44
1	0	16.09	0		16.09
1	0	16.09	-3.44	1.28	20.12
Token and Usage					
0	0	0	0		0
0	1	0	18.66		18.66
1	0	16.09	0		16.09
1	0	16.09	18.66	-6.38	34.56
GendRev and Class					
0	0	0	0		0
0	1	0	35.55		35.55
1	0	16.09	0		16.09
1	0	16.09	35.55	21.73	42.53

TABLE 4.19c Significant main and interaction effects involving original variables--Task-oriented participation.

Socio-emotional Participation

In order to analyze the statistical significance of the variables on socio-emotional participation, the following hypothesis was tested:

$H3_0$ There is no significant difference in socio-emotional participation between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals.

To test this hypothesis, three regressions were performed with socio-emotional participation as the response variable. The results of each regression are described in the next three sections preceding the appropriate output table.

Socio-emotional participation: original variables

As Table 4.20 indicates, this model explains little variation in total participation. The R-Square Adjusted has a value of only 9.6% but the P-value is .022 indicating that, although the model explained only a small portion of the total variation, it was useful in explaining this portion. Token status, gender-revealed status and the interaction of token and gender-revealed status are significant at $p < .10$ when all original variables are retained.

If all other variables are held constant the interactive effect of token status (P = 0.012) and gender-revealed status (P = 0.098) was:

Token	GendRev	Effect
0	0	No change
0	1	adds 2.79 when a non-token is gender-revealed.
1	0	adds 7.21 when a token is not gender-revealed.
1	1	2.79 + 7.21 - 9.54 = 0.46 when an individual is both token and gender-revealed

The regression equation is
Socio = 2.81 + 1.15 SEX + 7.29 Token + 2.79 GendRev + 0.43 Sex*Token
+ 0.53 Sex*GendRev - 9.54 Token*GendRev

Predictor	**Coef**	**StDev**	**T**	**P**
Constant	2.805	1.163	2.41	0.018
SEX	1.155	1.691	0.68	0.497
Token	7.289	2.829	2.58	0.012
GendRev	2.789	1.669	1.67	0.098
Sex*Token	0.430	3.009	0.14	0.887
Sex*GendRev	0.529	2.324	0.23	0.821
Token*GendRev	-9.540	3.036	-3.14	0.002

S = 5.561 **R-Sq = 15.5%** **R-Sq(adj) = 9.6%**

Analysis of Variance

Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	6	487.49	81.25	2.63	0.022
Residual Error	86	2659.62	30.93		
Total	92	3147.12			

Source	**DF**	**Seq SS**
SEX	1	69.05
Token	1	68.81
GendRev	1	40.78
Sex*Token	1	3.43
Sex*GendRev	1	0.03
Token*GendRev	1	305.38

TABLE 4.20 Regression on Original Model: Socio-emotional remarks

Socio-emotional participation: original variables after backward, stepwise regression

In an attempt to improve the model, a stepwise, backward regression was run on the original model. The results follow in Table 4.21

This model shows improvement over the original one, but it still is weak with an RSquare Adjusted of 10.9%, indicating that the model still fails to explain much of the differences in socio-emotional participation.

Token status, gender-revealed status and their intersection remain significant. If all other variables are held constant the interactive effects of token status (P =0.001) and gender-revealed status (P = 0.0018) are:

Token	GendRev	
0	0	No change
0	1	adds 3.06 for non-tokens who are gender-revealed.
1	0	adds 7.60 for tokens who are not gender-revealed.
1	1	3.06+7.60-9.66 or 1.08 for tokens who are also gender-revealed.

The regression equation is
Socio = 3.33 + 7.67 token + 3.06 GendRev - 9.66 Token*Gend

Predictor	Coef	StDev	T	P
Constant	3.3250	0.8731	3.81	0.000
token	7.675	2.262	3.39	0.001
GendRev	3.064	1.269	2.42	0.018
Token*Ge	-9.664	3.002	-3.22	0.002

S = 5.522 R-Sq = 13.8% R-Sq(adj) = 10.9%

Analysis of Variance

Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	3	433.39	144.46	4.74	0.004
Residual Error	89	2713.73	30.49		
Total	92	3147.12			

Source	DF	Seq SS
token	1	76.16
GendRev	1	41.33

TABLE 4.21: Backward, stepwise regression on the original model--Socio-emotional remarks

Socio-emotional participation: ancillary variables added with backward, stepwise regression

Adding the ancillary variables to the model (TABLE 4.22a & b) improved the model. P dropped to 0.000 while RSquare Adjusted was 51.9%. Sex ($p = 0.023$) and gender-revealed status ($P = 0.016$) remained significant main effects. In addition, several of the ancillary variables (ownership, usage, LOC, and confidence) had a $P < .05$.

The original variables also produced several significant interactive effects with the ancillary variables. The effects on total remarks of these interactions appear in TABLE 4.22c.

The regression equation is

Socio = - 84.0 - 3.82 token + 2.47 GendRev + 25.2 Owner + 9.59 Classes
+ 4.45 Usage - 23.1 LOC + 4.94 BEM + 1.62 Confidence - 5.30 Sex*Own
+ 3.10 Sex*LOC - 7.05 Token*GendRev + 15.5 Token*Bem1
+ 5.01 Token*Bem2 + 7.65 Token*Bem3 - 1.38 Own*Usage
- 8.64 Own*Bem1 - 1.60 Own*Bem2 - 7.47 Own*Bem3 - 0.276 Class*Conf
+ 1.57 Usage*LOC + 3.87 SEX - 0.101 Usage*Conf + 6.13 Loc*Bem1
- 3.28 Loc*Bem2 + 1.65 Loc*Bem3 + 1.30 Usage*Bem1
+ 0.794 Usage*Bem2 + 0.567 Usage*Bem3

Predictor	**Coef**	**StDev**	**T**	**P**
Constant	-84.02	21.38	-3.93	0.000
Token	-3.821	4.771	-0.80	0.426
GendRev	2.4700	0.9974	2.48	0.016
Owner	25.19	11.07	2.28	0.026
Classes	9.591	5.655	1.70	0.095
Usage	4.453	1.612	2.76	0.007
LOC	-23.054	4.242	-5.44	0.000
BEM	4.943	3.657	1.35	0.181
Confidence	1.6228	0.5906	2.75	0.008
Sex*Own	-5.301	1.981	-2.68	0.009
Sex*LOC	3.096	1.364	2.27	0.027
Token*GendRev	-7.048	2.997	-2.35	0.022
Token*Bem1	15.483	5.398	2.87	0.006
Token*Bem2	5.008	5.435	0.92	0.360
Token*Bem3	7.647	6.278	1.22	0.228
Own*Usage	-1.3849	0.8038	-1.72	0.090
Own*Bem1	-8.641	3.525	-2.45	0.017
Own*Bem2	-1.603	2.757	-0.58	0.563
Own*Bem3	-7.469	2.834	-2.64	0.011
Class*Conf	-0.2758	0.1374	-2.01	0.049
Usage*LOC	1.5656	0.2776	5.64	0.000
SEX	3.875	1.670	2.32	0.023
Usage*Conf	-0.10105	0.04260	-2.37	0.021
Loc*Bem1	6.131	2.415	2.54	0.014
Loc*Bem2	-3.277	1.796	-1.83	0.073
Loc*Bem3	1.646	1.631	1.01	0.317
Usage*Bem1	1.2959	0.7936	1.63	0.107
Usage*Bem2	0.7937	0.5645	1.41	0.165
Usage*Bem3	0.5669	0.3180	1.78	0.079

S = 4.055 R-Sq = 66.6% R-Sq(adj) = 51.9%

TABLE 4.22a: Regression equation from backward, stepwise regression with ancillary variables added--Socio-emotional remarks

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	28	2094.77	74.81	4.55	0.000
Residual Error	64	1052.35	16.44		
Total	92	3147.12			

Source	DF	Seq SS
Token	1	76.16
GendRev	1	41.33
Owner	1	32.40
Classes	1	245.14
Usage	1	13.10
LOC	1	2.79
BEM	1	0.26
Confidence	1	98.11
Sex*Own	1	16.13
Sex*LOC	1	4.95
Token*GendRev	1	230.90
Token*Beml	1	75.23
Token*Bem2	1	1.03
Token*Bem3	1	18.00
Own*Usage	1	5.20
Own*Beml	1	26.63
Own*Bem2	1	48.65
Own*Bem3	1	41.79
Class*Conf	1	126.48
Usage*LOC	1	522.49
SEX	1	36.95
Usage*Conf	1	102.28
Loc*Beml	1	88.39
Loc*Bem2	1	149.20
Loc*Bem3	1	30.61
Usage*Beml	1	6.94
Usage*Bem2	1	1.37
Usage*Bem3	1	52.26

TABLE 4.22b: ANOVA from backward, stepwise regression with ancillary variables added—Socio-emotional remarks

Intercept = -84.0

		Var. A	Var. B	Inter.	Total effect
GandRsv					
0					
1		2.47			2.47
Sex					
0					
1		1.67			1.67
Sex and Ownership					
0	0	0			0
0	1	0	25.19		25.19
1	0	1.67			1.67
1	1	1.67	25.19	-5.30	21.56
Sex and LOC					
0	0	0			0
0	1	0	-23.05		-23.05
1	0	1.67			1.67
1	1	1.67	-23.05	3.10	-18.28
Token and GandRsv					
0	0	0			0
0	1	0	2.47		2.47
1	0	-3.82			-3.82
1	1	-3.82	2.47	-7.05	-8.40
Token and Bem1					
0	0	0			0
0	1	0	4.94		4.97
1	0	-3.82			-3.82
1	1	-3.82	4.94	+15.48	16.60

TABLE 4.22c: **Significant main and interactive effects involving original variables--Socio-emotional participation.**

Participation by percentage of the conversational mix

Conversational mix is defined as the mix of task-oriented and socio-emotional participation in an individual's speech. It is recorded as a percentage. To test this hypothesis, three regressions were performed with the task-oriented portion of the conversational mix as the response variable. Since the sum of task-oriented and socio-emotional participation equaled the total participation, it was unnecessary to perform a similar analysis using socio-emotional participation as the dependent variable. The results of each regression are described in the next three sections preceding the appropriate output table. The hypothesis stated in the null is:

$H4_0$ There is no significant difference in the conversational mix between males and females, between token and non-token individuals and between gender-revealed and non-gender revealed individuals.

To test this hypothesis, three regressions were performed as described above with the task-oriented portion of the conversational mix as the response measure. The result from each of these regressions is described in the next three sections preceding the appropriate output table.

Participation as a percentage of the conversational mix: original variables

This model (TABLE 4.23) explains little variation in the conversational mix. The R-Square Adjusted has a value of 11.2% and the

P-value is 0.000%, indicating that, although the model explained only a small portion of the total variation, it was useful in explaining this portion. With all of the original variables and their interactions included, two of the variables (gender-revealed and token status) are significant at $P < .10$. Their interactive effect was also significant ($p = 0.010$).

Being a token decreased the task-oriented portion of the conversational mix by 11.3%. Being gender-revealed decreased the task-oriented portion by 9.8%. The interactive effect of being both token and gender-revealed reduced it by 3.6% (-11.3 - 9.8 + 17.5).

The regression equation is
Mix of 1s = 0.864 + 0.0298 SEX - 0.114 Token - 0.0989 GendRev
-0.0750 Sex*Token + 0.0229 Sex*GendRev
+ 0.175 Token*GendRev

Predictor	Coef	StDev	T	P
Constant	0.86375	0.02565	33.68	0.000
SEX	0.02984	0.03730	0.80	0.426
Token	-0.11395	0.06240	-1.83	0.071
GendRev	-0.09894	0.03680	-2.69	0.009
Sex*Token	-0.07503	0.06636	-1.13	0.261
Sex*GendRev	0.02287	0.05127	0.45	0.657
Token*GendRev	0.17509	0.06696	2.62	0.011

S = 0.1227 R-Sq = 17.0% R-Sq(adj) = 11.2%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	6	0.26473	0.04412	2.93	0.012
Residual Error	86	1.29372	0.01504		
Total	92	1.55845			

Source	DF	Seq SS
SEX	1	0.01148
Token	1	0.04994
GendRev	1	0.07178
Sex*Token	1	0.02308
Sex*GendRev	1	0.00558
Token*GendRev	1	0.10287

TABLE 4.22: Regression on Original Model: Conversational mix

Participation as a percentage of the conversational mix: original variables with backward, stepwise regression

In an attempt to improve the model, a stepwise, backward regression was run on the original model. The results follow in Table 4.24.

This model showed improvement over the original one, but it was

weak with an RSquare Adjusted of 11.6%. This indicated that the model still failed to explain much of the differences in conversational mix among participants.

The main and interactive effects of token status and gender-revealed status were:

Value		Effect
Token	GendRev	
0	0	0
0	1	- 8.7%
1	0	-15.3
1	1	- 8.7 - 15.3 + 17.8 = -6.2%

The regression equation is
Mix of 1s = 0.877 - 0.153 token - 0.0875 GendRev + 0.178 Token*Gend

Predictor	**Coef**	**StDev**	**T**	**P**
Constant	0.87718	0.01934	45.34	0.000
token	-0.15320	0.05013	-3.06	0.003
GendRev	-0.08748	0.02811	-3.11	0.002
Token*Ge	0.17829	0.06652	2.68	0.009

S = 0.1223 R-Sq = 14.5% R-Sq(adj) = 11.6%

Analysis of Variance

Source	**DF**	**SS**	**MS**	**F**	**P**
Regression	3	0.22623	0.07541	5.04	0.003
Residual Error	89	1.33222	0.01497		
Total	92	1.55845			

Source	DF	Seq SS
token	1	0.04728
GendRev	1	0.07142
Token*Ge	1	0.10752

TABLE 4.24: Backward, stepwise regression on the original model--Conversational mix

Participation as a percentage of the conversational mix: ancillary variables added with backward, stepwise regression

Adding the ancillary variables to the model (Tables 4.25a & b) improved the it. RSquare increased to 55.9%. Token status ($p = 0.0005$) and gender-revealed status ($p = 0.040$) were significant main effects. In addition, one of the ancillary variables--usage--was a significant main effect with $p < .05$.

The original variables also produced several significant interactive effects with the ancillary variables. The effects of these interactions on total remarks appear in TABLE 4.25c.

The regression equation is

Mix of 1s = 0.612 + 0.0268 SEX - 0.628 token + 0.597 GendRev - 0.0503 Owner
+ 0.219 Classes + 0.0699 Usage - 0.094 LOC - 0.173 BEM
+ 0.00334 Confidence + 0.210 Token*Class + 0.061 Token*Bem1
+ 0.324 Token*Bem2 + 0.534 Token*Bem3 - 0.0250 Token*Conf
+ 0.0289 Token*Like - 0.00416 Liking + 0.0813 Gend*Own
- 0.0605 Gend*Usage - 0.122 Own*LOC + 0.227 Own*Bem1
□ 0.0093 Own*Bem2 + 0.200 Own*Bem3 - 0.00713 Class*Like
- 0.0178 Usage*LOC - 0.0923 Usage*Bem1 - 0.0435 Usage*Bem2
- 0.0296 Usage*Bem3 - 0.0886 Loc*Bem1 + 0.113 Loc*Bem2
+ 0.0502 Loc*Bem3 + 0.00907 LOC*Like + 0.0139 Bem1*Conf
- 0.00390 Bem2*Conf - 0.0110 Bem3*Conf - 0.00014 Bem1*LIke
+ 0.00475 Bem2*Like + 0.0117 Bem3*Like + 0.0137 Class*Bem1
+ 0.161 Class*Bem2 + 0.0830 Class*Bem3 + 0.142 Gend*Bem1
+ 0.146 Gend*Bem2 + 0.0859 Gend*Bem3

Predictor	Coef	StDev	T	P
Constant	0.6115	0.2463	2.48	0.016
SEX	0.02681	0.02402	1.12	0.270
token	-0.6283	0.2158	-2.91	0.005
GendRev	0.5969	0.2833	2.11	0.040
Owner	-0.05029	0.05836	-0.86	0.393
Classes	0.2188	0.1508	1.45	0.153
Usage	0.06986	0.02599	2.69	0.010
LOC	-0.0937	0.1190	-0.79	0.435
BEM	-0.1729	0.1194	-1.45	0.154
Confidence	0.003338	0.004186	0.80	0.429
Token*Class	0.20979	0.08262	2.54	0.014
Token*Bem1	0.0611	0.1289	0.47	0.637
Token*Bem2	0.3239	0.1464	2.21	0.032
Token*Bem3	0.5342	0.1552	3.44	0.001
Token*Conf	-0.02500	0.01253	-2.00	0.052
Token*Like	0.02890	0.01140	2.53	0.015
Liking	-0.004161	0.003945	-1.05	0.297
Gend*Own	0.08125	0.04872	1.67	0.102
GendRev*Usage	-0.06053	0.02098	-2.88	0.006
Own*LOC	-0.12165	0.03223	-3.78	0.000
Own*Bem1	0.22690	0.08364	2.71	0.009
Own*Bem2	-0.00929	0.06705	-0.14	0.890
Own*Bem3	0.20009	0.06653	3.01	0.004
Class*Like	-0.007126	0.003647	-1.95	0.056
Usage*LOC	-0.017839	0.006331	-2.82	0.007
Usage*Bem1	-0.09231	0.02792	-3.31	0.002
Usage*Bem2	-0.04350	0.02013	-2.16	0.036
Usage*Bem3	-0.02956	0.01515	-1.95	0.057
Loc*Bem1	-0.08857	0.06120	-1.45	0.154
Loc*Bem2	0.11312	0.04608	2.45	0.018
Loc*Bem3	0.05019	0.03882	1.29	0.202
LOC*Like	0.009070	0.002087	4.35	0.000
Bem1*Conf	0.013932	0.008232	1.69	0.097
Bem2*Conf	-0.003900	0.005298	-0.74	0.465
Bem3*Conf	-0.011029	0.006010	-1.84	0.073
Bem1*LIke	-0.000142	0.005573	-0.03	0.980
Bem2*Like	0.004750	0.005342	0.89	0.378
Bem3*Like	0.011706	0.004957	2.36	0.022
Class*Bem1	0.01370	0.08955	0.15	0.879
Class*Bem2	0.16064	0.06981	2.30	0.026
Class*Bem3	0.08299	0.07675	1.08	0.285
Gend*Bem1	0.14198	0.07112	2.00	0.051
Gend*Bem2	0.14602	0.06558	2.23	0.031
Gend*Bem3	0.08593	0.06308	1.36	0.179

S = 0.08647 R-Sq = 76.5% R-Sq(adj) = 55.9%

TABLE 4.25a: Regression equation for model with ancillary variables added--conversational mix

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	43	1.192087	0.027723	3.71	0.000
Residual Error	49	0.366362	0.007477		
Total	92	1.558450			

Source	DF	Seq SS
SEX	1	0.011476
Token	1	0.049943
GendRev	1	0.071777
Owner	1	0.011657
Classes	1	0.036914
Usage	1	0.007919
LOC	1	0.004129
BEM	1	0.000677
Confidence	1	0.039271
Token*Class	1	0.064009
Token*Bem1	1	0.000000
Token*Bem2	1	0.018395
Token*Bem3	1	0.003670
Token*Conf	1	0.000578
Token*Like	1	0.051118
Liking	1	0.013705
Gend*Own	1	0.007252
Gend*Usage	1	0.000150
Own*LOC	1	0.061673
Own*Bem1	1	0.054187
Own*Bem2	1	0.055827
Own*Bem3	1	0.032562
Class*Like	1	0.042271
Usage*LOC	1	0.010342
Usage*Bem1	1	0.015639
Usage*Bem2	1	0.012247
Usage*Bem3	1	0.110116
Loc*Bem1	1	0.002725
Loc*Bem2	1	0.042790
Loc*Bem3	1	0.004346
LOC*Like	1	0.166624
Bem1*Con	1	0.040187
Bem2*Con	1	0.001451
Bem3*Con	1	0.008223
Bem1*LIk	1	0.003673
Bem2*Lik	1	0.000433
Bem3*Lik	1	0.034153
Class*Bem1	1	0.019492
Class*Bem2	1	0.034653
Class*Bem3	1	0.000954
GendRev*Bem1	1	0.007337
GendRev*Bem2	1	0.023666
GendRev*Bem3	1	0.013876

TABLE 4.25b: ANOVA from backward, stepwise regression with ancillary variables added—conversational mix

Intercept = 0.612

		Var. A	Var. B	Inter.	Total effect
Token					
0		0			0
1		0.628			0.628
Gender-Revealed					
0		0			0
1		0.597			0.597
Token and class					
0	0	0	0		0
0	1	0	0.219		0.219
1	0	0.628	0		0.628
1	1	0.628	0.219	0.210	0.199
Token and Bem2					
0	0	0	0		0
0	1	0	-0.173		-0.173
1	0	0.628	0		0.628
1	1	0.628	-0.173	0.324	-0.472
Token and Bem3					
0	0	0	0		0
0	1	0	-0.173		-0.173
1	0	0.628	0		0.628
1	1	0.628	-0.173	0.534	-0.267
Token and Liking					
0	0	0	0		0
0	1	0	-0.004		-0.004
1	0	0.628	0		0.628
1	1	0.628	-0.004	0.029	-0.603
Gender-revealed and Usage					
0	0	0	0		0
0	1	0	0.070		0.070
1	0	0.597	0		0.597
1	1	0.597	0.070	-0.061	0.606
Gender-revealed and Bem1					
0	0	0	0		0
0	1	0	-0.173		-0.173
1	0	0.597	0		0.597
1	1	0.597	-0.173	0.142	0.566
Gender-revealed and Bem2					
0	0	0	0		0
0	1	0	-0.173		-0.173
1	0	0.597	0		0.597
1	1	0.597	-0.173	0.146	0.570

TABLE 4.25c: Significant main and interactive effects involving original variables--task-oriented portion of the conversational mix.

Overview of Results Using the Original Model

The results of the regressions on the original variables indicated that the model explained little of the variation in total participation. In each regression, the RSquare Adjusted had a minimal value. The analysis using this model failed to reject most of the null hypotheses since regressions on the original model revealed no variables that were significant in predicting total or task-oriented participation. However, although the RSquare adjusted was low (9.6), the regression indicated the significance ($P < .10$) of token status, gender-revealed status, and their interaction in predicting socio-emotional participation and in predicting the conversational mix. A token individual made more socio-emotional remarks than a non-token did. A gender-revealed individual also made more remarks than a non-gender-revealed individual did but the interactive effect of the two decreased socio-emotional participation, bringing the net effect of being both token and gender-revealed almost to the intercept.

Similar effects were found when a regression was run using conversational mix as the dependent variable. Token status, gender-revealed status and their interaction were all significant ($p < .10$) but the RSquare adjusted remained low (11.2%). Findings were similar to those using socio-emotional participation as the dependent variable. Both tokens and gender revealed individuals used a greater percentage of socio-emotional remarks in their mix than did non token or non-gender-revealed individuals. The interactive effect decreased the socio-emotional percentage, being the net effect almost back to the intercept.

Overview of results Using the Original Model with Backward, Stepwise Regression

The stepwise regressions run on the original variables better revealed the importance of the original variables. Sex was shown to significantly affect both total and task-oriented participation. Females made 7.65 more task-oriented remarks and 9.38 more total remarks than males did.

Token status and the interaction of token status with gender-revealed status were shown to significantly affect both socio-emotional participation and the conversational mix. Token individuals used 7.6 more socio-emotional remarks than non-tokens did. Those who were both token and gender-revealed used 1.08 more. There was a similar effect on conversational mix The socio-emotional portion of the conversational mix was increased by 8.7% for gender-revealed individuals and by 15.3% for token individuals. The interactive effect increased the socio-emotional portion of the conversational mix for individuals who were both token and gender-revealed by 6.2%

Although the predictability of the model was improved, it was further improved by the introduction of the ancillary variables and a backward, stepwise regression on the variables.

Overview of Results Using the Expanded Model

Introduction of the ancillary variables created a much more complex but improved model. The role of those original variables that earlier appeared to be significant was diminished. Sex remained

significant in predicting total but not task-oriented participation as suggested in the regressions on the original model. However, sex also emerged as significant in predicting socio-emotional participation in this model. One especially interesting effect was that, once the ancillary variables were added, being female ceased to increase participation; instead the main effect was reversed with being female decreasing total participation (9.38 remarks), and socio-emotional (14.75 remarks).

Token status and gender-revealed status remained significant in predicting socio-emotional participation. Token status and the interaction of token status with gender remained significant in the conversational mix.

Several of the ancillary variables, especially Bem category, had significant interactions with the original variables.

The complexity of the model suggests that types of participation should be analyzed at a more detailed level so that effects can be better isolated. This is addressed in CHAPTER 5.

CHAPTER 5

SUMMARY AND CONCLUSIONS

Overview

Chapter 4 revealed the complexity of the analysis and of the results obtained. For that reason, this chapter reviews and briefly summarizes those effects based on the original variables of sex, token status, and gender revealed status. It also summarizes the conclusions, describes the limitations of this study, and proposes areas for future research.

Two sets of variables were used during the study. The three original variables--sex, token status, and gender-revealed status--are referred to in the hypotheses. In addition, a review of the literature indicated there was a secondary group--the ancillary variables--that might influence participation. It is of particular interest that the ancillary variables proved useful in improving each of the models.

A Review of the Findings

The measures of total, task-oriented, and socio-emotional participation are unbounded and by count of remarks; they enable the researcher to compare of the volume of remarks made by various members of the population. These counts were used as the dependent measures in analyzing the effect of each variable.

Unlike the other variables, conversational mix is measured as a percentage. It is a bounded value ranging between 0 and 100% inclusively. Conversational mix measures the mix of task-oriented and socio-emotional remarks used by an individual. When the analysis was by conversational mix, results were different than when it was measured by count of remarks.

Hypothesis testing for Hypothesis 1: Total participation

Total participation included all remarks made by an individual regardless of type. Therefore, it encompassed a wide range of remarks ranging from a task-oriented statement such as "We need to provide more detail on the budget" to socio-emotional remarks such as "You're a jerk!" Interpretation of results requires a cautionary note. Because of the diversity of remarks, it is possible that each type of remarks may be influenced by different variables. Therefore, a different mix of remarks might produce different results

When a stepwise, backward regression was run using the three original variables, only sex produced a significant main effect. This was not unanticipated since the data itself revealed that the mean of total remarks made by females was 36.5 compared to the 27.1 total remarks made by males. It is of interest that it was women rather that men who made the most remarks. The model was very weak however with a RSquare of only .0458.

The analysis shows that the data contradicted the null hypothesis: that there is no significant difference in total participation between males and females. There was no significant difference in total participation between token and non-token individuals and between gender-revealed and non-gender-revealed individuals.

The ancillary variables were then included and a second backward, stepwise regression was run in an attempt to improve the model. The model was substantially improved with its RSquare Adjusted increasing to 52.5%. Sex remained a significant main effect. In addition several significant interactive effects occurred, especially between Bem status and the original variables of token status and gender-revealed status.

Data were then studied using the two sub-categories of task and socio-emotional remarks. A discussion of the results follows in the next two sections.

Hypothesis testing for Hypothesis 2: Task-oriented participation

Task-oriented participation made up approximately 85% of all remarks made in this study. All remarks intended to further the task, whether providing suggestions, expressing opinions, providing orientation or requesting any of the above were classified as task-oriented. It, like total participation, included a variety of remark types. They were as diverse as "There are two points I'd like to make" and "How do I create a budget?" Since the remarks are so disparate, the possibility exists that variables may affect each sub-category differently. While analysis by sub-category is necessary, it is beyond the scope of current research.

Since such a large percentage of total remarks were task-oriented, it was anticipated that results might be similar to those using total participation, and such was the case. Sex again was a significant main effect. Women made more remarks that did men. Females made 7.65 more remarks than men did. However, again the model was weak with a RSquare Adjusted of 04.4%.

Once again, the analysis shows that the data contradict the

hypothesis that there is no significant difference in task-oriented participation between males and females. There was no significant difference in task-oriented participation between token and non-token individuals or between gender-revealed and non-gender-revealed individuals.

Adding the ancillary variables strengthened the model, raising the RSquare Adjusted to 46.6%. The regression equation is found in Table 4.18a. In this model, none of the original variables showed a significant main effect although the interaction of token status with BEM was significant.

Hypothesis testing for Hypothesis 3: Socio-emotional participation

Socio-emotional remarks carry an emotional response; that response may be either positive or negative. Socio-emotional participation was only 15% of total participation.

When a backward, stepwise regression was run using the original variables, both token status and gender-revealed status created significant main effect. In addition, their interaction was significant. However, the model showed only limited strength with a RSquare Adjusted of 10.9%.

The analysis shows that the data contradicted the null hypothesis: that there is no significant difference in socio-emotional participation between token and non-token individuals and between gender-revealed and non-gender-revealed individuals.

However, there was no significant difference in socio-emotional participation between males and females. When the ancillary variables were added in an attempt to strengthen the model, the model substantially improved, with RSquare Adjusted increasing to 51.9%. The

interaction of token status with gender-revealed remained significant. In addition, BEM classification continued to interact with both token status and gender-revealed status.

Because count of remarks compares the number of remarks by sub-category but fails to reflect the percentage of remarks by sub-category in an individual's speech, participation was also measured by conversational mix. A discussion of the results follows in the next section.

Hypothesis testing for Hypothesis 4: The conversational mix

Conversational mix is defined as the relationship of task-oriented and socio-emotional remarks in an individual's speech. It was recorded as a percentage. Following a stepwise regression, the main effects of token status and gender-revealed status were significant at < .10, and the interaction effect of sex and gender-revealed status was highly significant.

When the ancillary variables were introduced in an attempt to improve the model, the RSquare Adjusted increased to 55.9%. , the main effect of gender-revealed status was now significant. In addition, both token status and gender-revealed status showed significant interactions with BEM although the interaction of token status with gender-revealed status ceased to be significant.

Conclusion

There were several findings of interest. Four were of particular interest. First, differences in total and task-orientation were most dependent on the demographic variable "sex" while differences in socio-emotional responses and mix were most dependent on the situation, i.e. token status and sex.

Second was the importance of the ancillary variables. The study revealed that the ancillary variables consistently showed significant main effects as well as interactions with the original variables.

Third was the effect on participation of the variable sex. A review of prior research indicated that task-orientation is both sex and time related (Eagley & Karau, 1991). Several meta-analyses (Anderson and Blanchard, 1982; Carli, 1982; and Eagley & Karau, 1991) found that men had a higher rate of task contribution than women, and women had a higher rate of social contribution. Since most participation in the ad hoc group is task-oriented (Mc Grath, 1984) and since individuals identify task-oriented behaviors as masculine, the assumption is that men participate more and exhibit more task-influence behaviors (Craig & Scherif, 1986; Smith-Lovin & Brody, 1989).

Although this study supported the findings that men exhibited a higher percentage of task-oriented remarks as measured by the conversational mix, it did not support the findings that men participated more or that they made more task-oriented remarks. In fact, women made more remarks in all categories: total, task-oriented, and socio-emotional. Men appeared to be more task-oriented only when participation was measured by conversational mix.

One possible explanation is that, in spite of the differences in the mean number of remarks by males and females, including the ancillary variables in the regression equation indicated that being female actually decreased participation, all other values remaining constant. Some other variables are more often present in females and it may be that these variables are responsible for differences in participation.

A second, and more likely explanation, is that all three

categories used to code remarks in this study can be further subdivided; task-oriented remarks include questions about the task and statements about how to perform it. Researchers have found that women use more questions (Quina, Wingard, & Bates, 1987; Lakoff, 1975). Further analysis of the data used in this study may reveal that female participants did ask more questions. It is possible that prior studies may not have considered questions to be as task-oriented as statements.

It was of interest to note that gender-revealed status produced only a moderately significant main effect in predicting total and task-oriented behavior although it did show a significant interaction effect with token status for both socio-emotional remarks and conversational mix. It also produced a significant main effect for conversational mix.

One possible explanation is that gender was not effectively hidden even through the use of non-gender-revealing aliases. It is especially interesting because researchers have found evidence of gender recognition even when overt cues are omitted. They have found listeners to be adept at linking paralinguistic cues to gender identification (Lass, Mertz, & Kinnel, 1979; Sach, 1978; Bates, 1988). Herring (1995) proposed that men and women have different communication styles and ethics. Herring went as far as to say:

> "The existence of gendered styles has important implications for the claim that computer communication is anonymous and "gender-blind". If our on-line communication still reveals out gender, then gender differences, along with their social consequences are likely to persist on computer-mediated networks." (P 4)

The possibility of different communication styles raises interesting questions about the possibility of gender being displayed in

language itself. Although researchers have proposed that gender should not be displayed effectively in CMCS, linguistic differences themselves may provide gender-revealing cues, negating the effect of a non-gender-revealing status. Numerous style differences have been noted. Women are more socially expressive and use more affiliative language (Fowler & Rosenfeld, 1992). In addition, female speech patterns include tag questions, hedging, intensifiers, verbal fillers, and questions (Quina, Wingard, & Bates, 1987; Lakoff, 1975). These findings suggest that gender may be displayed in CMCS by speech patterns even when overt cues are hidden.

Limitations of the Study

This study had several limitations. First is its limited generalizability of subjects, of participation incentive, and of anonymity type. All participants were college students and their reaction to social cues may be atypical of the population at large. In addition, their age and education place them in a subset of the population that is accustomed to using computers. They were also aware that their conversations were being monitored. This may have inhibited their remarks.

Students were rewarded for taking part in the study by receiving extra credit points. These points were received for successful completion of the project rather than for individual effort or quality of individual work. There was no penalty for failure to complete the project. The dropout rate suggests that a penalty might have altered the results. In addition, the incentive to participate of these students may differ significantly from the population at large.

It was also limited to the differences produced by the types of anonymity selected. Other types of anonymity might have altered the results.

Second is the influence of experience, expertise and efficacy. The influences of these were minimized in this study by selecting students who had similar backgrounds and experience. Variations in experience were controlled by random assignment. Such conditions are unlikely to be duplicated in the workplace.

Third, this study measured participation only at the overview level of total, task and socio-emotional participation. These categories can be subdivided and, once subdivided, will provide additional and more specific information.

Other limitations included the representativeness of the task, the use of asynchronous communications with no face-to-face contact, the group size and composition, and the time period allowed. Changes to any of these might have changed the results.

Directions for Future Research

There are numerous directions for future research. Three are suggested here: analysis by more detailed categories, additional research into the effect of the ancillary variables, and additional research into the how well gender is revealed through communications themselves.

Analysis of total, task-oriented, and socio-emotional remarks yielded numerous significant variables and some findings that conflicted with prior research. One possible explanation is that each of these categories includes diverse sub-categories of remarks. In order to understand the effect of the various variables more clearly, it is

essential to analyze data at a more detailed level. If the analysis were by sub-category, it would include 16 additional sub-categories.

Inclusion of the ancillary variables produced much stronger models; several of the ancillary variables showed significant main and interaction effects. Due to the importance of these effects, it is imperative that the ancillary variables be studied in more depth.

This research suggests that gender may be revealed by linguistic differences, negating the effect of a non-gender-revealing status. Further research on the effect of gender-revealed status on participation and into the ability of group members to identify the sex of other group members when this type of anonymity is used would provide a useful addition to current research on anonymity and computer-supported work groups.

It would be of interest to repeat the study using various types of anonymity, tasks, or group compositions and would be of special interest to carry out a similar field study to increase the external validity. In addition, two other areas of additional research are suggested: (1) the relationship between participation and the quality of outcome and (2) the relationship between emergent leadership and characteristics of participation.

REFERENCES

Adrianson, L., & Hjelmquist, E. (1987). Group processes in face-to-face and computer-mediated communications. *Goteborg Psychological Reports, 17(4).*

Altewell, P. & Rule, J. (1984). Computing and organizations: What we know and what we don't know. *Communicatons of the ACM 12* 1184-1192.

Arndt, S., Feltes, J., & Hanak, J. (1983). Secretarial attitudes towards wordprocessors as a function of familiarity and locus of control. *Behavior and Information Technology. 2,* 17-22.

Bandura, A. & Cervone, D. (1986). Differential engagement of self-reactive influences in cognitive motivation. *Behavior and Human Decision Processes, 38,* 92-113.

Bem , S. L.(1975). Sex role adaptability: One consequence of psychological androgyny. *Journal of Personality and Social Psychology,* 31(4), 634-643.

Bem, S. L. (1974). The measurement of psychological androgyny. *Journal of Consulting & Clinical Psychology, 42,* 155-162.

Bem, S. L. & Lenny, E, (1976). Sex typing and the avoidance of cross-sex behavior. *Journal of Personalaity and Social Psychology, 33,* 48-54.

Bem, S. L. (1978). The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology, 42*(2), 155-162.

Bem, S. L. (1979) Theory and Measurement of Androgyny: A reply to the Pedhazur-Tetenbaum and Locksley-Colten Critiques, *Journal of Personality and Social Psychology,* 37(6), 1047-1054.

Benson, D. H. (1983). A field study of end-user computing: Findings and issues. *MIS Quarterly,* 7, 35-45.

Brewer, M. (1991). The social self: On being the same and different at the same time: *Personality and Social Psychology Bulletin,* 17: 475-482.

Collwell, N. L. & Sztaba, T. I. (1986). Organizational genderlect: The problem of two different languages, *Business Quarterly,* 24, 64-66.

Connelly, T., Jessup, L.M., & Valacich, J.S. (1990). Effects of anonymity and evaluative tone on idea generation in Computer-mediated groups. *Management Science. 36(6)* 689-703.

Constantinople, A. (1973). Masculinity-feminity: An exception to a famous dictum? Psychological Bulletin, *80,* 383-407

Craig, J. M. & Sherif, C. W. (1986). The effectiveness of men and women in problem-solving groups as a function of group gender composition. *Sex Roles. 14* 453-466.

Crosby, F. & Nyquist, L. The female register: An empirical study of Lakoff's hypothesis, *Language and Society, 6, 313-322.*

Culnan, M. J. & Markus, L. (1987), Information technologies: Electronic media and intraorganizational communication" in F. M. Jablin, I. L. Putnam, K.H. Roberts, & L. W. Porter (Eds.) *Handbook of Organizational Communication.* 420-444, Beverly Hills, CA: Sage.

Curley, K. & Pyburn, P. (1982). "Intellectual" technologies: The key toimproving white collar productivity. *Sloan Management Review. 24(1)* pp ?

Daft, R. L. & Lengel. R. H. (1984). Information richness: A new approach to managerial behavior and organizational design, In Staw and Cummings (Eds) *Research in Organizational Behavior,* vol 6 (Greenwich, CT:JAI Press, 191-233

Dennis, A. R.; Briggs, R. O.; & Nunamaker, J. F., Jr. (1991). Handwriting recognition and executive use of electronic meeting systems, Working paper, University of Arizona, Tucson as referenced in Jessup, L. M. & Valacich, J. S., Editors (1993). *Group Support Systems: New perspectives.* New York: McMillan Publishing Company.

Dennis, A. R.; Valacich, J. S.; & Nunamaker, J. F. ; Jr. (1990). An experimental investigation of the effects of group size in an electronic meeting environment, *IEEE System, Man, and Cybernetics* , 25, 1049-1057.

Dickson G., Lee. J., Robinson L. & Heath, R. (1989). Observations of GDSS interaction: Chauffeured, facilitated, and user-driven systems. In J. E. Nunamaker, Jr. (Ed.) *Proceedings of the 22th Annual Hawaii International Conference on Systems Sciences, 3,* 337-343. Los Alamitos, C:IEEE Computer Society Press.

Doll, W. J. & Torkzadeh, G (1988). The measurement of end-user computing satisfaction" *MIS Quarterly, 12,* 259-274.

Drucker, P. F. (1991). The coming of the new organization. In *Revolutions in Real time: Managing Information in the 1990's.* pp 3-16. Cambridge, MA: Harvard Business Review Press.

Eagly, A. H., & Karau, S. J. (1991). Gender and the emergence of leaders: A meta-analysis. *Journal of Personality and Social Psychology, 60*(5), 685-710.

Eakins, B. W. & Eakins, R. G. (1978). *Sex Differences in Human Communication,* Boston:Houghton Mifflin, Co.

Easton, G. K., George, J. F., Nunamaker, J. Jr., & Pendergast, M. O. (1990). Using two different electronic meeting system tools for the same task: An experimental comparison. *Journal of Management Information Systems. 7(1),* 85-100.

Easton, G. K., Vogel, D. R., & Nunamaker, J. F., Jr. (1989). Stakeholder identifiaction and assumption surfacing in small groups: An experimental study. In. J. F. Nunamaker, Jr. (Ed.) *Proceedings of the 22th Annual Hawaii International Conference on Systems Sciences, 3,*344-352. Los Alamitos, C:IEEE Computer Society Press.

Edinger, J. A. (1983). Nonverbal involvement and social control. *Psychological Bulletin, 93,* 30-56.

Fisher, B. A. (1970). Decision emergence: Phases in group decision making, *Speech Monographs,* 37, 53-66.

Fowler, G. & Rosenfeld, L. (1979).---check date--- Sex differences and democratic leadership behavior. *Southern Speech Communication Journal. 45,* 69-78.

Gallupe, R. B., Dennis, A. R., Cooper, W. H., Valacich, J. S., Nunamaker, J, F. & Bastianutti, L. (1992). Group size and electronic brainstorming. *Academy of Management Journal.*

Gilligan, C. (1982). *In a Different Voice*. Cambridge, MA: Harvard University Press.

Glesser, G. C., Gottehalk, L. A., & John, W. (1959). The relationship of sex and intelligence to choice of words: A normative study of verbal behavior, *Journal of Clinical Psychology* (15), 182-191.

Guimaraes, T. & Ramanvjam, V. (1986). Personal computing trends and problems: an emperical study, *MIS Quarterly, 10,* 179-184.

Herring, S. (1994). Gender differences in computer-mediated communication: Bringing familiar baggage to the new frontier [published on the www, text of a keynote talk at panel entitled "Making the Net*Work*: Is there a Z39.50 in gender communications?" at the American Library Association annual convention, Miami, June 27, 1994].

Hill, T., Smith, N. D. & Mann, M. F. (1987). Role of efficacy expectations in predicting the decision to use advanced technologies: The case for computers. *Journal of Applied Psychology, 72*(2), 307-313.

Hiltz, S. R., & Turnoff, M. (1978). *The Network Nation: Human Communication Via Computer*, Reading, MA: Addison-Wesley.

Hiltz, S. R., Johnson, K., & Turoff, M. (1986, Winter). Experiments in group decision making: Communication process and outcome in face-to-face versus Computerized Conferences. *Human Communication Research*, pp. 225-252.

Howard, G. S. & Smith, R. D. (1986, July). Computer anxiety in management: Myth or reality. *Communications of the ACM*, 29(7). pp. 611-615.

Howard, G. S. & Mendelow, A. L. (1991) ??? Model. *Decision Sciences, 22,* 241-265.

Igbaria, M. & Nachman, S. A. (1990). Correlates of user satisfaction with end use computing: An exploratory study. *Information Management, 19,* 73-82.

Igbaria, M., & Chakrabarti, A. (1990). Computer anxiety and attitudes toward microcomputer use, *Behaviour and Information Technology, 9,* 229-241.

Igbaria, M., Parasuraman, S. & Pavri, F. N. (1989). A path analytic study of individual characteristics, computer anxiety, and attitudes toward microcomputers. *Journal of Management*, 373-388.

Igbaria, M., Pavri, F. N. & Huff, S. L. (1989). Microcomputer applications: An empirical look a usage. *Information Management, 16,* 187-196.

Ives, B. & Learmounth, G. (1986). The information system as a competitive weapon. *Communications of the ACM, 27(12), 1193-1201.*

Jessup, L. M. & Tansik, D. A. (1991). Decision-making in an automated environment: The effects of anonymity and proximity on group process and outcome with a group decision support system. *Decision Sciences, 22(1)*, 266-279.

Jessup, Connolly, and Galegher, J. (1990). The effects of anonymity on group process in an idea-generating task. *MIS Quarterly, 14(3).* 313-321.

Jessup, L. M. & Valacich, J. S. (1993). In Jessup, L. M.; and Valacich, J. S.; Editors, *Group Support Systems: New Perspectives*. New York: McMillan Publishing Company, 3-7.

Kanter, R,. M. (1977). Some effects of proportions on group life:Skewed sex relations and responses to token women. *American Journal of Sociology 82,* pp 965-990.

Keisler S., Siegel, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist, 39,* 1123-1134.

Kernan, M., & Howard, G. S. (1990). Computer Anxiety and Computer Attitudes: An investigation of construct and predictive validity issues. *Educational and Psychological Measurement,* 681-690.

Koralik, K. & Ayman, R. (1987). Androgyny and leadership style: Toward a conceptual synthesis. Paper presented at the annual meeting of the Americal Psychological Association, New York.

Lakoff, R. (1975). *Language and Women's Place.* NewYork: Harper & Row.

Lakoff, R. (1977). Women's language, *Language and style,* 10,, 222-247.

Larson, C. E. and La Festo, F. M. (1990). *Team Work: What must go right/what can go wrong.* Beverly Hills: Sage Publications.

Loyd, B. H. & Gressard, C. (1984a). Reliability and factorial validity of computer attitude scales. *Educational and Psychological Measurement, 44,* 501-555.

Maccoby, E. E. (1974). *The Psychology of Sex Differences.* Stanford, Calif.: Stanford University Press.

Marshall, J. C. & Bannon. (1986). Computer attitudes and computer knowledge of students and educators. *Association for Educational Data Systems, 18*(4), 270-286.

McGarty, C., Haslam, S., Hutchinson, K. & Turner, J. (1994). The effects of salient group memberships on persuasion. *Small Group Research, 25,* 267-293.

McLeod, P. I. & Elston, S. E. (1997).Anonymity and consensus in computer-supported group decision-making, (Draft of an article under submission to the *MIS Quarterly.*)

Meier, S. T. & Lambert, M. E. (1991). Psychometric properties and correlates of 3 computer aversion scales. *Behavior Research Methods, 23*(1), 9 - 15.

Moir, A. & Jessel, D. (1991). *Brain Sex: The Real Difference Between Men and Women.* New York: Delta Books.

Morrow, P. C.., Prell, E. R. & McElroy, J. C. (1986). Attitudinal and behavioral correlates of computer anxiety. *Psychological Reports, 59,* 1199-1204.

Mulac, A. & Lundell, T. L. (1982), An empirical test of the gender-linked language effect in a public speaking setting, *Language and Speech, 25(3),* 243-256.

Mulac, A. & Rudd, M. J. (1977). Effects of selected American regional dialects upon regional audience members, *Communication Monographs,* 44, 185-196.

Nelson, D. L. & Cheney, P. H. (1987). Training end users: An exploratory study. *MIS Quarterly, 11(4).* 547-559.

Nunamaker, J. F., Jr.; Dennis, A. R.; George, J. F.; Valacich, J. S.; & Vogel, D. R. (1991). Electronic meeting systems to support group work. Theory and practice at Arizona. *Communications of the ACM,* 34(7), 40-61.

Nykodym, N., Miners, I., Simonetti, J. L., & Christen, J. C. (1989). Computer Phobia. *Personnel Administrator*, August, 54-56.

Poole, M. (1983). Decision development in small groups II: A study of multiple sequences in decision making, *Communication Monographs*, 50(3), 206-232.

Putnam, L. (1983). Conflict in group decision-making. *Communication and Group Decision-making*, (3), 206-232.

Rice, R. W. (1984). *The new media :Communication, research, & technology*. Beverly Hills, CA: Sage.

Rice, R. W., Bender, L. R., & Vitters, A. G. (1980). Leader sex, follower attitudes toward women and leadership effectiveness. *Organizational Behavior and Human Performance, 25*, 46-78.

Shaw, M. E. (1981). *Group dynamics: The psychology of small group behavior* (3rd ed) New York: McGraw-Hill.

Siegel, J., Dubrovsky, V., Keisler, S., & McGuire, T. (1986). Group processes in computer-mediated communication. *Organizational Behavior and Human Decision, 37*, 157-187.

Sleeth, R. G. & Humphreys, L. W., (1980). Influence on managerial attributes: Sex or androgny. In D. F. Ray (Ed) What Can Management Do to Improve Productivity in the 1980 Decade?. Mississippi State University: Southern Management Association.

Smith-Lovin, G. & Brody, C. (1989). Interruptions in group decisions. *American Sociological Review, 54,* 424-435.

Spears, R., Lea, M., & Lee, S. (1990). De-Individualization and group polarization in computer-mediated communication. *British Journal of Social Psychology, 29*, 121-134.

Sproull, L. &., Sara. (1991). *Connections*. Cambridge, MA: MIT Press.

Steinfeld, C. (1986). CMC: Explaining task and socio-emotional uses. *Communication Yearbook 9*, 777-804. Beverly Hills, CA: Sage.

Tanner, D. (1994). *Talking 9 to 5*. New York: William Morrow and Company, Inc.

Taylor, S. E., Fiske, S. T., & Etcoff, N. L. (1978). Categorical and contextual bases of person memory and stereotyping. *Journal of Personality and Social Psychology, 36*, 778-793.

Terborg, J. R. (1977). Women in management: A research review. *Journal of Applied Psychology, 62*, 647-664.

Torkzadeh, G. & Angulo, I. E. (1992), The concepts and correlates of computer anxiety. *Behaviour & Information Technology*, 99-108.

Trevino, L. K., & Webster, J. (1992). Flow in computer-mediated communication: Electronic mail and voice mail-Evaluation and impacts. *Communication Research, 19*(5), 539-573.

Tuckerman, B. W. (1965) Developmental sequence in small groups. *Psychological Bulletin,* 63, 384-399.

Valacich, J. S. (1989) *Group size and proximity effects on computer mediated idea generation: A laboratory investigation*. Unpublished doctoral dissertation, University of Arizona.

Valacich, J. S., & Dennis, A. R., Nunamaker, J. F., Jr. (1992). Group size and anonymity effects on computer-mediated idea generation. *Small Group Research*, 23(1) pp. 49-73.

Vancouver, J. B. & Ilgen, D. R. (1989). Effects of interpersonal orientation and the sex type of the task on choosing to work alone or in groups, *Journal of Applied Psychology, 74(6).* 927-934.

Venkatesh, M. & Wynne, B. E. (1991). Effects of problem formulation and process structures on performatnce and perceptions in a GDSS environment: An experiment in J. F. Nunamaker, Jr., (Ed.) *Proceedings of the TwentyOfourth Annual Hawaii International Conference on System Sciences 3,* 564-572.

Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research, 19*(1), 52-90.

Webster, J. & Martocchio, J. J. (1992). Microcomputer playfulness: Development of a measure with workplace implications. *MIS Quarterly,* , pp 201-223.

Westmoreland, Starr, D. P., Shelton, K. & Pasadeos, Y. (1977). Newswriting stules of male and female students, *Journalism Quarterly,* 54, 599-601.

Wood, R. & Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review, 14,* 361-384.

Zoltan, & Chapnis (1982). What do professional persons think about computers? *Behaviour and Information Technology, 1(1),* 55-68.

Zuboff , S. (1988). *In the Age of the Smart Machine,* New York: Basic Books.

Appendices

APPENDIX A

INVITATION TO PARTICIPATE

We will be performing an exercise involving computer-supported cooperative work. You are being given the opportunity to participate. In order to do so, it is necessary that you be familiar with working on a personal computer and with accessing sites through the Internet. You should be willing to check your conference site two or three times each day between April 9 and 16 and to communicate with other group members as necessary. The reward for your participation is having 2 extra credit points added to your course grade.

A number of business undergraduates studying at several Virginia locations will be participating. All identities will be anonymous. You may or may not be communicating with any of your own classmates. The schedule is as follows:

Week beginning March 24: Announcement will be made in your class about the exercise, credit given for participation, necessity of taking a preliminary survey, and the date of that survey

Week beginning March 31: Survey will be taken during your regularly scheduled class.

Week beginning April 7: Procedures and FocusPoint instructions will be given out in a regularly scheduled class.

April 9 to April 16: Conference will be available to you for group communications. Your group must complete its task and submit its plan no later that 3 PM on April 16.

Week beginning April 21: Debriefing during your regularly scheduled class. You will be asked to complete another survey at that time. That survey will take about 15 minutes.

As the schedule indicates, participation is optional but if you wish to receive participation credit it is necessary that you do three things:

- Complete a preliminary survey (***Survey A***) scheduled for the week beginning March 31
- Participate in an on-line conference with the group to which you are assigned and complete the task given.
- Complete a brief survey (***Survey B***) after the task is completed.

Survey A, measuring attitude and preferences, will be given the week beginning March 31 during your regularly scheduled class. It will take approximately 30 minutes to complete. If you wish to participate in the exercise, you must complete this survey at that time. Taking Survey A signifies your willingness to participate.

Once *Survey A* is completed, each participant will be assigned to a conference group. Participants will receive their group assignments

during a regularly scheduled class meeting the week of April 7. At the same time you receive your group assignment, you will receive a set of a set of instructions (*Using FocusPoint* handout) describing how to access and use your conference site. This site will be available to you 24 hours a day for the next 7 days. Work may proceed at your convenience during that time period. The conference will be run asynchronously so it is not necessary that group members work at the same time, only that they coordinate their efforts.

Since this is an extended time period, it is possible that a member of your group may cease participating for any of a number of reasons. It is the responsibility of the non-participating member to notify the group via the conference.

Your discussions will be analyzed as a means of better understanding the computer-supported work environment. Please sign on only to your own conference and refer to yourself only by your alias for the duration of this exercise. Your activity will be monitored and signing onto any conference other than your own or identifying yourself to other group members will result in your receiving no credit for your work.

Whenever your group has completed its work but no later than 3 p.m. on April 16, one member of your group must send me an email message containing the decisions the group arrived at. The alias names of all participating members must be included in this message.

Once this message is received from all groups, a list of participants' identification numbers will be forwarded to your professor so that credit may be given. That week, you will be asked to complete *Survey B* during your regularly scheduled class period. A brief discussion of the exercise will take place. That will be too early to provide you with the results of the exercise, but you will be given the opportunity to comment on the exercise and to ask questions.

Appendix B

Instruction Script

You are participating in an exercise involving computer-supported cooperative work. You should be aware that your discussions will be analyzed as a means of better understanding this work environment. Groups have been formed from all participants. Since business undergraduates from several Virginia universities will be participating, you may or may not have other classmates in your own group.

It is important that anonymity be preserved. Please sign on only to your own conference and refer to yourself only by your alias for the duration of this exercise. Remember your activity will be analyzed. Signing onto any conference other than your own or identifying yourself in any way will result in your receiving no credit for your participation.

For the purpose of this exercise, please think of yourself as a graduate of the School of Business at a mid-sized University located somewhere in the middle of the U. S. You graduated in May of 1987 and are looking forward to your class's 10th Reunion, which is scheduled for May 1997. You are one of a group of four who have been elected as hosts for the reunion weekend. As hosts you are charged with making all entertainment plans for the weekend. Unfortunately, you now live in different parts of the U.S.

Your group has decided to use a computer conference site to communicate since it is less expensive than using the telephone and faster than using mail. Your group is to determine the type of activities that your class members would most enjoy and then plan the weekend. Your group must determine when the reunion should begin and end. It should select the activities and types of facilities (hotels, restaurants, etc.) needed. Your group is to come to consensus on the criteria for selecting activities and facilities such as interest, size, cost or anything else your group believes relevant. You are then to plan the weekend, keeping your expenses within budget. You are NOT to select a particular facility, such as a particular hotel, or restaurant (i.e.: you will be going to a golf club, not the Ivy Ridge Golf Club).

Your class as a whole has already agreed to charge each person who registers $80.00 as part of the registration process. $75.00 of this $80.00 will be allotted to your committee for pre-paid activities. Any additional activities must be optional and funded by the participants. The cost of the hotel room is not included in the registration fee; a hotel may be selected but participants will register and pay for their rooms separately. **DO NOT INCLUDE REGISTRANTS' ROOM CHARGES IN YOUR BUDGET.**

You have been assured that it will be safe to assume that between 100 and 110 persons will attend the reunion. You have been assured that, should any deposits be required before everyone has registered, the money will be available to your committee. Once your group has decided what activities will take place, you need to create a realistic budget for the weekend's activities. It is not necessary that you spend all that you have been allocated, only that you do not exceed what has been allocated.

You will be given a separate set of instructions referred to as the ***Using FocusPoint*** handout. These instructions describe access to and use of your conference site. In addition, special lab assistants will be available at specified hours during the first few days of the conference in case you have any problems. You may access the conference from any computer from which you can get to the Internet.

The conference will begin on Wednesday, April 9, 1997 and end on Wednesday, April 16th. You

should sign on as soon as possible. After you have signed on you have two tasks:

- Your first task should be to change your password to one of your own choosing if you wish to do so. Instructions for changing your password are located in the ***Using FocusPoint*** handout.
- Your second task should be to determine some turnaround time on messaging. You might wish to begin the discussion by sending a short message to your fellow group members stating the times when you are most likely to check the conference site to read and respond to messages.

All group members will be able to see all messages posted to your site. You will be free to read and reply to any messages posted by a fellow group member. You can create what is referred to as a *thread.* A thread is a way of dividing messages by topics (i.e.: one thread might be about when each group member is likely to check the site. All messages related to that topic can be linked together by responding to that thread. A second thread might be a discussion of beginning and ending times of the Reunion). Pay particular attention to the section on responding to threads vs. creating new messages in your ***Using FocusPoint*** handout.

Work may proceed at your convenience so long as it is agreeable to the rest of your group. Since you have a week to complete the work, it is possible that a group member may cease participating for any of a number of reasons. It is the responsibility of the non-participating member to notify the group via the conference. If a member stops participating without explaining why, the rest of the group should complete the task on their own. You should not wait for non-participating members.

You will be done whenever your group has come to consensus on the plans (but no later than April 16). At that time, one member of your group should forward an email message containing your plans and budget to **floydn@emu.edu**. The alias names of all contributing group members must be included in this message. The name of any member who does not participate should not be included.

During your next scheduled class period, you will be asked to complete a brief survey (Survey B) about the exercise in which you have participated. For this survey, it will be necessary to know the aliases of your group members. At the end of this class period, the identification number of each participant who has completed Survey B and whose name appear as a contributor to the final plans will be forwarded to his or her professor so that credit may be given.

You are not to communicate anything other than your alias that might identify you in any way. Please note that your inter-group communications will be captured and analyzed. Only participating group members will receive credit for this activity.

APPENDIX C

SURVEY A

****

Identification Code for Part XI

(ID NUMBER) (SECTION) (SEX: 1 = Male, 2 = female)

___ ___ ___ ___ ___ ___

For Example:

(For ID number: 0011, Class: 1, Sex: F)

0 0 1 1 1 2

----ID NUMBER---- CLASS SEX

Do not fill in when completing survey; these will be filled in when groups are assigned:

Alias: _____

Password: _____

Group: _____

Experience With Computers

1. ___ Do you own a computer?
   1 = yes
   2 = no
2. ___ If you do own a computer. How long have you owned one?
   1 = less than 1 years
   2 = 1 to 2 years
   3 = more than 2 but less than 5 years
   4 = over 5 years
3. ___ Have you ever taken a course in typing?
   1 = yes
   2 = no
4. ___ Have you ever taken a course in computer literacy and/or computer programming?
   1 = yes
   2 = no
5. ___ If your response to question 4 was yes, how many courses have you taken (include high school, college, and work-related)?
   0 = less than one course completed
   1 = one course
   2 = two courses
   3 = three courses
   4 = four courses
   5 = five or more courses
6. ___ Currently, how often do you use a computer?
   5 = More than once a week
   4 = About once a week
   3 = About once a month
   2 = Less than once a month
   1 = Never
7. ___ Currently, how often do you use email?
   5 = More than once a week
   4 = About once a week
   3 = About once a month
   2 = Less than once a month
   1 = Never
8. ___ Currently, how often do you use the Internet (except for email)?
   5`= More than once a week
   4 = About once a week
   3 = About once a month
   2 = Less than once a month
   1 = Never

Computer Attitude Scale

(Loyd and Gressard, 1984a)

This survey lists feelings that individuals may have about computers. Please rate each of the following on a scale of 6 to 1 with 6 indicating strong agreement and 1 indicating strong disagreement.

Use the scale:

1. Strong disagreement
2. Moderate disagreement
3. Slight disagreement
4. Slight agreement
5. Moderate agreement
6. Strong agreement

____ 9. I don't understand how some people can spend so much time working with computers and seem to enjoy it.

____ 10. When there is a problem with computerized output that I can not immediately solve, I stick with it until I have the answer.

____ 11. I do not feel threatened when others talk about computers.

____ 12. I feel aggressive and hostile toward computers.

____ 13. It does not bother me at all to take computer courses.

____ 14. I do not think I could handle computer courses.

____ 15. I feel at ease in a computer class.

____ 16. I get a sinking feeling when I think of trying to use a computer.

____ 17. I am sure I could learn a computer language.

____ 18. Computers make me feel uneasy and confused.

____ 19. I'm no good with computers

____ 20. I think working with computers is challenging and stimulating.

____ 21. I don't think I would like to do advanced computer work.

____ 22. The challenge of solving problems with computers does not appeal to me.

____ 23. I'm not the type to do well with computers.

____ 24. Generally, I would feel OK about trying a new problem on the computer.

____ 25. I think using a computer language would be hard for me.

____ 26. I could get good grades in computer courses.

____ 27. I feel comfortable when I think of trying to use a computer.

____ 28. I have a lot of self-confidence when it comes to working with computers.

____ 29. I would like working with computers.

____ 30. Once I start to work with a computer, I find it hard to stop.

____ 31. Computers do not scare me at all.

____ 32. Figuring out computer problems does not appeal to me.

____ 33. I am sure I could work with computers.

____ 34. Working with a computer does not make me very nervous.

____ 35. Computers make me feel uncomfortable.

____ 36. I do as little work with computers as possible.

____ 37. If a problem is left unsolved in a computer case, I continue to think about it afterward.

____ 38. I do not enjoy talking with others about computers.

Rotter IE Scale

For each pair of statements, choose the one you feel is most true.

****

___39. (1) Children get into trouble because their parents punish them too much.
(2) The trouble with most children nowadays is that their parents are too easy with them.

___40. (1) Many of the unhappy things in people's lives are partly due to bad luck.
(2) People's misfortunes result from the mistakes they make.

___41. (1) One of the major reasons why we have wars is that people don't take enough interest in politics.
(2) There will always be wars, no matter how hard people try to prevent them.

___42. (1) In the long run people get the respect they deserve in this world.
(2) Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

___43. (1) The idea that teachers are unfair to students is nonsense.
(2) Most students don't realize the extent to which their grades are influenced by accidental happenings.

___44. (1) Without the right breaks one cannot be an effective leader.
(2) Capable people who fail to become leaders have not taken advantage of their opportunities.

___45. (1) No matter how hard you try some people just don't like you.
(2) People who can't get others to like them don't understand how to get along with others.

___46. (1) Heredity plays the major role in determining one's personality.
(2) It is one's experiences in life, which determine what one is like.

___47. (1) I have often found that what is going to happen will happen.
(2) Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

___48. (1) In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
(2) Many times exam questions tend to be so unrelated to course work that studying is useless.

___49. (1) Becoming a success is a matter of hard work; luck has little or nothing to do with it.
(2) Getting a good job depends mainly on being in the right place at the right time.

___50. (1) The average citizen can have an influence in government decision.
(2) This world is run by the few people in power, and there is not much the little guy can do about it.

___51. (1) When I make plans, I am almost certain that I can make them work.
(2) It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

___ 52. (1) There are certain people who are just no good.
(2) There is some good in everybody.

___ 53. (1) In my case getting what I want has little or nothing to do with luck.
(2) Many times we might just as well decide what to do by flipping a coin.

___ 54. (1) Who gets to be the boss often depends on who was lucky enough to be in the right place first.
(2) Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

___ 55. (1) As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
(2) By taking an active part in political and social affairs the people can control world events.

___ 56. (1) Most people don't realize the extent to which their lives are controlled by accidental happenings.
(2) There really is no such thing as "luck".

___ 57. (1) One should always be willing to admit mistakes.
(2) It is usually best to cover up one's mistakes.

___ 58. (1) It is hard to know whether or not a person really likes you.
(2) How many friends you have depends on how nice a person you are.

___ 59. (1) In the long run the bad things that happen to us are balanced by the good ones.
(2) Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

___ 60. (1) With enough effort we can wipe out political corruption.
(2) It is difficult for people to have much control over the things politicians do in office.

___ 61. (1) Sometimes I can't understand how teachers arrive at the grades they give.
(2) There is a direct connection between how hard I study and the grades I get.

___ 62. (1) A good leader expects people to decide for themselves what they should do.
(2) A good leader makes it clear to everybody what their jobs are.

___ 63. (1) Many times I feel that I have little influence over the things that happen to me.
(2) It is impossible for me to believe that chance or luck plays an important role in my life.

___ 64. (1) People are lonely because they don't try to be friendly.
(2) There's not much use in trying too hard to please people, if they like you, they like you.

___ 65. (1) There is too much emphasis on athletics in high school.
(2) Team sports are an excellent way to build character.

___ 66. (1) What happens to me is my own doing.
(2) Sometimes I feel that I don't have enough control over the direction my life is taking.

___ 67. (1) Most of the time I can't understand why politicians behave the way they do.
(2) In the long run the people are responsible for bad government on a national and on a local level.

BSRI

This inventory lists sixty personality characteristics, which may be used to describe a person. Please indicate how well each characteristic describes you. Please mark all characteristics.

Use the scale:

1. **Never or almost never true**
2. **Usually not true**
3. **Sometimes but infrequently true**
4. **Occasionally true**
5. **Often true**
6. **Usually true**
7. **Always or almost always true**

****

___ 1. Self-reliant
___ 2. Yielding
___ 3. Helpful
___ 4. Defend own beliefs
___ 5. Cheerful
___ 6. Moody
___ 7. Independent
___ 8. Shy
___ 9. Conscientious
___ 10. Athletic
___ 11. Affectionate
___ 12. Theatrical
___ 13. Assertive
___ 14. Flatterable
___ 15. Happy
___ 16. Strong personality
___ 17. Loyal
___ 18. Unpredictable
___ 19. Forceful
___ 20. Feminine
___ 21. Reliable
___ 22. Analytical
___ 23. Sympathetic
___ 24. Jealous
___ 25. Has leadership abilities
___ 26. Sensitive to the needs of others.
___ 27. Truthful
___ 28. Willing to take risks
___ 29. Understanding
___ 30. Secretive
___ 31. Makes decisions easily
___ 32. Compassionate
___ 33. Sincere
___ 34. Self-sufficient
___ 35. Eager to soothe hurt feelings
___ 36. Conceited
___ 37. Dominant
___ 38. Soft-spoken
___ 39. Likable
___ 40. Masculine
___ 41. Warm
___ 42. Solemn
___ 43. Willing to take a stand
___ 44. Tender
___ 45. Friendly
___ 46. Aggressive
___ 47. Gullible
___ 48. Inefficient
___ 49. Acts as a leader
___ 50. Childlike
___ 51. Adaptable
___ 52. Individualistic
___ 53. Does not use harsh language
___ 54. Unsystematic
___ 55. Competitive
___ 56. Loves children
___ 57. Tactful
___ 58. Ambitious
___ 59. Gentle
___ 60. Conventional

APPENDIX D

NAME CHOICES

Names were selected from a list of names nominated by three convenience samples of students. Each convenience sample consisted of students attending a class meeting held in the Department of Business and Economics. Each student was asked to list a name they considered highly feminine and one that they considered highly masculine. Those nominated more than once were automatically chosen to be further evaluated; the rest of the names in the evaluation sample were selected from the submitted list by selecting every 5th entry beginning with a randomly generated number between one and five inclusive.

A list of 30 nonsense names was randomly generated. These names were student-rated for femininity or masculinity. These three character names consisted of a constant followed by a vowel followed by a constant. Fifteen neutral nonsense names were selected.

A list of 15 highly feminine names, 15 highly masculine names, and 15 neutral nonsense names was created and an additional group of students was asked to evaluate these names by circling a value of from 5 to 1 with 5 representing a most-preferred name and 1 representing least-preferred name.

Those rating highest for likability were selected as aliases.

Names used are:

Feminine Names:

3.871 Ashley
3.903 Julie
3.903 Kristin
3.968 Sarah

Masculine Names:

3.613 Ryan
3.677 Chris
3.742 Dave
3.742 Matthew

Neutral Names:

1.645 KIX
1.548 MUJ
1.516 VAW
1.484 CIT

Some Editing was done to avoid using two names, which sounded almost the same

APPENDIX E

CONFERENCE NAMES

Andrews
Baker
Chase
Delta
Edwards
Fleming
Gaunt
Harold
Innes
Jackson
Kelly
Little
Moore
Newton
Oliver
Powers
Quincy
Roberts
Shull
Thomas
Underwood
Valdez
Wood
Xerox
Yates
Zwan

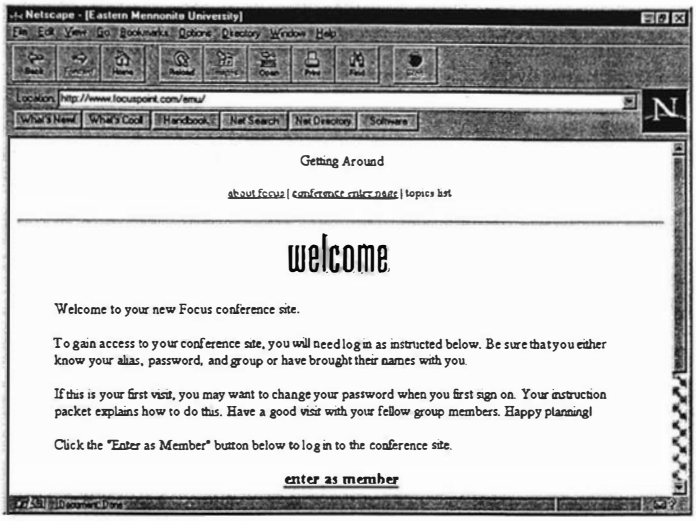
APPENDIX F

HANDOUT ON FOCUSPOINT

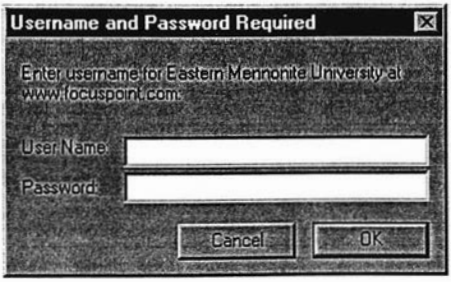
ACCESSING AND USING YOUR FOCUS POINT CONFERENCE

Signing on to the conference

You may access your conference site by signing on to any computer from which you can access the web and going to: **http://www.focuspoint.com/emu.** You will then see the FocusPoint opening screen:



Click on **enter as member** to enter the conference site. This will bring you to the following screen.



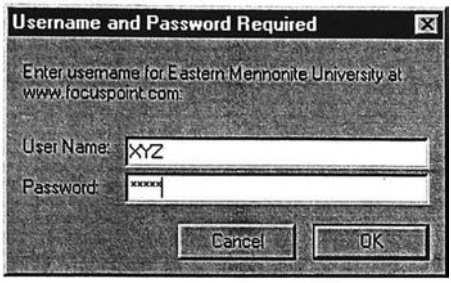
Enter your alias and password just as they appear on your copy of the cover sheet for Survey A:

For Example:

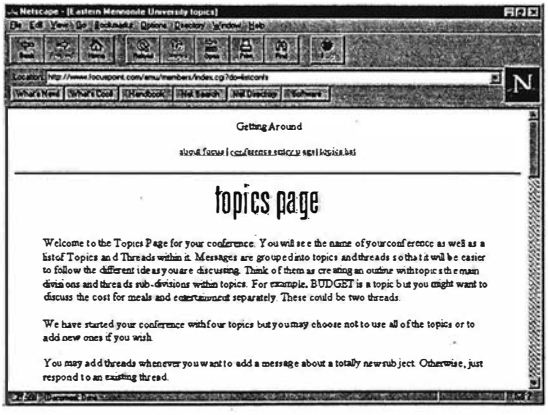
Alias: *XYZ* (be sure to use your own alias)

Password: *XYZ13* (be sure to use your o group)

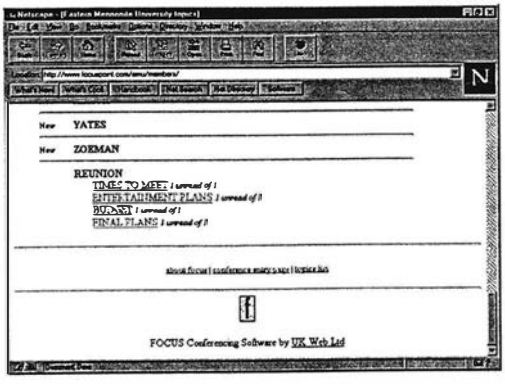
would be keyed in to create a screen looking like this:



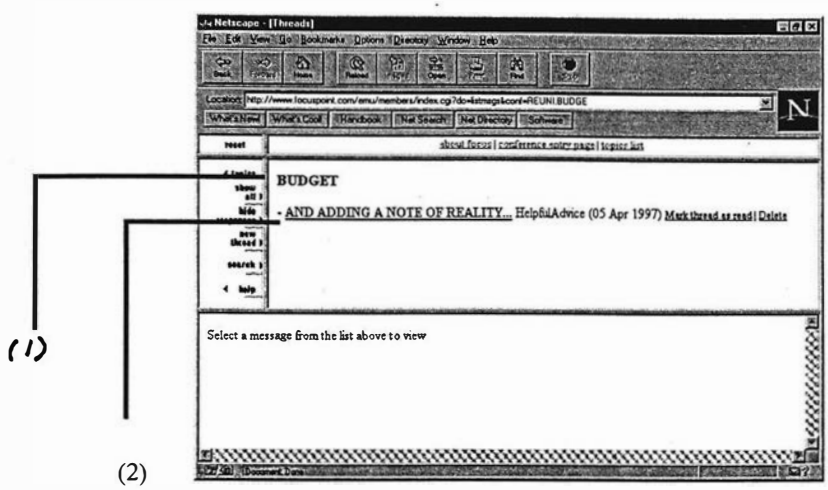
Remember that FocusPoint is case-sensitive; upper and lower case letters can not be used interchangeably in either names or aliases. Once you have keyed in your name and password, click on the OK button. This will take you to the Topics Page.



If you scroll down the screen, you will see the name of your conference and the initial topics. Assuming that your conference is named REUNION, the screen will look like this:



The Topics page lists the conference and topics to which you are subscribed. It is possible to set your options to see the names of other conferences but it will be easier if you do not do so. To access the messages in a topic, select the topic by clicking on its name. This will take you to a new page that lists the names of all of the threads included within the topic.



Notice that you can see the name of the topic (1) as well as the name of any threads (2).

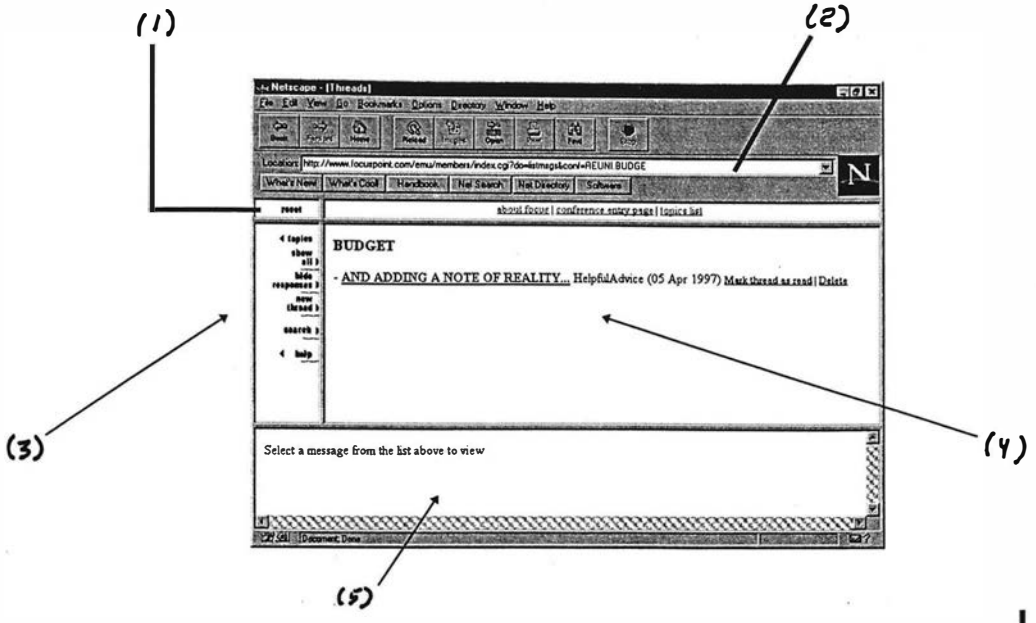
Reading existing messages

On this page, you will be able to review and respond to existing threads. A thread is a discussion topic. All messages within a thread should be on the same topic. Begin reading messages by clicking on the name of the message you want to read. The messages appear in the order in which they were received.

Look carefully at the leftmost partition of the thread screen. This partition is divided into five sections:

(1) The **RESET** button is at the top. Clicking on this button will redraw the screen if it gets confused.
(2) The **Topic Menu Bar** is across the top
(3) At the left of the screen are a set of **message reading options**
(4) To the right of the screen is a list of **message subjects**
(5) At the bottom is the window in which each message is displayed when it is read.

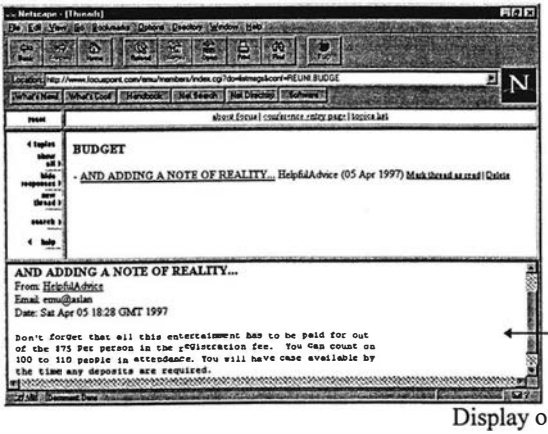
An illustration of this screen follows on the next page.



Focus will remember which messages you have read. When you return to a topic, you will see only those threads containing unread messages. If you wish to see all messages rather than only the unread ones, click on the **Show All Threads** button (6). It will then appear as **New Threads**.

Following a thread:

You may trace a thread by reading all messages in chronological order starting with the oldest. You may also start with the most current and read backward, since each responding message presents the latest thoughts on a subject. Clicking on the message you wish to read will cause that message to be displayed in the lower portion of the screen:



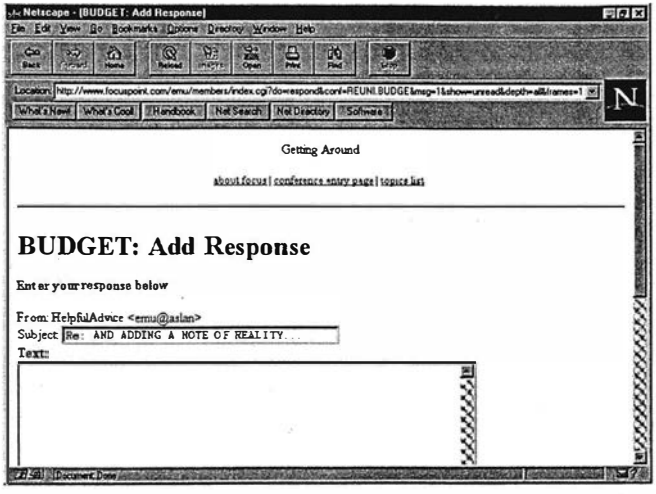
Display of message contents

You may scroll through the message. At the end of the message, there are a series of five buttons enabling you to either reply to the existing message, read the previous message, or read the following message. Although it is possible to delete or edit the message, ***PLEASE DO NOT DO SO—IT MAKES IT MUCH MORE DIFFICULT FOR OTHERS TO FOLLOW THE MESSAGES.***

Click on the **reply button**, to enter your own message.

Entering your own message:

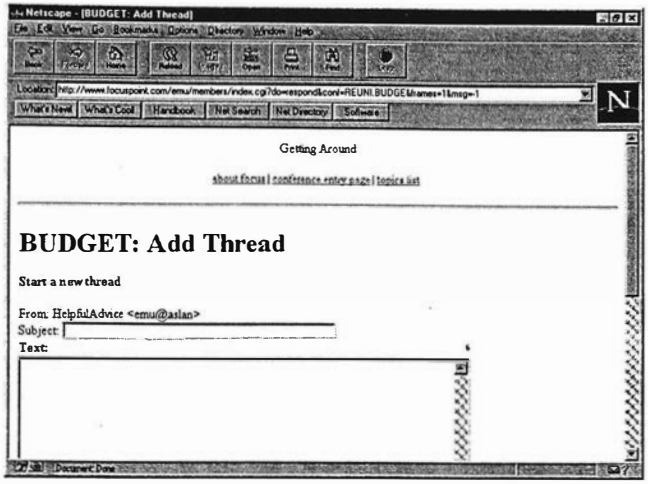
There are two ways you can add a message to a Focus topic: either by starting a new thread, or replying to an existing one. **To reply to an existing message,** you will click on the **reply button**. The following screen will appear:



Note that the subject will be filled in already. You may change this subject of you wish. The text of the message will start out containing the text of the message to which you are replying. You may cut this down to the just the part of the message to which you are responding. Once you have keyed in your own message, click on the **Add Message** button found at the end of the message area.

Adding Threads

To add a new thread, you will first click on the **New Thread** button found on the left hand portion of the screen. This will take you to the following screen:



Enter your subject, followed by the message. Once your message is entered, click on the **Add Tread** button found at the end of the message area. Your message will now appear as a new thread on the **Topics Page**.

Signing off the conference

When you are through for this session, you may sign off the conference. Remember that you can always return to a previous screen by pressing the **Back** button found at the upper left hand portion of your screen.

When your group has reached consensus

When your group has reached consensus, one member should agree to forward the plans via email to the conference administrator at **floydn@emu.edu**. This must be no later than April 16. This message must contain the name of the group and the names of participating members as well as a description of the activities scheduled and estimated cost. If possible, costs should show both individual and total costs for each activity. Total your costs to show that they do not exceed the total available budget.

What to do in case of communication problems

This conference site has been running without problems for a long time. Once in a great while you might receive the message :server not responding." So far, it has always meant that the message did not get through. If you retry in a few seconds, the message should get through properly.

APPENDIX G

SURVEY B

****

Identification Code for Part XI

(ID NUMBER) (SECTION) (SEX: 1 = Male 2 = Female)

___ ___ ___ ___ ___ ___

Example:

(ID number 0011, Class 1, F)

0	0	1	1	1	2
01	02	03	04	05	06

Alias: _____

Password _____

Conference name: _____

Gueman and Long's (1991) 14 item 5 point Likert scale

DIRECTIONS: Rate the designated group member by circling the number that most closely represents your appraisal of his or her performance. The descriptions in the left-hand column reflect the most desirable practices; those in the right-hand, the least desirable. ***Note that one sheet must be completed for each group member including yourself.*** There should be a total of four sheets.

_____'s effectiveness in performing leadership tasks.
(Name of member)

1. Clarified problems for other group members	5 4 3 2 1	Obscured problems with irrelevant material
2. Kept discussion on the right track	5 4 3 2 1	Let discussion wander
3. Communicated only when necessary	5 4 3 2 1	Monopolized the discussion
4. Adapted to the group's desires	5 4 3 2 1	Sought own agenda at expense of the group
5. Introduced relevant material when it had been ignored	5 4 3 2 1	Let the group ignore relevant material
6. Acted democratically	5 4 3 2 1	Dictated procedures
7. Handled interpersonal conflict well	5 4 3 2 1	Ignored or overrode interpersonal conflict
8. Sought information, facts, ideas from others	5 4 3 2 1	Was not concerned with what others had to say
9. Supported other group members	5 4 3 2 1	Was not supportive of other group members
10. Kept on task	5 4 3 2 1	Was easily distracted
11. Had a good relationship with other group members	5 4 3 2 1	Did not have a good relationship with other group members
12. Made a significant contribution to the group's task	5 4 3 2 1	Did not contribute to the group's task
13. Was open-minded about other's ideas	5 4 3 2 1	Was inflexible about other's ideas.
14. Overall, this person was a good leader	5 4 3 2 1	Overall, this person was not a good leader

APPENDIX H

HOW TO CODE SPEECH ACTS

Thank you for agreeing to code the speech acts found within these documents. There will be two of you doing the coding. You may do it at your convenience provided that sample coding indicates that you, for the most part, agree on how to code each remark. If there are significant differences of opinion, we will need to work together at least part of the time. It will be necessary to measure inter relater reliability three times during this process:

(1) AT the beginning, I will ask each of you to code a sample conference. I will then compare the results to ensure that you know how to code the sample and also that you usually agree on how you would code the remarks.

(2) After you have coded the first group of conferences, I will again ask you each to code another sample conference. This is just to be sure that you still agree on how to code a document.

(3) At the end of the second (which is the last) group of conferences, I will again ask you to code the first conference you did to see if—for the most part—you still would code it the same way.

You will note that the spelling and grammar used in these conferences is uncorrected. This is deliberate in order to leave all messages just as the originator wrote them. I apologize for any inconvenience this causes you.

There are three basic steps to the coding process:

(1) First, each message must be broken into remarks. I have done this, but some of the decisions are judgement calls and you may disagree with my coding. If you do disagree and you believe that your coding task would be easier if the message were divided differently, you may indicate on the manuscript how you would have divided it, then code your remarks. You should not worry much about how the messages are divided into remarks, but to help you understand how and why I divided the dialogue, here are some characteristics of a remark.

   a. Each is a thought
   b. Each is comprised of a clause (subject, verb, and object) although some of these may be implied
   c. Conditional clauses (sentences containing "if"/"then" and so forth, will be counted as one unit IF the "then" clause depends on the outcome of the 'if" clause.
   d. Names are not counted as a unit unless they consist of more than two words or if they convey information about a choice
   e. Verbal ticks such as "you know" or "Hey" only count if they occur at the beginning or end of a remark in the form of a question or affirmative assertion.

(2) You will code each of these remarks by type. Notice that on the sheets you receive, each remark is prefaced by a code consisting of a name, a number, a date, and two blanks:

For example: Matt 3 10:03:37 ___ ___

The first of these two blanks will contain the type of remark (task-oriented, socio-emotional, or other). The second will—as necessary—contain a more detailed indication of the type of remark. It may be easier for you to first code the general type of act then go back and place it in a more explicit category. Do them in whatever way is easier for you. I will describe the process as though you are first coding category and then coding subcategory.

A brief listing of all remark categories and subcategories follows. A more detailed explanation follows this listing.

CATEGORY	CODE AS
Task	1
Socio-emotional	2
Other	3

SUB CATEGORIES OF TASK TYPE REMARKS	CODE AS
Gives suggestions	04
Gives opinion	05
Gives orientation	06
Asks for orientation	07
Ask for opinion	08
Asks for suggestion	09

SUB CATEGORY OF SOCIO-EMOTIONAL	CODE AS
Shows solidarity	01
Shows tension release	02
Agrees	03
Disagrees	10
Shows tension	11
Shows antagonism	12

A More Detailed Explanation (with samples)

Task-oriented Remarks

A task type of remarks is any remark that is directly related to the assigned task. It is emotionally neutral. It can involve insight, musing, analysis of causes, etc. It is always related to the task at hand, however. **CODE ALL TASK TYPE REMARKS AS 1.** There are six major types of task-oriented remarks. **CODE EACH TYPE WITH THE NUMBER PRECEDING ITS TYPE DESCRIPTION.**

4 Gives suggestion (direction, implying anonymity for other)

Samples: "We have to turn this in soon.", "John, will you send this in.", "Go right ahead", "Each of us needs to draw up a budget"

5. Gives opinion (evaluation, analysis, expression of feelings, wishes, etc.)

Samples: "I think we should be fair about this.", "That seems best.", "I wish we could…", "Maybe we got off the track because…", "According to my calculations…"

6. Gives orientation (gives information, repeats, clarifies, confirms, etc.)

Samples: "Say, John,", "There are two points I'd like to make…", "We were discussing …", "I remember …", "I worked at an Inn and we …", "We just have two days left."

7. Asks for orientation, information, repetition, and confirmation

Samples: "I didn't quite understand you." "What do you think about…", "How long did they…",, "If isn't clear to me…"

8. Asks for opinion)asks for evaluation, analysis, expression, of feelings, etc)

Samples: "How do you feel about this?", "What do you think we should do?", "I don't know how I feel about this."

9. Asks for suggestion (asks for direction, possible ways of action, etc.)

Samples: "Is this ready to turn in?", "Where do we go from here?", "What do you suggest?"

Socio-emotional Remarks

Socio-emotional remarks may be either positive or negative. **Code all socio-emotional remarks whether positive or negative as 2.** The three positive socio-emotional responses are listed below; they are followed by the four negative responses. **Use the number in front of the description to indicate the sub-category of a socio-emotional speech act.**

1. **Shows solidarity (raises other's status; gives help or reward)**

   Samples: "Hello", "You've done a good job.", "Do you need my notes?". "Both of you have swell ideas.", "Do you think we could…?"

2. **Shows tension release (jokes, laughs, shows satisfaction)**

   Samples: "What a relief, …",. Any type of friendly bantering would be included in this group.

3. **Agrees (Shows passive acceptance, understanding, concurs, complies)**

   Samples: "I'll be glad to …", "Yea, that is what I would do.", "You were right.", "Oh, I get it."

The three negative socio-emotional types are:

10. **Disagrees (shows passive rejection, formality, withholds help)**

    This category includes any time that an individual is unappreciative, :hard to please" or uncommunicative. Another possible response is to work at something other than the task when there is the expectation that all will participate. It can include being dubious about accepting the route others want to take. Include also those times when an individual appears not to hear or not to respond to what other group members are saying.

11. **Shows tension (asks for help, withdraws out of the field)**

    This category includes any time a group member seems embarrassed, self-depreciating, or antagonistic toward other group members. Any remark that indicates that the individual is attempting to place responsibility on other group members for the solution to his or her own problems, finally anything that seems to flatter or cajole.

12. **Shows antagonism (deflates other's status, defends or asserts self)**

    Any attempt to control, regulate, govern, direct, or

supervise others in an autocratic way. Any act that is rebellious, irresponsible, or willful. This category can also contain any acts that can be constructed as griping, nagging, badgering, harassing, etc., Also any act that seems designed to impress others with the importance of the speaker.

Samples

Matt	1	13:00:00	____	____	Hey, I just signed on this project, too.
Matt	1	13:00:00	____	____	I read both of your messages
Matt	1	13:00:00	____	____	and I think Monday sounds good
Matt	1	13:00:00	____	____	If both of you could email me a specific time on Monday when we could get together, that would be great.
Matt	1	13:00:00	____	____	As for me, Monday at 9:00 p.m. would be a good time
Matt	1	13:00:00	____	____	And when we meet, please have a budget of your own ready so we can discuss it.
Matt	1	13:00:00	____	____	and get it done that same day.

Vita

[redacted]