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JOSEPH B. WALTHER

Interpersonal Effects in Computer-Mediated Interaction

A Relational Perspective¹

Several theories and much experimental research on relational tone in computer-mediated communication (CMC) points to the lack of nonverbal cues in this channel as a cause of impersonal and task-oriented messages. Field research in CMC often reports more positive relational behavior. This article examines the assumptions, methods, and findings of such research and suggests that negative relational effects are confined to narrow situational boundary conditions. Alternatively, it is suggested that communicators develop individuating impressions of others through accumulated CMC messages. Based upon these impressions, users may develop relationships and express multidimensional relational messages through verbal or textual cues. Predictions regarding these processes are suggested, and future research incorporating these points is urged.

I sit down at the terminal and all of these people talk to me in little [sic] letters that run across the face of the CRT faster than I can read them! I can easily distinguish personalities and moods, although my view of the people behind them may be a little [sic] warped. I tend to regard them as little people who, when they speak, open their mouths and make little letters run across my CRT. . . . Other than that, they are very much like me or you.

(A FORUM user; Vallee et al., 1975, p. iii)

Computer-mediated communication (CMC) is synchronous or asynchronous electronic mail and computer conferencing, by which senders encode in text messages that are relayed from senders' computers to receivers'. Numerous reports in the growing literature about CMC describe the relational tone of communication in this channel. The most common theoretical explanations

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for the difference between CMC and face-to-face communication hold that electronic mail (e-mail) and computer-based conferencing systems eliminate nonverbal codes that are generally rich in relational information. The absence of such codes affects users' perceptions of the communication context and other participants and constrains users' interpretation of messages. Such characteristics may render CMC less suitable for certain communication purposes (Rice, 1984; see also Trevino, Lengel, & Daft, 1987) or may affect group problem-solving effectiveness (Hiltz, Johnson, & Turoff, 1986). According to Rice and Love (1987, p. 86), "A general question raised by the diffusion of CMC systems is the extent to which human communication is altered by such media."

According to many, less socially oriented and less friendly communication are such alterations. Experimental research has reported that CMC is less personal or socioemotional than is face-to-face communication (Hiltz et al., 1986; Connolly, Jessup, & Valacich, 1990); according to Rice and Love (1987, p. 88), CMC is "less friendly, emotional, or personal and more businesslike, or task oriented." At the same time, however, several field studies investigating CMC have failed to support the undersocial view of CMC that experimental studies have found. Rather, these efforts indicate that CMC may not be as stark as was once thought. Kerr and Hiltz (1982) report that CMC users seem to adapt to the medium, so that its initial novelty diminishes. Hiltz and Turoff (1978) reported the development of "online communities," and other studies present cases of friendship development and warm relations in CMC. At present, the effects of CMC as a whole on interpersonal interaction appear inconsistent, and the characterizations of CMC born from experiments on groups seem contradictory to the findings of CMC in field studies. Optimally, some explanation for these differences should be found that accounts for these discrepant findings in each research setting and illuminates how the findings in both settings might occur.

This article presents a critical evaluation of the theories and research on CMC and relational tone and develops alternative predictions from the perspective of related communication theory and research. In critiquing the early research, several aspects will be considered. First, interactive media theories and supporting experimental results are reviewed, and inconsistencies between many experimental and field studies of CMC are noted. Second, issues about the research designs in previous experiments used to test these positions are explored. Third, methods that analyze only verbal data from the control groups in CMC research are criticized, as this approach excludes some of the very relational communication that is of central interest in testing relational effects. Prior coding procedures may also obscure the

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differences or similarities between communication conditions. This critique suggests that the undersocial relational qualities described in many CMC experiments may not exist or do not generalize across CMC applications. The question remains how to account for CMC partners' more sociable interaction in other research.

It is argued that the quality of fixed, impersonal relational communication qualities in CMC may be strictly bounded to initial interaction conditions among previously unacquainted partners and that these effects should dissipate over time. A social information processing perspective is introduced, and other research about relational development and communication is used to suggest alternative patterns and predictions for the use of verbal and textual cues in impression formation, interpersonal knowledge generation, and relational communication in computer-mediated interaction.² This approach also may account for the relational differences found previously in comparing face-to-face communication to CMC and between CMC research settings.

Relational Tone in CMC

Interactive Media Theories

Social presence theory, the lack of social context cues hypothesis, and media richness theory have been used to account for interpersonal effects in CMC research. Each of these positions addresses the lack of nonverbal cues in CMC and how this condition affects communication.

SOCIAL PRESENCE THEORY

Social presence is the feeling that other actors are jointly involved in communicative interaction. According to Short, Williams, and Christie (1976), the fewer channels or codes available within a medium, the less attention that is paid by the user to the presence of other social participants. As social presence declines, messages are more impersonal.

Social presence is conceived to be a differential property of communication media. Short et al. (1976, p. 65) state that electronic media differ in their "capacity to transmit information about facial expression, direction of looking, posture, dress and nonverbal, vocal cues." Computer-mediated communication, with its paucity of nonverbal elements and backchanneling cues, is said to be extremely low in social presence in comparison to face-to-face

communication. Social presence theory has been used to account for task orientation and impersonality in CMC (Culnan & Markus, 1987; Hiltz et al., 1986; Rice, 1984; Steinfield, 1986).

It is not clear from the original theory whether the actual characteristics of the media are the causal determinants of communication differences or whether users' perceptions of media alter their behavior. The original Short et al. formulation states:

We regard Social Presence as being a quality of the communications medium. Although we would expect it to affect the way individuals perceive their discussions, and their relationships to the persons with whom they are communicating, it is important to emphasize that we are defining Social Presence as a quality of the medium itself. We hypothesize that communications media vary in their degree of Social Presence, and that these variations are important in determining the way individuals interact. (1976, p. 65)

These theorists (who dealt not with CMC but with audio and video teleconferencing) suggested that users' perceptions of media may guide users' media selections, but they do not state that social presence is based in perception.

Their research, however, suggests a different approach. Despite their acknowledgment that media really do differ in the number of cues available, the experiments they report measured social presence more perceptually, via subjects' ratings of several media "on a series of seven-point, bipolar scales" (Short et al., 1976, p. 66). Computer-mediated communication researchers who have adopted the social presence framework generally reflect the a priori approach, rather than the subjective. At the same time, several studies have assessed the effectiveness of CMC for a variety of functions by asking subjects to rate the media, rather than by assessing their performance in using them (e.g., Hiltz, Johnson, & Agle, 1978; Rice & Case, 1983; Steinfield, 1986). According to Steinfield (1986), "Social presence, although thought to be an attribute of the media, was generally measured by examining subjective perceptions of media characteristics. Perceived characteristics of the channel therefore are used to predict the amount of task-related and social use" (p. 781; see also Hiemstra, 1982, p. 880). Although social presence theory was not explicitly designed to explain CMC and although it may be "at best a vague concept, never clearly defined by its proponents," (Svenning & Ruchinskas, 1984, p. 248), it has nevertheless been accepted widely (and criticized) as a major theory in this area (see Rafaeli, 1988).

LACK OF SOCIAL CONTEXT CUES

Sproull and Kiesler (1986) define the critical difference between face-to-face communication and CMC as having to do with the absence of "social context cues" in CMC. Social context cues include aspects of the physical environment and actors' nonverbal behaviors that define the nature of the social situation and the actors' relative status. In face-to-face settings these cues might be conveyed by spatial features, artifacts, and physical adornments (Edinger & Patterson, 1985; see Siegel, Dubrovsky, Kiesler, & McGuire, 1986; Sproull & Kiesler, 1986; for a thorough review of nonverbal aspects related to situation and status cues, see J. Burgoon, Buller, & Woodall, 1989). The absence of such cues in CMC leads to increased excited and uninhibited communication such as "flaming" (insults, swearing, and hostile, intense language); greater self-absorption versus other-orientation; and messages reflecting status equalization (Kiesler, Siegel, & McGuire, 1984; Siegel et al., 1986; Sproull & Kiesler, 1986). The lack of social context cues is also conducive to equalized participation. When such cues are absent, actors become disinhibited who would otherwise defer speaking turns to higher-status participants.

Although CMC takes place in several contexts and is used to fulfill a variety of purposes, the social presence and lack of social context cues work has focused largely on the structural characteristics of communication via the computer channel, without as much consideration of contextual and functional processes. The related experimental research has emerged primarily in the limited domain of synchronous group conferencing and, in some cases, organizational e-mail. Yet because of the structural orientation, some pioneers in CMC research have either assumed that these effects should be universal, whereas others have stated explicitly that these effects transcend the lines of e-mail, conferencing, and bulletin boards (Kiesler, Zubrow, Moses, & Geller, 1985). The next approach does take into account the nature of the communicative interaction, while the structural "richness" of the medium is still given great attention.

MEDIA RICHNESS

Media richness theory (Daft & Lengel, 1984, 1986; Daft, Lengel, & Trevino, 1987; Trevino, Daft, & Lengel, 1990; Trevino et al., 1987) also suggests that communication across various media differs, based on the band width or number of cue systems available within them. Once again, face-to-face communication is touted as "richest," given the availability of immediate feedback, the number of cues and channels utilized, nonverbal (facial and

oral) backchanneling cues, and personalization and language variety. Computer-mediated communication is a very "lean" channel, because no nonverbal cues are present. Other media—videoconferencing, telephone, and so on—are described as moderately rich according to their channel capacities; formal letters and memoranda are the "leanest." That language is less personalized and less varied in low-richness channels is presented axiomatically within this framework; although it is possible that "a personal note can be added to... a formal letter" (Trevino et al., 1990, p. 77), the theorists argue that in organizations—presumably all of them—people do not use a high variety of language within particular communicative channels (Daft & Lengel, 1984) and that e-mail does, or should, restrict users to "natural language" (Trevino et al., 1990).

This prescriptive should suggests how the media richness approach extends previous theories, by providing a set of contingencies under which each medium might optimally be used, so that receivers understand messages clearly. These contingencies pertain to the ambiguity or equivocality of the intended message or messages one wishes to send and the richness of the media that may convey them. When messages are very simple or unequivocal, a lean medium such as CMC is sufficient for effective communication. Moreover, a lean medium is more efficient, because shadow functions and coordinated interaction efforts are unnecessary. For receivers to understand clearly more equivocal information, information that is ambiguous, emphatic, or emotional, however, a richer medium should be used. In this way immediate feedback from auditors—both verbal and nonverbal—is available to speakers in order to make their messages more clear and enhance auditors' understanding. From this perspective one may either match or mismatch messages and media, and organizational actors are advised to optimize their channel selections accordingly.³ For instance, a manager may wish to convey an urgent message of some ambiguity to an associate who works halfway across the globe. Geographical distance prohibits rich face-to-face interaction, and a phone call is difficult because their different time zones place one communicator asleep at night while the other works at the office. In such a case as this, CMC may be the only media choice available (Trevino et al., 1987). However, less successful outcomes may be expected from such choices (see Thomas & Trevino, 1989), and Trevino et al. (1990) urge organizational actors to consider travel for face-to-face meetings if the message is ambiguous and its understanding is important enough to justify such an expense.

An early formulation of the theory included the amount of information or understanding over time as an important element of media classification: "Information richness is defined as the ability of information to change understanding within a time interval" (Daft & Lengel, 1986, p. 560). This time dimension has not reappeared in later discussions of the theory, which have implied time-invariant qualities of different media.

Social presence theory, the lack of social context cues approach, and media richness theory all point to similar causes and effects regarding the relational nature of CMC. Indeed, Culnan and Markus (1987) dubbed social presence and lack of social context cues frameworks the "cues-filtered-out" approach, because these positions focus on the reduction of nonverbal cues as the critical difference between CMC and face-to-face channels. As this perspective provides that the structure or bandwidth of the medium alters the nature and interpretation of messages, it implies that such effects are inherent, constant, and context invariant. By implication, there are no identifiable boundary conditions associated with this perspective.

Effects

Several effects on relational aspects of communication have been associated with CMC through experimental research and seem to support the cuesfiltered-out explanations. They include greater impersonality and negative affect, task orientation, and equality.

Messages in CMC have been described as characteristically impersonal, cold, and unsociable relative to face-to-face communication (Hiltz et al., 1986, p. 228). Users are self-absorbed and are less likely to form impressions of other actors as distinct individuals. Emotional expression in computer conferencing is often negative or inflammatory (Kiesler et al., 1985; Rice, 1984; Rice & Love, 1987; Sproull & Kiesler, 1986). Because of the nature of CMC, subjects have said that it would be less appropriate to use this channel for such highly personalized interactions as are needed in resolving disagreements, getting to know someone, or bargaining and negotiation (Hiltz et al., 1978; Rice & Case, 1983; Steinfield, 1986; Rice, 1984).

Participants in CMC have been found to be more task oriented than are face-to-face interactants in their communication. Early empirical studies in CMC employing Bales's (1950) interaction process analysis (IPA) found that participants in computer-conferencing groups offered more opinions and evaluations of proposals (task-oriented IPA messages) and fewer statements of agreement (IPA socioemotional messages) than they did in face-to-face settings (see, e.g., Hiltz, 1975; Hiltz et al., 1978; Hiltz & Turoff, 1978). These studies have been cited often and by many, to the extent that Rice (1984) indicated that the task-oriented nature of CMC was generally well accepted. This effect offers mixed implications for group decision making, when greater

task orientation may enhance problem-solving deliberations. According to G. Phillips and Santoro (1989, p. 152), computerized group communication steers users away "from consideration of irrelevant interpersonal and theoretical issues by focusing attention on the process and content of problem-solving discussion." At the same time, inadequate socioemotional agreement messages hinder consensus development, the ability for group members to support one another's ideas (Hiltz et al., 1986). Thus the general conclusion of CMC research, according to Rice and Love (1987, p. 88), is that "CMC, because of its lack of audio or video cues, will be perceived as impersonal and lacking in normative reinforcement, so there will be less socioemotional (SE) content exchanged."

In computer conferencing there is greater equality of participation, less dominance, and greater status equality in comparison to face-to-face group discussions (Hiltz & Turoff, 1978; Siegel et al., 1986; see also Dennis, George, Jessup, Nunamaker, & Vogel, 1988). Dominance has been measured as a disproportionately large part of total group interaction (on the presumption that more dominant actors speak more than others; see Siegel et al., 1986), so that the participation effect and the dominance effect are tautologically related. Whether status equalization causes participation equalization, or vice versa, or whether the effects are reciprocally related is unclear. What is clear is that the tendency for an individual or a faction of a group to dominate group discussions dissipates in the computer environment. As Rice (1986, p. 229) describes, "Computer conferencing reduces the inequality usually present in other forms of group interaction" and "the emergence of group leaders is . . . simply less likely, in teleconferencing."

Contrary Findings

Much of the research that has explored the effects of CMC has failed to account for differences between CMC contexts and purposes explicitly. Although writers have been clear in describing the settings and characteristics of the e-mail or computer-conferencing systems used in their studies, they have not confined the generalizability of their conclusions to those characteristics in many cases. The degree of social presence, social context, or the relational qualities associated with CMC may be affected by the different social processes, settings, and purposes within CMC use as well.

Such differences exist that challenge a static view of the medium. Several field studies of e-mail use have detected greater positive IPA socioemotional message frequency than group-conferencing experiments of CMC typically report. Rice and Love (1987) found a significantly greater percentage of

socioemotional content in an ongoing computer "bulletin board" than was reported in several experimental findings. Steinfield's (1986) field study of organizational e-mail found that factors within CMC settings differentially affected task versus social message generation. Although the task orientation of CMC is explained by the cues-filtered-out theories as a function of the medium alone, Steinfield found that task complexity, task interdependence, environmental uncertainty, and the need for communication across locations were all associated positively with increasing task orientation in CMC messages. These studies challenge the implicit inherency aspect of the cues-filtered-out approaches.

"Leanness" and impersonality findings may be refuted as well. Foulger (1990) reported that experienced computer users rated several text-based media (including e-mail and computer conferencing) "as rich" or "richer" than telephone conversations, television, and face-to-face conversations. Hiemstra (1982) confirmed users' concern for others through the presence of face-saving as well as face-threatening constructions in e-mail exchanges. Case studies on particular conferences or networks have found the development of numerous personal relationships via CMC. For example, Johansen, DeGrasse, and Wilson (1978) reported interactions on a research scientists' network. They found that messages among participants on a research network often reflected similarities in some participants' interests and attitudes, and many chance "meetings" turned into professional colleagueships and friendships over time. Relational qualities such as task or social orientation, impersonality, and negative affect may be affected by other factors than the medium alone.

Generally, results from experimental research on CMC have differed from the relational picture of CMC gleaned from field studies. The one-shot studies were often consistent with the cues-filtered-out position, whereas the longitudinal case studies showed more variation in positive interpersonal relations. Unfortunately, most CMC field research offers no comparison to parallel face-to-face interaction, so it is difficult to say what aspect of the field setting may account for the differences. A careful examination of experimental procedures, however, may elucidate why laboratory results have supported the undersocial view.

Weaknesses in CMC Research

The following discussion examines weaknesses due to timing during CMC experiments, how timing factors may confound the emergence of relational expression, and how verbal-only data may obfuscate actual communication patterns. Coding procedures for task orientation and dominance are cri-

tiqued, and the limited roles of developmental factors and social information are explored.

Chronometry

Limitations in the amount of time that users communicate in computerconferencing experiments may preempt normal communication patterns of group discussion. Many experiments in computer conferencing assign subjects into group problem-solving situations, whether face-to-face or through CMC, giving them limited time in which to reach a group decision. Equal time periods are presumably adopted for the purpose of experimental control. The control advantage is lost, however, if time limits interact with the communication channel difference. In comparing CMC to face-to-face communication, just such an interaction seems to occur, and the potentially confounding effect of time has been overlooked in most CMC research. Although several CMC studies have examined the effects of time on user behavior (e.g., Baroudi, Olson, & Ives, 1986; Rice & Case, 1983; Rice & Love, 1987, none of which dealt with group CMC; and Hiltz & Turoff, 1981; Johansen et al., 1978; Weisband, in press; Zigurs, DeSanctis, & Billingsley, 1989, which did), only Weisband's research examined whether the time given to CMC could explain differences between CMC and face-to-face conditions.

Computer-mediated groups take longer to communicate than face-to-face groups. The CMC groups took longer to reach decisions than did face-to-face groups in several studies; some CMC groups even failed to achieve consensus at all within the allotted time (Hiltz et al., 1986; Siegel et al., 1986; see also Rice, 1986). Failure to achieve consensus was attributed to the lack of socioemotional (agreement) messages in one case, yet might just as plausibly be due to typing requirements; fewer messages being exchanged (Hiltz et al., 1986; Siegel et al., 1986); difficulty organizing; lack of leadership emergence (Rice, 1986); or other variables slowing down the group process. On the other hand, when CMC groups were given as much time as they needed to reach consensus, Weisband (in press) found that the average number of messages exchanged did not differ from the average of face-to-face groups making the same decision. On the basis of these findings, it appears that CMC and face-to-face groups operate at different rates.

Changes in relational tone may not appear in time-limited CMC exchanges. Relational communication in groups is known to vary during a group's evolution through time. Several studies on the progression of small groups through decision-making stages typically describe the first exchanges in group development as heavily task oriented, followed by conflict, then

solidarity (Bales & Strodtbeck, 1951; Fisher, 1974; Tuckman, 1965). If computer-mediated groups are indeed working more slowly than face-to-face groups, then the finding that CMC is more task oriented may be a result of cutting off the experiment before other, more socioemotional phases, such as "emergence" or "performance" stages, occur. Although more recent group studies, such as Poole and Roth's (1989b, p. 549), dispute the notion that "groups develop in a single, universal set of stages" as far as their decision making goes (see also Poole & Roth, 1989a; McGrath, 1984), such studies have not directly contested the changing relational communication patterns as groups proceed. A recent study using several computer groups (Zigurs et al., 1989) did find that positive versus negative affective attitudes about the groups' interaction varied over several sessions in patterns that generally conformed to the phase theories' predictions.

The differential effect of time by development in CMC presents a threat to one-shot, equal-time investigations. One would expect both the experimental (CMC) and control (face-to-face) groups to exhibit less personal messages, initially. Yet as the CMC group goes through slower development during the same time interval as the face-to-face group, its total messages should be more like the initial—less personal—interactions of its face-to face counterpart. If groups in general show different relational patterns at correspondingly different stages in their existence, then comparing groups at systematically different stages of their evolution may yield artifactual findings. These combined aspects of time, messaging rate, and group development might sufficiently account for the less personalized communication effects reported in CMC experiments, without recourse to invariant social presence or context cues' effects. This time-by-rate development confound may be especially pronounced where zero-history groups were used in research. Although the use of zero-history groups in communication research has been sharply criticized (Gouran & Fisher, 1984; McGrath, 1984), the method should not obviate comparisons between CMC and face-to-face when zero history is a constant. However, if time interacts with communication condition on relational development and communication, the effect should be nowhere more apparent than in those groups with zero history, which has been frequent in CMC research. At best, cues-filtered-out effects in CMC may be bounded to initial interactions among unacquainted partners.

Verbal-Only Data

Another significant issue in comparing CMC to face-to-face communication has to do with the nature of the communication data experimenters compare.

Although the cues-filtered-out approaches recognize that nonverbally transmitted messages are of great importance in communication, the actual nonverbal messages of face-to-face groups in CMC research have been almost entirely ignored. Verbal comments from transcripts or audiotape recordings of such groups have been used as the basis of comparison to CMC groups; no CMC research to date has examined the nonverbal visual behaviors of face-to-face groups as part of their total expressive output, and the extent to which audiorecorded vocalic behaviors have been considered in interpreting face-to-face comments has not been reported. Although Rice's (1984, p. 136) review reports one experiment that found "considerable nonverbal and nonlinguistic behavior" in their face-to-face control groups, these cues were not included in the final CMC/face-to-face comparisons in that research (see Hiltz et al., 1978). Unfortunately, interaction coding that does not consider nonverbal behavior may miss as much as two thirds of the meaning in any social interaction in which such cues are present (Birdwhistell, 1955; J. Burgoon, 1985; see also J. Burgoon et al., 1989).

How might nonverbal behaviors change the picture of a face-to-face group's relational behavior? Although nonverbal messages may emphasize or be redundant to accompanying verbal messages, the relationship of these cue systems includes substitution and contradiction functions (J. Burgoon, 1985). It would be no surprise if nonmediated groups' nonverbal behaviors do accentuate the agreement messages revealed in their speech. It is just as plausible, however, that their nonverbal behaviors might convey formality and nonimmediacy-less personal or task-oriented messages-or disagreement-negative socioemotional behavior. Indeed, the latter case may be more likely; "because of their ambiguity, subtlety, and deniability, the nonverbal channels may be especially well suited to expressing sensitive and risky interpersonal information," such as criticism, via "looks, touches, and vocal tones," according to J. Burgoon et al. (1989, p. 161). CMC researchers Kiesler et al. (1984) recognize that many nonverbal "social context cues" convey formality and status inequality. Yet they have reached their conclusions about CMC/face-to-face differences without actually observing the very nonverbal cues through which these effects are most likely to be performed. If the nonverbal as well as verbal messages of face-to-face groups were coded, then the overall ratio of socioemotional expressions to total messages may be no different in face-to-face than in CMC groups. It appears that the conclusion that CMC is less socioemotional or personal than face-to-face communication is based on incomplete measurement of the latter form, and it may not be true whatsoever, even in restricted laboratory settings.

Coding

An additional criticism pertains to the coding techniques often used in experimental and field studies to analyze the relational aspects of CMC and face-to-face behavior. It is unclear whether CMC may be less personal or more, to the extent that relational communication aspects of CMC are untapped by the bifurcation of messages as task or socioemotionally oriented. Bales's (1950) task-social dichotomy, which has been criticized over the years (see Hirokawa, 1988; McGrath, 1984), has been the measure of choice for many of the studies on the interpersonal aspects of CMC (e.g., Hiltz, 1975; Hiltz et al., 1978; Hiltz et al., 1986; Rice & Love, 1987; Steinfield, 1986; Vallee et al., 1975). There are at least two problems associated with this measure as it has been used in CMC, or other group research. First, it fails to account for other, multidimensional relational qualities untapped by the IPA. Second, as McGrath (1984, p. 143) points out, because "any act fits one and only one category," it assumes that "every action serves either a task instrumental or a social-emotional function; no behavior serves any other function; and no behavior serves both of those functions." These assumptions have been rejected in more functionally oriented views of small group interaction (Fisher, 1974) and relational communication. Although the IPA may be very useful in describing the kinds of communicative moves people make, it is not appropriate as a gross measure of task versus social orientation or relational tone.

The degree to which messages vary along multiple dimensions of relational meaning has received growing attention in recent communication research (see J. Burgoon, Buller, Hale, & deTurck, 1984; J. Burgoon & Hale, 1984). The interpretation of all messages as either task or socially oriented is a notion contrary to axiomatic positions about the simultaneous content and relational functions of any message (Watzlawick, Beavin, & Jackson, 1967) and the variety of relational themes interactants typically address and interpret. As J. Burgoon and Hale (1987, p. 40) state: "A person who is very task oriented may still demonstrate sociable tendencies. Consequently, in assessing a person's relational communication, different criteria may be applied to the judgment of task involvement versus social orientation." Burgoon and Hale suggest that task-related comments may vary in regard to other dimensions such as affiliation or inclusion. Such interpretations are not possible with the IPA or coding schemes identifying comments as exclusively task oriented versus non-task oriented (e.g., Siegel et al., 1986; Weisband, 1989).

Similarly, it is also questionable whether group CMC promotes greater equality and less dominance among members, as has been claimed in several studies (e.g., Hiltz & Turoff, 1978; Kiesler et al., 1984; Siegel et al., 1986). These experiments operationalized equality and dominance as equality among members' proportions of the groups' total conversation, and found that disproportional participation occurs less in CMC than in face-to-face meetings. Although a disproportionately higher percentage of talk time in groups is historically associated with dominance, power, and leadership (see Kirscht, Lodahl, & Haire, 1959), this relationship may be most true at extreme levels of disproportionate participation. When one participant exhibits moderately higher participation than others, group members rate such a person as "associative" (Cappella, 1985), which might suggest an attribution of equality rather than dominance. As was mentioned above, however, participation balance has been used by experimenters as the operational definition of dominance or inequality. Subjects' perceptions or other approaches to relational dominance have not been widely considered.

Other approaches to the construct of relational dominance also change the picture. In relational communication research, it has been the content and linguistic construction of speech that reveals dominance-seeking communication. Relational dominance is associated with efforts to control, command, and persuade others; equality connotes cooperation and mutual respect (J. Burgoon & Hale, 1987). Relational control (dominance-submission) has been measured as the use of grammatical imperatives and compliance requests, whereas submission may be indicated by expressions of vulnerability or offering compliance (Millar & Rogers, 1976; Rogers & Farace, 1975). Because IPA-based analyses have found more assertions and opinions and fewer statements of agreement in CMC than in face-to-face groups, it becomes unclear just which condition promotes relational dominance or equality, depending on the way in which these constructs are conceived.

These observations about chronometry, nonverbal data, and coding procedures question the validity of the cues-filtered-out results on methodological grounds. They do not clearly address, however, why such relational tendencies should be any different in longitudinal research on CMC or why similar coding schemes detect more affiliative relational tone in field transcripts. It would be easy to assume that there is something different about these two CMC domains, that field research involves e-mail among individuals and differs from the group-based medium of computer conferencing often used in experiments. However, e-mail is also used for intragroup communication (see Finholt & Sproull, 1990), and even one-to-many transmission in electronic bulletin boards has shown relatively high socioemotional content.

Developmental Factors and Social Knowledge

Alternatively, these relational differences between experimental and field settings may have more to do with differential relationship development within the respective research settings. It has already been mentioned that many group-conferencing experiments employed zero-history or one-shot groups. Because the field studies were conducted in situ, the lengths of the electronic relationships varied. Participants may have interacted with one another over longer periods of time, and/or it is far more likely that electronic communicators knew their counterparts by way of previous relationships or long-term CMC interactions.

Although these differences might provide confounds in an experimental sense, they are ecologically valid elements in much real CMC use. Relationships outside the computer connection are commonplace. E-mail is often used to communicate with someone one might also see daily (Schaefermeyer & Sewell, 1988). Because CMC is more efficient than potentially unanswered phones and walks to sometimes empty offices, people often use e-mail and group distribution lists for messages to nearby co-workers (Rockart & DeLong, 1988). In one organization, an average of 19% of e-mail originated within 100 yards of its destination, with another 13% from elsewhere in the same building (Finholt & Sproull, 1990). Even when communicators are remote, they may have particular information about other users through personal association or network-based information (Culnan & Markus, 1987). Sherblom (1988) said of the organizational e-mail users he observed that they were "never dependent entirely on the electronic medium for information and interpretation of a person and situation" (p. 42). These findings lend some support to the notion that CMC's relational qualities may be influenced through time-by-relational development as well as other social factors. These factors have seldom been replicated in the laboratory settings used in conferencing research.

Even when computer-mediated communicators have no other source of information about each other than their CMC interactions, some relational development may be expected to occur. Indeed, Johansen, Vallee, and Spangler (1988, p. 141) suggest that social presence can "be cultured" among teleconferencing participants, a position much different than Short et al.'s (1976) position that social presence is an attribute of a communication medium. Elsewhere, some CMC researchers have posited that CMC users may come to adapt their textual messages to socioemotional content (e.g., Hiltz & Turoff, 1978). Rice and Love (1987) tested the hypotheses that (a) the percentage of socioemotional content in CMC would increase over time, and

(b) socioemotional content would constitute about one third of the total message content in CMC. These hypotheses were based on the premise that CMC users "develop an ability to express missing nonverbal cues in written form" (p. 89), a notion consistent with arguments in this article. A modified IPA coding scheme (Bales, 1950) was used to determine the content of messages in a public electronic bulletin board. Twenty-eight percent of coded messages were positive socioemotional, 4% were negative socioemotional, and 71% were task oriented, supporting the second—descriptive—hypothesis. The hypothesis regarding change over time was not supported.

No particular impetus to make such adaptations over time nor any requisite interpersonal processes were offered by Rice and Love (1987). Others have called for systematic studies of the effects of time in CMC (Williams, Rice, & Rogers, 1988). To date, however, very little work has examined temporal effects in CMC, and the concern for effects of information over time has been dropped from the media richness research.

Verbal and Textual Accommodation of Relational Cues: A Social Information Processing Perspective

If the relational tone effects of the cues-filtered-out research are indeed limited to initial interactions among strangers, what changes take place when such communicators continue their interactions over time? The development of relationships in CMC, it will be argued, is predicated on the passage of sufficient time and message exchanges. It also requires that users adapt their remaining communicative cues-language and textual displayto the processes of relational management. The case for such adaptation to occur is argued next, and some relevant mechanisms are explored. The following section proposes a social information processing perspective explaining how relational communication changes from initial impersonal levels to more developed forms in CMC. As will be explained, the following requisite elements are posited in order for this adaptation to occur: (a) Certain drives, or relational motivators, may prompt communicators to (b) develop distinctive impressions of other interactants by decoding text-based cues and (c) derive psychological-level knowledge about other actors from CMC interaction. As this occurs they (d) manage relational changes and encode relational messages in CMC. These requisite processes are reflected in a number of assumptions and propositions, which are listed together in Table 1. The discussion of these processes is followed by illustrations of how relational communication dimensions might change in CMC, particularly the immediacy/affection dimension, and what verbal or textual mechanisms in

"traditional" interpersonal interaction and CMC may be used to effect such changes.

It should be noted that the term, social information processing, has been applied to CMC phenomena before, but with a very different meaning. Fulk, Steinfield, Schmitz, and Power (1987), following Salancik and Pfeffer (1977, 1978) originally used this term to describe a socially constructed subjective model of media choice (as opposed to a rational choice model, such as media richness theory). The implication of their use of the term was that one's perception of an object is in large part determined by the communication one has with others about such objects. This article does not contest or affirm their position (which they have since renamed a "social influence model"; Fulk, Schmitz, & Steinfield, 1990). Currently, however, the term social information processing is used to describe the (individual) cognitive processing of socially revelatory information (and subsequent communication based on that information), rather than the social (conjoint) processing of information (about a medium). The present use of the term is consistent with its use in psychological literature regarding impression formation and related socialcognitive processes (e.g., Lord, 1985; Taylor & Crocker, 1981; Wyer, 1980; Wyer & Srull, 1980; see also Berger & Bradac, 1982).

Although the assumptions of this present perspective are admittedly rather commonplace, their derived propositions provide a framework for understanding CMC development. These processes, assumptions, and propositions are discussed, as follows:

Relational Motivators

To the extent that actors in CMC are affected by the same drives as actors in other contexts, common motives affect their communication behavior (Assumption 1). One such drive is the affiliation motive. It is an axiomatic principle that humans are driven to interact with one another (see Argyle & Dean, 1965; J. Burgoon, 1978). We also seek social reward from others. According to Bell and Daly (1984, p. 91), "People expend considerable social energy attempting to get others to like and to appreciate them," and affinity seeking is an ubiquitous function of human behavior. Impression management and dominance drives are also essential social motivators (Hogan, Jones, & Cheek, 1985). This brief description of some basic motivators is presented here to argue that CMC users, just as communicators in any context, should desire to transact personal, rewarding, complex relationships and that they will communicate to do so. Even in formal organizations, humans use information exchange for more purposes than those that Daft

Table 1
Assumptions and Propositions

Assumptions:

- Humans affiliate. They use communication to affect the ways they affiliate, and these messages constitute relational communication.
- The development of an interpersonal impression of another person is based on the information one gets via nonverbal or verbal-textual channels over the course of several interactions.
- 3. Developmental change in relational communication will depend on forming an interpersonal impression of another interactant.
- Relational messages are transmitted (i.e., encoded and decoded) by nonverbal or verbal, linguistic, and textual manipulations.
- 5. In computed-mediated communication (CMC), messages take longer to process than do those sent face-to-face.

Propositions:

- Based on Assumptions 2 and 5, the development of interpersonal impressions among previously unacquainted interactants requires more time in CMC than in face-to-face interactions, because CMC takes longer to exchange.
- Based on Assumptions 2 and 5, personalized communication (based on interpersonal knowledge of others) takes longer to emerge in CMC than in face-toface interactions.
- Based on Assumptions 3 and 4, relational communication changes as the number of exchanges increases.
- 4. Based on Assumptions 3 and 5 and Proposition 1, relational communication in initial interactions is different from that in later interactions.
- 5. Changes in relational communication will take longer to accrue in CMC than in face-to-face interactions.
- 6. Based on Assumptions 1 through 5, given sufficient time and message exchanges for interpersonal impression formation and relational development to accrue, and all other things being equal, relational valences in later periods of CMC and face-to-face communication will be the same.

and Lengel (1986, p. 555) portray, "to accomplish internal tasks, to coordinate diverse activities, and to interpret the external environment." As Murray and Bevan point out, even in computer conversations in which the main goal is "a task involving giving or receiving information, . . . any human conversation will also seek to achieve a number of social goals," such as "social acceptance and developing relationships" (1985, p. 34; see also Clark, 1984; Clark & Delia, 1979; Graham, Argyle, & Furnham, 1980).

Although Culnan and Markus (1987; see also Rafaeli, 1988) imply that comparing CMC with face-to-face communication is unjustified, others believe that face-to-face interpersonal communication is the standard against which all communication events are compared. Face-to-face transactions contain within them the prototypical dimensions and expectations to which communicators are accustomed (Durlak, 1987; Gumpert & Cathcart, 1986). There is more to this position than just the affordance of a methodological

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baseline—communicators in a variety of contexts and media may attempt to imbue textual messages with verbal, grammatical, and punctuation features intended to replicate a face-to-face oral—more personal—style (Gumpert & Cathcart, 1986; see also Beniger, 1987).

Impression Formation: Decoding

Although cues-filtered-out theories suggest that the lack of nonverbal (social context) cues in CMC dampens the ability of users to form impressions of each other. Assumption 2 contends that communicators do attribute characteristics to others on the basis of verbal cues. According to M. Burgoon and Miller (1987, p. 199), "By evaluating our language choices, others make attributions about social and professional status, background and education and even the intent of communication." For example, a review by Bradac, Bowers, and Courtwright (1979) described effects on competence, character, socioeconomic status, anxiety, similarity, and affect impressions resulting from variations in language intensity, verbal immediacy, and lexical diversity. Byrne and Clore (1966) examined the effects of verbal versus nonverbal information in initial interpersonal attraction. In order to vary the amount of nonverbal information, they presented a stimulus person to subjects via one of three different media—a color movie with soundtrack, an audiotape recording,, and written responses on mimeographed attitude scales. No effects were found for stimulus mode on attractiveness ratings, nor did medium interact with attitude similarity; attraction ratings were linearly related to attitude similarity. Textual information was no less potent (nor did other media enhance or dilute effects) for the attractiveness-rating task. By extension, impression formation through CMC seems likely.

There are mixed opinions about impression formation in CMC research. DeSanctis and Gallupe (1987) speculated that computer mediation reduces interpersonal attraction and group cohesiveness by increasing the psychological distance between discussants. These effects should not be expected to change over time if the paucity of nonverbal cues—a constant within CMC—is the only factor affecting such impressions. This prediction is refuted, however, by the results of a field experiment by Lim and Facciola (1988). Subjects participated in both an ongoing asynchronous computer conference and in face-to-face discussions over several months. They rated their partners significantly more attractive and more credible in the computer conference than they were in nonmediated meetings. Although time was not a variable of concern in Lim and Facciola's research, such effects have not been found

in one-shot conferencing experiments (see, e.g., Kiesler et al., 1985). It is apparent that textually based, computer-mediated information can provide the data for interpersonal impressions.

According to Proposition 1, it may take longer to observe and decode impressions from verbal and textual cues alone than from multichannel cues. Given the lack of nonverbal cues and requirements for greater time to achieve group objectives in CMC (see Weisband, in press), it is likely that forming distinct individual impressions of other interactants may require more time in the computer-mediated environment than in similar face-to face encounters. These processes are posited to take longer in CMC because the functions accomplished through a variety of face-to-face cues are undertaken via fewer codes in CMC, and any single message exchange may not carry as much social information as would the exchange of the same qualities in a nonmediated setting. These processes are also applicable to both dyadic and group communication contexts in CMC. However, as the number of interactants increases, the more exchanges between each interactant are necessary for the impression formation and other social information processing effects, below, to adhere.

Developing Psychological-Level Knowledge: Interpersonal Epistemology

The concept of interpersonal epistemology (Berger, Gardner, Parks, Schulman, & Miller, 1976; Miller & Steinberg, 1975) ties the importance of interpersonal impression formation to the process of relational development and communication change. Interpersonal epistemology is achieved when persons develop distinctly individuating representations of one another's psychological makeup. These include representations of others' beliefs, the reasons for those beliefs, and their underlying motivational structures (Berger et al., 1976).

Such individuating knowledge is gained through ongoing interaction over time through "strategic probes," the "patterns of communication used by an individual to gain information about another person's beliefs, motives, and intentions" (Berger et al. 1976, p. 156). Communicators use knowledge-generating strategies such as interrogation, self-disclosure, deception detection, environmental structuring, and deviation testing to gather psychological-level information about other persons (Berger et al., 1976; see also Berger & Bradac, 1982). Indeed, one participant's very first comment in an ongoing conference, as reproduced in Figure 1, shows a strong orientation toward

interpersonal information acquisition. Although this comment was more lighthearted than most in the conference, the user's interest in others and their approaches was not uncommon.

Interpersonal epistemology development is relevant to the findings of (initial) impersonality in CMC messages. Miller and Steinberg (1975) argue that truly interpersonal communication is that in which messages are adapted to the receiver, based on the sender's psychological- or individual-level knowledge of the target. M. Burgoon and Ruffner (1978) define group communication similarly, as that which is based on personal-level knowledge of the receivers. Previously unknown interactants, therefore, should not be expected to employ interpersonal messages.

The development of interpersonal epistemologies is probably retarded in CMC encounters. Because information takes longer to accumulate in CMC (Assumption 5), with fewer verbal exchanges over time and no nonverbal cues, CMC is likely to hinder the development of distinctly individuating impressions. As a result, interpersonal messages should not be expected to occur as early as in face-to-face encounters (Proposition 2).

Eventually, however, the building of interpersonal epistemologies and attendant communication changes should occur in CMC. Although less initial information about others may be present, textually conveyed information about persons and their characteristics and attitudes will accumulate. Furthermore, the interactive strategies for acquisition of interpersonal knowledge posited by Berger et al. (1976) can be accomplished through verbal interactions. As interpersonal knowledge accumulates, communicators express more personal messages. This approach accounts for the presence of more personalized impressions and message transmission through ongoing asynchronous conferencing, as well as for the more task-oriented and impersonal messages in time-limited computer-mediated interactions among unacquainted interactants.

The development of interpersonal epistemologies in CMC depends on decoding of linguistic cues and text-based content. Although surveys in several studies (see Rice, 1984, p. 132) projected that CMC would be difficult to use for getting to know someone, Johansen et al. (1988) point out that these goals, compared to those such as technical information exchange, are more difficult in face-to-face encounters as well.

To summarize the process so far, communicators in CMC, like other communicators, are driven to develop social relationships. In order for them to do so, previously unfamiliar users must become acquainted with others by forming simple impressions of others through textually conveyed information. On the basis of these impressions, they test their assumptions about

com103a/task1 #3, user12, 1589 chars, 29-Sep-88 18:09

TITLE: getting to know youuuuuu, getting to know all about youuuuuu

hi. this is user 12. it's really great to be meeting you all, whoever you are. please introduce yourselves sometime (by anonymous name only, of course). so, what do you guys think about this . . . deal???? anyone with ideas, please share them. i'm breathless with anticipation to see how we all logically support our own choices.

well, it was nice "meeting" all of you. . . . HASTA LUEGO

Figure 1: Ongoing conferencer's first message. This message was recorded in an anonymous decision-making student conference directed by the author of this article.

others over time through knowledge-generating strategies, the results of which accumulate in refined interpersonal epistemologies. As such knowledge develops, communicators use more personal messages in CMC. This process is also assumed to stimulate changes in relational interaction among CMC users. In other research, J. Burgoon et al. (1987) found that relational history—number of prior contacts—was associated with greater immediacy and receptivity in a study of (unmediated) doctor-patient communication. Although the development of interpersonal epistemologies was not considered as a functional mediator for this effect, the relational outcome is consistent with the present framework. The following discussion focuses on how relational communication through textual cues may change in CMC.

Relational Exchange in CMC

Initial levels of relational communication in CMC are expected to change over time (Propositions 3 and 4). Although the rate of social information processing may differ between CMC and face-to-face conditions, relational communication dimensions in these conditions should correspond after sufficiently frequent social exchanges. To apprehend this notion fully, predictions about the valences of relational communication dimensions in initial CMC interactions should be posited, and a theoretical explanation for their subsequent alteration through textual cues should be specified. The following discussion undertakes these points.

INITIAL RELATIONAL VALENCES

Prior CMC studies lend themselves to hypothesizing how initial CMC interactions might be characterized in relational communication terms. For instance, using the four relational dimensions found by Wish, Deutsch, and

Kaplan (1976), Murray and Bevan (1985, p. 36) asserted that "most computer conversations are intended to be cooperative, equal, intense, and task-oriented, which puts them in the same category as business partners."

The effects of low social presence and reduced social context cues—which may be viable within the boundary of initial CMC interactions with previously unacquainted partners—translate into some of the relational topoi articulated and assessed by Burgoon and her colleagues (J. Burgoon et al., 1984; J. Burgoon & Hale, 1984, 1987). Using these dimensions as a framework, the following predictions may be derived. If communicators are initially less oriented to one another in CMC, then messages should be low in relational dominance, show high equality, and be task oriented. Although some arousal is associated with communication in general, it may be low, as the presence and immediacy of others is low; composure, conversely, should be high. Formality may be expected to be low because the cognizance of others is low, and such social conventions as turn taking are removed. The effects of decreased social presence should decrease the relational dimension of intimacy and its subdimensions, involvement and affection, similarity and depth, and receptivity and trust. (Indeed, trust—as evidenced by cooperative versus competitive strategies in prisoner's dilemma simulations—was shown to decrease from face-to-face to electronic and written media in a study reported by Short et al., 1976.)

Changes in these relational qualities should accrue as interaction history develops. Social penetration theory (Altman & Taylor, 1973) predicts that communication leads to greater affiliativeness. Alternatively, Knapp, Ellis, and Williams (1980) suggest that when interpersonal relationships develop, several dimensions of relational or communicative behavior increase toward greater affiliativeness in generally linear trends, with plateaus marking latter periods of relational stabilization. There are several factors that may affect the applicability of these trends toward greater affiliativeness. Social penetration processes do not always lead to ever-increasing intimacy (Altman, Vinsel, & Brown, 1981). Yet group development literature indicates that members begin to affiliate with one another on the basis of attitude and similarity in initial interaction stages, and terminal interaction stages are marked by increased cohesiveness and solidarity (see Fisher, 1974). This suggests that greater degrees of affiliativeness should be expected as relationships develop over time. It is recognized that dynamics and personalities of individuals and groups may vary from one another, and some people who get to know each other wish not to develop personal relationships (Sunnafrank, 1986). So may be the case in CMC, and the direction of relational communication changes may become less affiliative. The major contention, however,

is that *ceteris paribus*, as goes face-to-face so goes CMC, given the opportunity for message exchange and accompanying relational development.

Encoding Relational Messages Through Text

Most research on relational communication "has focused on nonverbal codes as best suited to the relational function, relegating verbal codes to a content function" (Donohue, Diez, Stahle, & Burgoon, 1983). Although nonverbal cues are "implicitly seen as natural or even 'sole' carriers of relational information, subtle verbal variations that also carry relational information have been neglected" (Donohue et al., 1983). As Hobbs (1980, p. 65) has observed, "When we move from face-to-face conversations to dialogs over computer terminals, the communication is purely verbal. The work done non-verbally now has to be realized verbally. How are realizations of (communicative) functions altered over the change of channels?" If CMC users are to compensate for the loss of nonverbal subtext in order to perform relational functions, these "neglected" linguistic or textual cues will become their stock in trade. This section describes precedents for relational message expression through linguistic cues.

IMMEDIACY EXCHANGE

Of the relational communication dimensions, the immediacy/affection construct provides a particularly interesting exemplar for relational development in CMC. Theoretical and empirical work in this area has taken explicit notice of cue substitutability, and the opportunity for communicators to replace their nonverbal expressions of this dimension with verbal indicators seems clear. This dimension includes affection, inclusion, and involvement (J. Burgoon & Hale, 1984) and seems to be the least likely to gain in CMC according to the characterizations of CMC from the cues-filtered-out perspective. On the other hand, Korzenny (1978) proposed that communication through interactive electronic media creates a feeling of greater propinquity with others, regardless of their actual geographic dispersion. This "electronic propinquity" might be expected to foster friendships, as actual propinquity is known to do (Wegner & Vallacher, 1977; see for review J. Burgoon et al., 1989).

The theoretical and empirical work on intimacy or immediacy exchange has conceived of immediacy cues as both nonverbal (Mehrabian, 1971) and verbal (Wiener & Mehrabian, 1968). Immediacy may be conveyed nonverbally by combinations of proximity, smiling, eye contact, and body-lean behaviors (J. Burgoon et al., 1984) or by verbal indicators such as spatiotemporally

indicative demonstratives, denotative specificity, selective emphasis, and "agent-action-object relationships" (Wiener & Mehrabian, 1968). These dual mechanisms for immediacy expression offer a case for cue substitutability within the framework of equilibrium theory.

Argyle and Dean's (1965) affiliative conflict theory—or equilibrium theory—posits that communicators adopt levels of gaze, physical proximity, and other behaviors indicative of intimacy and that these levels are derived partly from cultural norms (Argyle & Cook, 1976), as well as from a need for affiliation. In dyadic interaction, elevations or reductions of these base levels by one communicator through one channel (e.g., proxemic distance reduction) may be compensated for by the other interactant through an alternative channel (e.g., reduced gaze) in order to maintain desired levels of intimacy. This compensation is most likely to occur within established relationships (Argyle & Cook, 1976).

The affiliative conflict model leaves open what other behaviors indicate intimacy. Although nonverbal behaviors are most commonly discussed by the authors, verbal behaviors are not excluded from consideration as intimacy cues. Topical intimacy through language has been found to act as one such cue, and form of address is included as another by Argyle and Cook (1976), but few other linguistic cues are mentioned as potential intimacy stimuli. Elsewhere, however, Wiener and Mehrabian (1968) consider linguistic cues to offer a vital code for the expression of immediacy (a construct whose nonverbal counterpart has been included in the equilibrium model). If linguistic cues can function as a channel of immediacy (or of other relational messages), then they, too, may function as intimacy-enhancing or intimacy-reducing signals, especially where other, nonverbal cues are constrained.

There is empirical support for this contention. Results of a study by Donohue et al. (1983) on verbal and nonverbal immediacy suggest that face-to-face interactants compensate for reduced nonverbal affiliativeness with verbal cues in order to restore "normal" conversational style. Donohue et al. found that when one conversational partner reduced nonverbal immediacy (i.e., decreased proximity), the other partner exhibited significantly greater (spatiotemporal) verbal immediacy.

Short et al. (1976) were also well aware of equilibrium theory and research. Although they did not embrace equilibrium theory per se, they did speculate that language may substitute or even "overcompensate" for missing nonverbal information. Reviewing teleconferencing research, they suggested that a participant, "aware of the reduced-cue situation, . . . will modify his behaviour; thus head-nods indicating agreement may be replaced by verbal phrases such as 'I quite agree'. . . . This constitutes a clear case of

interchangeability between non-verbal cues (in this case head-nods and facial expressions) and verbal messages (in this case explicit expressions of agreement or disagreement)" (Short et al., 1976, p. 64). Equilibrium theoretic principles support the contention of cue substitutability, in that interactants are likely to adopt other symbol systems to convey affective messages that are unavailable nonverbally. In other words, CMC-only partners can be expected to achieve desired immediacy levels through the manipulation of verbal immediacy.

Other relational effects are also associated with verbal and textual performances. Most of these effects have been found in "traditional" (i.e., faceto-face or written) communication. Others have been discovered within CMC observations.

"TRADITIONAL" RELATIONAL COMMUNICATION

Numerous examples of verbal relational behavior appear in the literature. In addition to those mentioned above, dominance patterns in groups can be achieved through manipulation of verbal floor-managing cues (Shimanoff, 1988). Variations in interpersonal equality are associated with the grammatical forms of requests and directives (Harkness, 1990). Dominating messages must be reciprocated by submissive ones in order for a dominance relation to flourish (see Millar & Rogers, 1976). In CMC just such reciprocal exchanges can occur.

Relational intimacy has been associated with certain verbal cues, such as tense references, degrees of topic agreement, and specific verbalizations of attachment and irreplaceability in regard to partners (see Millar & Rogers, 1987). Knapp (1984) identified the following stylistic dimensions in which communication changes as relationships develop: narrow/broad, stylized/ unique, difficult/rigid, awkward/smooth, public/personal, hesitant/spontaneous. and overt judgment suspended/overt judgment given. Although several of the examples Knapp provides for these dimensions depict nonverbal exchanges, others are expressed as language strategies. These stylistic expressions are said to revert to original levels in relational de-escalation, and CMC users who did not wish greater intimacy might be expected to maintain or emphasize these initial styles. Knapp also lists common effects in relational intensification: forms of address become less formal, use of the first-person plural becomes more common, private symbols (jargon) develop, verbal shortcuts emerge, more direct expressions of commitment may appear, and partners act as communication "helpers" (e.g., finish each others' sentences). Knapp also points to form of address as an indicator of relational formality (as did Argyle & Cook, 1976). It is reasonable that failure to adopt these behaviors

or failure to reciprocate one's partner's (or partners') expressions of these moves in CMC over time would signal a less affiliative relationship.

In other research, lexical variation has been associated with relational communication and with written communication in ways that may be assumed to parallel CMC. Jordan, Street, and Putnam (1983) explored the relationship of interpersonal distance and lexical variety. They found that dyadic partners who had greater physical distance between them used greater lexical variety than closer speakers. They also found that speakers used greater lexical variation speaking to strangers—relationally distant partners—than they did with friends, and the researchers considered these language variations to compose a metacommunicative cue. Whether this pattern would appear in text-based CMC is not clear; communicators have been found empirically to use more language variety in writing than in speaking (Blankenship, 1974; DeVito, 1973), findings that do not conform to Daft and Lengel's (1984) supposition that face-to-face interaction adopts a high variety of language and text-based expressions do not.

RELATIONAL STRATEGIES IN CMC

Some very recent research has examined some of the ways that communicators have adapted their computer-generated signals to the purposes of relational effects. Along the lines of relational dominance and status cues (which should be absent in CMC, according to social context cues theory), electronic communicators have developed a grammar for signaling hierarchical positions. Sherblom (1988) found a significant difference in the tendency to add one's "signature" (name) to the end of messages on the basis of hierarchical status and direction of message flow in an organizational e-mail. In the system Sherblom studied, e-mail messages were automatically identified in regard to the sender's identity.

Signing the mail file, therefore, did not add any additional information about the identity of the sender. Being informationally redundant, the presence or absence of this signature was analyzed as a paralinguistic reflection of the hierarchical and communication relationships between the mail file sender and the receiver. (p. 44)

Sherblom found that a redundant signature was added in 67% of upward messages and 87% of horizontal messages but in none of the downward-directed messages in his sample.

Organizational power and status were indicated indirectly in another organizational e-mail study. S. Phillips and Eisenberg (1989) explored com-

***		SYSM	INBASKET	PRINT	***
MESSAGE ID: 310200		DATE: 08/09/89		TIME: 11:58	
TO:	s. jones				
FROM:	h. smith				
SUBJECT:	Reply to beth				
would get bac	k to her by tu	b and bob told he esday, and it is not in the called me.	now wed.		

Figure 2: Emotional e-mail message. This message was sent via a corporate e-mail system to a single individual, several states away from the sender. Names of the sender, receiver, and subjects have been altered at the user's request. Proper names were written with lowercase letters in the original.

pliance gaining via CMC. Although most influence attempts followed a simple request strategy, these requests were often electronically "carbon copied" to the recipients' superior, implying surveillance and a mandate from one's master. S. Phillips and Eisenberg characterize this as a *contextual* strategy, with coercive and manipulative overtones.

Affection and metacommunicative cues have been examined in the forms of textual cues composed of typing-related features. "Relational icons" (Asteroff, 1987) are the contrived sideways faces that can be made by combinations of punctuation marks. These marks "contextualize the message within the relationship" (Sherblom, 1988, p. 44). Electronic "paralanguage" (Carey, 1980) is the use of intentional misspelling, lexical surrogates for vocal segregates, spatial arrays, grammatical markers, absence of corrections, and capitalization. Intentional misspellings include the repetition of a vowel to resemble a drawn-out pronunciation of a word or a repeated final consonant for stress. Lexical surrogates function as parenthetical metalinguistic cues. such as typing out hmmm or yuk yuk in one's comments. These notations add affective information and indicate informality. Spatial arrays involve the arrangement of letters and characters to create graphical or spatiotemporal effects: "Users often leave space between words (indicating pause, or setting off the word or phrase), run words together (quickening of tempo, onomatopoeic effect), skip lines within a paragraph (to setoff [sic] a word, phrase, or sentence)" (Carey, 1980, p. 68). Manipulation of grammatical displays refers to the repetition of exclamation points, question marks, ellipses, and continued capitalization for emphasis or attitudinal indicators. According to Allen

(1988, p. 90), electronic communicators "will INSULT EACH OTHER IN CAPITALS." Little is known about the frequency or contexts with which these signs are used, except that these relational cues are becoming conventions among those who use and recognize them (Carey, 1980; Turner, 1988). Figure 2 shows an interesting employment of both natural language and stylized text in a clearly affectionate tone.

Given the natural ability to substitute verbal for nonverbal indicators, the variety of relational cues available to computer-mediated communicators, the same affiliative drives as others, and sufficient exchange of messages needed to overcome the slowness of information processing in this medium, relational communication in CMC should become similar over time to that exhibited by face-to-face counterparts in otherwise similar situations (Proposition 6).

Conclusion

As Salomon and Gardner (1986) point out, research on computer media should be careful not to fall into the same trap as did much early television research by treating all exemplars of the medium as the same and failing to explore differences based on uses and applications. The study of CMC is very young, and new systems with new qualities emerge almost constantly. In such a rapidly developing field, it is not surprising that any interesting discovery should be reported, especially as it might apply to fundamental communication processes. As has been shown, however, the theories and claims based on early experimental findings do not adequately describe other observations and deserve close conceptual and methodological scrutiny. At the same time, alternative theories have been slower in coming.

The predictions in this article suggest that, over time, computer mediation should have very limited effects on relational communication, as users process the social information exchanges via CMC. If these predictions are confirmed, they will indicate that the ways in which humans pursue these interpersonal functions are more robust than can be impeded for long by computer mediation. This is not to suggest that CMC is completely substitutable for face-to-face communication, primarily because CMC takes a great deal longer than face-to-face interaction to accomplish more than simple data transfer; there are occasions when much needs to be discussed in a short time, and CMC would impede this goal. Although CMC may not be as efficient, however, there is less reason to think it may not be as effective when time is not of the essence.

Such a stance runs counter to the McLuhanism suggested in the cuesfiltered-out perspective. The prior theoretical positions and derived empirical studies have focused on the structural characteristics of communication via the computer channel; communication contexts and functions within CMC encounters, consequently, have not been foremost concerns in those studies. Some CMC theorists have assumed that the relational effects are universal. Some have grouped together the various contexts of e-mail, conferencing, and bulletin boards as if they are the same environment with a common character (Kiesler et al., 1985). Much like a classic mass media research paradigm, the form-via-channel of the message is said to have strong effects on its recipients (see Pingree, Wiemann, & Hawkins, 1988).

Viewing CMC from a relational communication perspective offers an approach to the process that differs from a channel-effects view alone. A relational perspective suggests that functional and social factors should be examined. Like the central paradigm of interpersonal communication inquiry in general, this perspective takes into account interpersonal antecedents that in turn affect communicators' reciprocal message patterns (Pingree et al., 1988). Social aspects, as well as message characteristics, are often significant factors in the relational cosmology. This approach offers a more comprehensive paradigm with which to explain the CMC process.

Future research on technological aspects may also be enhanced. For instance, the effects of synchronous versus asynchronous CMC may affect the information processing requisite to impression formation and relational development. Synchronous CMC "does allow immediate response, and personal cues often appear in new forms, while direct questions are almost always answered-even when addressed to strangers," according to Rice (1986, p. 230). These aspects, the "overwhelming presence of the group" in synchronous computer conferencing (Vian & Johansen, 1981, p. 13) may be experienced as more immediate and involving, perhaps. On the other hand, Hiemstra (1982) points out that asynchronous users have more time to contemplate and compose messages than do synchronous communicators. This ability may afford users enhanced opportunity for selective self-presentation. rendering qualitatively different interpersonal impressions than they might convey in synchronous CMC or face-to-face communication (Walther & Burgoon. 1991). Yet another concern has to do with the amount of structure imposed on CMC interaction and the possible mediation of interpersonal effects when such systems as group decision support systems are employed.

Although this essay has focused on text-based CMC, new variations of text-plus-audio, voice mail, and video mail are emerging and receiving study. Regardless of the number of cues these media might convey, however, what

is needed is research on communication technology guided by the theoretical underpinnings regarding communication functions in any context. From this perspective differences due to channel attributes will become more precise, interesting, and may possibly be employed with greater discretion and utility.

Notes

- 1. I wish to extend my gratitude to Judee Burgoon, Deborah Newton, and two anonymous reviewers for their suggestions, which aided in the development of the manuscript. An earlier version of this article was presented at the annual meeting of the Western States Communication Association, Phoenix, AZ, February 1991.
- 2. This discussion uses the terms verbal cues and textual cues in reference to the words and other written matter that appear as typed characters transmitted in CMC. Verbal, or language-borne, cues refers to any verbal content, lexical variation, syntactic usage, or other feature of language that may be conveyed in written communication. Textual cues is a larger category, incorporating verbal cues and also a variety of paralinguistic features, such as typographic manipulations, spatial arrangements, intentional nonstandard spellings, and so on. These latter types of textual cues have been called nonverbal surrogates in some CMC literature, as they may be used to signal relational or affective content or metacommunication in the same ways that nonverbal behaviors may function in face-to-face interaction. However, written CMC does not carry nonverbal communicative code elements such as proxemic, kinesic, haptic, physical appearance, vocal, and physical artifact cues.
- 3. Aside from the criticism of the media richness theory above, there is also a clarity bias in the media richness literature, in that it implies that effective messages are those unambiguously understood. Although clarity and comprehension are often desirable aspects of communication efforts, ambiguity and equivocality may also be the legitimate and intended aspects of organizational messages (Eisenberg, 1984; see also Bavelas, Black, Chovil, & Mullett, 1990). If the contingencies about message and channel matching in media richness theory were valid, then the prescriptions about media selection should incorporate a further contingency: the intended ambiguity of the message. Then CMC might be more appropriate than richer media for messages that senders wish to remain somewhat equivocal (Contractor & Eisenberg, 1990). However, the central thesis of this article is that CMC messages—as well as those in face-to-face interactions—can be clear, ambiguous, emotional, or factual as communicators use whatever codes are available to accomplish their conversational and relational objectives.
- 4. Hiltz et al. (1978) recognized that much socioemotional nonverbal behavior was present in their face-to-face groups that could be coded using the IPA and attempted to code such observations. However, underconfident in the coding techniques they attempted, they aborted their nonverbal IPA analyses prior to the completion of their study.

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