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Abstract

Do the gender differences found when men and women maintain personal relationships in person and on the phone also emerge when they use electronic mail? Alternately, does e-mail changes these ways of interacting? We explore the types of relationships women and men maintain by e-mail, differences in their e-mail use locally and at a distance, and differences in the contents of messages they send. Our findings are based on both qualitative and quantitative data collected over a four-year period. These data suggest that using e-mail to communicate with relatives and friends replicates pre-existing gender differences. Compared to men, women find e-mail contact with friends and family gratifying. Women are more likely than men to maintain kin relationships by e-mail. Women's messages sent to people far away are more filled with personal content, and are more likely to be exchanged in intense burst. They are more likely than men to use e-mail to keep in touch with people who live far away. The fit between women's expressive styles and the features of e-mail seems to be making it especially easy for women to expand their distant social networks.

Interpersonal communication remains the dominant use of the Internet, even though the Internet supports a rich array of other services, from information retrieval, to electronic commerce and entertainment (Kraut, Mukhopadhyay, Szczypula, Kiesler, & Scherlis, 1998; Stafford, Kline, & Dimmick, 1999). According to a survey conducted by the Pew Internet and American Life Project (2000b), 78% of those who went online in a typical day in 2000 sent e-mail—more than double the number of those who used the Internet for any other single activity. Between 1995 and 1998, there was an almost 50% growth in the use of e-mail for personal relationships, whereas there was virtually no growth in the work-related use of e-mail (Cummings & Kraut, 2000). The Internet has been largely praised as a tool that allows people from around the world to communicate. However, very few studies have examined how already existing personal relationships are maintained online (e.g., Cummings, Butler, & Kraut, 2001; Pew Internet Report, 2000; Stafford, Kline, & Dimmick, 1999).

The current article examines how women and men use the Internet, and e-mail in particular, to sustain their personal relationships. We illustrate how the use of new technologies perpetuates traditional gender roles in communication behavior. Previous research suggests that women are more likely than men to define themselves through their social relations and to act as the communication hub between the household and kin and friends. Women, we argue, have now appropriated the Internet for these purposes. Further, we explore the specific ways in which the new communication technologies influence their social networks.

Personal relationships require significant investments in energy and time if they are to be maintained (Duck, 1988; Canary & Stafford, 1994; Stafford & Canary, 1991). Whatever initial factors brought two people together—blood ties, common interests, beauty, or charm—lose power with time (Berg & Clark, 1986). They must be supplemented with behavioral exchanges, which influence whether the relationship will be valued and retained, or, devalued and dropped. The Internet provides a new mechanism for contact and a new tool to enact personal relationships, and does so in a way that saves both time and money.

However, women and men tend to value relationships differently and to have different styles in sustaining them (e.g., Deaux & Major, 1987; Duck & Wright, 1993; Eagle & Steffen, 1984; Spence & Buckner, 1995). As a result, one would expect to see differences in the way they use the Internet for interpersonal communication. Some indications of such differences have started to appear in the research literature (e.g., Kraut et al., 1998; Pew Internet & American Life Project, 2000a). The present article examines in more detail potential gender differences in using the Internet for personal relationships. In order to provide a context for examining gender-specific patterns of using the Internet to communicate with family and friends, we first review some of the previously found gender differences in relating to others.

GENDER DIFFERENCES IN RELATING TO OTHERS

Many authors have identified differences in the way men and women relate to others and manage their relationships. Spence and Helmreich (1978) proposed the term

expressiveness to indicate a set of attitudes and behaviors associated with emotional intimacy and sharing in personal relationships, and the term *instrumentality* to indicate a more agentic style of relationship oriented around common activities. Even though women and men vary widely from one person to another on these styles, there is evidence that women are, on average, more relationally oriented and less agentic than men (e.g., Deaux & Major, 1987; Eagle & Steffen, 1984). Consequently, women have been found to be more expressive and men to be more instrumental in maintaining their relationships. Women tend to engage in intimate conversation with their good friends, whereas men tend to spend time in common activities with theirs (e.g., Caldwell & Peplau, 1982; Davidson & Duberman, 1982; Duck & Wright, 1993; Spence & Buckner, 1995; Twenge, 1997; Walker, 1994; Wright & Scanlon, 1991). It has also been suggested that women tend more to communicate in order to avoid isolation and gain community, whereas men tend more to communicate to gain and keep social position (e.g., Tannen, 1992).

Other authors have emphasized that men and women differ in their conversation styles. For example, Hauser and colleagues (1987) distinguish between *enabling* or *facilitative* styles of communication, which help to 'ramp up' a conversation, and *restricting* styles that tend to dampen the interaction. Women are socialized into using the facilitative styles and men the restricting styles (Maccoby, 1990). In communication, women tend to seek dialogue, whereas men tend to interrupt the communication process at an early stage.

Since women, on average, invest more in personal relationships, some studies have found that women have more extensive social networks (e.g., Moore, 1990; Walker, 1994; Wellman, 1992). Other studies, however, indicate that men report more same-sex friendships than women, although male friendships tend to be less intimate than female friendships (e.g., Claes, 1992). More specific role obligations are consistent with the general tendency of women to connect to others: women are expected to be the maintainers of family ties (Di Leonardo, 1987; Rosenthal, 1985) and of their family's connections to friends (Wellman, 1992).

Such gender differences, first observed in face-to-face behavior, have already been found to carry over to ways in which men and women use the telephone (Noble, 1987). Women, for example, are more frequent users of the telephone than men (e.g., Brandon, 1980; Lacohee & Anderson, 2000; Walker, 1994). Men use the phone more instrumentally than women do. Small talk and emotional sharing are not considered legitimate motives for men to initiate phone contact, and men may not call if they do not have an instrumental reason to call (Lacohee & Anderson, 2000; Walker, 1994). Because technology makes it easier to share thoughts and feelings at a distance than to engage in common activities at a distance, women use the telephone more often than men to sustain a larger circle of distant friendships (Lacohee & Anderson, 2000; Walker, 1994).

Do these gender differences in communication and relationship styles hold for computer-mediated communication? Do women embrace computers as a new means of connecting to others? If so, we may expect more use of the Internet for communication by women than men, and more expressive communication by women, and more instrumental communication by men. On the other hand, do the technological features of

e-mail somehow interfere with women's expressive communication style? Some studies indicate that the text-based communication format of e-mail makes it less suitable for maintaining relationships than face-to-face communication or the phone (Cummings, Butler, & Kraut, 2001; Walther, 1996). Other studies suggest it is, instead, more suitable for management and coordination of activities (Sproull & Kiesler, 1986). That is, the text-based format of e-mail may facilitate an instrumental communication style more commonly associated with men.

A recent national survey of Internet use (Pew Internet and American Life Project, 2000a) showed that women use the Internet more for communication than do men. Of those who use e-mail, more women than men use it to communicate with both family and friends. Women, for example, were more likely than men to have sent e-mail to their parents or grandparents and to have reached out electronically to their extended families—aunts, uncles or cousins. Women were more likely than men to use e-mail to sustain distant friendships; 73% of women who use e-mail said they had sent e-mail to friends who lived far away, compared to 65% of men. More women than men e-mailers liked e-mail, mostly because they find it more efficient than other forms of communication (Pew Internet and American Life Project, 2000a). Other studies have also suggested quantitative, and possibly qualitative, differences in how men and women use computers to communicate (e.g., Kraut et al., 1998).

The current article examines in more detail how men and women use e-mail to maintain their personal relationships. Guided by previous findings about gender differences in relational maintenance, we investigate how type of relationships, distance between communication partners and type of message influence women's and men's e-mail use. This exploratory study is based on qualitative data analysis. In addition, we draw upon survey data from 1998-1999, collected within the HomeNet project—a long-term investigation of how the Internet is influencing the lives of Americans (see Kraut et al., 1998; 2000 for more details).

METHOD

Sample

The HomeNet survey data were collected from two samples. The first consisted of 220 members of 93 Pittsburgh households recruited during the spring of 1995 and 1996 and followed for two to three years (Kraut et al., 1998). The second sample consisted of 446 individuals from 237 households in the Pittsburgh area who had recently purchased either a computer or a television during the spring of 1998. They were followed for one year (Kraut et al., 2000). Within the HomeNet Project, 41 interviews were conducted between 1996-1999 in four sub-samples: 10 households in 1996, 14 in 1997, 5 in 1998 and 12 in 1999. We selected households where at least one member was in the top quartile in time online.

Qualitative Data

The present study is mainly based on analyses of interviews with adult women and men from these 41 households. All interviewees were Internet neophytes. The interview sub-sample includes 32 women (mean age 47) and 28 men (mean age 48.8). The sample comprises highly educated and high income adults, with 77.5% having at least some college education and 35.2% a graduate degree; 27.3% had a household income of \$35,000 or less, 36.4% between \$35,000-\$50,000 and 36.3% \$50,000 or over. Ninety-eight percent were Caucasian.

Interviews were semi-structured and lasted two to three hours. We attempted to interview all household members (including children), first as a group around the kitchen or dining room table and then individually in front of the family computer. All interviews were tape recorded and transcribed. The portion in front of the computer was videotaped as well.

The analyses of the interviews followed standard guidelines for structured thematic analyses (e.g., Silverman, 2000; Taylor & Bogdan, 1998), using NUD*IST software (QSR, 1999). Coding was first done for three major types of relationships (relatives, friends and acquaintances) and for three major Internet applications (e-mail, chat rooms and instant messaging) separately for the adult men and women in the four interview sub-samples. We gathered eighteen collections of excerpts from the transcripts, nine referring to women's and nine to men's communication with relatives, or friends, or acquaintances by e-mail, or chat rooms, or instant messaging. For the final analyses, we compared women's and men's communication within each type of relationship for each modality and for each sub-sample. However, we do not report our findings for each sub-sample separately, because, with very few exceptions, we did not see changes in the way men and women were using the Internet to maintain relationships over time¹.

Quantitative Data

We also draw upon cross-sectional quantitative data from the second HomeNet survey sample (Kraut et al., 2000)². Respondents completed survey questionnaire three times: in the spring of 1998, the fall of 1998 and the spring of 1999. Several measures of communication by e-mail were consistently used in the three questionnaire surveys. For the purposes of the present report, analyses include only adult participants who had Internet access during the time of the surveys (N=253). Because the first questionnaire was administered before many of the households had Internet access, the analyses here are done only on data from the second and the third questionnaires, with scores averaged across the two surveys.

For this study, the quantitative analyses are based on questionnaire items related to using the computers in personal relationships: self-reports on actual behaviors, and attitudes about how useful and how much fun computers are in sustaining personal relationships (for details on the measures used, see Kraut et al., 2000). The following self-reported behaviors are of particular interest here: (a) frequency of e-mail use; (b) frequency of keeping in touch with a friend or relative far away and with people in the Pittsburgh area; and (d) time (measured in minutes) spent on the most recent weekday on each of the following activities: communicating with friends, communicating with

family, using e-mail and using the World Wide Web. Frequency of e-mail use was measured on an four-item index (Cronbach's $\alpha=.91$). For the analysis, this variable was centered, with a mean of 0. When measures had outliers, they were truncated. Because the distributions of the time measures were skewed, we took their log in the analyses that follow.

Another set of questions asked about attitudes toward using computers to communicate with others. Respondents were asked to rate how useful and how much fun computers were for sending e-mail, keeping up with family and friends, finding new people to communicate with from all over the world, keeping up with music and entertainment, playing computer games and searching the World Wide Web for hobby information. All items were measures on a 5-point scale, where one meant not at all useful (or fun) and five meant extremely useful (or fun).

DOES E-MAIL PERPETUATE GENDER DIFFERENCES IN RELATIONAL MAINTENANCE?

QUANTITATIVE DATA RESULTS

To place the interview data findings in context, we first present the results from the 1998-1999 survey data. An analysis of covariance was conducted, to test for the effect of gender on frequency of e-mail use, controlling for educational level and household income. Since 98 percent of the sample were Caucasian, we did not control for race in the present analyses. Women were marginally more likely than men to report using e-mail frequently ($p=.11$). (See Table 1).

Since three of the self-report time measures of communicating with others were theoretically and statistically related, a multivariate analysis of covariance was conducted to test for gender effects on time spent on a weekday communicating with family, communicating with friends and using e-mail, controlling for education and household income. There was a significant multivariate (Hotelling's test) gender effect ($F(3, 238)=4.59$; $p=.004$). The univariate tests showed significant gender effects on all three measures (See Table 1). Women reported spending more minutes than men communicating with family. They spent more time communicating with friends. Finally, they spent more time using e-mail. In contrast, there was no gender effect on time spent using the World Wide Web.

A multivariate analysis of covariance was conducted to test for gender effects on frequency of Internet communication with friends in the local area and with people far away, controlling for education and household income. The multivariate test was significant for gender ($F(2, 239)=3.31$; $p=.038$). Univariate tests showed no gender differences in frequency of people's use of the Internet to communicate with local friends, but women were more likely than men to use the Internet to keep up with people far away. (See Table 1). To test for the interaction of gender by geographic distance of the partner, a 2 (gender) \times 2 (e-mail locally versus far away) ANOVA was conducted. The interaction was not statistically significant ($F(1, 240)=1.78$; $p=.18$). There was an overall

Table 1. Means and Standard Deviations for Women and Men on Measures of Internet Use for Personal Relationships.

Time Spent Using the Internet			
	Women	Men	F ^A
Frequency of using e-mail [‡]	.24 (.81)	.09 (.77)	2.62
Communicating with friends (minutes)	110.31*** (95.53)	77.53*** (89.67)	10.41***
Communicating with family (minutes)	169.54* (144.34)	123.92* (111.99)	4.47*
Using the World Wide Web (minutes)	32.20 (50.25)	33.99 (48.81)	.20
Using e-mail (minutes)	24.32* (37.49)	16.07* (23.89)	3.95*

Frequency of Using the Internet for Different Purposes [‡]			
	Women	Men	F
For communicating with friends in the Pittsburgh area	2.48 [†] (1.30)	2.36 [†] (1.24)	2.76 [†]
For keeping in touch with someone far away	2.98* (1.41)	2.55* (1.29)	6.62**

Attitudes toward Internet Use for Specific Activities ^{##}						
	How useful			How much fun		
	Women	Men	F	Women	Men	F
Software that allows to...						
Send e-mail	4.17 (1.12)	3.94 (1.11)	.98	3.98** (1.15)	3.48** (1.08)	9.34**
Keep in touch with family and friends	4.09** (1.02)	3.63** (1.10)	8.95**	4.01** (1.07)	3.56** (1.09)	7.66**
Find new people to communicate with from all over the world	2.95* (1.21)	2.53* (1.02)	6.38**	3.18* (1.21)	2.78* (1.06)	4.91**
Keep up with music and entertainment	2.76 (1.15)	2.59 (1.16)	.05	2.99 (1.20)	2.82 (1.13)	.35
Play new computer games	2.59 (1.20)	2.52 (1.06)	.55	3.07 (1.34)	3.05 (1.18)	.07
Search the Internet or the World Wide Web for hobby information	3.82 (1.18)	3.80 (1.04)	.46	3.80 (1.22)	3.69 (.98)	.001

^A F-values are based on the multivariate analyses of covariance described in the text. Df for the numerator is 1 and df for the denominator varies between 233 and 245 for different dependent variables. [†]p<.10;

* p<.05; **p<.01; ***p<.001

[‡] This variable was centered with a mean of 0.

[‡] Measured on a 5-point scale (1 = never and 5 = often).

^{##} Measures on a 5-point scale (1 = not at all useful (or fun) and 5 = useful (or fun)).

gender effect (F(1, 240)=5.41;p=.02) on frequency of communication locally and far away, with women scoring higher than men.

Similarly, we used multivariate analyses to test for gender differences in attitudes about how useful and how much fun it is to use computers for five different activities, controlling for education, household income and e-mail usage. The multivariate analysis showed significant gender effect on the dependent variables measuring how useful computers were ($F(6, 233)=4.12$; $p=.001$). Univariate tests indicated that women more than men believed the Internet was useful for keeping up with family and friends. (See Table 1). Again, women scored higher than men on usefulness of computers in finding communication partners. In contrast, there was no significant of gender differences on non-social items, such as keeping up with music and entertainment, playing computer games, or searching the Internet for hobby information. However, although women scored higher on the usefulness of useful sending e-mail is, this difference was not statistically significant.

A comparable pattern was found for the effect of gender on the set of dependent variables measuring how much fun computers were for certain activities. The multivariate analysis showed significant gender effect on the dependent variables measuring how much fun computers are ($F(6, 229)=4.12$; $p=.007$). Univariate tests indicated that women more than men though computers were fun for sending e-mail, for keeping up with family and friends, and for finding communication partners. In contrast, there was no significant effect of gender on the items that were not associated with personal relationships, namely, keeping up with music and entertainment, playing computer games, or searching the Internet for hobby information. (See Table 1.)

QUALITATIVE DATA RESULTS

The survey data analyses describe gender-related pattern of sustaining personal relationships using computers, but they provide no detail about differences in communication between friends and family, or why women use the Internet more than men for distant partners but not for local ones. They provide no information about the substance of the communication online. To explore these issues, we turn to the interview data.

In general, more women than men interviewees reported using e-mail for personal relationships. Of the 32 women who were interviewed, 29 reported using e-mail at home to communicate with others they know, whereas of the 28 interviewed men, only 14 used e-mail. Of those who did not use e-mail, all three women, but only two of the 14 men attributed it to lack of time and/or knowledge about how to use e-mail or to having difficulty typing. None of the women and five men in the sample reported lack of interest in using e-mail to communicate with others, illustrated in the following comments of two men who did not use e-mail.

Jim³: I utilize the computer for entertainment and information. I don't e-mail or any... I don't e-mail at all.

Marc: I don't e-mail friends or relatives... I don't know why... I'm not one to communicate often with friends, you know, like, I communicate with them once a month and that's fine with me.

In the context of these findings—that ninety-one percent of the women and only half of the men in our sample use e-mail to communicate with others—we further examine what specific relationships are sustained by this mode of communication.

TYPES OF RELATIONSHIPS SUSTAINED BY E-MAIL

Communication with Family and Kin

Interviewees conducted little communication within the household by e-mail. Only two families reported using e-mail among themselves. In one case, a family used e-mail to communicate with each other in different parts of the house. In another case, a husband at work exchanged messages with his wife at home—on topics ranging from how their day was going to making shopping lists.

Communication by e-mail with other family and more distant kin perpetuates the gender-role pattern described earlier. One of the female interviewees described explicitly such a gender-related pattern in her family.

Barbara: In our family... I'm much more of the communicator and my husband is not. It's a typical, I guess, gender division, and it happens to be true in our case. I'm the one who, you know, talks on the phone to the other family members and makes social arrangements and all kinds of things like that, and when we got the e-mail, that trend just stayed. I mean I am the one who e-mails our son, who's at college and I e-mail other family members and my husband really has no interest in e-mail. And he was never one who would talk on the phone, either. He occasionally has used it [the computer] to pursue a few of his, you know, hobby interests on the Internet, but other than that he doesn't use it. So, I don't know, it's not because he's shy, I just think people who aren't that interested in communicating they're not going to do it with e-mail either.

The interview data suggest that women in the recent cohort were more likely to use the Internet to communicate with family and kin than those in the earlier sub-sample. Only 12 out of 20 women who used e-mail between 1996-1998 reported extensively using it to contact their family and kin, while all nine women interviewed in 1999 did so. We did not see similar cohort effects in men's e-mail use.

Women reported communicating by e-mail most frequently with their siblings and with their parents. Of the 29 women who used email, ten corresponded with their siblings and six with their parents. Communication with family was less common among the 14 men e-mailers—only four reported staying in touch with siblings by e-mail, and none with parents. When women failed to use e-mail with siblings or parents, their most common explanation was that the relatives did not have Internet access. Men were less likely to give this explanation. We also found weak evidence that e-mail supplemented women's telephone conversations with their parents, whereas it substituted for telephone calls with their siblings. For example, some of the women who communicated with both elderly parents and siblings by e-mail explained that they also called their parents as

before, but did not call their brothers and/or sisters as often, since having the e-mail connection.

Ten of the female interviewees and three of the male interviewees reported communicating by e-mail with other kin—namely, cousins, aunts and uncles, a niece and a nephew, or, with their in-laws. One case is of particular interest because it presents a nontraditional way of meeting future in-laws. After their wedding date was announced, Jean started communicating with her future in-laws online before she even met them in person. For example, she developed a relationship with her sister-in-law online long before she met her in person on the wedding day.

Our interviews do not contain adequate information on the e-mail communication between the parents and their children who do not live at home, because our sample contained only four children (two daughters and two sons) away in college. Mothers reported staying in touch with all four by e-mail, whereas only one father reported occasionally corresponding with his son. Three more women, who expected their daughters to be leaving for college soon, expressed enthusiasm about using e-mail in the future to stay in touch with daughters in college. One family kept a common e-mail account that they could use to keep in touch with their son in college, but only the mother regularly checked the account. With one exception (when a son regularly did not answer e-mail), mothers found e-mail connections with their children in college to be useful and satisfying.

As a whole, our qualitative data findings do not indicate that e-mail usage introduced any dramatic changes in the gender-specific pattern of communication with family and kin. There was, however, one case when using e-mail resulted in redefining a traditional communication pattern. One participant, Barbara took advantage of e-mail to change dramatically her relationships with both her father and her son. From the beginning of her marriage, she had long, weekly phone conversations with her mother; her father would get on the line only briefly to say "hi". She had hardly ever exchanged personal thoughts and emotions with him before he started using e-mail. With e-mail, they started a regular correspondence and her father shared his feelings, thoughts and personal history with her. Still, when Barbara would call home, it would be only her mother, but not her father, who would talk to her. "If it were not for the e-mail, I wouldn't have talked to my father..." Barbara also found e-mail communication with her son in college more gratifying than phone communication with him.

Barbara: I e-mail him [my son] a lot. And I enjoy that and I feel that we have a much better communication on e-mail than we would on the phone. And if we didn't have e-mail I wonder what our communication would be, because somehow when I call, it's like, you know, he's busy, or he's tired, or he's studying, or whatever.

Such cases suggesting that e-mail is radically changing relationships with friends and kin, however, were only exceptions in our data. Despite this, we believe it is important to investigate in depth such cases in the future in order to better understand

why this is happening and how gender and other social and personal factors influence this process.

Communication with Friends

In our interview sample, women and men differed in the size of the circle of friends they sustained by e-mail. Twenty-three women, or 72% of the women interviewed (79% of the e-mail users) and nine men, or 32% of the men interviewed (64% of the e-mail users) reported staying in touch with friends using e-mail. Our interviews suggest that, like communication with family and kin, women have the responsibility for sustaining relationships with common family friends by e-mail. Irene and Tom, a husband and wife that we interviewed, described this pattern in their family. It seemed natural to them that Irene was the one who communicated directly with family and common friends by e-mail, thus leaving Tom feeling that he did not need to duplicate the activity.

Irene: [talking about relatives and friends] ...people e-mail me stuff and I'll send it to him [her husband].

Tom: ...rather than both sending [e-mail]... I mean, she talks [by e-mail] to them and then she e-mails me anything I need to know, so I don't really communicate directly with them, but indirectly, through her routing me the e-mails.

Communication with local friends. Women and men did not seem to differ much in their use of e-mail to communicate with geographically local friends. Seven men (25% of those interviewed and half of the male e-mailers) and 10 women (31% of those interviewed and 34% of the female e-mailers) reported using e-mail to communicate locally with friends. Both men and women emphasized the convenience of e-mail for organizing activities and arranging events with friends and acquaintances. Neither women nor men seemed to use e-mail just to chat with local friends. An exception is Jane, who reported preferring e-mail over phone to chat with her closest friend locally.

Jane: I have a friend that lives 10 minutes away and we e-mail back and forth [just to chat]... I could pick up the phone and talk, but we don't.

Jane explained that they e-mail instead of talking by phone, because "it is painless", each of them could do it at their convenience.

Communication with geographically distant friends. In contrast to its use for local relationships, e-mail was more central to distant relationships, and women used it more extensively than men.

E-mail made it easier for both men and women to sustain personal friendships with people far away in at least three different ways. First, e-mail helped people to retain relationships despite geographic mobility. Interviewees reported that after moving to a new location or job, e-mail kept them in touch with people from the old location—former colleagues, friends from college, and neighbors. While geographic relocation frequently

interrupts regular contacts with extended less close family and non-intimate friends, e-mail counters this disruption with low cost communication.

Second, e-mail provides a low-cost means of reinvigorating previously dormant relationships. A combination of e-mail and the World Wide Web allowed some interviewees to actively search for friends they had lost contact with and to re-initiate contact with them. Thus, through e-mail, people intensified their communication with dormant friends and acquaintances. Jill, for example, explained how she was able to keep in touch with some friends, with whom in the past she had only exchanged Christmas cards.

Jill: On Christmas cards I sent out the e-mail address and I did discover I had some surprising contacts... I did find again some long lost friends...

Finally, and more rarely, e-mail allowed people to develop relationships with others they would not maintain otherwise. Irene, for example, described being able to build strong relationships communicating frequently by e-mail.

Irene: [T]here are people I never talk to, like my friends in Alaska, I never talk to him on the phone, we just e-mail each other. Also, my friend in Ireland, we never talk, we just e-mail, so, that's really nice because... My friend in Alaska I've only seen him three times ever and we... basically our whole relationship for the three or four years has been over the Internet and e-mailing, so, that's kind of interesting.

Without computer-mediated communication, Irene and other interviewees would not have been able to develop satisfying relationships with people far away with whom they shared common interests.

The interviews suggest that e-mail expands the circle of geographically distant friends more for women than for men. Eleven women (38% of e-mailers and 34% of all women with Internet access) and four men (29% of e-mailers and 14% of all men with Internet access) reported keeping in touch with more geographically distant friends because of e-mail. Women, it seems, are not just using e-mail as another modality to supplement already existing distant ties; they are taking advantage of the low cost communication to revive lost connections and to stay in touch with friends who would otherwise be lost through geographic mobility.

MESSAGE TYPES AND PATTERNS OF MESSAGE TRAFFIC

To better understand how e-mail builds and sustains relationships, we analyzed interviewees' descriptions of their e-mail content and a limited sample of e-mail messages that they made available to us. These data suggest that there are three types of e-mail messages—boilerplate messages, messages for coordination and messages for personal sharing—which have different roles in developing and sustaining relationships. Because of the small sample of messages, we do not even speculate here on possible gender differences.

Message types

Boilerplate messages. Boilerplate messages include jokes, stories, sayings, greeting cards, pointers to music sites, and other pre-fabricated messages copied by the sender from one source and then forwarded, often to more than one recipient. For example, one of the women in the sample received the following note addressed to her and nine other recipients, most of whom she did not even know:

Feminist saying, circa 1968-1972: “The hand that rocks the cradle can also cradle a rock”.

Like conventional greeting cards, these boilerplate messages serve to remind partners of each other’s existence and, as such, preserve a relationship as a potential resource for companionship, advice, or social support at some later time. It is also important to emphasize that these are messages often addressed to a group of receivers—the circle of sender’s friends and/or relatives. Whether and how this could affect the “density” of one’s social network needs to be studied further.

Coordination messages. A second type is a coordination message. It is used to set up a joint activity or other occasion where the participants share companionship and other social resources. This excerpt from a message of one woman to another illustrates this second type:

Julie: I don't know how your plans are working out for tomorrow night, but it's no problem with me if we have to reschedule it for next week or whenever. I will be out of the house most of tomorrow, so you probably won't be able to get me on the phone then anyway.

Other examples of messages for coordination included organizing a group of friends to play golf over the weekend, arranging monthly board-game nights with 20 other family friends, and managing activities of a local community committee on families and education.

Messages for personal sharing. The third type of messages have personal content that directly supports the relationship. Such messages have an expressive nature, and in themselves they provide companionship and social support by allowing communicators to share thoughts and feelings with one another. Contrast, for example, the coordination e-mail from Julie above with the following message Alice sent. Alice's message has substantive content, which enacts the relationship.

Long time no hear from! How are you? I'm getting by. I'm still working at the law firm as a receptionist but I am bored!!! And I was turned down for two jobs this week. I had second interviews for both. I thought at least one would be good! I really feel like I suck!!! Anyway, I came across your address and thought I'd write you. Hope all is better for you. I'm glad spring is coming!!

Dorothy, a creative writer, exchanges with her artist mother, along with regular phone calls and occasional visits. They talk about family gossip and the events of the day,

and in particular, what her mother has been working on that day. These messages also serve to enact the relationship, by themselves providing companionship and social support.

Dorothy: For her [my mother], talking about work in progress is very interesting to her and can get her going. So, she'll be telling me she's working on something and ask for my ideas on it and I'll send ideas back and so, back and forth, that kind of thing, and then family gossip... you know, this sister is coming to dinner, or you know, this nephew said this funny thing. There's certain amount of family chit chat in there, too.

We have some preliminary evidence that women may not consider e-mail very suitable for sharing of emotions and personal thoughts. Six women reported that they restricted their e-mail contacts to light conversation, reserving deep conversations involving social support for more interactive media—the phone or, in more recent times, instant messaging. Kathleen described media choice when communicating with her daughter this way:

Kathleen: [W]hen times were stressful, she [my daughter] would call up... you know, that upset does not necessarily come through on an e-mail. And so, I was there for emotional support... So, a lot of it was not conversational... While, just here [in her e-mail messages] is some information... what are you doing, Mom, and I would write back and you know, those kind of things... it's likely to be much longer and in depth if we're on the phone.

However, at least two women judged e-mail more appropriate than the phone for deep, emotionally laden topics with someone far away. In one case, a female family friend was terminally ill and her husband used e-mail to keep friends informed about her physical and emotional state. In another case, e-mail communication supplied indispensable emotional support for two sisters after their mother died.

Cynthia: My Mom had died a while ago and ... we were talking about that through e-mail and you know, she [my sister] said stuff about my Mom and everything, and... the way we were talking, I'm thinking, I probably never would have said that to her...

Although these examples may only be exceptions, they suggest some of the conditions under which e-mail may be preferred over the telephone for sharing deep emotions. E-mail is more efficient than interactive media for broadcasting messages to a group of recipients. In addition, e-mail is a more reflective medium than the phone or instant messaging, and allows the writer to more carefully choose and review message content before sending it.

Patterns of message traffic. The interview data suggest two differing styles of e-mail use for maintaining personal relationships: *facilitating dialogue* (enacting the relationship in intense bursts of e-mail communication) and *restricting dialogue* (interrupting the communication in an early stage). Several women emphasized that they e-mailed others

“in spurts”, activating a dormant relationship through an intensive communication exchange for a few days, then allowing it to die back. The following excerpt is an example of how initiating communication with another stimulates further communication for women.

Jill: For a short spurt I'll e-mail her back and we'll e-mail for a couple of days and then we sort of fade out for awhile until the next spurt ... [Once we get in touch,] I usually get excited about e-mailing the person, it just makes me want to talk to them more...

In contrast, men seemed more apt to accept substantial delay between messages. One of the interviewees, Jim described this pattern in some detail. When he would get an e-mail message from a friend, he would almost never respond to it right away. He would get back to him in some future communication session.

Jim: I don't see much use [in e-mail] unless it's something important. If it's something [important], I'd like to get to it later, like, I won't answer right then. Like, say, if I'm just checking e-mail, but if I really want to write [back] something, I'll leave it [the message] there, so the next time I can come back and write whatever it is.

Harry emphasized that intensive e-mail message exchange with another person was not something ‘men do’.

Harry: For me, it [e-mail] usually has a point of giving him [his friend] information, asking him questions: are you available for that... Not back and forth simultaneously in chains. Not for me; maybe for [Elizabeth] [his daughter].

As in the case of telephone use, gender-role expectations seem to channel e-mail behavior. Our findings also suggest that instant messaging, by facilitating dialogue, may be more appealing to women than to men. Melanie, interviewed in 1999, describes below why she prefers instant messaging to e-mail.

Melanie: Well, first of all, an e-mail message... it's a one-sided conversation, you have to get a response before you can type anymore, but on instant chat we use a split screen all the time, so you can chat constantly. It's just like talking on the telephone except that you're using a printed word instead, [which is] much better.

However, because instant messaging did not exist when we started to collect interview data, its use is underrepresented in our sample.

DISCUSSION AND CONCLUSIONS

Several studies have found that, controlling for overall Internet use, women are heavier users of e-mail than men (e.g. Kraut et al., 1998; Pew Internet & American Life Project, 2000a). The current article suggests that the different role obligations men and women have towards relationships, the different value they place on personal relationships, the precise ways they use the Internet for developing and sustaining

relationships may account for these differences in e-mail use. Our qualitative and quantitative data analyses show gender differences in both behavior and attitudes toward computer-mediated communication with family and friends.

Our findings, of course, are conditional on the limitations of our survey and interview samples. For example, data were collected with relatively small samples only in the city of Pittsburgh. Our survey and interview samples are not directly comparable, since interviews were accumulated gradually between 1995 to 1999, while the surveys reported here were collected in 1998 and 1999. Most of the participants in our samples were middle class, highly educated, white Americans, married, between 35 and 55 years old. Men and women other than middle class and white appear to have different gender ideologies and different patterns of personal relationship maintenance and styles of relating to others (e.g., Franklin, 1992; Hensen, 1992). Only one author coded the interviews. Our conclusions about message content are based on interviewees' comments as much as they are on the text of the messages. Also, we do not compare e-mail to other modes of communication, nor do we consider the gender of the corresponding partner. Previous studies, for example, show differences in communication patterns between same-gender and different-gender friends (e.g., Parker & de Vries, 1993).

Despite these limitations, our study shows that some pre-existing differences between men and women in their beliefs and behaviors in maintaining personal relationships are being perpetuated in e-mail communication. For example, women in the United States have been traditionally responsible for maintaining relationships among family and friends, and we find that they have appropriated e-mail as a new tool for this traditional role obligation. Women were more likely than men to report sending e-mail to their elderly parents and siblings. They also reported more often than men sending e-mail to extended family. These findings of gender differences using e-mail replicate gender differences using the phone, greeting cards, and letters. In all these modes of communication, women do most of the "work of kin" (cf. Di Leonardo, 1987).

Proximity—a major factor in relationship maintenance—seems to interact with gender in e-mail use. Both our survey and interview data suggest that women are more likely than men to use e-mail to communicate with family and friends who live far away, and women are more interested in actively seeking communication by e-mail with someone far away. Being socialized in connectedness and seeking closeness in dialogue, women seem to have embraced e-mail as a less costly way to connect to others far away. Locally, however, men and women use e-mail similarly, mainly for coordination of joint activities.

We speculate that these differences come about because of the different way women and men generally enact relationships. E-mail fits better women's expressive style of relationship maintenance, with its emotional intimacy and sharing of personal information, because e-mail allows women to carry out this style with distant friends and family. In contrast, men's more instrumental style of relationship maintenance, with its emphasis on joint activities, is hard to accomplish with distant partners through computer mediated communication. Men seem to be less willing to use e-mail to sustain geographically distant relationships, possibly because it would be difficult to sustain

these relationships without sharing personal thoughts and feelings. Instead, e-mail is useful for setting up joint activities with local partners, and both men and women use it for coordinating social activities with local partners. These findings are consistent with recent reports on a narrowing gap between women and men on instrumentality but not on expressiveness (Duck & Wright, 1993; Spence & Buckner, 2000; Twenge, 1997; Wright & Scanlon, 1991).

Our survey data show that women have more positive attitudes toward using e-mail as a tool to connect to others. They find sending e-mail to family and friends more useful and more enjoyable than men do. Other studies have come to a similar conclusion—e-mail is more psychologically gratifying to women than to men (see e.g., Pew Internet & American Life Project, 2000a; Stafford, Kline, & Dimmick, 1999).

Since women tend to use a facilitative communication style, seeking dialogue, they seem to communicate by e-mail “in spurts”, enacting their relationships in intense bursts of communication. In contrast men, being more prone to a restricting style of communication, seem to tolerate considerable delays between communication sessions. These findings suggest that instant messaging may differentially appeal to women than men, because it better supports highly interactive communication sessions.

In addition to finding that e-mail perpetuates some gender-related behaviors and attitudes, our study indicates that certain types of personal relationships may be changing as a consequence of computer-mediated communication. For example, while previous studies—based on more traditional modes of communication—report that, of all family ties, the mother-daughter relationship is the closest and most frequently enacted (e.g., Schütze, 1996), we found that e-mail exchanges with siblings was most frequent. One reason may be that availability drives frequency. Because elderly parents have less access to the Internet than their adult children, the middle-aged adults can't send e-mail to them. However, our data also suggest that women are using e-mail to supplement telephone conversations with their parents, whereas they are substituting it for telephone calls with their siblings.

Thus, our study suggests, women are using the new technologies to expand their distant social networks and to intensify certain family and kin relationships. Both men and women are using it to keep up with siblings and with local friends. The interview data imply that e-mail is having a generally beneficial effect on personal relationships, but more so for women than for men.

While our study focuses on e-mail, Internet services for real-time communication has been spreading rapidly, especially among the younger population. We do not have enough observations on the role of more recent communication technologies (for example, instant messaging), since we stopped collecting data in mid-1999. Future research on the issues of how the new technologies are used to sustain personal relationships should include all these modalities, and more diverse demographic groups.

NOTES

¹ Exploratory interviews that we conducted in 2000 and 2001 suggest that instant messaging applications are now being used much more frequently than in the earlier periods, and that they seem to be used in a different manner to sustain relationships than e-mail. However, we do not have enough data about the use of instant messaging or chat rooms to investigate it separately. Consequently, this article focuses on communication by e-mail. National survey research shows that as of 2000, e-mail dominated use of instant messaging.

² We also conducted analyses on the basis of questionnaire items from the first HomeNet sample (Kraut et al., 1998). However, measures differ somewhat across the two samples—from the wording of the items to the range of scales used—which makes combining the two data sets problematic. In the separate analyses of the 1995-1998 HomeNet survey data, we found similar gender-related tendencies associated with e-mail use in personal communication. For lack of space and because the focus of this study is our quantitative data analyses, we only report here the more recent survey data analyses.

³ For considerations of confidentiality, we use pseudonyms throughout the text.

REFERENCES

- Berg, J. H. & Clark, M. S. (1986). Differences in social exchange between intimate and other relationships: Gradually evolving or quickly apparent? In V. J. Derlega and B. A. Winstead (Eds.), *Friendship and Social Interaction*. New York: Springer-Verlag.
- Brandon, B. (1980). *The effects of the demographics of individual households on their telephone usage*. Cambridge, MA: Ballinger.
- Caldwell, M. A., & Peplau, L. A. (1982). Sex differences in same-sex friendships. *Sex Roles*, 8, 721-732.
- Canary, D. J. & Stafford, L. (1994). Maintaining relationships through strategic and routine interactions. In D. J. Canary & L. Stafford (Eds.), *Communication and relationship maintenance*. (pp. 3-22). NY: Academic Press.
- Cancian, F. M. (1987). *Love in America: Gender and self-development*. Cambridge: Cambridge University Press.
- Claes, M. E. (1992). Friendship and personal adjustment during adolescence. *Journal of Adolescence*, 15(1), 39-55.
- Cummings, J. N., Butler, B., & Kraut, R. (in press, 2001). The quality of online relationships. *Communications of the ACM*.
- Davidson, L. R., & Duberman, L. (1982). Friendship: Communication and interactional patterns in same-sex dyads. *Sex Roles*, 8, 809-822.
- Deaux, K., & Major, B. (1987). Putting gender into context: An interactive model of gender-related behavior. *Psychological Review*, 94, 369-389.
- Di Leonardo, M. (1987). The female world of cards and holidays: Women, families and the work of kinship. *Signs: Journal of Women in Culture and Society*, 12, 440-453.
- Duck, S. W. (1988). *Relating to Others*. Chicago: Dorsey
- Duck, S., & Wright, P. H. (1993). Reexamining gender differences in friendships: A close look at two kinds of data. *Sex Roles*, 28, 709-727.
- Eagle, A. H., & Steffen, V. J. (1984). Gender stereotypes stem from the distribution of women and men into social roles. *Journal of Personality and Social Psychology*, 46, 735-754.
- Fox, M., Gibbs, M. & Auerbach, D. (1985). Age and gender dimensions of friendships. *Psychology of Women Quarterly*, 9, 489-502.

- Hauser, S. T., Powers, S. I., Weiss-Perry, B., Follansbee, D. J., Rajapak, D., & Greene, W. M. (1987). *The constraining and enabling coding system manual*. Unpublished manuscript.
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., & Helgeson, V. (submitted, 2000). Internet Paradox Revisited. *Journal of Social Issues*.
- Kraut, R., Mukhopadhyay, T., Szczypula, J., Kiesler, S., Scherlis, W. (1998). Communication and Information: Alternative Uses of the Internet in Households. *Computer-Human Interaction*.
- Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet Paradox. A Social Technology that Reduces Social Involvement and Psychological Well-being? *American Psychologist*, 53 (9), 1017-1031.
- Kraut, R., Scherlis, W., Mukhopadhyay, T., Manning, J., & Kiesler, S. (1996). The HomeNet field trial of residential Internet services. *Communications of the ACM*, 39, 55-63.
- Lacohée, H., & Anderson, B. (2000). Interacting with the telephone. *International Journal of Human-Computer Studies*, 53.
- Maccoby, E. E. (1990). Gender and relationships: A developmental account. *American Psychologist*, 45(4), 513-520.
- Moore, G. (1990). Structural determinants of men's and women's personal networks. *American Sociological Review*, 55, 726-735.
- Noble, G. (1987). Individual differences, psychological neighbourhoods and use of the domestic telephone. *Media Information Australia*, 44, 37-41.
- Parker, S., & de Vries, B. (1993). Patterns of friendship for women and men in same- and cross-sex relationships. *Journal of Social and Personal Relationships*, 10(4), 617-626.
- The Pew Internet & American Life Project (2000a, May 10). Tracking online life: How women use the Internet to cultivate relationships with family and friends. Downloaded May 15, 2000. at <http://www.pewinternet.org/reports/>
- Pew Internet and American life project (2000b). Daily Internet Activities. Downloaded January 9, 2001. at http://www.pewinternet.org/reports/chart.asp?img=5_Daily_Activities.gif
- Rosenthal, C. (1985). Kinkeeping in the familial division of labor. *Journal of Marriage and the Family*, 47, 965-974.
- QSR NUD*IST software. (1999). SCILARI. SAGE Publications Software..

- Schütze, Y. (1996). Relationships between adult children and their parents. In A. E. Auhagen, & M. von Salisch (Eds.), *The diversity of human relationships*. (pp. 106-119). Cambridge: Cambridge University Press.
- Silverman, D. (2000). Analyzing talk and text. In N. K. Denzin, & Y. S. Lincoln (Eds.). *Handbook of qualitative research*. Thousand Oaks, Calif. : Sage Publications.
- Spence, J. T., & Buckner, C. E. (2000). Instrumental and expressive traits, trait stereotypes, and sexist attitudes: What do they signify? *Psychology of Women Quarterly*, 24, 44-62.
- Spence, J. T., & Buckner, C. (1995). Masculinity and femininity: Defining the undefinable. In P. J. Kalbfleisch, & M. J. Cody (Eds.), *Gender, power, and communication in human relationships*. (pp. 105-140). Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers.
- Sproull, L. & Kiesler, S. (1986). Reducing social context cues: E-mail in organizational communication. *Management Science*, 32, 1492-1512.
- Stafford, L., & Canary, D. J. (1991). Maintenance strategies and romantic relationship type, gender and relational characteristics. *Journal of Social and Personal Relationships*, 8, 217-242.
- Stafford, L., Kline, S. L., & Dimmick, J. (1999). Home e-mail: Relational maintenance and gratification opportunities. *Journal of Broadcasting & Electronic Media*, 43(4), 659-669.
- Tannen, D. (1992). *You just don't understand. Women and men in conversation*. London: Virago Press.
- Twenge, J. M. (1997). Changes in masculine and feminine traits across time: A meta-analysis. *Sex Roles*, 36, 305-327.
- Walker, K. (1994). "I'm no friends the way she's friends": Ideological and behavioral constructions of masculinity in men's friendships. *Masculinities*, 2, 38-55.
- Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal Interaction. *Communication Research*, 23(1), 3-43.
- Wellman, B. (1992). Men in Networks: Private Communities, Domestic Friendships. In: P. M. Nardi (Ed.). *Men's friendships*. (pp. 74-114). London: SAGE.
- Wellman, B., & Wortley, S. (1989). Brothers' keepers. *Sociological Perspectives*, 23, 273-306.
- Wright, P. H., & Scanlon, M. B. (1991). Gender role orientations and friendship: Some attenuation but gender differences abound. *Sex Roles*, 24, 551-566.