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Conversation

Making Friends in Cyberspace

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Introduction

From its birth as a way of linking a few university and defense laboratories in the late 1960s, the Internet has grown into a global network connecting between 30 and 40 million people (Elmer-Dewitt, 1995). Social linkages in the form of E-mail and discussion groups appeared in the first days of the Internet and have grown explosively ever since. Today there are over 5,000 Internet discussion groups (Hahn & Stout, 1994). Aside from its sheer size, this new social milieu commands scholarly attention because it is one of the new "collaborative mass media forms" in which messages come from a wide variety of participants with little or no centralized control (Rafaeli & LaRose, 1993). It therefore blurs the traditional boundaries between interpersonal and mass communication phenomena and raises new opportunities and risks for the way individuals relate to one another (Lea & Spears, 1995; Williams & Rice, 1983).

The purpose of this study was to examine the relational world actually being created through Internet discussion groups (usually called newsgroups). (1) Because the development of personal relationships is a pivotal issue in the larger debate about human relations in cyberspace, this study explores four basic questions: How often do personal relationships form in Internet newsgroups, who has them, how close or developed do they become, and do relationships started on line migrate to other settings?

We begin by examining two conflicting visions that have dominated popular and scholarly debate. On one side are those who view on-line relationships as shallow, impersonal, and often hostile. They assert that only the illusion of community can be created in cyberspace (e.g., Beninger, 1987; Berry, 1993;

Heim, 1992; Stoll, 1995). On the other side are those who argue that computer-mediated communication liberates interpersonal relations from the confines of physical locality and thus creates opportunities for new, but genuine, personal relationships and communities (e.g., Pool, 1983; Rheingold, 1993). One vision is of relationships lost, while the other is of relationships liberated and found. These conflicting visions are not, of course, unique to debates about computer-mediated communication. Instead they reflect long-running, historical debates about the nature of modernity and the social effects of changes in communication and transportation technology (Marvin, 1987; Wellman, 1979). More specific versions of these debates can be found in the literature on the effects of the reduction in communicative cues associated with computer-mediated communication. They are also reflected in the sharply differing applications of personal relationship theories to on-line settings.

Most of the early research on computer-mediated communication involved laboratory studies in which small groups worked on structured problems for limited periods of time (Garton & Wellman, 1995). Groups that communicated by means of computer (CMC) were compared to groups that communicated face-to-face (FtF). Findings from this line of research have generally emphasized the social disadvantages of computer-mediated communication, therefore implying that highly developed, positive personal relationships should occur infrequently in on-line settings. Computer-mediated groups, for example, have greater difficulty recognizing and moving toward shared points of view (Kiesler & Sproull, 1992). People in CMC groups also engage in more verbal aggression, blunt disclosure, and nonconforming behavior than people in FtF groups (Dubrovsky, Kiesler, & Sethna, 1991; Siegal, Dubrovsky, Kiesler, & McGuire, 1986). Such behavior is usually called "flaming," and it has been observed both in laboratory settings and in a variety of business, governmental, educational, and public networks (e.g., Hiltz, Turoff, & Johnson, 1989; Lea, O'Shea, Fung, & Spears, 1992; Sproull & Kiesler, 1986; Thompsen & Ahn, 1992). Such findings may reflect the comparative anonymity afforded by CMC or local norms that make the overt expression of hostility more acceptable in on-line settings (Lea et al., 1992; Prentice-Dunn & Rogers, 1989; Spears & Lea, 1994; Zimbardo, 1969). These differences are most often explained by observing that social cues are filtered out in on-line settings (Culnan & Markus, 1987). Relational cues emanating from the physical context are missing, as are nonverbal cues regarding vocal qualities, bodily movement, facial expressions, and physical appearance. CMC is thus judged to have a narrower bandwidth and less information richness than FtF communication (see Daft & Lengel, 1984; Kiesler, Siegal, & McGuire, 1984). According to both social presence theory (Rice, 1987; Rice & Love, 1987; Short, Williams, & Christie, 1976) and social context cues theory (Sproull & Kiesler, 1991), this reduction in contextual, visual, and aural cues should cause communication in on-line settings to be more impersonal and nonconforming than communication in face-to-face settings. Both theories predict that participants' awareness of and sensitivity to others will be related to the number of channels or codes available for linking them. Face-to-face communication should breed greater awareness and sensitivity because of its multiplicity of channels, while on-line communication should be more impersonal, less inhibited, and less adaptive. This is not to say that positive personal relationships are impossible. Indeed Sproull and Kiesler (1991) note that electronic settings sometimes provide more opportunities for social relationships and less evaluation apprehensions than face-to-face settings. Nonetheless, theories of computer-mediated communication that are based on the reduced-cues perspective generally predict that positive personal relationships should occur infrequently rather than frequently.

Claims that computer-mediated communication is characterized by impersonality, hostility, and nonsocial orientation, however, have been challenged repeatedly. The empirical support for some claims is less robust than researchers first suggested, and critics note that the causal antecedent to some effects may have been identified incorrectly. Because people need to manage uncertainty and develop rapport, they will adapt the textual cues to meet their needs when faced with a channel that does not carry visual and aural cues (Walther, 1992, 1993; Walther, Anderson, & Park, 1994; Walther & Burgoon, 1992). Time is the key element in this adaptation. While the multiple channels and cues available in FtF interaction speed the exchange of task and relational information, the process is slowed by the "reduced bandwidth" of CMC, that is, the inability of CMC to carry aural and visual cues. The important point, however, is not that CMC is unable to convey relational and personal information, but rather that it may take longer to do so. In a meta-analysis of CMC studies, Walther and his colleagues found that the proportion of socioemotional content was higher when interaction time was not restricted (Walther et al., 1994). Thus, the negative effects attributed to the computer as a medium may have instead been the result of the stringent time restrictions placed on interaction.

As research on CMC moved from the laboratory to the field, it also became apparent that people related to one another in many more ways than had been envisioned by the reduced-cues perspective. Studies of E-mail in the workplace have consistently shown the interpersonal side of CMC. Users commonly report that they socialize, maintain relationships, play games, and receive emotional support via E-mail (e.g., Feldman, 1987; Finholt & Sproull, 1990; Haythornthwaite, Wellman, & Mantei, 1994; McCormick & McCormick, 1992; Rice & Love, 1987).

Further evidence that personal relationships are forming on line can be found in a variety of sources, including popular cyberspace travelogues (Rheingold, 1993), the popular press (e.g., Bock, 1994; De Leon, 1994; Kanaley, 1995; Lewis, 1994; Wright, 1993), and a handful of scholarly reports on specific on-line communities (e.g., Brennan, Moore, & Smyth, 1992; Bruckman, 1992; Myers, 1987; Ogan, 1993; Reid, 1991; Wilkins, 1991). These accounts make it clear that on-line relationships are genuine personal relationships in the eyes of the participants. One person who played a MUD (2), for instance, commented that his on-line friendships were "much deeper and have better quality" than his real-life friendships (Bruckman, 1992, p. 23). Another person who had been active in a computer network for church workers said, "I know some of these people better than some of my oldest and best friends" (Wilkins, 1991, p. 56). In some cases, on-line relationships have blossomed into romance and marriage (Bruckman, 1992; Reid, 1991).

These reports also illustrate how people overcome the technical limitations of CMC. In addition to the well-known use of keyboard characters, or "smileys," to imitate facial expressions and paralinguistic features of conversation (e.g., typing ":-)" to indicate a smile), users frequently express emotion and metacommunicative intent by embedding words in text (Wilkins, 1991). The person who wishes a message to be taken as friendly teasing, for example, may embed a word or phrase like "grin" or "just kidding" in text.

Another way people overcome the technical limitations of CMC is simply to supplement CMC with additional channels of communication. There are several reports of mail, telephone, and face-to-face contact as supplements to CMC (Ogan, 1993; Reid, 1991). In some cases, participants in on-line groups have organized social events so that they might meet in person (Bruckman, 1992; Rheingold, 1993).

Popular attention has often fixated on the more manipulative and deceptive aspects of on-line relationships. Cases of gender switching (e.g., men pretending to be women) command particular attention (e.g., Bruckman, 1992; Van Gelder, 1985). CMC obviously provides rich opportunities for self-presentation and identity manipulation (Lea & Spears, 1995; Myers, 1987). However, these opportunities also have a positive side. Cyberspace creates an "identity workshop" in which people learn and test social skills (Bruckman, 1992). Some participants, for example, report that their on-line identities allow them to overcome the shyness they feel in face-to-face interaction (Myers, 1987). People who are isolated or disabled can develop social relationships (Bock, 1994; Brennan et al., 1992; De Leon, 1994; Kanaley, 1995). Whereas the possibility of abuse always exists, CMC also provides ways for people to transcend the limitations they experience in face-to-face settings (Walther, 1995).

Personal Relationship Theories Visited and Revisited

Conflicting predictions regarding on-line relationships can also be obtained from theories of interpersonal communication and relationship development. The relative lack of social cues and the potential for feedback delays, for example, should lead both to higher uncertainty and more difficulty in reducing uncertainty about how to behave, how the partner will behave, and how to explain the partner's behavior. According to uncertainty reduction theory (Berger & Calabrese, 1975; Parks & Adelman, 1983), the inability to reduce uncertainty should prevent, or at least retard, the development of personal relationships.

Existing theories of relational development pose several other challenges for on-line relationships, as Lea and Spears (1995) observe. For example, most theories assume both physical proximity and frequent interaction between prospective partners (e.g., Altman & Taylor, 1973; Berger & Calabrese, 1975; Huston & Burgess, 1979; Kelley, 1979; Kelley et al., 1983). Existing theories also underscore the importance of physical appearance and physical attraction, especially in the development of romantic relationships (e.g., Berscheid & Walster, 1978). Yet information regarding physical appearance is usually unavailable in on-line settings. On-line communicators, therefore, are generally assumed to lack many of the things emphasized in traditional discussions of relationship development: physical proximity, frequent interaction, information about physical appearance, cues about group membership, and information about the broader social context (Lea & Spears, 1995). However, a more optimistic assessment of the potential for personal relationships emerges when we re-examine the assumptions about on-line communication. If Walther's (1992, 1993) information-processing perspective is correct, for instance, people in on-line settings may simply take longer to reduce their uncertainty about one another. The lack of proximity and of visual information might be overcome by arranging meetings or by exchanging photographs either electronically or by mail. Information about membership in social groups can be exchanged easily. Thus, many supposed limitations of CMC may be overdrawn.

More important, however, is the question of whether these conditions are really necessary for the development of relationships. The emphasis placed on factors like physical appearance or proximity may reflect less of a theoretic necessity than a consequence of the fact that most theories of relational development predate the current explosion in computer-mediated communication technology. In social penetration theory, for example, the driving force behind relational development is the forecast of a positive reward:cost ratio (Altman & Taylor, 1973). Other exchange-based theories make similar assumptions about what drives development (e.g., Huston & Burgess, 1979; Kelley, 1979; Kelley et al., 1983). In uncertainty-reduction theory the driving force is the progressive reduction of uncertainty about the partner and the relationship (Berger, 1988; Berger & Calabrese, 1975; Parks & Adelman, 1983). None of these theories requires physical proximity and frequent interaction as necessary conditions for relational development. These conditions may be helpful, but they are not necessary to arrive at predictions of how rewarding future interactions might be, how one might feel about another person, or how one might be treated by that person.

Whereas studies of face-to-face relationships emphasize the reward and information value of physical appearance and physical attractiveness (e.g., Berscheid & Walster, 1978; Hatfield & Sprecher, 1986), no theory of relational development explicitly requires this information as a necessary precondition. Information about physical appearance may serve as a reward or promote inferences about other qualities, but it is not the only source of rewards or of the information used to make inferences. Visions of relationships lost may, therefore, not acknowledge either the capabilities of on-line communication or the necessary conditions in theories of relationship development.

In short, both popular and scholarly accounts present sharply contrasting, often dramatized, views of the possibilities for on-line relationships. What is missing is a systematic research effort to map the prevalence of personal relationships in on-line settings, the basic demographics of relational participants, the levels of development achieved in on-line relationships, and their links to off-line or real-life settings.

How Often Do Personal Relationships Form in Internet Newsgroups?

Our first task was to determine just how common personal relationships were in on-line settings. To do this, as well as to address our other research questions, Internet newsgroups and their contributors were selected through a two-stage sampling procedure. In the first stage, 24 newsgroups were randomly selected from published lists of groups (Hahn & Stout, 1994) in each of four major Usenet newsgroup hierarchies: "comp," "soc," "rec," and "alt." (3) In the second stage, 22 people were randomly chosen from lists of those who had posted messages to these groups over a several day period. Surveys were then sent to prospective participants by direct E-mail. Responses were received from 176 of the 528 (33.3%) people contacted in this manner. Respondents ranged in age from 15 to 57 years. The typical respondent was 32 years old, more likely to be male than female, and more likely to be single than married. Respondents had typically been involved with newsgroups for approximately two years and contributed to an average of five groups on a monthly basis.(4)

Our primary finding was that personal relationships were common. When we asked if our respondents had formed any new acquaintances, friendships, or other personal relationships as a result of participating in newsgroups, nearly two thirds (60.7%) reported that they had indeed formed a personal relationship with someone they had "met" for the first time via an Internet newsgroup. Further, the likelihood of developing a personal relationship did not differ across the newsgroup hierarchies or groupings we examined. That is, personal relationships seemed equally likely to develop in all sectors we examined. They were not restricted to just a few types of newsgroups. The fact that personal relationships developed for so many of our respondents and across so many different types of newsgroups suggests that criticisms of on-line interaction as being impersonal and hostile are overdrawn. These findings lend more credence to images of relationships liberated than to images of relationships lost.

These findings obviously raise questions about the types of relationships that our respondents were forming. Additional analyses revealed that opposite-sex relationships (55.1%) were slightly more common than same-sex relationships (44.9%), but this difference was not statistically significant. Only a few (7.9%) were romantic. Relationships ranged in duration from less than a month to six years, but most relationships (69.6%) were less than a year old (Mdn = 5.00 months, M = 9.62 months, SD = 12.21). Participants communicated regularly with their on-line partners. Nearly a third (29.7%) reported that they communicated with their partners at least three or four times a week, and over half (55.4%) communicated with their partners on a weekly basis.

Who Has On-line Personal Relationships?

Some people may be more likely than others to develop personal relationships on line. Although stereotypes of lonely, perhaps dysfunctional people being attracted to cyberspace abound in the popular press, the fact is that we lack even the most basic information about the participants in on-line relationships. We compared people who did and did not have an on-line personal relationship in terms of their demographic characteristics and patterns of Internet involvement.

Women were significantly more likely than men to have formed a personal relationship on line. While 72.2% of women had formed a personal relationship, only 54.5% of men had ($c2= 4.80$, $df = 1$, $p < .05$). Additional research will be needed to distinguish potential explanations for this difference. It may stem from motivational factors. It may simply be that a greater proportion of women are looking for friends. There may be gender differences in the willingness to label an on-line relationship as such. Or, women may simply be more sought after in a medium where more users are male.

Age did not appear to be related to the likelihood of developing a personal relationship on line, nor did marital status. Married, never married, and divorced respondents were equally likely to have personal relationships that started in newsgroups.

The best predictors of whether an individual had developed a personal relationship were the duration and frequency of their participation in newsgroups. People who formed personal relationships on line contributed to significantly more newsgroups ($M = 5.90$ groups, $SD = 6.81$) than did those who had not ($M = 3.62$, $SD = 2.88$), $t (147) = 3.00$, $p < .01$. The two groups did not differ, however, in terms of the number of newsgroups they read. Nor did the two groups differ significantly in terms of either the length of time they had been reading newsgroups in general or the length of time they had been posting to newsgroups in general. Significant differences, however, did emerge when we examined the duration of participation in the particular newsgroup we sampled. Those who had formed on-line relationships had been reading their particular newsgroup longer ($M = 13.34$ months, $SD = 16.76$) than those who had not ($M = 8.03$ months, $SD = 10.36$), $t (164) = 2.52$, $p < .05$. Moreover, those with a relationship had been posting to their particular newsgroup longer ($M = 12.04$ months, $SD = 16.37$) than those without one ($M = 6.94$ months, $SD = 8.83$), $t (158) = 2.59$, $p < .01$. The overall frequency of participation in newsgroups also distinguished people who had developed on-line personal relationships from those who had not. Although the two groups did not differ in terms of how frequently they read their favorite newsgroups, they did differ in terms of how often they posted messages to their favorite newsgroups, $t(164) = 3.09$, $p < .005$. Those with on-line relationships contributed more often ($M = 4.01$, $SD = 1.81$) than those without ($M = 3.17$, $SD = 1.54$). Those who had formed a personal relationship also used direct E-mail to respond to a greater number of newsgroup contributors each month ($M = 10.25$, $SD = 15.97$) than those who had not ($M = 4.75$, $SD = 4.30$), $t (121) = 3.28$, $p <.001$. Although much more extensive research is necessary, it may be that developing personal relationships on line is more a function of simple experience than it is of demographic or personality factors. As people get used to and involved with their favorite newsgroups over time, they appear to start developing personal relationships with one another.

How Developed Do On-line Personal Relationships Typically Become?

Interpersonal relationships of all types are usually conceptualized as developing from the impersonal to the personal along a series of relatively specific dimensions: increases in interdependence, in the breadth and depth of interaction, in interpersonal predictability and understanding, in the change toward more personalized ways of communicating, in commitment, and in the convergence of the participants' social networks. Respondents who reported having an on-line personal relationship rated its level of development by responding to items designed to measure each of these dimensions. These items were based on previous theoretic discussions and measures of the relationship development process (see Altman & Taylor, 1973; Huston & Burgess, 1979; Kelley et al., 1983; Parks & Adelman, 1983; Parks, in press). Reliability estimates, as well as item statistics and wording, can be found in Table 1. Because there was no comparison sample against which to evaluate levels of development, we used the theoretic midpoint of each scale as a reference point. Although admittedly arbitrary, this procedure allowed us to determine if the majority of responses fell below the midpoint, thus indicating a comparatively low level of development, or above it, thus indicating a comparatively high level of development. Results for each of the seven relational dimensions are presented in Table 1, followed by a summary.

In its most general sense, a relationship develops as its participants come to depend on each other more deeply and in more complex ways (Kelley, 1979; Kelley et al., 1983). The personal relationships observed in this sample varied widely in terms of their reported levels of interdependence. The seven items making up the interdependence scale yielded totals that were normally distributed and whose overall mean of 26.60 (SD = 8.93) fell close to the theoretic midpoint of the scale. Approximately half (50.5%) of the relationships were above this midpoint, while half (49.5%) were below it. Thus, moderate levels of interdependence typified the sample as a whole.

As relationships develop, the breadth and depth of interaction increases (Altman & Taylor, 1973; Parks, in press). The variety of topics, activities, and communication channels increases. People reveal more important, risky, and personal information. Our respondents generally reported moderate to high levels of breadth and depth in their on-line personal relationships. The observed mean on the breadth scale was 21.12 (SD = 4.70) and fell just above the theoretic midpoint of 20. Over half (57.0%) of the subjects recorded breadth scores in the upper half of the scale range. The depth dimension of relational development was assessed using items designed to measure intimacy and self-disclosure. Totals for the items assessing depth produced a mean of 35.45 (SD = 11.24), nearly four points higher than the theoretic midpoint of the scale. Almost two thirds (61.2%) of the respondents recorded depth scores in the upper half of the scale range.

Development is also characterized by communicative code change. The participants evolve specialized ways of communicating, such as personal idioms, that allow them to express themselves in more efficient ways and that reinforce their relational identity (e.g., Bell & Healey, 1992; Bernstein, 1964). We measured this dimension with a six-item scale whose observed mean was 18.77 (SD = 7.20), nearly six points below the theoretic midpoint. Only 21.4% of subjects scored at or above the theoretic midpoint of this scale, suggesting that most of the personal relationships had not developed highly specialized communication patterns.

Table 1: Levels of Development in On-Line Relationships

Scale/Item	**Mean**	**SD**
Interdependence (a = .85)		
The two of us depend on each other.	2.93	1.80
There have been times when each of us has waited to see what the other thought before making a decision of some kind.	3.22	2.02

Neither of us sets aside time to communicate with the other. (R)	3.53	1.94
This person and I have a great deal of effect on each other.	3.65	1.67
We often influence each other's feelings toward the issues we're dealing with.	4.02	1.78
We would go out of our way to help each other if it were needed.	5.14	1.44
The two of us have little influence on each other's thoughts. (R)	4.15	1.75
Breadth (a = .85)		
Our communication is limited to just a few specific topics. (R)	3.84	1.64
Our communication covers issues that go well beyond the topic of any one particular newsgroup.	4.52	2.13
Our communication ranges over a wide variety of topics.	4.30	2.08
Once we get started we move easily from one topic to another.	4.61	1.77
We contact each other in a variety of ways besides the Internet.	3.53	2.20
Depth (a = .88)		
I usually tell this person exactly how I feel.	4.74	1.91
I feel quite close to this person.	3.98	1.75
I try to keep my personal judgments to myself when this person says or does something with which I disagree. (R)	4.55	1.73
I have told this person what I like about her or him.	3.71	2.08
I feel I could confide in this person about almost anything.	4.11	2.05
I would never tell this person anything intimate or personal about myself. (R)	5.20	1.78

Table 1, continued

Scale/Item	**Mean**	**SD**
I have told this person things about myself that he or she could not get from any other source.	4.61	2.20
Our communication stays on the surface of most topics. (R)	4.79	1.80
Code Change (a = .81)		

There is not much difference between the way I communicate with this person and the way I generally communicate on the Net. (R)	3.83	1.67
We have developed the ability to "read between the lines" of each other's messages to figure out what is really on each other's mind.	3.51	1.76
The two of us use private signals that communicate in ways outsiders would not understand.	2.69	1.82
We have special nicknames that we just use with each other.	2.21	1.60
I can get an idea across to this person with a much shorter message than I would have to use with most people.	3.96	1.61
We share a special language or jargon that sets our relationship apart.	2.65	1.64
Predictability/Understanding (a = .82)		
I am very uncertain about what this person is really like. (R)	4.81	1.54
I can accurately predict how this person will respond to me in most situations.	3.85	1.54
I can usually tell what this person is feeling inside.	3.44	1.67
I can accurately predict what this person's attitudes are.	3.87	1.61
I do not know this person very well. (R)	3.97	1.86
Commitment (a = .86)		
I am very committed to maintaining this relationship.	4.42	1.59
This relationship is not very important to me.	4.70	1.55
This relationship is a big part of who I am.	2.46	1.88
I would make a great effort to maintain my relationship with this person.	4.07	1.65
I do not expect this relationship to last very long. (R)	4.43	1.49
Network Convergence (a = .79)		
This person and I do not know any of the same people. (R)	3.64	2.38
We have introduced (face-to-face or otherwise) each other to members of each other's circle of friends and family.	2.74	2.21
We have introduced (face-to-face or otherwise) each other to our work associates.	2.05	1.76

We contact a lot of the same people on the Net.	4.01	1.98
This person and I are involved with many of the same newsgroups and/or mailing lists.	4.02	1.92
We have overlapping social circles on the Net.	3.79	1.88
We have overlapping social circles outside of the Net.	2.71	2.04

(R) indicates that the score was reversed. All figures are based on a scale of 1-7, where higher values indicate higher levels of agreement. Means represent reversed scores where appropriate.

The observed mean of our five-item commitment scale was 20.07 (SD = 6.57) and fell almost exactly on the theoretic midpoint of the scale. Just under half of the subjects (49.0%) reported commitment levels at or above this midpoint, suggesting moderate levels of commitment in the sample as a whole.

Finally, as relationships develop, network convergence occurs as the participants introduce one another to each other's friends and family and develop a common social circle (Parks & Eggert, 1991; Parks, 1995; Parks, in press). In on-line relationships, network convergence would imply not only that participants were introduced to one another's on-line contacts, but also to people in their real-life social networks. The seven items used to measure this dimension yielded a mean of 22.95 (SD = 9.61), well below the theoretic midpoint of the scale. Only 31.3% of the relationships were rated in the upper half of the scale range. These results indicate that network convergence was not extensive in most of the personal relationships we examined. Inspection of the individual scale items revealed that relational partners believed that there was considerably more convergence among their on-line contacts than between their on-line contacts and their contacts outside of the Internet (see Table 1).

If the relationships-lost view were correct, we should have found very few relationships that scored highly on these seven dimensions. In fact we found many. Depending on the particular dimension, half or more of the relationships registered above the midpoint of the measurement scale. Across the total sample, then, approximately 40% of the respondents had no on-line personal relationships, about 30% had a less developed personal relationship, and about 30% had what might legitimately be considered a highly developed personal relationship.

Do On-line Relationships Migrate to Other Settings?

Relationships that began in Internet newsgroups often broadened to include interaction in other channels or settings. Although nearly all respondents used direct E-mail (98.0%) in addition to newsgroup postings, a surprising number also supplemented computer-mediated communication with other forms of contact. About a third had used the telephone (35.3%), the postal service (28.4%), or face-to-face communication (33.3%) to contact their on-line friends. The average number of channels used was 2.68 (SD = 1.23), and nearly two thirds (63.7%) of our respondents with personal relationships had used communication channels other than the computer. These findings imply that relationships that begin on line rarely stay there. Although this expansion in the number of contexts where interaction occurs is typical of the relational development process in general (Parks, in press), it is particularly noteworthy in on-line relationships. For one thing, it represents a way in which relational partners can overcome the limitations of computer-mediated channels. Vocal and visual information are added as participants move into other channels. In addition the broadening of communication indicates that people may not draw such a clear line between their on-line and off-line activities. When asked about how he met his friend, for example, one 34-year-old male respondent replied, "He saw a posting I had made on comp.human-factors and invited me to a meeting of the local chapter of the Human Factors Society." A female respondent indicated that she had met her friend "via a Usenet support group because we both found that we were the only ones on one side of a major debate." She added, "We got together 'off line' to compare notes and viewpoints."

The New Challenges of Cyberspace

The growth of computer-mediated communication poses new challenges for our understanding of social relationships both in cyberspace and in general. Our goal in this study has been to provide an empirical reference point for evaluating conflicting visions of social life in cyberspace by exploring the prevalence and development of personal relationships in one large on-line environment, Usenet newsgroups on the Internet. To that end, we have conducted what appears to be the first systematic survey of on-line personal relationships in a random sample of newsgroup participants.

Our primary finding was that personal relationships were common in this environment. Just over 60% of the people in our random sample reported that they had formed a personal relationship of some kind with someone they had first contacted through a newsgroup. Personal relationships were not limited to any one type of newsgroup, but were spread rather evenly across a variety of newsgroups and Usenet hierarchies. Contrary to the relationships-lost perspective, we found that personal relationships are commonplace and evolve naturally as a function of time and experience in the on-line environment of newsgroups. Newsgroups, of course, are not the only on-line venues. A more definitive picture will be gained by extending our observations to other CMC settings (e.g., Internet Relay Chat, commercial chat rooms, BBS systems, MUDs and MOOs).

The fact that personal relationships in on-line settings are so commonplace poses challenges and opportunities for contemporary approaches to interpersonal communication and relationship development. Like Lea and Spears (1995), we believe that existing theories have largely ignored settings that do not involve frequent face-to-face interaction. Our results clearly indicate that high levels of relational development are occurring on line. How participants manage uncertainty, forecast rewards and costs, and obtain rewards is less clear in on-line settings. Because these factors represent central explanatory forces in theories of relationship development, further research is necessary to understand how they function in on-line settings. Future research should also focus on the development of on-line relationships in special populations. The fact that a large proportion of users actually develop personal relationships suggests new opportunities for those who are isolated or disabled in ways that restrict or stigmatize them in face-to-face interaction (e.g., Bock, 1994; Brennan et al., 1992; Kanaley, 1995).

The results of this study also have implications for previous approaches to computer-mediated communication. Personal relationships were found far more often and at a far higher level of development in this study than can be accounted for by the reduced-cues perspective. The finding that those who posted more often and who had been posting for a longer time were more likely to have developed a personal relationship on line is consistent with Walther's (1992) social information-processing perspective. However, the additional finding that nearly two thirds of those whose personal relationsh ips began on line chose to use additional communication channels challenges the belief that participants are denied vocal and visual information. Indeed, no current theory of CMC seems to account for this expansion in channel use. Even within the Internet itself, the information available to relational participants continues to expand as more people use the World Wide Web to exchange pictures, sound, and video. The reduced-cues perspective may simply become a theoretic antique, given the continuing advances in network technology.

The fact that relationships that begin on line rarely stay there raises even more profound questions about our understanding of cyberspace. From the beginning, discussions of cyberspace have almost invariably emphasized its more exotic qualities. Gibson (1984), who coined the term in his novel Neuromancer, described it as a "consensual hallucination." Benedikt (1991), who edited one of the first scholarly treatises on cyberspace, viewed it as a "another life-world, a parallel universe." Yet for most of our respondents, cyberspace is simply another place to meet. Just like people who meet in other locales, those who meet in cyberspace frequently move their relationships into settings beyond the one in which they met originally. They do not appear to draw a sharp boundary between relationships in cyberspace and those in real life. Furthermore, if cyberspace is becoming just another place to meet, we must rethink our image of the relationships formed there as being somehow removed and exotic. The ultimate social impact of cyberspace will not flow from its exotic capabilities, but rather from the fact that people are putting it to ordinary, even mundane, social uses.

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1. Internet users participate in discussion groups by "posting" messages to one of the thousands of newsgroups carried by their Internet site. These newsgroups form what is commonly called the Usenet. Their messages, or "posts," are then disseminated to all Internet sites carrying that newsgroup. Others may respond to a particular message, thereby creating a "thread" or connected series of messages, or they may read without responding (called "lurking"). Newsgroups are loosely organized into general categories, called "hierarchies," such as "comp" (issues dealing with computing), "sci" (science), "rec" (recreation), "soc" (social and cultural activities), and "alt" (groups that cover such a wide range of topics that only the term "alternative" seems to include all of them). Thus, the group "alt.bonsai" is devoted to the art of bonsai, while the group "rec.sport.hockey" is for hockey fans.

2. MUDs, MOOs, MUSHES, and VEEs are an outgrowth of programs first developed by interactive game designers. Although there are differences among them, all of these programs create text-based, virtual realities in which participants can not only talk with each other, but can also take nonverbal actions, manipulate "cyberobjects" that they create, and journey through virtual worlds that they have programmed. Rheingold (1993) provides an easily accessible description of social life in these settings.

3. Newsgroups were initially selected in two ways. Three newsgroups were selected at random from Usenet newsgroup hierarchies: "comp," "soc," "rec," and "alt." Twelve additional groups which were randomly selected from a list of 30 newsgroups (primarily in the "soc," "rec," and "alt" hierarchies) where our preliminary observations had suggested that participants would be most likely to develop personal relationships. Because tests revealed no significant differences between these two sets of groups, they were combined.

4. Age was normally distributed with a mean of 31.65 years (SD = 8.61) The sample was predominantly male (67.7%). The largest group had never been married (49.4%). Approximately 40% were married or cohabiting and 10% were separated or divorced at the time of the study. The typical respondent had been reading Usenet newsgroups for just over two years (M = 26.79, SD = 26.78 months) and had been posting for just under two years (M = 23.11, SD = 26.07 months). He or she had been reading the newsgroup we sampled for almost a year (M = 11.22, SD = 14.75 months) and had been contributing to it for about ten months (M = 9.99, SD = 14.05). Respondents reported following an average of 16 newsgroups on a monthly basis (M = 15.62, SD = 21.62) and posting to about five (M = 5.01, SD = 5.70).

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