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Computer-mediated communication and gender: An examination of two Internet newsgroups.

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COMPUTER-MEDIATED COMMUNICATION AND GENDER: AN EXAMINATION OF TWO INTERNET NEWSGROUPS

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Computer-Mediated Communication and Gender:

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Abstract

This thesis examines computer-mediated communication (CMC) and gender. Specifically, the examination focused on two newsgroups found online on the Internet in an effort to discover differences between females in a female-only discussion group and females in a female-minority discussion group. The study looked for differences primarily in regard to female-patterned message behavior. Seven different female-patterned language categories were used in a content analysis of 100 messages from each group. Differences were examined overall, and according to each language category. In addition, the study sought to determine if message length differed between the two groups. Statistical analysis showed a significant difference between the two groups in terms of overall message behavior. However, the difference was in the opposite direction than expected: the female-minority group exhibited more female-patterned message behavior than the female-only group. When individual message characteristics were examined with statistical analysis, no significant differences were found. The difference in message length approached a significant difference, with the female-only group posting longer messages. Supplemental analysis added richness to the study, especially in the area of the individual message categories.

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CHAPTER 1
INTRODUCTION, REVIEW OF LITERATURE AND STATEMENT OF PURPOSE

Introduction

The idea of communication without social context clues appeals to many. Members of groups who feel discriminated against, or at least biased against, such as women, minorities, and the handicapped (or those who are just simply strange-looking), could presumably all benefit from a communication mode in which they are not pre-judged on the basis of the color of their skin, the sound of their voice or the wrinkles on their face.

When computer-mediated communication (CMC) became widely available, researchers and sociologists posited that this faceless medium would reduce or remove social context clues, and, thus, would lead to more egalitarian, or more democratized, communication between diverse groups or individuals. Indeed, preliminary research on CMC indicated that the new medium invalidated traditional rules and norms found in society. The assertions and early research seemed plausible enough: if I don't know your name, where you live, or what you look like, I will be more likely to communicate with you on the basis of your ideas, your thoughts and your intellect.

But what if I can tell your gender by what you write in CMC and how you write it? What if your language and method of response shows me that you are a man or a woman? Some recent research has found that the traditional norms regarding gender in communication are still apparent in CMC. Other research has found the CMC does indeed result in more egalitarian communication.

Literature Review

The following literature review will attempt to critically review CMC literature that is focused primarily on gender issues. First, however, a brief review of gender and language literature and theories will provide a foundation for better understanding CMC and gender.

Gender and Language

Gender, a term used to describe socially constructed categories based on sex, and language have been the basis of numerous studies over the last several decades. One commonly cited work is from Lakoff (1975) who described a linguistic style that she considered characteristic of women, including "feminine" patterns of hedging, politeness, illogical sequence and exaggeration. Many studies have followed in an attempt to prove or disprove these patterns.

An example of such a study was completed by Quina, Wingard, and Bates (1987). In the study, 12 sentence pairs representing Lakoff's "women's language" and corresponding "masculine" styles were developed to examine gender stereotyping as a function of linguistic pattern usage. Students read the sentences as transcribed from an interview with a hypothetical male, female, or sex-unknown client. Then the students evaluated the speaker on 31 bipolar adjective scales. Ratings on the masculinity-femininity dimension confirmed Lakoff's speech style as a gender stereotype. Factor analysis and subsequent multivariate analyses of variance on factor scores showed that study participants rated the non-feminine language style significantly higher in competence, but lower in social warmth, than the feminine style.

Other studies on Lakoff's categories produced mixed results. Eakins and Eakins' (1978) data supported Lakoff's distinctions. Some studies (Frank, 1978; McConnel-Ginet, 1978; Thorne, Kramarae & Henley, 1983) show less male/female differences. Some literature takes the position that other social variables, such as social role or power held by the speaker, are more influential than the speaker's or writer's gender. Freed (1996) stated:

> Researchers need to exert extreme caution before generalizing about any characteristics garnered from specific women's or men's verbal interactions and should hesitate before attributing to sex or gender differences what can more accurately be accounted for by economic privilege, subcultural phenomena, setting, activity, audience, personality, or by the context-specific communicative goals of the particular speakers who are being studied. (p. 56)

That position, which is echoed by other current research (O'Barr & Atkins, 1998; Brown, 1998), makes gender research in computer-mediated communication even more fascinating and worthwhile. As more social context clues are removed, more emphasis can be placed on the language itself in relation to gender.

Literature on Gender and CMC: Leading Influences

Perhaps today's most influential person in the study of CMC and gender is Susan C. Herring. Herring's (1993) study of the democratization of CMC revealed that women and men behave much the same in CMC as they do in face-to-face communication. She noted the tendency for a minority of male participants to effectively dominate discussions both in the amount of talk and through rhetorical intimidation. Her position as a result of these findings is that these circumstances represent a type of censorship and that an essential condition for democratic discourse is not met.

Herring's study began with a discussion of the notion of democracy and its two essential components in this context: 1) access to a means of communication and 2) the right to communicate equally, free from status constraints. Herring says that there is a strong a priori case for the democratic nature of CMC. But, she asked in this study, how democratic is the communication that is actually taking place via electronic networks? Specifically, does it show evidence of increased gender equality?

Herring gathered data over a year-long period from two academic electronic discussion lists and analyzed it to answer that question. The data collected through ethnographic observation, discourse pattern gathering, and an electronic survey were subjected to quantitative and qualitative analysis.

The findings showed significant differences between male and female participants, with principal differences falling into amount, topic and manner. The most striking difference was the extent to which men participated more than women in the discussion groups in the study. In fact, Herring found that a small male-minority dominated the discourse both in terms of amount of talk, and rhetorically, through self-promotional and adversarial tactics. Herring concluded by noting that this state can be attributed to the influence of pre-existing patterns of hierarchy and male dominance in academia and, more generally, in society as a whole.

In 1994, Herring presented more evidence of gender bias in CMC. She presented her claim that 1) women and men have recognizably different styles in posting to the Internet and 2) that women and men have different communicative ethics—that is they value different types of online interactions as appropriate and desirable.

To support these claims, Herring cited findings of an "adversarial style" in 68 percent of the messages posted by men in a particular online discussion group she observed. Herring characterized adversarial style as one in which "the poster distanced himself from, criticized, and/or ridiculed other participants, often while promoting his own importance" (paragraph 6). In contrast, of the few women who participated in the group while Herring observed it, most displayed features of "attenuation—hedging, apologizing, asking questions rather than making assertions—and a personal orientation, revealing thoughts and feelings and interacting with and supporting others" (paragraph 16). As a result of these findings, Herring proposed that women and men have different characteristic online styles that are recognizably and stereotypically gendered.

Literature on Gender and CMC: Group Composition

Savicki, Lingenfelter and Kelley (1996) focused on Internet group gender composition and the relationship between gender roles and group process functions. Specifically, two hypotheses were tested: 1) the larger the proportion of men in discussion groups, the more the members will use language that a) states facts without personal ownership, b) challenges group members, c) calls for explicit action, d) is argumentative, e) uses coarse and abusive language, and f) indicates the members' status; 2) the larger the proportion of women (i.e. smaller proportion of men) in discussion groups, the more the members will use language that a) self-discloses, b) states personal ownership of opinion, c) apologizes, d) asks questions, e) uses "we" pronouns, f) responds directly to others in the group, and g) seeks to prevent or alleviate tension or arguments.

The authors used a sample drawn from the ProjectH dataset. ProjectH is an international computer-supported research collaboration (Sudweeks and Rafaeli, 1996). The sample was randomly selected from 27 online discussion groups from both the Internet and commercial information services (e.g., CompuServe). The 2,692 valid messages were coded for language content (fact; apology; first person flaming—whereby a person might use derogatory, rude or unusually abrupt, harsh language; status, etc.) that has been related to gender role in other research. Content analysis was done on the messages using the ProjectH codebook.

Results were mixed in regard to the hypotheses. The expectation was supported that groups with higher proportions of women would be conducive to group members self-disclosing and seeking prevention and reduction of tension. However, other predictions were not confirmed. The authors reported that, "It may be that when language choice is considered using multiple regression rather than individual, one-way analyses, self-disclosure and tension reduction account for the lion's share of the variance with other predicted language patterns subsumed by these two" (paragraph 22).

Savicki, Lingenfelter and Kelley (1996) went on to further discuss "threshold" gender composition proportion beyond which women may be able to have an even greater effect on language choice, and they called for examination in future research of extreme groups rather than mixed gender groups.

The authors also pointed out that it is becoming clearer that findings for one context of CMC do not necessarily generalize to other CMC contexts. "Distinctions must be made between findings from asynchronous versus synchronous interaction, along

dimensions of media richness, task, and of course in relation to group factors such as size and composition" (paragraph 26).

Group gender composition and perception of three different CMC systems was studied by Olaniran (1995) in relation to five variables: satisfaction, decision confidence, immediacy, effectiveness and system ease of use (1995). Results lend support to the argument that perception of communication outcomes differs by CMC medium, gender and group gender composition. Olaniran found that gender had an effect on three of the variables: perceived immediacy, decision confidence and effectiveness. Generally, the results indicated that CMC influences the participants' perceptions of the communication outcomes among the participants.

Literature on Gender and CMC: Online Idiosyncrasies

Several studies have examined characteristics of CMC and gender that would not be found in face-to-face conversation or, typically, in written conversations.

Witmer and Katzman (1997) examined a particular component of CMC as it relates to gender: online smiles. These online smiles, or graphic accents (GAs), are sometimes known as "emoticons." They are written or typed symbols or icons that are intended to display an emotion. For example, :-) is a smile, ;-) is a wink, and so on. The study drew on current literature to formulate and test three hypotheses: 1) women use more graphic accents than men do in their CMC, 2) men use more challenging language in CMC than women, and 3) men write more inflammatory messages than do women. Inflammatory messages are known in the online world as "flaming," whereby a person might use derogatory, rude or unusually abrupt, harsh language.

In this particular sample group, the authors found that only the first hypothesis was partially supported and that women tended to challenge and flame more than men did. Witmer and Katzman (1997) used data from ProjectH, an international computer-supported collaboration (Sudweeks and Rafaeli, 1996), and specifically used that portion of the ProjectH codebook on graphic accents (GAs). To test the hypotheses, a 2(gender) x 2(flame) x 2(challenge) factorial ANOVA test and t-tests were conducted on 343 GA-containing messages from ProjectH. Results of the t-tests indicated that females used GAs significantly more than males, included more challenges in their messages and flamed more than men did.

Gender differences in text-based virtual reality were examined in a study by Cherny (1994). Cherny focused specifically on a particular type of multi-user dimension (MUD) that is known as MOO, or MUD: object oriented. In this Internet-based, online environment, text descriptors tell users what they see as they move around the virtual environment. For three months, Cherny recorded interactions between male and female-identified characters in a particular MOO. In these recorded interactions, Cherny found clear gender differences in the use of the MOO, relating specifically to violent imagery and physical affection. Cherny found that men used more physically violent imagery during conversations, while women were more affectionate toward other characters than the men were.

The use of pseudonyms in computer-mediated communication and their effect on gender differences was investigated by J. Michael Jaffe, Young-Eum Lee, Li-Ning Huang and Hayg Oshagan (1995). The researchers used mixed-gender groups for an experiment

which involved real-name and pseudonymous computer conferences. Consistent with their expectations, the researchers found that 1) participation levels were related to prior computer knowledge, 2) overall participation levels were significantly higher in the pseudonym conference than in the real-name conference, 3) women tended to mask their gender with their pseudonym choice while the males did not, 4) women generally tended to exhibit greater patterns of social interdependence than men, 5) men showed greater tendency to exhibit communication patterns of social independence in the pseudonymous than in the real-name CMC context, and 6) men showed a lesser tendency than women to exhibit social interdependence in the real-name CMC context, though not in the pseudonymous CMC context.

The researchers used 114 students to carry out the experiment and had them participate in two parallel electronic conferences. Then the entire transcripts of the computer-mediated conferences were coded for the presence of four relational categories (reference to others, self-reference, supporting references, and emotional text). Volume (hypotheses one and two) was tabulated by number of sentences from each participant. A survey was also conducted as part of the study to find out about use of computers, knowledge of computers, and attitudes toward computers.

Jaffe et al. (1995), assert from their study that CMC may lead to a reduction in the power asymmetry characterizing the communication patterns of men and women as participants control their identities through the use of pseudonyms.

The use of pseudonyms in CMC has also been studied in relation to Internet Relay Chat (IRC) and multi-user dimensions (MUDs) (Danet, 1996). In this study, Danet

examined the use of "nicks" or nicknames in those forums, using two different MUD groups. In both groups, about half the participants chose male personas. In one group, nearly one-third chose a neutral nickname, with the remaining choosing a female persona. In the other group, only one-fifth chose a neutral nickname. Danet did not speculate on the reasons for the choices of male, female or neutral nicknames in these forums, but did offer an extensive list of questions for future research in this area.

Bechar-Israeli (1995) mapped the nicknames used in Internet Relay Chat in an attempt to show the importance that these nicknames play in CMC. While the focus was not strictly on gender in Bechar-Israeli's study, the study is important because of its evidence on how IRC participants choose identities, including men portraying themselves as women and women portraying themselves as men.

Literature on Gender and CMC: Gender Differences, Similarities and the Future

As all of the previously discussed studies illustrate in some way, CMC is host to a number of gender differences. But some researchers are calling for an examination of similarities between the sexes, rather than a focus on the differences. Others call for further examination of the differences.

Rodino (1997) focused on CMC and its capacity to describe gender and its relationship to language. She noted that her project was inspired by feminist linguists who are asking, "Why do we ask questions that strengthen the male-female dichotomy?" Rodino views gender as not a stable quality, but as something that exists only in the works of its production. She suggested retooling the concept of gender study so that gender is thought of as continually constructed, allowing one to look at the various,

sometimes inconsistent ways in which a person represents gender. To accomplish this in her study, Rodino qualitatively analyzed a continuous 40-minute stream of conversation on an Internet Relay Chat channel. Rodino reported that this analysis suggests that conceptualizing gender as a dichotomy neglects the variety of gender constructions in IRC.

Winter and Huff (1996) examined the culture of CMC within a women's only electronic forum by surveying 491 members of the forum. Based on the survey, Winter's and Huff's main conclusion is that basic patterns of gender-based communication are at least replicated, if not magnified, in electronic communication. Many of the survey respondents reported that mixed-sex forums on the Internet required them to either adopt a competitive, confrontational style of that forum or to not participate at all. In addition, many reported that the Internet discussion groups exhibit many of the same problems that female professionals face in the workplace: confrontational styles and even hostility, lack of support and sexual harassment. As a result, many of the women in the survey had withdrawn to a more secure environment—the women's only forum. The authors pointed out in their conclusions that because of these perceptions, access to electronic communication is not only a hardware issue, it is a culture or climate issue.

In a study focused on a specific e-mail system, Allen (1995) found gender differences in attitudes toward and uses of that system. The researcher used one-on-one face-to-face interviews, a survey instrument, and discussion of findings with interviewees at the corporate headquarters of Public Broadcasting Services. Interview data showed females rated e-mail higher in several categories than males rated it: ease of use,

usefulness, efficiency and effectiveness. Also, the data showed that females felt more strongly than males that it was appropriate to use e-mail to solicit donations for charities, announce lost/found items, get a message through to someone whose calls are normally screened, and to describe traffic situations. Allen noted that although these results might not be generalizable, they substantiate the need for researchers to identify and analyze gender differences in the ways that employees make CMC technology part of their daily routines.

Smith, McLaughlin and Osborne (1996) explored the nature of offensive conduct on Usenet, and included an examination of gender differences in the newsgroups studied. The authors reported that the gender analysis in this study strengthens a growing concern regarding unequal representation of women on the net. However, the authors believed they found encouraging trends in the way females conduct themselves on Usenet. For example, they found that female reproachers were slightly more prolific than any other group of posters, perhaps indicating a somewhat stronger voice among women who participate frequently. Despite such emerging trends, the authors reported, gender differences in online communication still deserve extensive study from multidisciplinary perspectives.

CMC and Reduction of Social Context Clues

Earlier studies of CMC typically did not differentiate between the variables discussed in the Savicki et al. (1996), study: asynchronous versus synchronous interaction, dimensions of media richness, task, and group factors such as size and composition. In fact, many of the earlier studies took more general (and some might say

superficial) looks at CMC and painted it as more egalitarian. While the following studies are not necessarily focused on gender, they are focused on the reduction of social context clues, which some theorists claim results in a more democratic communication environment.

For example, Sproull and Kiesler (1986) offered an experiment and analysis of the reduction of social context clues through electronic mail. One of Sproull and Kiesler's hypotheses stated that EMS (electronic mail system) behavior is relatively uninhibited and nonconforming. They tested the ideas that people behave irresponsibly more often in EMS than they do in face-to-face conversations, that people violate the norm against nonwork communication during the workday more with electronic mail than with other media, and that people violate the norm against work communication at home more with electronic mail than with other media. In their study in a Fortune 500 company using questionnaire data and actual e-mail messages, Sproull and Kiesler found: relatively weak social context cues in e-mail systems, people focused more on themselves than others in message salutations and closings, people overestimated their own contributions to the e-mail system, people underestimated their group messages, messages from superiors and managers looked no different from subordinates and nonmanagers, people preferred to use e-mail to send messages to superiors more than to subordinates, people behaved irresponsibly more often on e-mail than they did in face-to-face conversations, people preferred e-mail for sending bad news, people used e-mail for nonwork communication during the workday, and 60 percent of the messages contained new information. Sproull and Kiesler argued that each of these observations can have important consequences for

organizations, such as status equalization or uninhibited behavior. Status equalization may enable managers to access information that formerly would have been difficult if not impossible for them to get. Uninhibited behavior may lead to more new ideas flowing through electronic mail or may make people less unwilling to send bad news up the chain of command.

Sherblom (1988) conducted a content analysis on 157 electronic mail files received by a middle manager at a large organization. He asserted that electronic mail does not just supply another channel through which organizational communication can pass. Its use and its characteristics impact the communication systems as a whole, including structure. Sherblom's study involved coding and analyzing the e-mail according to the direction of the communication through the hierarchy of the organization, the communication function of the mail, and whether or not the mail contained a redundant signature. Significant differences were found (chi square = 45.40, $p<.001$) in the communication function according to the direction of the communication. Vertical mail was more restricted in function than horizontally directed mail and was used primarily to exchange information. The presence or absence of a signature in the mail reflected the direction mail was sent through the organizational hierarchy. Subordinates and others signed mail significantly more often than superiors (chi square=18.62, $p<.001$).

Rice and Shook (1990) examined electronic mail and other more traditional modes of organizational communication—memos/letters, face-to-face conversations, meetings, telephone, etc.—in a meta-analysis of over 40 studies and in their own study of

four organizations. Rice and Shook found that communication technology use is dependent on the hierarchy and structure of the organization. The two hypotheses tested in this study were: 1) different job categories will be characterized by different patterns of use of different media, and 2) higher level categories will be characterized by greater use of media with lower information richness of social presence (i.e., memos, letters, e-mail). Rice and Shook's hypotheses were supported by both the meta-analysis and in their own study. An interesting implication of their work, the authors noted, is that the tools that could be used to improve organizational tasks—computer-mediated communication systems that support group communication—are typically perceived as less appropriate for the kinds of equivocally reducing tasks implied by meetings.

While the above studies did not specifically focus on gender, they are relevant because of their examination of the reduction or lack of social context clues in online communication. The researchers take the position that CMC is a democratizing medium, and that equalization is enhanced in this forum. This position and its implications for CMC and gender must not be overlooked, because these early studies form the basis for future studies on CMC and gender.

CMC and Group Decision-Making

Group decision-making and computer-mediated communication has been examined by many researchers (Kiesler and Sproull, 1992; Valacich, Dennis and Nunamaker, 1991; Lea and Spears, 1991; Poole and DeSanctis, 1990). Although all of these researchers did not necessarily examine gender in the context of group decision-

making and CMC, their work is relevant because of its examination of online communication and the reduction of social context clues in a group environment.

Kiesler and Sproull (1992) found that technological changes help people cross physical, social, and psychological boundaries and have secondary effects on group behavior and decision making. Three phenomena of technology in organizations observed by Kiesler and Sproull in field studies include the redistribution of work time, relative advantages in participation for peripheral workers, and increases in complexity of group organization. They have also found in experiments that, compared to face-to-face meetings, computer-mediated discussions lead to delays; more explicit and outspoken advocacy; "flaming;" more equal participation among group members; and more extreme, unconventional, or risky decisions.

Through controlled laboratory experiments and through organizational work groups in the field, Valacich, Dennis and Nunamaker (1991) have found that electronic meeting system technology has the potential to change the way people work together by effectively supporting larger groups, reducing meeting and project time, and enhancing group member satisfaction.

Lea and Spears (1991) researched the social psychological processes in computer-mediated communication and group decision-making in relation to previous findings that groups communicating via computer produce more polarized decisions than face-to-face groups. The authors provided an alternative model and explanation based on social identity theory and a re-conceptualization of de-individuation, which takes into account the social and normative factors associated with group polarization. Lea and Spears

conducted an experiment in which they were able to partial out the effects of the computer-mediated communication technology which, in their opinion, have confounded comparisons with face-to-face interaction in previous research. Lea and Spears' results challenge the explanations based on persuasive arguments while being consistent with their social identity model.

Again, although this body of work is not necessarily focused on gender, the findings are important considerations in the study of gender and online communication. This is because of the findings that group behavior is more equal in CMC than in face-to-face situations. This democratization effect of CMC noted by the above researchers is contradictory to some of the more recent research that has focused specifically on gender and CMC. Thus, the need for further research in this area. What did the early research miss, if anything? Does CMC have an equalizing effect at least somewhat, but stopping short of gender equalization? The next section of studies outlined in this review offers more insight on the earlier studies of CMC and its potential equalizing effects.

CMC and Status Equalization

In a study on physically handicapped people on the job, Earls (1990) found that disabled employees participated in a computer bulletin board more actively than did non-disabled employees. Disabled employees reported that the computer bulletin board gave them more of an equal chance to participate in discussions and to exchange information than they had in face-to-face conversations. While Earls found this to be due to a number of factors, communication norms were involved in the change in participation.

In a study by Siegel, Dubovsky, Kiesler and McGuire (1986), the researchers found generally more unequal participation by members of a face-to-face discussion than computer-mediated discussion. This too was partially attributed to the organization's norms.

Status behavior of an electronic work group was researched by McGuire, Kiesler and Siegel (1987). The researchers found that when groups of executives met face-to-face, the men in the groups were five times as likely to make the first decision proposal. When those same groups met via computer, the women made the first proposal as often as the men did. The same study found that groups that met face-to-face were opposed to risk for gain choices and risk seeking for loss choices, as most individuals are. Yet when the same groups met electronically, they were somewhat risk seeking in all circumstances. The face-to-face discussions produced conventional decisions, whereas the electronic discussions produced unconventional ones that were riskier. Yet the participants of the study (university administrators and corporate managers) were just as confident of their decisions whether they made them through computer-based communication or face-to-face. One implication of these results for gender issues is whether women are as risk-taking and confident as men when making computer-mediated group discussions. This is a valuable area for further research.

CMC and Theory

The CMC area is not typically marked by theory; however, Poole and DeSanctis (1990) use adaptive structuration theory as a model for understanding group use of technologies. Adaptive structuration theory emphasizes the importance of group

interaction processes in determining group outcomes. For researchers, Poole and DeSanctis argue that the theory implies that study of technology effects must take into account the unique ways in which people respond to the contextual demands surrounding the technology and that group interaction is a critical mediator in the ultimate effects of new technologies in organizations.

Rice, Chang and Torobin (1992) examined the frameworks used in communication technology research in one study. The authors analyzed the roles of communicator style, other media use, and organizational level in influencing the adoption, use, and evaluation of computer-mediated communication in two organizations. They found that although overall, communicator styles have only a very weak influence, the relaxed and precise styles and the friendly style do maintain some slight associations in multivariate analyses. Although the characteristics of media suggested by theories of social presence and information richness provide some foundation for these influences, other CMC characteristics and organizational contexts, as well as other approaches, also provide useful frameworks for understanding the slight role of communicator style, according to Rice, Chang and Torobin.

Although these theoretical-based works do not necessarily focus on gender, the theories—since they are adapted to CMC—could be useful in examination of gender and online communication. For example, theories of social presence and information richness might be valuable as applied to research on gender and particular online discussion groups. Adaptive structuration theory might be especially useful in that same kind of

examination to help explain why certain behaviors are exhibited within CMC in relation to gender.

Statement of Purpose

As communication technology becomes more pervasive, so do the areas for research. The previous literature review presents some of that diversity and expansion. It would be safe to say that communication technology now affects nearly all aspects of society, and that its implications for gender must not be overlooked.

The research in this area is beginning to look at a variety of aspects of gender and communication that are affected by technology. Communication technology research has tremendous potential, with almost limitless room for research on a variety of effects of communication technology.

This topical potential is both a strength and a weakness. While many areas have been and are currently being examined, there is still much that needs to be researched. Some areas have been examined rather thoroughly, for example, electronic mail and a variety of its impacts. Other communication technologies, however, are discussed rather sparsely in the literature.

This is also a subject with tremendous theoretical potential. A relatively new area, communication technology needs to develop and expand on theories that would be applicable. Much of the literature in this area offers little theoretical discussion. However, as the field progresses and more longitudinal studies are completed, the likelihood of theories evolving increases.

A noticeable weakness of this area is the lack of depth many of the studies seem to have. Many have examined surface effects of communication technology without a thorough examination of the things that cause those effects. For example, many of the studies seem to hint at the transformation of societal rules or changing of norms of the culture through communication technology. However, the concept of rules or norms is not discussed.

Compared to the general constraints on research methods in the organizational communication field, the literature in this subarea has benefited methodologically from its subject. While some of the problems associated with general communication research have not been overcome and still apply to research done in communication technology, research on communication technology seems to have an advantage over traditional research on communication.

For example, it is much easier to document the conversations that take place through electronic mail compared with documenting face-to-face conversations. There is less chance for researcher bias, there is more researcher control over the information that takes place, etc. Perhaps this methodological advantage of research in e-mail partially explains the proliferation of studies on this topic. And now that researchers can tap into real-life conversations, the credibility for the studies and the findings is supplemented. Very few of the most recent studies completed in this area rely on laboratory settings; it has become dramatically easier to observe what is going on in the world because of communication technology advances.

Future Study of CMC and Gender

One key characteristic of advances in communication technology (e-mail, faxes, voice mail, etc.) is that they all (in varying degrees) reduce social context clues. Social context influences information exchange through perception, cognitive interpretation, and communication behavior. Examples of social context clues include static clues, like people's appearance or the artifacts around them (e.g. a plush house, shabby clothes or a fancy car), as well as dynamic clues of nonverbal behavior (e.g. a wink, a yawn or body positioning).

The social context clues of online discussion groups are greatly reduced. Dynamic clues are eliminated because people are not face-to-face when they use this type of communication. Static clues are reduced because in a typical online discussion, participants cannot discern race, age, or surroundings of others. However, in many cases, gender is discernable because many people use their first names (which usually are gender-specific).

Because of this reduction in social context clues, online discussion groups are prime candidates for studies that focus on gender and computer-mediated communication (CMC). To date, research results in this area have been mixed. One focus area is on gender group composition and the seeming relatedness between gender roles and group process functions described as task and maintenance, as found on the Internet (Savicki et al., 1996). Herring (1994) asserts that entire online discussion groups can and do adopt gendered styles. Savicki et al., question whether there is a "threshold" gender composition proportion beyond which women may be able to have an even greater effect

on group language choice and have noted, to some extent, different patterns of behavior in female-only groups than in equally mixed or male-only groups. They call for future research to examine the threshold question in this context by looking at extreme groups.

This is what this thesis attempts to do. The research questions focus on the presumption that female-only groups will exhibit more female-patterned behavior than females in predominantly male online discussion groups. The specific research questions are as follows:

RQ1: Do females in the same gender online communication group significantly exhibit more female-patterned message behavior than females in the female-minority online communication group overall?

RQ2: Do females in the same gender online communication group significantly exhibit more female-patterned message behavior than females in the female-minority online communication group in the following specific categories: a) self-disclosure, b) stating personal ownership of opinion, c) apologizing, d) asking questions, e) using "we" pronouns, f) responding directly to others in the group, and g) seeking to prevent or alleviate tension or arguments?

RQ3: Does length of female messages significantly change from the female-only group to the female-minority group?

The focus of the study will be similar to Savicki et al.'s 1996 study, building on its findings and using some of the same methodology. This is important for several reasons. First, another study in this area of CMC and gender would either add to the generalizability of previous findings, or it would shed new light on the area. Second, the rapid changes inherent in CMC make even a two-year-old study seem dated. Another study in this area might reveal particular changes that have taken place in online discussion groups. Finally, Savicki et al.'s call for future study on extreme groups presents a compelling challenge. As noted by many of the researchers in CMC, this field can be especially rewarding because of the ability to research "real-life situations." However, those situations also present obstacles and raise many questions. Adding another study to this area is important for all of the above reasons.

CHAPTER 2
METHODOLOGY

Overview

This research was patterned after an investigation of online communication and gender conducted by Savicki, Lingenfelter and Kelley (1996). While the particulars of the methodology were different than Savicki et al., the common ground was in the content analysis of online communication as it relates to gender-specific language. The Savicki et al., study used the ProjectH codebook, as did this study. (ProjectH is an international computer-supported research collaboration, Sudweeks and Rafaeli, 1996.)

Computer-mediated communication (CMC) uses computer text-processing and other tools to provide high-speed information exchange. With the addition of the Internet to CMC, people from around the world can communicate easily and quickly via computers, modems and phone (or cable) lines. Like memos or postal mail, but unlike face-to-face conversations, computer-mediated communicators do not attend the same conversations simultaneously. CMC, while rapid, is asynchronous. Another important characteristic is that CMC is text-based. Messages are conveyed through text and written symbols that the sender and the receiver view on video (computer) terminals. Sound and visual elements are eliminated.

Thus, there is a reduction in social context clues. Unlike face-to-face communication, or even telephone conversations, computer-mediated communicators rely primarily on their written words to convey their messages. The reduction of social context clues in CMC can leave one major clue, however, on which judgements may be

made: gender. In many newsgroup and bulletin board postings on the Internet, gender can be determined by the sender's name.

Research on human subjects for this thesis was authorized by the University of Nebraska Institutional Review Board (see Appendix A).

Sample

The sample for the present study consisted of two independent groups: female online messages from a female-only newsgroup and female online messages from a female-minority newsgroup. The messages were selected during the same time period. No more than one message from the same person was used.

One hundred messages were randomly selected from each of these groups. One female-only Internet newsgroup discussing a particular topic was arbitrarily selected and one female-minority Internet newsgroup discussing a particular topic was arbitrarily selected. Then systematic sampling was used; that is, every third element of each total list was chosen systematically for inclusion in the sample. Periodicity was avoided by sorting the messages electronically according to author rather than sorting by date (again, only one message from an author was included in the population). Thus, any cyclical pattern according to date and discussion thread was eliminated.

The female-minority group was based on a combination of Kanter's (1977) skewed (85 to 99 percent male) and tilted (65 to 84 percent male) groups. For this study, the skewed and tilted groups applied to postings or messages, since the actual composition of the groups was indeterminable (lurkers, or those who only read and do not contribute to the online messaging, were impossible to count).

The sample groups were taken from newsgroup e-mail postings from the Internet. Newsgroup postings were more conducive to study than chat rooms. Chat rooms can be dominated by very short, rapid messages that are not retained by the chat service. Newsgroup postings, however, are typically retained for much longer periods of time. Another important difference is that newsgroup postings are more typically accompanied by gender-specific names (Jaffe, et al., 1995). In contrast, chat rooms are dominated by nonsensical pseudonyms.

Data Collection and Coding

Data was collected by saving 100 messages from the female-only and 100 messages from the female-minority groups. Content analysis of gender-specific language was performed on those messages. Coding used the portion of the ProjectH codebook used by Savicki et al. (1996). This codebook is the basis of the seven female language categories used by Savicki et al. Each message was assigned one dominant category (coded as one message type). This was so that the primary results of the study would be more pure as problems can arise whenever responses appear to fit equally into more than one code category (Babbie, 1992). Coding each message for all seven categories would have also added unnecessary complexity to the study. Research question one focused on the presence or lack of presence of a female-language style. Individual message characteristics were examined in research question two. There was no need to attempt to classify each message for all seven characteristics for the purposes of this study. Rather, by assigning a dominant characteristic, plus a secondary and even third characteristic as necessary, each message had a very thorough examination. The seven female-style

message categories, used by Savicki et al. and originating with the ProjectH codebook, examined in this study were: a) self-disclosure, b) stating personal ownership of opinion, c) apologizing, d) asking questions, e) using "we" pronouns, f) responding directly to others in group, g) seeking to alleviate tension or prevent arguments (see Appendix A for more complete definitions of the categories). If a message did not have any of the seven categories, then it was assigned as h) "none of the above."

Interobserver/intercoder reliability was tested by having three independent observers code the messages from each group. Thus coding reliability was based on 100 percent of the total sample. Coders were trained on the ProjectH codebook prior to coding the messages so that any disagreements on messages and their appropriate categories would be reduced and consistent coding between coders was more likely. When disagreements occurred during coding, those particular messages were discussed and disagreements were resolved.

Holsti's (1969, p. 137) formula for intercoder reliability was used to test reliability prior to reaching agreement on each message. This formula computes a composite reliability coefficient with the following formula:

$$\text{Composite reliability} = \frac{N \text{ (average inter-judge agreement)}}{1 + [(N-1) \text{ (average inter-judge agreement)}]}$$

Data Analysis Procedures

A significance level of .05 (with two-tailed tests) was used to examine the three research questions. Significance was tested with chi-square analysis and a t-test. For research question one, a two by two chi square was used as an overall test of the

significance between the female-only and the female-minority groups and the seven language categories or message types combined plus the "non-classified" category. For research question two, eight separate chi squares were used to test the significance between the groups for each of the seven specific language categories (message types) plus the non-classified category on an individual basis. For question three, a t-test was used to test for significance between the message lengths for messages from the female-minority group and messages from the female-only group. Message lengths were determined by number of words in each message. Salutations and closings were not counted.

Summary tables and descriptive analyses were used to add richness to the study. For example, the occurrence of messages that did not fit into one of the seven categories was examined. Messages were re-coded for a secondary characteristic, and a third as necessary and then tested for co-occurrence among categories. A frequency table shows the categories or message types that occur most often.

CHAPTER 3
RESULTS

Dataset Background

One hundred messages from the all-female online newsgroup, *weddings.alt* and 100 messages from the female-minority online newsgroup, *books.alt*, were coded for female-patterned language and message length. The coding provided the data used in the statistical analysis to answer research questions one, two and three, plus it provided the basis for the supplementary information. All results are recorded in this chapter. The results are derived from chi-square analyses and from a t-test.

Weddings.alt is a discussion forum for anything to do with wedding ceremonies, honeymoons, and related subjects. This was the group used as the female-only group. *Books.alt* was used as the female-minority group and it consists of messages related to particular books and authors, including reviews, comments, and questions. These particular newsgroups, *weddings.alt* and *books.alt*, were chosen on the basis of their availability for study. They met the required number of messages in a particular timeframe, and gender was easily determined in each group. While many newsgroups post hundreds and even thousands of messages each day, the number of messages is severely restricted when only one message from each participant can be used. Most newsgroups consist of a core of participants who repeatedly send messages. Therefore, finding two newsgroups with 300 messages from 300 different participants (300 messages were needed so a random sample could be selected) in a reasonable time period restricted the choice of newsgroups for study. Even more restrictive was finding a

newsgroup that met those considerations that had 300 messages from 300 different females, yet with female participation being in the minority.

Inter-coder Reliability

Inter-observer/inter-coder reliability was tested with Holsti's (1969) formula. Three independent observers coded every message from each group for first (primary), second and third language categories. There were no messages that displayed more than three language categories. Coding reliability was based on 100 percent of the total sample. After receiving initial instruction, coders completed the study dataset (100 messages from the female-only group and 100 messages from the female-minority group). When disagreements occurred during coding of the messages, those messages were examined further and discussed among the three coders until agreement was reached on primary, second and third message categories. The following formula from Holtsi was used to compute a composite reliability coefficient.

Table I: Holsti's Formula for Composite Reliability

$$\text{Composite reliability} = \frac{N \text{ (average inter-judge agreement)}}{1 + [(N-1) \text{ (average inter-judge agreement)}]}$$

Before resolutions were reached on language categories, the composite reliability was .89. After discussions to resolve differences, agreement was 100 percent.

Frequencies and Percentages

Descriptive analysis was conducted on the data to obtain an overall picture of the results. Specifically, frequencies, percentages and cumulative percentages show the overall breakdown of the seven different language categories for both groups combined, plus the eighth category, "none of the above." These results are shown in the following tables for the primary, secondary and third characteristic for each message.

Table II: Frequencies, Percent and Cumulative Percent for All Data, Primary Characteristic N=200

Value (language category)	Frequency	Percent	Cumulative Percent
1. Self-disclosure	41	20.5	20.5
2. Stating personal ownership of opinion	43	21.5	42
3. Apologizing	2	1	43
4. Asking questions	51	25.5	68.5
5. Using "we" pronouns	1	.5	69
6. Responding directly to others in group	16	8	77
7. Seeking to prevent or alleviate tension or arguments	2	1	78
8. None of the above	44	22	100
Total	200	100	

Table III: Frequencies, Percent and Cumulative Percent for All Data, Secondary Characteristic N=200

Value (language category)	Frequency	Percent	Cumulative Percent
1. Self-disclosure	45	22.5	22.5
2. Stating personal ownership of opinion	16	8	30.5
3. Apologizing	3	1.5	32
4. Asking questions	6	3	35
5. Using "we" pronouns	3	1.5	36.5
6. Responding directly to others in group	4	2	38.5
7. Seeking to prevent or alleviate tension or arguments	1	.5	39
8. None of the above	122	61	100
Total	200	100	

Table IV: Frequencies, Percent and Cumulative Percent for All Data, Third Characteristic N=200

Value (language category)	Frequency	Percent	Cumulative Percent
1. Self-disclosure	5	2.5	2.5
2. Stating personal ownership of opinion	1	.5	3
3. Apologizing	0	0	3
4. Asking questions	5	2.5	5.5
5. Using "we" pronouns	0	0	5.5
6. Responding directly to others in group	0	0	5.5
7. Seeking to prevent or alleviate tension or arguments	0	0	5.5
8. None of the above	189	94.5	100
Total	200	100	

Message Length

In addition to the frequencies and percentages of the language patterns overall, the message length of both groups was examined as a combined set. The median and mean lengths were computed. The following table shows the results.

Table V: Message Length for All Data
Mean=90.395, Median=61.5
N=200

Value (Message Length in No. of Words)	Frequency	Percent	Cumulative Percent
2	1	.5	.5
4	1	.5	1
5	1	.5	1.5
6	1	.5	2
7	2	1	3
8	3	1.5	4.5
9	2	1	5.5
10	1	.5	6
11	3	1.5	7.6
12	5	2.5	10
14	1	.5	10.5
15	5	2.5	13
16	4	2	15
17	2	1	16
18	1	.5	16.5
20	1	.5	17
21	2	1	18
22	2	1	19
23	1	.5	19.5
26	3	1.5	21
27	1	.5	21.5
28	2	1	22.5
30	2	1	23.5

31	1	.5	24
32	3	1.5	25.5
33	2	1	26.5
34	1	.5	27
35	2	1	28
36	3	2	30
37	2	1	31
38	3	1.5	32.5
39	2	1	33.5
40	1	.5	34
41	2	1	35
42	3	1.5	36.5
43	3	1.5	38
44	2	1	39
46	1	.5	39.5
47	3	1.5	41
48	2	1	42
50	2	1	43
51	1	.5	43.5
53	2	1	44.5
54	1	.5	45
55	1	.5	45.5
56	1	.5	46
57	2	1	47
58	1	.5	47.5
59	2	1	48.5
60	2	1	49.5
61	1	.5	50
62	1	.5	50.5
64	1	.5	51
65	1	.5	51.5
66	2	1	52.5
67	2	1	53.5
68	3	1.5	55
69	2	1	56
70	2	1	57
71	3	1.5	58.5
73	2	1	58.5
74	2	1	60.6
75	1	.5	61
76	1	.5	61.5
79	2	1	62.5
80	1	.5	63
81	1	.5	63.5

85	2	1	64.5
86	1	.5	65
88	2	1	66
89	3	1.5	67
90	1	.5	68
91	1	.5	68.5
92	1	.5	69
94	2	1	70
99	1	.5	70.5
100	1	.5	71
101	1	.5	71.5
103	1	.5	72
104	2	1.5	73.5
106	1	.5	74
110	1	.5	74.5
111	1	.5	75
112	1	.5	75.5
115	1	.5	76
117	1	.5	76.5
118	1	.5	77
124	2	1	78
126	1	.5	78.5
127	1	.5	79
128	1	.5	79.5
130	1	.5	80
131	1	.5	80.5
133	1	.5	81
135	1	.5	81.5
149	1	.5	82
150	1	.5	82.5
151	1	.5	83
153	1	.5	83.5
154	2	1	84.5
157	2	1	85.5
160	1	.5	86
161	1	.5	86.5
162	1	.5	87
163	1	.5	87.5
166	1	.5	88
167	1	.5	88.5
168	1	.5	89
174	1	.5	89.5
178	3	1.5	91
189	1	.5	91.5

214	1	.5	92
219	1	.5	92.5
253	1	.5	93
254	1	.5	93.5
258	1	.5	94
275	1	.5	94.5
304	1	.5	95
308	1	.5	95.5
317	1	.5	96
356	1	.5	96.5
370	1	.5	97
380	1	.5	97.5
420	1	.5	98
468	1	.5	98.5
503	1	.5	99
545	1	.5	99.5
547	1	.5	100
Total	200	100	

Research Question Results

RQ1: Do females in the same gender online communication group significantly exhibit more female-patterned message behavior than females in the female-minority online communication group overall?

Chi-square analysis of the primary message behavior found a significant difference between the female-only group and the female-minority group overall. Pearson's chi-square probability revealed value=4.196, df=1, $p<.05$. Results are shown in Table VI.

Table VI: Overall Chi-Square Analysis of Primary Message Behavior

Category 1 (Primary message behavior)	No. of messages with female-patterned message behavior	No. of messages with non-female-patterned message behavior	Totals
Group One (Female only)	72	28	100
Group Two (Female minority)	84	16	100

Pearson chi-square value=4.196 df=1 p=.040

Q2: Do females in the same gender online communication group significantly exhibit more female-patterned message behavior than females in the female-minority online communication group in the following specific categories: a) self-disclosure, b) stating personal ownership of opinion, c) apologizing, d) asking questions, e) using "we" pronouns, f) responding directly to others in the group, and g) seeking to prevent or alleviate tension or arguments?

When chi-square analysis was used to examine each message behavior category independently, no significant differences were found between the female-only group and the female-minority group.

Results for the seven insignificant female-patterned message categories were as follows: Message behavior one, self-disclosure (Pearson chi-square value=.030, df=1, p=.860); message behavior two, stating personal ownership of opinion (Pearson chi-square value=2.399, df=1, p=.121); message behavior three, apologizing (Pearson chi-

square value=2.020, df=1, p=.155); message behavior four, asking questions (Pearson chi-square value=.658, df=1, p=.417); message behavior five, using "we" pronouns to refer to others in list (Pearson chi-square value=1.0, df=1, p=.316); message behavior six, responding directly to others in group (Pearson chi-square value=1.087, df=1, p=.297); message behavior seven, seeking to prevent or alleviate tension or arguments in discussion (Pearson chi-square value=.0, df=1, p=1.0).

To add richness to the study, supplementary tests were conducted that relate most closely to research question two. Specifically, secondary and third message behaviors were combined with the primary message behavior to examine possible differences between the female-only group and the female-minority group on the basis of **all** message behaviors found in each message. In other words, all occurrences of each message behavior (whether it be the primary, secondary or third characteristic of a message) were combined for each group and tested for a significant difference between the female-only group and the female-minority group.

Pearson's chi-square probability was used for these tests as well. Message behavior one, self-disclosure, approached a significant difference but was not significant (value=3.112, df=1, p=.07). There were no significant differences between the two groups in regard to message behaviors two, three and four (stating personal ownership of opinion, apologizing, and asking questions). The chi-square analysis showed that message behavior five, using "we" pronouns, had significant differences between the two groups when all occurrences were taken into account (value=3.89, df=1, p=.048). This is shown in Table VII. In the table the "totals" differ from the 100 messages per group used

in testing the main research questions because some messages were counted twice or three times (to record all incidents of female-patterned message behavior).

Table VII: Combined Message Behaviors (primary, secondary, third), Message Behavior Five

All Categories (Primary, secondary and third message behavior)	No. of messages with message behavior five	No. of messages without message behavior five	Totals
Group One (Female only)	0	141	141
Group Two (Female minority)	4	143	147

Pearson chi-square value=3.89 df=1 p=.0485

Message behavior six, responding directly to others in group, approached a significant difference but was not significant (Pearson chi-square value=3.091, df=1, p=.078). There was no significant difference between the two groups regarding message behavior seven, seeking to prevent or alleviate tension or arguments.

Q3: Does length of female messages significantly change from the female-only group to the female-minority group?

A t-test was used to examine message length differences between the female-only group and the female-minority group. Message lengths were determined by counting the number of words in each message, minus any salutation or closing. The difference in

message length approached significance, but was not significant (t-value=1.89, df=196.19, p=.061).

CHAPTER 4
DISCUSSION

RQ1: Do females in the same gender online communication group significantly exhibit more female-patterned message behavior than females in the female-minority online communication group overall?

The answer to research question one is no. In fact, a significant difference was found in the other direction. There was more female-patterned message behavior overall in the female-minority group than there was in the female-only group.

This finding was shown through Pearson's chi-square analysis, which calculated a significance of .04. This means that the messages from the female-minority online group used for this study exhibited significantly more female-patterned language behavior than the messages in the female-only online newsgroup. This finding is based on the coding of each message from each group according to the ProjectH codebook (Sudweeks and Rafaeli, 1996) and the assignment of a dominant code to each message.

This result was the opposite of what was expected. Since this area of study is still in the exploratory phase, research questions were used instead of hypotheses. Still, as the phrasing of the question indicates, the messages from the female-only group were expected to show more female-patterned language behavior than the messages from the female-minority group. Significance in the opposite direction was an unexpected result.

This does not mean, however, that this study is in conflict with all previous work in this area. In fact, as can be seen in the literature review, there have been several studies of gender and online communication that have indicated language style in this method of

communication to be less gendered and, in some cases, for females to exhibit more male-patterned language behavior (Savicki, Lingenfelter and Kelley, 1996; Witmer and Katzman, 1997; McGuire, Kiesler and Siegel, 1987). In Savicki, Lingenfelter and Kelley's study of 2,692 online messages, results were mixed. As in this study, the messages were coded for language content that has been related to gender role in other research. Content analysis was done on the messages using the ProjectH codebook. The expectation was supported that groups with higher proportions of women would be conducive to group members self-disclosing and seeking prevention and reduction of tension. However, other predictions were not confirmed. Groups with higher proportions of women did not show significantly more female-patterned message behavior than the groups with higher proportions of men. Savicki, Lingenfelter and Kelley called for further examination in this area by studying extreme groups. They questioned whether an all-women group would exhibit more female-patterned message behavior. This study responded to their call and examined an all-women newsgroup, yet more female-patterned language behavior was not found.

In their examination of online graphic accents (GAs), Witmer and Katzman (1997) found that only their first hypothesis was partially supported and that women tended to challenge and flame more than men did (flaming is generally thought to be a male-patterned language behavior). Witmer and Katzman used data from ProjectH, and used factorial ANOVA tests and t-tests on 343 GA-containing messages. Results of the t-tests indicated that females used GAs significantly more than males, including more challenges in their messages and more flaming than men did.

In an older study, McGuire, Kiesler and Siegel (1987) found that when groups of executives met face-to-face, the men in the groups were five times as likely to make the first decision proposal. But when those same groups met via computer, the women made the first proposal as often as the men did.

Other studies from the infancy days of CMC also found equalizing behavior within computer-mediated communication, although those studies were not necessarily focused on gender (Kiesler and Sproull, 1992; Sproull and Kiesler, 1986; Rice and Shook 1990).

It wasn't until Herring's 1993 study of the democratization of CMC that the pendulum began swinging in the other direction and researchers began to doubt the equalization effects of CMC. Herring's 1993 study showed that women and men behave much the same in CMC as they do in face-to-face communication. Herring found the tendency for a minority of male participants to effectively dominate discussions both in the amount of talk and through rhetorical intimidation.

From these differences in previous studies on gender and CMC, one can surmise that there is no "right" or "wrong" answer to research question one. This field of study will need many more extensive studies to establish a conclusive base of data upon which some generalities can be built. One possibility, for example, in accounting for the results of significantly more female-patterned behavior in the female-minority group focuses on the issue of ego defensiveness. Using a greater amount of female-patterned behavior is a way to assert ego in groups where males are in the majority.

In addition, it is important to take into consideration the factor of time in a study of this type. Online communication has developed extremely rapidly. Just a few years ago, there were no MUDs or MOOs. Even a few years before that, there was no e-mail. This is very new technology and a very new way to communicate, especially compared to standard written and face-to-face communication. CMC is also changing rapidly, both in its use and in the number of users. Once reserved for "techies", CMC is becoming more and more common for the general population. All of these factors must be taken into consideration when studying gender and online communication. It is possible that early studies of e-mail were right on target with their findings of status equalization. It is also possible that the next wave of studies hit the mark with their findings of differences in male and female online behavior. Now, a few years later, it should not be surprising to find cases in which male and female behavior is less gendered. This may be due to females establishing a certain comfort level with CMC and with the method of communication becoming more prevalent in society as a whole. It also suggests that future work needs to carefully look at specific contingency factors that combine with gender composition in affecting whether a female-patterned style is used (e.g. the specific focus of the user group being studied).

Another important factor to take into consideration is that this study is focused on group behavior. While individual messages were the units of analysis, the intent was to examine language behavior based on group composition: female only versus female minority. The research questions suggest that messages of females in a female-only group may include more female-patterned language behavior than the messages of females in a

male dominated group. Prior research (Herring, 1993) has found that females tended to be more restrained in their use of female-patterned language behavior when participating in a male-dominated group. Herring's research found that females tended to conform to the male style when they were in the minority. Yet this study found the female-patterned style to be significantly greater in the female-minority group.

It has already been suggested that an "ego-defensiveness" explanation could account for the results of research question one. In addition, the results could be due to behavior in the two newsgroups examined that is not consistent with online newsgroups overall. More specifically, one can assume that *weddings.alt* is made up primarily of young women (considering the average age for marriage). This specific age group may have a bearing on the results. In addition, each group dealt with a particular subject matter. The female-only group, *weddings.alt,* is a discussion forum for anything to do with wedding ceremonies, honeymoons, and related subjects. *Books.alt*, the female-minority group, consists of messages related to particular books and authors, including reviews, comments, and questions. It is possible that because of the nature of *weddings.alt* and *books.alt* that the messages might inherently have one or more of the female-patterned message behaviors. For example, "stating personal ownership" of opinion may have been more common in *books.alt* because that was part of the nature of the group: sharing opinions about a particular book or author.

RQ2: Do females in the same gender online communication group significantly exhibit more female-patterned message behavior than females in the female-minority online communication group in the following specific categories: a) self-disclosure, b) stating personal ownership of opinion, c) apologizing, d) asking questions, e) using "we" pronouns, f) responding directly to others in the group, and g) seeking to prevent or alleviate tension or arguments?

The answer to all parts of research question two is no. In fact, no areas even approached significance. The seven language categories represent female-patterned language behavior and were used as the coding basis to determine if female-patterned language behavior existed significantly more in the female-only online newsgroup than in the female-minority online newsgroup.

Research question two examined the primary message characteristic on an individual basis. Each message was assigned a dominant code and those dominant codes were tested for significant differences between the female-only group and the female-minority group.

While research question one did find a significant difference between the two groups, research question one represents a culmination of all of the categories found as the dominant characteristic. Research question two is an examination of the categories on an individual basis, and when looked at in this manner, no significant differences were found.

In a supplementary analysis to research question two, all of the language behaviors found in each message were included in the analysis instead of just the primary

characteristic. The supplementary analysis was a combination of and then a comparison of that culmination of language behaviors between the two groups. In other words, all occurrences of each message behavior (whether it be the primary, secondary or third characteristic of a message) were combined for each group and tested for significant differences between the female-only group and the female-minority group.

For the most part, there were no significant differences found in the chi-square analysis. Two categories approached significance, however, and a third did show a significant difference. Message behavior five, using "we" pronouns to refer to others in the discussion list, showed significantly more occurrences in the female-minority group than in the female-only group (Pearson chi-square value=3.89, df=1, p=.0485). Message behavior one, self-disclosure, approached a significant difference but was not significant (Pearson chi-square value=3.112, df=1, p=.07). Message behavior six, responding directly to others in the group, also approached a significant difference but was not significant (Pearson chi-square value=3.091, df=1, p=.078).

Message behaviors five and six are related in their meaning. Message behavior five, using "we" pronouns to refer to others in the group, and message behavior six, responding directly to others in the group, are similar behaviors, so it is not surprising that their occurrences somewhat coincide (message behavior six was more prevalent in the female-minority group as was message behavior five). What might be considered surprising, however, is their greater presence in the female-minority group instead of the female-only group. While this does support the overall finding of more female-patterned language behavior in the female-minority group, it is important to note that the actual

numbers of message behavior five are quite small (four in the female-minority group and zero in the female-only group), so this finding could, for all practical purposes, be meaningless.

Message behavior one, when examined for all occurrences, approached a significant difference in the other direction. Self-disclosure (a statement by the author of a message about the author of the message) was found 51 times overall in the female-only messages versus 39 times overall in the female-minority messages. This occurrence is probably due to the nature of the newsgroups. In *weddings.alt*, the primary topic is personal; most participants are writing about themselves and their weddings. In *books.alt*, most participants are writing about a particular book or author. It stands to reason that there would be more self-disclosure in *weddings.alt* regardless of the gender of the participants or the group's composition. However, this is just one possibility and the finding cannot be dismissed on the basis of that.

To examine the reasons behind this non-significance is to revisit the discussion concerning research question one. In an exploratory study of this type, it is not unusual to show findings that are in conflict with expectations. As with research question one, the phrasing of research question two suggests the expectation of finding significant differences between the two groups in at least some of the individual categories. While this was not the case, there may be many valid reasons behind the unexpected findings.

Most of those reasons lie in the field of study itself. As discussed earlier, the rapid progression of CMC makes it difficult to establish conclusive data on behaviors related to CMC. The medium is far from static, and its transitioning nature makes results anything

but definitive and final. However, the fact that no significant differences were found in this study relating to research question two does add evidence that CMC may be moving toward less gender-specific participation between males and females, at least as far as their language choices are concerned.

In fact, many gender researchers would find these results heartening. To examine seven different language categories that have been established as female-patterned language behavior and to find no significant differences due to the composition of the groups (female only versus female minority) could be encouraging, especially in the wake of studies that have found CMC language behavior to be similar to traditional modes of communication where men play a more dominant role. A conclusion of egalitarian participation is made more complex, of course, because results for research question one were most significant for the female-minority group.

This finding of no significant differences could be because of the particular nature of the two newsgroups examined, and those characteristics may be in conflict with other newsgroups found online. As discussed earlier, these two newsgroups have distinctive characteristics that take away from the generalizability of the results. Specifically, the composition of the groups in relation to other variables besides gender certainly would have an impact on the findings. The finding of no significance could also suggest possible validity problems with the ProjectH coding of female-patterned language, especially since research question two examined individual language categories. Examining possible validity problems with female-patterned coding is an important area for future research.

Q3: Does length of female messages significantly change from the female-only group to the female-minority group?

The answer to research question three is no. There was not a significant difference in length between the individual messages found in the female-only group versus the individual messages found in the female-minority group. The difference did approach significance, however ($p=.061$). The mean for the female-only group message length was 103.28 and the mean for the female-minority message length was 77.49. This question was addressed by counting the number of words in each message (excluding salutations and signatures) in each group. Then a t-test was run to determine differences.

While the significance level was not met, the approaching of significance is important. Expectations were that message length in the female-only group would be longer than the message length in the female-minority group. This is because of earlier studies that indicated online conversations in male-dominated groups tend to be shorter than those in female-dominated groups (Herring, 1993). The fact that the results for this research question approached significance is in conflict with other findings of this study regarding female-patterned language behavior. The answers to the first two research questions generally support the premise that CMC is more equalizing and egalitarian in terms of group composition and language behavior. But the findings for research question three would show support for the argument that CMC mirrors more traditional modes of communication. Again, this could be due to the nature of the two newsgroups in the

study. For example, the messages in *weddings.alt* could be more lengthy because of the topic, which invites participants to share personal experiences and use extensive detail.

CHAPTER FIVE
CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

Conclusions

The present thesis results generally do not support the original assumptions of this thesis. The original assumptions involved significant differences between a female-only online group and a female-minority online group, with the female-only group showing significantly more female-patterned message behavior. This is not what this study found.

The first research question, which addressed the seven message behaviors overall, showed significantly more female-patterned behavior in the female-minority group instead of in the female-only group. The second research question, which addressed the seven message behaviors individually, did not show significant differences between the two groups. The third research question, which addressed length of messages, did not find a significant difference between the two groups, although the finding did approach significance, with the female-only messages being more lengthy.

A primary goal of this thesis was to determine if online message behavior of females was influenced by the composition of the group in which they were participating. In other words, would females in female-only groups use more female-patterned message behavior than females in female-minority groups? In this study, the answer is no. Thus the response to the primary goal of the thesis is that message behavior was not influenced by the group composition, at least not in the expected direction.

Another goal of this thesis was to determine if specific message behaviors appeared significantly more in the female-only group than in the female-minority group.

They did not. The seven message behaviors, established in previous research (Sudweeks and Rafaeli, 1996), served as the codebook for the content analysis used in this thesis. The message behaviors have been established as female-patterned language behavior in online communication. They include: self-disclosure, stating personal ownership of opinion, apologizing, asking questions, using "we" pronouns to refer to others in the group, responding directly to others in the group, and seeking to prevent or alleviate tension or arguments in the discussion. None of the categories showed a significant difference between the messages from the female-only group and the female-minority group.

Finally, this thesis sought to determine if there was a significant difference in length between the individual female-only group messages and the individual female-minority group messages. Previous research (Herring, 1993) has shown that females in male-dominated online discussions may curtail or shorten their messages. Thus, this thesis made the assumption—or at least deemed the question to be important—that females in the female-only group would have longer messages than females in the female-minority group. The difference in message length between the groups was not significant, although it approached significance with the messages from the female-only group being longer.

Limitations

There were several limitations in this thesis. First, the sample itself is a limitation because the two newsgroups studied were unique and there were some unknown and uncontrollable variables associated with each. This leads to a lack of generalizability of

the results. These particular newsgroups, *weddings.alt* and *books.alt*, were chosen on the basis of their availability for study. They met the required number of messages in a particular timeframe, and gender was easily determined in each group. While many newsgroups post hundreds and even thousands of messages each day, the number of messages is severely restricted when only one message from each participant can be used. Most newsgroups consist of a core of participants who repeatedly send messages. Therefore, finding two newsgroups with 300 messages from 300 different participants (300 messages were needed so a random sample could be selected) in a reasonable time period restricted the choice of newsgroups for study. Even more restrictive was finding a newsgroup that met those considerations that had 300 messages from 300 different females, yet with female participation being in the minority. Thus, the choice of *weddings.alt* and *books.alt* was based on practical reasons of exclusion of other newsgroups that may have been more generalizable. For example, the study would have had added validity if the two newsgroups had more similar topics. In addition, one can assume that *weddings.alt* is made up primarily of young women (considering the average age for marriage).

That example raises another point on limitations: gathering of demographic data in the study of online newsgroups is difficult. Thus, when making comparisons between the two groups, the only thing the researcher knows about the subjects is their gender. That makes it difficult to determine if additional variables are influencing the results. Even gender can be in dispute. Participants in newsgroups commonly pose as the opposite gender, although posing is unlikely in newsgroups of the type studied in this

thesis, because that should be more prevalent in online discussions that are more inflammatory, controversial or sexual in nature.

The codebook may have been a limitation. While other researchers (Savicki, Lingenfelter and Kelly, 1996) have used this codebook, the codebook has not been tested over time as a precise measurement of female-patterned language behavior. Therefore, the validity and reliability of the instrument is somewhat in question, although intercoder reliability was high in this study (.89). Validity is questionable because there could be other categories that are more appropriate than the ones used, or additional categories that should be included. This is an area for future careful research.

Another limitation is the lack of qualitative data associated with this thesis to support the quantitative data resulting from content analysis. While probably very difficult and time-consuming, a follow-up addition to this study would be a survey of newsgroup participants to discover participants' feelings about, thoughts on and experiences in those particular newsgroups.

Implications and Recommendations

The results of this study have meaningful implications for those researching online communication and gender. While the results of this study may not be extremely generalizable to the overall field of study, this is very typical in this area. Since the field is young and changing very rapidly, any valid and reliable data is a valuable addition to a growing base of data that, at some point, can be used in a more general way to build theory and more conclusive findings. In addition, a study such as this that uses "real life" data, rather than laboratory or academic settings can be very valuable.

The findings of this study that females in the female-only group do not use more female-patterned language behavior than females in the female-minority group is important for other researchers. The field of study appears to be divided with respect to online communication and its implications on gender language behavior. Credence must be given to both sides. It may be that more studies like this one will show that CMC does reduce gender-specific language, leading to more equal participation in discussions in this medium. CMC would then be more egalitarian and democratizing and messages could be interpreted for their meaning alone, rather than on the basis of the writer. As a result, this medium of communication would have advantages for females that more traditional mediums do not. Before arriving at such a conclusion, however, a number of specific contingency factors (e.g. a person's tenure in an online group) must be considered, along with gender, to assess their impact on use of a female-patterned language style.

Because of some of the limitations discussed earlier, there are several suggestions for future research. Future research on online communication and gender needs to further examine the group composition area. This is a very limited area of study to date. Since more and more group meetings and discussions are being held online (or at least mediated by computers), it is important to know how group composition influences online language behavior, both for males and for females. In addition, group composition needs to be studied on a wider basis, with more groups representing more diverse participants. If additional groups were studied in this manner, other factors, including demographic variables, might become more evident and therefore, more definite conclusions could be drawn about the role of gender and language choice in CMC. This

could increase the generalizability of research results and is an important area for future study.

Longitudinal studies are also extremely important in this area. Because of rapidly changing technology and the rapid adoption of CMC, results from studies like this are only a snapshot of a certain time period. More longitudinal studies are needed to capture behaviors over time and to add that longitudinal data to the existing base of knowledge.

Studies of this type also need to rely on more than just content analysis of the messages, although that provides a good basis from which to start. Adding surveys of participants would be especially valuable so that the quantitative data from the content analysis can be supplemented with more quantitative data from the survey instrument and qualitative data from open-ended questions. The study of CMC and gender is complex. This study is rather simple, and more descriptive, qualitative methods may more effectively capture the complicated processes, dimensions and characteristics of CMC and gender.

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Appendix A

IRB Exemption Letter

University of Nebraska

Institutional Review Board (IRB)
Office of Regulatory Affairs (ORA)
University of Nebraska Medical Center
Eppley Science Hall 3018
986810 Nebraska Medical Center
Omaha, NE 68198-6810
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http://info.unmc.edu/irb/irbhome.htm

October 8, 1998

Teresa Paulsen
5133 Franklin Street
Omaha, NE 68104

IRB#: 104-98-EX

TITLE OF APPLICATION/PROTOCOL: Computer-Mediated Communication and Gender

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Dear Ms. Paulsen:

The IRB has reviewed your Exemption Form for the above-titled research project. According to the information provided, this project is exempt under 45 CFR 46:101b, category 4. You are therefore authorized to begin the research.

It is understood this project will be conducted in full accordance with all applicable sections of the IRB Guidelines. It is also understood that the IRB will be immediately notified of any proposed changes that may affect the exempt status of your research project.

Please be advised that the IRB has a maximum protocol approval period of five years from the original date of approval and release. If this study continues beyond the five year approval period, the project must be resubmitted in order to maintain an active approval status.

Sincerely,

E. Prentice/jlg

Ernest D. Prentice, PhD
Vice Chair, IRB

EDP:jlg

Appendix B:

Female-Patterned Message Behaviors

Appendix B: Female-Patterned Message Behaviors

Content Scale	Definition	Example
self-disclosure	Measured verbal self-disclosure, a statement by the author of the message about the author of the message.	"I like opera" , "I'm an e-mail junkie" , "My hair is black" but not "My mother's hair is black" or "My cat is black"
stating personal ownership of opinion	Measure statements of personal opinion of the message of the author; it had to indicate the first person directly or indirectly.	"I think chocolate is the best flavor of ice cream" , "Chocolate is a favorite flavor of mine"
apologizing	Measured any form of apology (implied or direct).	"I am sorry I said that" , "I take my words back"
asking questions	Measured the presence of a question.	"How can I operate this software?"
using "we" pronouns	Measured use of the first person plural pronouns (we, us) to refer to others in the discussion list.	"We seem to be able to consider these ideas well" , "Good for us!"
responding directly to others in the group	Measured degree of agreement or disagreement with another person or statement previously appearing in the group discussion.	"I really agree with Ralph" , "I think that Ralph and Inge's idea sucks"
seeking to prevent or alleviate tension or arguments	Measure efforts to prevent of alleviate tensions or arguments in the discussion.	"I think things are getting out of hand here. Let's cool the tirades and get back to the point."