14

Cues Filtered Out, Cues Filtered In

Computer-Mediated Communication and Relationships

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In August 1998, news of the results of a study soon to be published in the *American Psychologist* sent shock waves through the Internet community and, to no small extent, through public discourse about the social impact of the Internet. Robert Kraut and his colleagues (1998) had found that Internet use in a sample of 93 families had resulted in small but significant increases in loneliness, social isolation, and depression over a 2-year period. The researchers asserted that the cause of these decrements in well-being was that on-line relationships do not sustain social support, and the substitution of on-line relationships for stronger, off-line relationships led to these negative outcomes. The ensuing debate was a forceful reminder that the Internet has become a flash point for more general concerns about technology. For some, Kraut et al.'s findings were a direct challenge to their prized ideological positions about the Internet as a source of meaningful relationships, social support, therapeutic engagement, and identity growth. For others, the findings were striking confirmation of the dehumanizing, destructive potential of computer technology. We will present a thorough assessment of these findings later in this chapter, but for now the essential point is that the impact of Internet communication on personal relationships is a central issue in

technology research, one that raises controversy in academic and public discussions. In doing so, it underscores the fact that, for good or ill, the Internet is a profoundly social medium.

The social nature of the Internet has been recognized, albeit unevenly, throughout the history of Internet research. Such research has drawn heavily on interpersonal constructs such as self-presentation, impression formation and management, socioemotional orientation, hierarchical role awareness and performance, deference, cooperation, intimacy, attraction, affection, and relational development. Moreover, even when the focus of Internet research moves beyond the immediate world of dyadic and small group relationships to consider features such as organizational communication, community dynamics, collective action, and educational developments, the work's theoretical underpinnings have often remained solidly rooted in the relational aspects of interaction.

In this chapter we examine the theoretical research about computer-mediated communication (CMC) and relational dynamics. We begin by reviewing several theories that have emerged from or have been applied to these issues. Recent reviews have covered some of the same ground (e.g., Postmes, Spears, Lea, & Reicher, 2000; Walther, 1996), but our assessment is both more far reaching and set more squarely in the context of interpersonal communication. Next, we explore the use of CMC in three contexts of particular relevance for interpersonal communication: mental health and social functioning, social support, and relationship development. Finally, we evaluate the adequacy of existing theories of CMC and interpersonal communication in light of the observation that any given relationship frequently exists in several different media at once. We contend that these "mixed-media relationships" create challenges for current theoretical approaches. We offer a potentially unifying approach to the phenomenon of relationships that develop on-line and migrate to off-line encounters, and identify several approaches from previous interpersonal communication research that suggest promise for adaptation into the electronic domain.

Computer-mediated communication is a broad term, and it is growing broader with each technological innovation. We therefore limit our review to those features that are likely to hold the greatest relevance for students of interpersonal communication. First, although inquiry ranges from rigorous ethnographic, interpretive, and linguistic work (e.g., Baym, 1999; Herring, 1993) to psychoanalytic and postmodernist accounts (e.g., Bruckman, 1992; Turkle, 1995), we devote the bulk of our attention to work rooted in traditional social scientific approaches. In many cases, of course, this research has been stimulated and enriched by alternative perspectives. Our emphasis, however, is on efforts to provide more general, theoretical explanations for the interpersonal dynamics of on-line interaction. Second, we focus here on text-based messaging systems on the Internet. This might strike the reader as an overly restrictive stance, given the proliferation of sound and sight in recent Internet technologies (e.g., voice messaging, video and photographic displays). However, the fact remains that text-based systems still dominate interaction on the Internet. E-mail, chat rooms, multiuser discussions (popularly called "MOOs" or "MUDs"), and Listservs and other mailing lists, as well as the global system of Usenet newsgroups that hosts thousands of group discussions on myriad topics, continue to link millions of people in text-based interaction on a daily basis. And innovations in text-based communication continue to unfold beside or within their flashier technological cousins. Instant messaging and "chat boxes" that stand alone or that accompany on-line games or retail shopping sites illustrate the continuing expansion of text-based interaction on the Internet (see Nardi, Whittaker, & Bradner, 2000; Pew Internet & American Life Project, 2001a, 2001b). Another reason we

focus on text-based systems is that they are the most interactive and hence the most engaging for scholars of interpersonal communication. Although Web pages providing personal information (see Miller, 1995) can be revised, and files containing photographs or video can obviously be exchanged, the real give-and-take of social life involving the Internet still occurs in text-based interaction.

THEORIES OF COMPUTER-MEDIATED COMMUNICATION

The dominant theories with implications for the interpersonal dynamics of CMC have not, as a rule, developed in the context of interpersonal relations. Some were based in small group communication, whereas others were concerned with message comprehension in organizations. Still others were imported from nondigital domains and adapted to explain on-line phenomena. Some observers have raised questions about the applicability of such theories to the interpersonal uses of the Internet (e.g., Baym, 1995), and it is true that we do not yet have a clear sense of what the boundary conditions of these theories may be. They may or may not be applicable to interpersonal behavior on the Internet. Certainly a few have been stretched so far from their original starting places that the value of their guidance is open to question. Nevertheless, rooted as they are in basic communication constructs, and without any theoretical competition in sight at present, these general theories continue to be applied to interpersonal dynamics and CMC. In one way or another, all deal with how the communicative cues available in on-line settings affect the ensuing interaction. They differ in terms of the cues they consider and their conceptions of how people use those cues. In this section we consider five approaches, which for convenience we label cues filtered out, cues to choose by, cues filtered in, cues about us, and cues bent and twisted.

Cues Filtered Out

The Internet is only one in a succession of new media spawned over the past 150 years. It is therefore not surprising that early attempts to account for social behavior on the Internet drew on theories that were originally focused on other media. Short, Williams, and Christie's (1976) social presence theory, for example, dealt with more traditional media in terms of their *bandwidth* and *social presence*. *Bandwidth* refers to the number of communication cue systems a technology can convey, specifically, the incremental addition to verbiage of voice, kinesics, and proxemics. Short and his colleagues argue that nonverbal cues make the presence of communicators more salient to one another and enhance the warmth and friendliness of interaction. Thus the greater the bandwidth a system affords, the greater the social presence of communicators.

Researchers used this theory to explain CMC's effects on group discussion (e.g., Hiltz, Johnson, & Agle, 1978) as well as to predict preferences among alternative media for various tasks (Rice & Case, 1983). Because of their low bandwidth, text-based systems were thought to result in low social presence. This in turn was hypothesized to increase task orientation and to facilitate group discussion (e.g., Turoff, 1991). Early studies partially supported these speculations. Task-oriented communication was more frequent in computer-mediated settings than in face-to-face (FtF) settings. However, it also appeared that groups using CMC reached consensus less frequently. The lack of nonverbal cues and lower social presence made it more difficult for leadership to emerge and for groups to reach agreement in socioemotional terms (for a review, see Walther, 1996).

Other researchers pointed to the lack of social context cues in on-line settings (Kiesler, Siegel, & McGuire, 1984; Siegel, Dubrovsky, Kiesler, & McGuire, 1986; Sproull & Kiesler, 1986). CMC was thought to lack the nonverbal

cues that are typically used in FtF settings to express purpose, setting, decorum, roles, relative status, and affect. Without such cues, researchers argued, communicators would become absorbed in the task and the self, and become disinhibited and hostile. Without nonverbal cues, communicators should be less able to "alter the mood of a message, communicate a sense of individuality, or exercise dominance or charisma" (Kiesler, 1986, p. 48). Research supported these predictions; compared with people in FtF groups, CMC users were found to express greater hostility (commonly called "flaming") and to send more task-oriented messages.

These approaches have been combined in what is generally referred to as the *cues filtered out* model (Culnan & Markus, 1987). They share the assumption of a one-to-one correspondence between communicative *cues* and communicative *functions*. That is, they assume that the functions served by nonverbal cues in FtF interaction go unmet in computer-mediated interaction because the nonverbal cues are absent. If no other cues can perform the social functions that physical appearance, copresence, and dynamic nonverbal behavior can, then, as Culnan and Markus (1987) point out, CMC must always be impersonal.

In spite of its considerable intuitive appeal and early empirical support, the cues filtered out perspective came under heavy criticism as evidence came in from a wider range of on-line settings and theoretical conceptualizations became more sophisticated. One critique pointed to the relatively short time periods allowed for both CMC and FtF groups in the early studies and the possibility that it simply takes longer to achieve the same level of content exchange in CMC as in oral FtF communication (Walther, 1992). If time limits interrupt group and relational development, task orientation and lack of agreement may be the result of different rates of communication. Indeed, reanalyses of existing data as well as new studies supported the belief that it was time limitations, rather than the ultimate capacity of CMC to convey relational dynamics, that accounted for the differences in early studies (Walther, Anderson, & Park, 1994). Recent research also suggests that time limits may affect CMC interactions and FtF groups in qualitatively different ways. Reid and colleagues found that CMC groups were more sensitive to time pressure than parallel FtF groups. When time was restricted, CMC users expressed less positive affective content relative to unhurried CMC groups and FtF groups (Reid, Ball, Morley, & Evans, 1997; Reid, Malinek, Stott, & Evans, 1996).

Another line of critique challenged the notion of the isomorphism of communicative cues and communicative functions. The problem with the isomorphism assumption, as Lea and Spears (1995) observe, is that more complex factors outside the exclusive domain of spatial and nonverbal cues might predict attraction and affect; factors such as group identity and attitude similarity are not considered. Observations in newsgroups and field settings demonstrated that people were clearly making strong judgments based on text alone. The cues filtered out perspective has fallen out of favor with many CMC researchers because of these objections. Although the original advocates have not explicitly recanted their positions, their subsequent work has reflected more positive assessments of CMC's relational potential (e.g., Galagher, Sproull, & Kiesler, 1998; Sproull & Faraj, 1997). Elsewhere, however, researchers continue to draw on the images of restricted interactions and restricted cues (e.g., Gunawardena, 1995; Gunawardena & Zittle, 1997).

Cues to Choose by

Some types of messages might be conveyed more efficiently in one medium than in another. This seemingly commonsense proposition is the premise upon which media richness theory (or information richness

theory; Daft & Lengel, 1984, 1986) is based. Although the theory originated in work on information processing in organizations, it has the potential to help explain why people used computer-mediated channels and why these channels might be particularly appealing for certain types of tasks.

The core argument in media richness theory is that there is an optimal match between the equivocality of communication tasks and the communication media among which one may choose. It is important to note that the original theory proposed a single and simple outcome as a result of such matching: efficiency (in turn, the effective accomplishment of understanding within a specific time interval; Daft & Lengel, 1984). Thus the more equivocal the communication task and the richer the medium one uses, the more efficient the exchange. Conversely and ingeniously, when equivocality is low, it does not matter what medium is used for *effectiveness,* but a leaner medium is more *efficient.*

Richness of a medium is determined by four characteristics: multiplicity of cue systems (analogous to the concept of bandwidth), the availability of immediate feedback (i.e., whether the medium offers delayed interaction or full interruptibility), message personalization (whether messages can be tailored to a specific individual versus a large audience), and natural language or language variety (formal versus conversational language). CMC, particularly electronic mail, has been incorporated into the model as a relatively lean medium (e.g., Daft, Lengel, & Trevino, 1987).

Media richness theory draws on a straightforward definition of equivocality as the number of possible interpretations one can make, but then takes a turn of particular relevance to those interested in the relational aspects of on-line communication. Emotionally arousing, personally involving tasks are conceptualized as having high equivocality and thus are seen as more appropriate for richer media (Daft & Lengel, 1984; Dennis & Kinney, 1998). This implies that relatively lean media, such as text-based messaging systems, should not lend themselves to efficient communication of emotionally complex matters. And this, of course, suggests that lean media should be poor carriers of interpersonal communication.

Empirical tests of this framework have yielded inconsistent results. When *projective* methods have been used, findings have generally been supportive. These methods typically involve asking respondents to indicate which media they would be most likely choose, from FtF through e-mail, for each of several kinds of communication episodes that vary in equivocality (see, e.g., Rice, 1993). These studies indicate, for example, that managers who make optimal matches between equivocality and medium tend to be rated more successful in their organizations than those who make less sensitive matches (Daft et al., 1987). Results from *observational and experimental* studies have not been as supportive. These studies demonstrate that people often make very effective use of lean media to accomplish highly equivocal tasks (e.g., Dennis & Kinney, 1998; Fulk, Schmitz, & Steinfield, 1990; Markus, 1994a).

The discrepancy between projective and observational results is testimony to the fact that actual media choices often do not match normative expectations. One reason for this is that media choices in the real world are not always made on the basis of optimal efficiency. Even if a FtF meeting would be most efficient, such meetings cannot always be held on the spur of the moment; we walk down the hall to pay someone a visit but find the office empty, and telephone calls go unanswered, leaving e-mail, perhaps the last choice, as the first among unequals. This is not to say that CMC is a preferred medium, the easiest, or the most efficient. It is likely, however, that an asynchronous medium wins the day when synchronous choices are not available (see Bozeman, 1996). How, then, does a lean medium overcome its restrictions? Although this suggestion has not appeared in the literature to date, the answer may be found in a

root proposition of the theory: We must work less efficiently—communicate more effortfully, or at least more iteratively—to achieve the same relative effectiveness that FtF or other rich media afford with less difficulty.

In this respect, Korzenny's (1978) theory of electronic propinquity, which also predates the Internet, offers a different perspective: The fewer one's choices of media, the more psychological closeness one may experience, even through low-bandwidth channels. Korzenny does not state whether this phenomenon should result from perceptual or behavioral processes. That is, does a low-bandwidth medium merely seem richer when alternatives are limited? Or, if forced to rely on the structurally least expressive of media choices, does a user accommodate and expand the otherwise limited range of the medium through greater effort, greater application of communication skills, and the reduction of formality? Such a process would go far in explaining how lean media can be used for the effective performance of interpersonally demanding tasks. Unfortunately, the sole empirical test of electronic propinquity theory failed to support the framework (Korzenny & Bauer, 1981), although the experimental protocols may have been problematic. The theory has received less subsequent attention than it probably deserves, and new experimentation is currently under way.

Closer inspection of the core definitions and propositions of media richness theory illuminates other problems as well. It is apparent that the relationships among the four characteristics of media richness have never been specified with any level of precision. It is not clear how or whether changes in cue multiplicity, immediacy of feedback, message personalization, and linguistic form might be related to one another. Although the theory appears to assume that all four move in unison as we examine one medium or another, obvious exceptions abound (Markus, 1994a). E-mail, for example, offers little immediate feedback but many opportunities for personalized language. Moreover, communicative efficiency may rest on sequences or combinations of media rather than on isolated choices about a single medium. It may be more efficient, for example, to raise discussion of a difficult, emotionally charged topic in e-mail in advance of a FtF conversation than to raise the topic out of the blue in conversation. People may make suboptimal media choices as part of larger strategies to optimize overall series of exchanges.

Despite media richness theory's problems, it is also apparent that the research to date has not directly tested the underlying claim of the theory. The fundamental claim is that *if* users select richer media for equivocal messages, *then* their efficiency will be greater. Researchers who have asked respondents what they might use or have assigned users to tasks and media in order to assess perceptions or effectiveness have not addressed that proposition. This is equivalent to refuting the lawlike proposition that greater fuel efficiency and reduced fatalities result when motorists drive at 55 rather than 65 miles per hour by arguing that many drivers don't think so and that many good drivers exceed 55 miles per hour. The basic proposition remains untested.

Examination of media selection in interpersonal contexts makes it clear that media selection also depends on situational and relational goals of the participants. Thus Kayany, Wotring, and Forrest (1996) found that e-mail and phone were preferred to FtF communication in relationally competitive situations as well as in situations in which the communicators wished to regulate the extent to which they imposed on each other. Moreover, in relationally complementary settings, e-mail and phone were advantageous because they reduced the amount of pressure placed on the other party, conveyed deference, and were thought to maintain goodwill. O'Sullivan (2000) explored how the presence of potential face threats to the sender or receiver in an

interpersonal encounter might affect media choice. His initial assumptions were consistent with media richness theory; namely, that electronic media with fewer cues and less temporally immediate interaction would create less emotional impact than FtF speech. However, he turned one of the implicit assumptions of media richness theory on its head by drawing on other lines of research to argue that people do not always seek unambiguous or unequivocal communication (e.g., Bavelas, Black, Chovil, & Mullett, 1990). Subjects were presented with scenarios in which they were called upon to communicate in a way that would bolster or threaten either their own egos or their partners' egos. They were then instructed to choose between FtF interaction and one of several "partial-cue" media (e-mail, telephone, answering machine, or letter). Results confirmed that subjects preferred partial-cue media over FtF when a preferred impression was threatened, and especially when the impression at stake was the subject's rather than the partner's. These results lend credence to Markus's (1994b) speculation that different aspects of different media may promote secrecy, privacy, hostility, or openness, depending on their application by users. Such applications would not be apparent either from a unitary media richness hierarchy or from conceptualizations of choice in which the sole focus is the reduction of equivocality.

Cues Filtered in

The social information processing (SIP) theory of CMC interaction (Walther, 1992) departs from the theories discussed above by explicitly rejecting the view that the absence of nonverbal cues restricts communicators' capability to exchange individuating information. It assumes instead that communicators are just as motivated to reduce interpersonal uncertainty, form impressions, and develop affinity in on-line settings as they are in other settings. When denied the nonverbal cues available in FtF interaction, communicators substitute the expression of impression-bearing and relational messages into the cues available through the CMC. Thus SIP theory posits that communicators exchange social information through the content, style, and timing of verbal messages on-line. The rate of information exchange is slower on-line, not only because both instrumental and relational information must be conveyed in a limited bandwidth, but because typing and reading are slower than speaking, looking, and listening. Time therefore becomes the critical predictive variable. When time limits are imposed in CMC, interaction should not go beyond impersonal and task-oriented behavior. When interaction time is not restricted, people in on-line settings should ultimately reach, although more slowly, levels of impression and relational development similar to what they would reach in FtF settings.

Support for SIP theory has been obtained in several settings. One was a test of impression development in which comparisons were made between CMC and FtF groups that met over a period of 6 weeks to discuss three decision-making tasks (Walther, 1993). The CMC groups used asynchronous computer conferencing at times of their own choosing, and the FtF groups met once every 2 weeks for 2 hours. Participants completed measures assessing their willingness to rate group members on a number of attributes after each task was completed. Repeated measures analyses supported SIP predictions by indicating that FtF participants formed more fully developed impressions sooner than CMC participants, but the impressions of CMC participants continued to develop over time until the end of the 6-week study period, at which point they were not significantly different from those of the FtF participants.

Walther and Burgoon (1992) used similar procedures in a more extensive study of relational communication (see Burgoon & Hale, 1984, 1987). It was predicted that immediacy,

composure, receptivity, and social orientation would initially be greater in FtF settings, but that over time, relational communication levels in CMC would increase and converge with those in FtF settings. These predictions were partially supported, although not all of the relational levels differed after only the first task. Moreover, although both CMC and FtF communication became more socially oriented over time as predicted, social orientation was greater in CMC than in FtF settings across all time points, in stark contrast to the earlier cues filtered out findings about task-oriented CMC. In an earlier study, Rice and Love (1987) also found relatively high levels of socioemotional content in a longitudinal examination of electronic bulletin board use, but did not find an expected increase over time in this behavior.

Additional support for social information processing theory emerged from a meta-analysis of previous research in CMC (Walther et al., 1994). Comparisons were made between previous studies in which time limits were placed on groups, and experiments with no deliberate time limits as well as field studies with cross-sectional data on socioemotional tone in CMC. The comparisons demonstrated a significant effect for time limitation. Studies in which there were no time limits found significantly more positive socioemotional communication than did studies in which interaction was cut off at any point.

These results all suggest that people who communicate using computers must either place greater weight on the cues that remain in text-based CMC or use alternative cues as substitutes for those they would typically use in FtF interaction. The first possibility directs attention to the fact that text-based communication systems still carry at least one nonverbal code, chronemics: the nonverbal cue system regarding "how we perceive, structure, and react to time and . . . the messages we interpret from such usage" (Burgoon & Saine, 1978, p. 99). E-mail users, for example, regularly attend to the time stamps that are automatically placed on their messages (Rice, 1990). Time stamps allow e-mail users to determine when the messages they receive were sent and how much time passed before one of their messages received a response. Walther and Tidwell (1995) hypothesized that these cues are potent enough to affect judgments of affection and dominance. They tested this hypothesis by varying the time stamps on two pairs of apparent e-mail message transcripts. One pair was socially oriented (gossip and plans to visit), and the other pair was a task-oriented request. The time stamps were manipulated to vary the time of day (night versus day) the first message was sent and the time it took for the receiver of that message to respond (immediate versus one day later). As predicted, chronemic codes had a significant impact on subjects' interpretations of senders' dominance and affection. Nighttime, task-oriented messages were rated the most dominant and the lowest in relational equality compared with daytime task requests. Social messages sent in the day signaled less equality and more dominance than did those sent at night. The amount of affection subjects ascribed to messages resulted from a complex interaction of the time a message was sent, its content, and the promptness with which it received a reply. The messages that were rated most affectionate were those that replied quickly to a task message sent during the day; those that gave a prompt response to a nighttime task message were rated least affectionate. A slow reply to either day or night task messages signaled moderate affection. As for social messages, more affection was perceived in a slower reply to a daytime message than in a fast reply, but a fast reply at night showed more affection than a slow one.

Other studies have focused on the cue systems that are unique to CMC. Chief among these are "emoticons" (graphical smiles, frowns, and other facial expression simulations created with various keyboard symbols) and "scripts" (preprogrammed texts that

narrate nonverbal actions among players). Utz (2000), for example, found that players of a German MUD not only used more emoticons and scripts as they became more experienced, they also believed that they were becoming more skillful at conveying relational and emotional messages using these cues. Utz also found that the use of such cues was a significant predictor of relationship development in MUDs, accounting for 14% of the variance in users' frequency of friendly or romantic relationships on-line.

Although there is no shortage of speculation about the role of emoticons (e.g., Godin, 1993; Rezabek & Cochenour, 1998), only a few researchers have made systematic attempts to understand exactly how these symbols function in on-line discourse. Instead, researchers have focused on who uses them, examining gender differences (Witmer & Katzman, 1997), regional influences (Rezabek & Cochenour, 1998), and how their usage diffuses in mixed-gender on-line groups (Wolf, 2000).

The two studies that have examined the communicative functions of emoticons have yielded engaging, if somewhat inconsistent, results. Thompson and Foulger (1996) found that the impact of a positive emoticon (presumably a happy face) varied with the perceived hostility of the accompanying verbal message. Whereas the emoticon diminished the perceived hostility of a message showing "tension," it increased the perceived hostility of more antagonistic verbiage. Walther and D'Addario (2001) conducted a controlled experiment in which familiar emoticons depicting a smiling face, a winking and smiling face, and a frowning face were inserted in simulated e-mail messages that contained either positive or negative evaluations about a college course. Based on the messages, subjects evaluated their own attitudes toward the course in question as well as the affective states of the supposed message senders. Although the subjects were familiar with the emoticons and interpreted them as intended, the impacts of the emoticons were extremely limited. The smiling face emoticons had no effect on message interpretation. The frown emoticons, on the other hand, attenuated positive verbal messages, but failed to affect subjects' interpretations of negative verbal messages. These findings suggest that emoticons, by themselves, have only limited effects on the interpretation of verbal messages. However, it could be that emoticons help the writer more than the reader. Generating an emoticon may act "as a self-signaling cue, prompting the writer to write in such a way that is as expressive as s/he intends" (Walther & D'Addario, 2001, p. 343). Just as speakers sometimes use gestures to help them construct verbal messages in FtF settings (Freedman, 1977), individuals using CMC may employ emoticons to prompt the construction of other affective messages.

Researchers are only now beginning to move beyond analysis of isolated cues to consider the relative availability of higher-order information-seeking strategies in CMC and FtF. Studies of initial interactions in FtF settings have identified several distinct types and subtypes of information-seeking strategies (Berger, 1979; Berger, Gardner, Parks, Schulman, & Miller, 1976). Tidwell and Walther (2002) argue that, unlike FtF settings, on-line systems offer individuals only limited opportunities to observe others unobtrusively or to gain information about them indirectly (e.g., by questioning third parties). Although group-based CMC and MUDs with textually represented rooms and objects may offer some opportunities for observational strategies (Ramirez, Walther, Burgoon, & Sunnafrank, 2002), e-mail and dyadic computer chat offer little other than interactive strategies.

Tidwell and Walther (2002) further argue that if CMC users do indeed adapt available cues to perform interpersonal functions, then they would rely on interactive strategies to a greater extent in CMC than in FtF settings. They tested this hypothesis by examining the information-seeking strategies employed by CMC and FtF dyads engaged in

either acquaintance or decision-making tasks. Their results support the adaptation contention. CMC users employed a greater proportion of self-disclosures and questions than did FtF partners. Additionally, the personal questions employed by CMC users showed greater depth than those used by their FtF counterparts, with FtF partners employing proportionally more superficial interrogations and CMC partners using more intermediate ones. Moreover, the correspondence between the frequency of these interactive strategies and partners' ratings of one another's communication effectiveness was significantly more positive in CMC than in FtF communication. Thus, consistent with SIP theory, it appears that whereas FtF partners draw on numerous visual, auditory, and verbal cues at their disposal, CMC users readily avail themselves of the remaining strategies for effective interpersonal information acquisition.

Anticipation: A Solution and a Problem

Although the studies to date generally support most aspects of SIP theory, at least one finding has created both a refinement as well as a question about the theory's integrity. As we have noted, Walther and Burgoon (1992) discovered that people in initial interactions in CMC settings were rated no less positively along some relational dimensions than were people in initial interactions in FtF settings. This finding was inconsistent with the SIP prediction that initial CMC interactions should be less personal than initial FtF interactions. In an effort to explain the inconsistency, Walther (1994) proposed that members of the CMC group might have had heightened anticipation concerning future interaction. We know, for instance, that anticipating future interaction prompts greater exchange of personal information, greater perceived similarity, and more friendliness (for a review, see Kellermann & Reynolds, 1990). We know also that the groups in the initial study were aware that they would be interacting on several occasions in the future.

On this basis, Walther (1994) formed CMC and FtF experimental groups in which medium (CMC versus FtF) was crossed with anticipation of future interaction. Half the groups were told they would be working together on multiple projects over a period of time, and the other half were told they would work together only once. At the end of the first period, analyses confirmed that anticipation prompted more positive relational communication. Indeed, when the effect of anticipated future interaction was factored out, communication medium itself did not predict relational immediacy, similarity, trust, or composure. Results also revealed that anticipation had greater effects among the CMC groups than among the FtF groups. That is, anticipating future interaction had a large effect across media, but it had a particularly large effect on CMC. These findings may account for the positive initial ratings in CMC groups in Walther and Burgoon's (1992) study, particularly given the fact that these groups were well aware that they would be working together over an extended sequence of projects. This dynamic may also account for Rice and Love's (1987) finding that socioemotional content in an ongoing electronic bulletin board discussion was high but did not grow higher over time; the participants may have assumed their communication would be ongoing.

Although the anticipation factor clarifies some aspects of the conflicting results found in research on SIP, it points to at least two theoretical challenges, one that has been addressed and one that has not. First, social information processing theory did not originally consider variations in the motivation to reduce uncertainty across different types of media. Anticipation has been acknowledged as one such factor, as have general expectations about CMC's relational potency: As Utz (2000) has found, people who are skeptical about the relational potential of CMC are less likely to report

that they have formed relationships on-line. Utz's results may indicate little more than a self-fulfilling prophecy, but they also suggest that general expectations for the medium could influence motivations to seek information and to develop relationships using CMC.

The second issue concerns precisely what kind of catalyst anticipated future interaction provides, in CMC as well as FtF settings. One possibility is that anticipation stimulates greater amounts of information exchange (as seen in Calabrese, 1975; Cline & Musolf, 1985). Alternatively (or simultaneously), anticipation may stimulate heuristic processing and positively bias interpretations of information (as seen in Berger & Douglas, 1981). The net effect of either dynamic can be more favorable impressions and relational communication, obscuring which underlying process is functioning. At a practical level, it matters little how anticipation operates. At a theoretical level, however, this paradox raises questions about the fundamental assumptions of both SIP theory and reformulations of uncertainty reduction theory (Berger, 1979; Berger & Bradac, 1982). Both theories assume that a relatively straightforward and linear accretion of social information leads to impression formation and relational development. A qualitative shift in interpersonal evaluations, although very plausible from other perspectives, is not consistent with these theories' specifications.

Cues About Us, Not You or Me

Social identity/deindividuation (SIDE) theory is another theory founded on the assumption that CMC's lack of nonverbal cues filters out interpersonal and individual identity information (Lea & Spears, 1992; Spears & Lea, 1992). However, in contrast to previous theories, SIDE theory focuses on the effects of contextual cues and cues that indicate the common social categories of CMC group members. Communicating without nonverbal information, and in physical isolation, promotes greater group identification and self-categorization in line with social identity. For instance, individuals' participation in particular groups—such as Usenet newsgroups on specific topics, corporate e-mail lists, or social psychology experiments among college students—provides others with clues about them based on the nature of those groups. According to SIDE theory, people use such clues about collectives as a basis for relating. They interpret the content of others' messages not as individuating characteristics, but as signals creating or reinforcing group norms (Lea, O'Shea, Fung, & Spears, 1992). Rather than temper their impressions and relations on the basis of so little information, CMC users overinterpret the information they have. When context makes group identity salient, CMC users overattribute similarity and common norms, resulting in social attraction to the group and thereby its members.

This positive group bias is nullified when users relate on the basis of individual instead of social identities. Individuating information may result in a broader range of partner evaluations or stimulate attributions of dissimilarity and negative evaluations. A recent study offers a good example of SIDE theory's approach and utility. Lea, Spears, and de Groot (2001) formed groups with students in two countries who communicated via CMC. Some groups used text-based messaging alone and were visually anonymous, whereas others augmented their interaction with videoconferencing, providing physical appearance and nonverbal cues, and were thus identifiable as individuals. Not only were members of the visually anonymous groups more attracted to the group at the distal outcome level, but results also supported SIDE theory's predictions about the underlying processes involved. Analyses revealed that the text-only users developed greater group-based self-categorizations, which structural equation modeling showed to affect group attraction; group

attraction was also indirectly affected through increased stereotyping of out-group members. Interestingly, group identification overcame the prospective in-group/out-group influence of nationality, which had no effect on member evaluations.

SIDE theory has accumulated an impressive body of empirical support for its central claims and has extended its domain into gender categories, differences in power and status, and intergroup perceptions and behavior. Its originators acknowledge that more work is needed on the strategic, as opposed to the interpretive, components of the theory; work to date has generally focused on perceptual outcomes rather than on direct assessment of message behavior, although some progress has been made on the latter front (e.g., Postmes, Spears, & Lea, 2000). As our discussion here must be somewhat abbreviated, we are glad to note that several extensive reviews cover this work in depth (e.g., Postmes, Spears, & Lea, 1998; Postmes, Spears, Lea, & Reicher, 2000).

Although SIDE theory offers a powerful lens through which to view certain CMC relationships, its application to *interpersonal* relations (in the sense of dyadic or close personal relationships) is less clear. The implication that all on-line interaction stays fixed at the social or group level, never reaching the personal level, is particularly troubling. Almost all of the studies supporting SIDE theory have experimentally manipulated group identity or created contexts in which group identities were especially likely to be salient. This is a reasonable experimental approach, but the generalizability of the findings to a wide range of naturally occurring CMC relationships is unclear. For example, although SIDE theory may explain initial attraction between two users who meet in a topical Usenet group, it is somewhat more difficult to imagine its application when those users move to private e-mail as they pursue dyadic friendship or romance (e.g., Parks & Floyd, 1996). In spite of conceptual efforts to apply SIDE theory to on-line romantic relationships (Lea & Spears, 1995), the theory dictates that all CMC use in which communicators are visually anonymous and geotemporally dispersed must focus on a group level of identification. It clearly differentiates between *interpersonal* cues and *social* cues, precluding the former and promoting the latter in its account of on-line attraction. Individuating information that might personalize impressions has no role in SIDE theory, except, perhaps, to conform to a possible local norm of personal information sharing (see Walther, 1997). Indeed, according to the theory, interpersonal information should undermine the group-based categorizations upon which attraction is predicated. The implications of these issues for relationships other than groups' have yet to be addressed by SIDE theory (see Walther, Slovacek, & Tidwell, 2001).

Cues Bent and Twisted

Reports of surprisingly close friendships, rapidly escalating romances, and inexplicably cohesive groups forming on-line cropped up with increasing frequency as Internet use exploded during the 1990s. It was clear that in many cases people were achieving levels of sociality and intimacy in on-line settings that they would never have achieved as rapidly, if at all, in comparable FtF settings. It was also clear that existing theoretical approaches to CMC could not account for these phenomena. In an effort to explain these observations, Walther (1996) pointed to four sets of effects operating in many on-line settings. These *sender, receiver, channel,* and *feedback* effects may create "hyperpersonal communication" that goes beyond the interpersonal levels typically achieved in FtF associations.

Receiver and source effects flow from the roles individuals play in the communication process. Although there are individual differences, these effects generally are created when receivers initially engage in stereotypically positive and idealized attributions of on-line

partners. Receivers may overgeneralize based on a common group identity (as in SIDE theory), but they may also make such positive attributions because of anticipated future interaction or because they are deliberately seeking new relational partners (Roberts, Smith, & Pollock, 1996; Walther, 1997). For their part, senders regularly exploit CMC's absence of nonverbal cues for the purpose of selective self-presentation. CMC users may take advantage of their greater control over message construction to craft messages to reflect preferred characteristics, and they may time self-revelations in order to serve developing relational goals.

The *channel* itself facilitates goal-enhancing messages by allowing sources far greater control over message construction than is available in FtF settings. A CMC user may pause to review and edit during the initial construction of a message and may take advantage of an asynchronous channel to buy time to consider responses. Asynchronous channels also allow users to interject social comments more easily in task-oriented settings, as there is no shortage of time for both dimensions when partners communicate in temporal independence. Moreover, sources are freed from a number of distractions while using CMC and are thus able to concentrate on managing their self-presentations. They need not attend to ambient environmental stimuli, to multiple simultaneous cues from their partners, or to their own physical back-channeling.

Finally, hyperpersonal *feedback* effects may create self-fulfilling prophesies among senders and receivers. As idealizing receivers in turn send selective messages, behavioral confirmation processes may be cued (Snyder, Tanke, & Berscheid, 1977) wherein partners rather easily come to behave in ways that meet their partners' exaggerated interpersonal expectations.

Positive hyperpersonal effects have received the greatest attention, but "hypernegative" effects are possible as well. When coupled with time restrictions and no expectation of future interaction, the relatively effortful nature of CMC may trigger overly negative interpretations on the part of receivers, ill regard and hostile message construction by sources, failure to use the channel's positive capabilities, and amplifying cycles of disaffiliation (Walther et al., 2001).

The overall hyperpersonal model has been tested in two studies involving students on different sides of the Atlantic. E-mail was used for international communication, although group members local to one another had FtF conversations occasionally. In the first study, student groups were prompted to develop either a group or individual identity and given the expectation that they would have either short- or long-term interaction (Walther, 1997). Surveys conducted at the end of the students' projects revealed a number of interaction effects that supported the hyperpersonal model. Long-term, group-identity partners rated their CMC-only partners as higher in affectionate communication and as more socially and physically attractive (despite never seeing them) than those in the short-term, group-identity condition. Individual-identity groups scored in the middle range, presumably because they were less sensitive to the cognitive biases suggested by SIDE theory. Moreover, the groups' self-reported ratings of their efforts on their projects coincided with their relational patterns, suggesting a social facilitation of work by relational states. Ratings of FtF partners, on the other hand, showed no influence of these manipulations.

Several additional aspects of the hyperpersonal framework were addressed in a second study involving international student groups using CMC (Walther et al., 2001). Two factors were manipulated: previous interaction (zero history versus semester-long contact) and visual information (photo versus no photo). As predicted from a social presence approach, providing participants photographs of one another over the Internet tempered negative effects in zero-history, no-future groups.

Conversely, in line with the hyperpersonal perspective, providing photographs dampened positive affect in the long-term, hyperpersonal condition. Long-term groups who saw photographs reported less attraction than did those who communicated without seeing photographs. Across all conditions, short-term, no-photo groups related least positively, as predicted, and the long-term, no-photo groups were most positive, with both of the photo-showing conditions in the middle ranges. Additional analyses indicated that participants generally felt more successful in their self-presentations when they did not have photographs showing. Post hoc analysis further revealed that when no pictures were shown, greater familiarity was associated with more affection, and that subjects' perceived success at self-presentation predicted how physically attractive they were judged to have been. With actual physical appearance through photos, however, self-presentation was negatively associated with physical attractiveness, suggesting (among other conclusions) that attempts to impress may backfire when physical appearance gets in the way of selective self-presentation. Ultimately, it appears that when virtual partners are given the time and opportunity, and conditions facilitate their getting to know one another, they appear to do so selectively and, ultimately, more positively using CMC and CMC alone.

The hyperpersonal model has been used as an explanatory framework for findings across several different domains. In person perception research, for example, Hancock and Dunham (2001) found that CMC partners evaluated their partners more extremely, albeit on fewer criteria, than did FtF counterparts. Hyperpersonal predictions have been utilized in studies of on-line social support (Turner, Grube, & Meyers, 2001), on-line education (Chester & Gwynne, 1998), and relationship development in on-line settings (Parks & Floyd, 1996; Parks & Roberts, 1998; Wildermuth, 2000).

Perhaps the greatest appeal of the hyperpersonal model is that it accounts for behavior in computer-mediated settings in terms of variations among familiar communication components—the sender, receiver, channel, and feedback. Its utility has been demonstrated across a variety of relational contexts in CMC. Yet the model is open to significant criticism as well. It is not at all clear whether there are any necessary theoretical linkages among and between the four major components and the more detailed processes that the model specifies. In other words, its constructs and propositions are poorly interrelated, and its status as a robust theory is therefore tenuous. The danger of this, as with any theory, is that it is difficult to reconcile either supportive or inconsistent empirical results with the overall model, or to identify which aspect of the model may have been supported or disconfirmed. Furthermore, as the model now offers both hyperpersonal and hypernegative outcomes and assumptions that users adapt the media to their relational goals, it will be important for researchers to stimulate, specify, or discover the relational goals CMC users bring to their interactions, without which the model may become unnecessarily teleological. Even so, the hyperpersonal approach offers an agenda worth pursuing, not only because of its promise for increasing our understanding of relational processes in a variety of CMC settings, but also for its practical implications for the management of on-line education and virtual work teams.

INTERPERSONAL PROCESSES IN COMPUTER-MEDIATED COMMUNICATION

In this section we consider the role CMC may play in larger interpersonal contexts and processes. Our focus shifts from research on the availability of cues and the structure of messages to research on several broader social uses to which those cues and messages are put in the domains of the social basis of mental

health and well-being, social support, and relationship development. It is important to note that the nature of the research shifts focus as these topics are explored. First, the predominant focus in this research is on the different social networks that individuals access via the Internet. Second, whereas most theoretical investigations have taken the form of controlled experiments that dichotomize CMC and FtF associations, the researchers who have conducted the field studies reviewed below have recognized to a greater extent the availability and interchangeability of multiple communication channels in pursuing relationships, and have raised the issue of complementarity between on-line and off-line interaction. This represents a significant and healthy shift in the applied value of the research, although, as we will see, the tension between descriptive and theoretical understandings waxes and wanes throughout these studies as a whole.

Internet Use and Mental Health

Mental health and social functioning have been central topics in interpersonal communication research for nearly 50 years. It is not surprising, then, that a great deal of attention has been directed toward the question of whether social use of the Internet promotes or damages mental health and social functioning. This brings us back to where we began—to Kraut et al.'s (1998) longitudinal study of Internet adoption and use in a sample of 93 families. Kraut and his colleagues tracked these families, who did not previously have computers or the Internet at home, over a period of 2 years, starting in 1995. The results of the study indicated that spending more time on the Internet was associated with a small but significant increase in scores on a self-administered measure of general depression. Greater Internet use was also associated with small reductions in the amount of communication with family members and with geographically proximate acquaintances. The researchers offered images of relational displacement or substitution to explain these findings. Assuming that on-line relationships are inherently weaker and less supportive than FtF relationships, Kraut and his colleagues argued that substituting on-line interaction for FtF interaction should result in a reduction in the social support available to users. With less support available to them, Kraut and his colleagues reasoned, people would be more likely to experience depression.

Criticism of the study was immediate. Some dismissed the results on the basis of their own subjective experiences in using the Internet for personal growth. Some insisted that because Kraut et al. did not include a control group, their results were meaningless (which is refutable, although not completely, given the study's longitudinal design). Others noted that Kraut et al.'s explanation depended on a negative correlation between Internet use and social support—a correlation that they did not in fact find. Still others suggested that the sample was not representative of the self-motivated Internet-using public: The participants' reactions might have represented a "newbie effect"—that is, their behavior reflected their relative inexperience with the Internet rather than characteristics of the Internet itself.

But this was not the only study that raised questions about the effects of Internet use on family communication. Nie and Erbring's (2000) survey of 4,113 Internet users indicated that the more time individuals spend on-line, the less time they spend with family members in FtF or telephone communication, looking at television and newspapers, or shopping in physical stores. These findings, like Kraut et al.'s, were trumpeted in the press as demonstrating the social dangers of the Internet. Once again, however, there were good reasons to believe that the findings were not as clear as claimed. Nie and Erbring did not account for obvious alternative explanations for some of their findings (such as children growing more autonomous and spending less time with parents). Nor did they

pay adequate attention to the fact that when the Internet users switched from phone communication to e-mail, their e-mail communications included members of their extended families.

A number of studies have corroborated the value of the Internet for family and friendship networks. Stafford, Kline, and Dimmick (1999), for example, found that the dominant use of e-mail in the home was for contact within family and friendships networks. Users reported that e-mail provided them with greater opportunities for satisfying their interpersonal needs, but the reasons for this were e-mail's speed, low cost, and convenience, rather than any favorable or unfavorable expressive capacities. Likewise, the first report by the Pew Internet & American Life Project (2000), which presents survey data from 1,690 Internet users, indicates that communication with family members and existing friends via e-mail accounts for a significant proportion of Internet use. A majority of respondents indicated that they now communicate with family members more often than they did before they had access to the Internet. Focusing on the *nature* of on-line communication, the report also states that more than a third of the sample agreed that they find it easier to communicate frankly with their family members via e-mail than by alternative modes, and that the ability to do so improves their relationships.

Sorting through the conflicting findings and claims requires a more rigorous theoretical stance than has been applied in most studies. LaRose, Eastin, and Gregg (2001) made a positive step in this direction when they examined Internet use and mental well-being using social cognitive theory (Bandura, 1997). They were particularly concerned with how differences in experience with the Internet might lead to differences in self-efficacy, competence, stress, social support, and depression. They found that more experienced users reported greater self-efficacy with respect to their abilities to use the Internet. And those who felt greater self-efficacy and competence, they found, experienced less stress using the Internet, and hence less depression. Moreover, more frequent Internet use—especially e-mail—was associated with increased social support, also leading to less depression. LaRose et al. note that more experienced users know how to take advantage of the Internet's resources to obtain social support, and also, they use e-mail to stay in touch with family and friends who provide support. These findings help put those of previous studies in context. Instead of blaming on-line communication for depression, these results point to the stresses and lack of efficacy new users often experience and suggest that these often transitory factors might account for the depression that new users (such as those in the Kraut et al., 1998, study) experience.

Time and additional research have also led to revisions in the postures taken by previous researchers. Kraut and colleagues (2002) have revised their conclusions about the effects of Internet use on depression after conducting a follow-up study in which they accounted for the potential differences as Internet dynamics changed over time. In a follow-up study among Kraut et al.'s (1998) original subjects, they found that more frequent Internet use (especially e-mail) was associated with increased contact with both local and distant social partners, as well as with family members. Internet use was associated with more family contact and greater social support for teens. For adults, more frequent use was associated with more FtF communication with family and closer feelings toward extended family and friends. Further, Internet use was also found to interact with extraversion. Extraverts experienced more positive effects as their Internet use increased, including less depression, more positive affect, and increased self-esteem; but introverts declined on these indicators the more they were on-line (see also Wright, 2000, regarding similar effects of communication apprehension). For all users, the more they used the Internet,

the more stress and hassles they reported in their lives.

Kraut et al. (2002) account for this dramatic difference in findings by observing that both the users they studied and the Internet itself had changed since the first study. The users became more experienced. More of their FtF-based friends and relatives had moved on-line, thus making it easier for them to communicate with strong ties (see Markus, 1987, for a "critical mass" explanation of technology adoption). Interestingly, Kraut and his colleagues did not revisit their assumption that relationships that exist exclusively on-line are necessarily "weak," nor did they attempt to explain why greater use of CMC was associated with more positive affect and closeness within those strong-tie relationships that exist both on- and off-line.

The potential importance of CMC in these "mixed-mode" relationships—relationships that exist in several different media—is further illuminated by a recent study of long-distance relationship maintenance conducted by Gunn and Gunn (2000). These researchers found that, compared with long-distance partners who did not use the Internet, those who communicated using CMC "reported greater love and felt closer to long distance relationship partners, [and] self-disclosed at greater depth and breadth" (p. 2). They also found that those who used the Internet generally preferred their long-distance relationships over their local relationships, whereas those who did not use the Internet generally preferred their local relationships to the long-distance relationships they maintained through letters and telephone calls.

Looking across the studies to date, it appears that for new Internet users, contact with close ties, as well as social and mental well-being, may suffer slightly while they learn to use the social potential of the Internet. Over time, however, they become adept at using the Internet to maintain contact with friends and family and to obtain social support. Individual differences, such as extraversion/introversion, may make it easier or harder for some people to reap the social benefits of the Internet. For those who wish to maintain long-distance contacts with friends and family, however, CMC may be a more satisfying choice than more traditional channels such as letters or the telephone.

Social Support On-Line

The Internet must be judged as a fabulously successful medium for social support. Understanding, reassurance, and advice flow out through literally thousands of on-line support groups (for an extensive list of on-line support venues and the topics they address, see "Emotional Support on the Internet V1.36" at www.cix.co.uk/~net-services/care/list.htm). No one can observe the discussions that take place among the members of such support groups and not be struck by their authenticity and intimacy. The question for researchers is not whether the Internet is capable of providing social support, but rather why it should be so effective as a support medium.

CMC and the Internet fundamentally change two structural aspects of social support: the cues/channels of communication and the sociometric relationships of the participants. Most studies of on-line support have concentrated on one of these two factors. Thus studies have examined the use of CMC by individuals who have few FtF sources who share their illness-related experiences or concerns (Scheerhorn, Warisse, & McNeilis, 1995), the types and functions of social support messages typical in on-line venues (Braithwaite, Waldron, & Finn, 1999), the levels of emotion and relational strength among sociometric weak ties (Egdorf & Rahoi, 1994), and rhetorical strategies that establish a communicator's authenticity and credibility in seeking or providing support on-line (Galagher et al., 1998).

Two studies provide particular comparisons between social support in FtF and on-line

settings. Walther and Boyd (2002) observed that previous literature had identified several risks or difficulties with FtF social support, especially in close relationships. For example, individuals who make up support seekers' close personal networks may not have the requisite expertise to deal with support seekers' problems (La Gaipa, 1990). In efforts to reassure them, partners may attempt to minimize the severity of support seekers' concerns, or, out of regard, be less than frank in their assessments. For support seekers, disclosing concerns may create vulnerability and dependence; they may risk stigmatization and embarrassment that may spread among other members of their personal networks (Adelman, Parks, & Albrecht, 1987; La Gaipa, 1990). When support messages are not well matched to a seeker's needs, social support is ineffective, and the relationship between the seeker and provider can suffer (Cutrona & Russell, 1990; Goldsmith, 1992).

Reasoning that many of these problems might be overcome in on-line settings, Walther and Boyd (2002) surveyed users of Usenet support groups in order to explore which aspects of on-line support the users themselves found attractive. Their research yielded four dimensions of attraction to on-line support, highlighting both the sociometric and interactional characteristics of the Internet and CMC. First, a *social distance* dimension reflects users' appreciation for the greater expertise of on-line sources, compared with the expertise available to them from their personal networks. A man suffering from testicular cancer, for example, may very well not know anyone in his FtF network who can speak to his experience. This is especially likely to be true if he lives in a rural area. People with rare conditions may find it difficult to locate anyone with expertise or common experience within the range of FtF contact. Social distance also allows people in on-line settings to be less concerned about becoming dependent or stigmatized.

Second, users value *anonymity* because it expands their ability to avoid embarrassment. The nature of the social and the technological networks allows both relative anonymity, with respect to the chances of knowing anyone directly, and actual anonymity, through technologically enabled anonymous addressing. One can even obtain support without ever saying a thing. Individuals can, as Mickelson (1997) observes, "obtain comparison information or vicarious support without having to disclose anything about themselves . . . [and] obtain validation for their feelings of stigma without having to communicate those feelings to others" (p. 172).

A third factor, *interaction management*, reflects users' appreciation of being able to craft messages carefully, read messages at their convenience, and express themselves more effectively than they might typically do FtF. Additionally, this dimension reflects the value of being able to enter and exit support relationships opportunistically. One need not, for example, sit through an entire meeting of a support group just to have a question answered.

Finally, users find the night-and-day *access* to on-line support systems attractive, in comparison to the potential difficulty of engaging in support exchanges off-line. The Internet never sleeps. No matter what time it is, a potential supporter is likely to be awake and available somewhere in the world.

These findings may seem paradoxical with respect to assertions from the studies on mental health and Internet use discussed above. Although the report of the Pew Internet & American Life Project (2000) acknowledges the benefits that CMC confers in interaction management and message construction, that study and several others (especially Kraut et al., 2002; LaRose et al., 2001) have emphasized that the benefits of CMC for enhancing social support derive from the fact that Internet access makes it possible for people to connect more readily to preestablished partners, such as family and friends. Walther and

Boyd's research suggests that the support advantage of the Internet is conferred in exchanges with relative strangers. One recent study that examined differences in satisfaction between on-line and off-line support networks found that users favored on-line networks over FtF sources (Wright, 2000).

Recent research has begun to untangle this paradox and offers a glimpse at the strategic, opportunistic, and intelligent ways in which Internet users exploit both local and virtual resources. Turner et al. (2001) compared support provision by on-line sources and close FtF sources. They posited that the relational depth and perceived support from FtF partners and the relational depth and support experienced with regard to an e-mail-based support list would predict the amount of involvement with each source. They also predicted that deficiencies in support from one source would lead to greater involvement with the other. Responses from users of several cancer-related Listservs provided no support for the main effects on involvement with each source, but they did highlight several significant interactions. "Perceived support from the list predicted time spent reading only when support from their face-to-face partner was low," Turner et al. (2001, p. 245) note. Moreover, "when both the depth of the relationship with the list was high and the depth of the relationship with their face-to-face partner was low, subjects spent more time reading, and staying in contact via email." These patterns also predicted an increase in users' e-mail correspondence with members of the list on a dyadic basis and FtF meetings among list members.

The implications of these findings should not be underestimated. They suggest that media choice is not predicted by users' assessments of media characteristics and goals alone. Rather, individuals exploit the alternative social networks and communicator characteristics that are associated with different channels. These findings remind us that there is nothing sacrosanct about FtF communication or personal relationships; nothing makes them inherently beneficial all of the time. Relational competence and mental health might have much to do with knowing with whom to communicate, in what way, and when. In this respect, CMC expands the range of competent choices rather than simply extending opportunities to communicate with the same old partners in the same old ways. Finally, Turner and colleagues (2001) offer a note of contingency and maturity to some of our own earlier positions when they point out that although the hyperpersonal perspective may

> help us to understand how CMC enables close relationships to develop and flourish, most relationships do not occur in a vacuum but in the context of a network of supportive relationships inside and outside the virtual community. It is these other relationships, the needs of the participants, and the common . . . experience of [the community] that appear to interact with and cumulatively influence the development of hyperpersonal relationships. (p. 246)

Relationship Development on the Internet

Views regarding the types of relationships people develop in on-line settings have been both polarized and politicized. For some, nostalgic stances about "real relationships" and warnings about restricted cues combine to portray the Internet as a relational wasteland. For others, the Internet is not only a good place for intimate relationships, it's too good a place. They see it as a dangerous or at least exotic breeding ground for intense sexual relationships (e.g., Cooper, Delmonico, & Burg, 2000; Lipton, 1996). Although the Internet is undoubtedly not relationally fertile enough for some and a bit too fertile for others, neither extreme yields a very accurate or useful view of relational development in on-line settings.

In one of the first studies to provide basic descriptive data on the relational potential of

the Internet, Parks and Floyd (1996) surveyed participants in a stratified sample of Usenet newsgroups. They discovered that a clear majority (60.7%) of participants reported having formed at least one dyadic personal relationship on-line. These relationships took place marginally more often between cross-sex partners than between same-sex partners, but only 8% were described as romantic relationships. Most were described as friendships of one type or another. The best predictor of individuals' starting relationships on-line was the length of time they had been Internet users. Just as people start relationships with the people they meet over time as residents in an apartment building, people start relationships with others on-line as they become more familiar with their virtual environs.

On-line relationships may reach remarkably high levels of development. Parks and Floyd asked respondents to rate one of the relationships they had started on-line along a number of standard developmental dimensions. Approximately half of the respondents indicated a high degree of *interdependence* in their relationships, and half scored low on this dimension. They reported moderate to high levels of both *breadth* and *depth* in their on-line personal relationships, including items assessing intimacy and self-disclosure. These relationships did not in general reflect a high degree of *shared personal codes* and idioms, as other close relationships traditionally do.

Parks and Floyd (1996) also asked their respondents how they and their on-line friends use communication media. After meeting in Usenet groups, almost all partners augmented their communication with other media, including direct, dyadic e-mail (98%), the telephone (35%), and postal exchanges (28%). Fully a third of those who had developed relationships on-line progressed to eventual FtF meetings, in spite of the fact that they and their on-line friends were often separated by formidable distances.

A follow-up and extension of this study conducted by Parks and Roberts (1998) examined relationship formation in another Internet setting and asked about FtF relationships as well. This study examined MOOs (multiuser dimensions, object oriented), real-time discussions in which participants create names and descriptions for themselves and can create textual depictions of rooms and objects. Many MOOs are purposefully designed to foster free-ranging social interaction, whereas others foster on-line games or are mixtures of the two types. Unlike newsgroups, where all postings are available for public inspection, MOOs allow participants to take part in person-to-person messaging, either by privately messaging targets despite the virtual presence of other participants or by going to private virtual rooms. Some 94% of the respondents in this study reported forming personal relationships with other MOO users, with such relationships typically lasting just over a year; 86% of these were cross-sex relationships. Most were close friendships or friendships, although 26% were described as romantic in nature. Compared with friendship partners, romantic partners spent significantly more hours on-line with one another and met on-line more frequently. Concerning *interdependence, breadth* and *depth,* and *shared personal codes,* participants in MOO-based relationships rated higher on each of these characteristics than the Usenet respondents. When participants were asked to rate comparable FtF partners, scores on the same measures were slightly but significantly higher.

Of those in MOO-initiated relationships, 93% used other channels as they progressed, and 38% eventually met face-to-face. However, Parks and Roberts ascertained that only 8% went from MOO to FtF without engaging a sequence of other channels first, and these were primarily friendships, not romantic partners. In general, between MOO meeting and FtF meeting, these partners used e-mail, telephone, cards and letters, and photographs exchanged by

mail. Although Parks and Roberts do not speak to the final step, these findings suggest there may be some truth to the folklore reported by Mitchell (1995): "Hacker lore has it that burgeoning cyberspace romances progress through broadening bandwidth and multiplying modalities—from exchange of e-mail to phone and photo, then taking the big step of going [FtF], then climbing into bed" (p. 19).

In other research, Baker's (1998) descriptive study implies such romantic consummation and works backward from there. In an effort to determine what elements predict successful romantic relationships that begin on-line, Baker interviewed 18 couples who had initiated their acquaintances via the Internet, met FtF, and were still (at that time) together. She reports that most of the couples had originally encountered each other in some venue facilitating a mutually shared interest, such as playing a trivia game or participating in an occupationally related discussion group; fewer met via on-line matchmaking services. Consistent with some of the perspectives reviewed above, they were attracted to one another on the basis of "sense of humor, response time, interests, qualities described online, and writing style" (p. 2), and several respondents acknowledged that they had found it easier to reveal thoughts and feelings, and that they disclosed more, on-line in comparison to their experiences FtF.

All of the couples in Baker's sample used multiple media prior to meeting, and all but one had exchanged photographs of themselves before meeting FtF. Several subjects commented, however, that the photos they received were not very accurate depictions of their partners' actual physical appearance. Men more often sent pictures that were out-of-date and more flattering than they currently appeared (see also Levine, 2000), whereas women more often sent pictures or issued self-descriptions that were less attractive than they actually looked. With respect to communication behavior, some partners seemed shier FtF than their more outgoing on-line interactions suggested they would be. Baker concluded from these interviews that time was a critical factor in the success of these couples: Despite the discrepancies in appearance or shyness, they felt as though they had gotten to know each other very well before meeting FtF. Although they had exchanged photos, some respondents indicated, the significance of the photos was nil, because they had already fallen in love. In spite of the small size of Baker's sample, these findings point in a number of directions that might prove fruitful for future research. The shift from CMC to FtF interaction presents opportunities for communication researchers not only to address basic theoretical questions regarding media use, interaction management, and identity construction, but to develop practical guidance for those involved.

MIXED-MODE RELATIONSHIPS: THEORETICAL OPPORTUNITIES AND CHALLENGES

The research reviewed in the preceding section bears testimony to the fact that CMC has become one among many modalities in contemporary relationships. As more people have connected, it has become apparent that the Internet is a remarkably convenient, low-cost tool that people can use to stay in touch with people they already know—coworkers, friends, family members. The research on social support suggests that people are making complex decisions about intimate disclosure within the context of a combined network of on-line and off-line contacts. Other studies have demonstrated that relationships that start on-line rarely stay there. As they develop, many on-line relationships migrate to FtF settings.

At the same time, modern relationships may have outgrown our theories about them. Although some accounting has been given to long-distance relationships that began FtF and are maintained using personal media (e.g., Stafford & Reske, 1990; Stephen, 1986), existing theories certainly never anticipated

mixed-mode relationships (MMRs), in which people meet on-line and migrate off-line. As Rheingold (1993) observes, "The way you meet people in cyberspace puts a different spin on affiliation: in traditional kinds of communities, we are accustomed to meeting people, then getting to know them; in virtual communities, you can get to know people and then choose to meet them" (pp. 26-27). Nor do extant theories address how we may be affected by the orchestration of multiple relationships that have been segmented into different channels (regarding the pros and cons of cyberaffairs, see, e.g., Levine, n.d.).

These new social arrangements not only pose challenges for existing theories, they also afford new opportunities for theory. We explore several of these challenges and opportunities in this section. First, we illustrate how the rise of MMRs reveals gaps or strains in influential theories of interpersonal communication and CMC. Second, we offer an alternative approach for thinking about how communicators manage identity in a world of variably connected contexts.

Leaving Virtuality: A Paradigmatic Problem

For people who have met on-line, the decision to meet FtF is rich in risk and opportunity. It is a potentially defining relational move. As Mitchell (1995) observes, "I have found that it can be a jarring, dislocating experience actually to meet somebody I have long known through network interactions and for whom I have by virtue of these interactions, presumptively devised a persona" (p. 12). This observation is hardly unique. Interviews with people who have met their virtual friends FtF reveal a trail of inaccurate guesses and violated expectations (Jacobson, 1999). These dislocations are theoretical as well as experiential. Some of the most promising theories in CMC research that account for relational processes taking place exclusively on-line break down when faced with relationships' movement toward continuation in physical FtF interaction. The implicit or explicit assumptions about physicality in extant theories of FtF and CMC may make them problematic with respect to this type of progression. To illustrate, we review some of the more potent theories from both traditions below.

Uncertainty reduction theory (URT) holds great prospects for MMRs that move from the virtual to the physical realm successfully, but it cannot accommodate those that are unsuccessful. In the uncertainty reduction process, according to Berger and Calabrese (1975), uncertainty reduction leads to greater affinity. As interaction progresses and information is obtained or disclosed over time, greater liking and intimacy should result. A great deal of uncertainty-reducing information should be presented upon an initial FtF encounter following a CMC-based acquaintanceship. We should therefore predict that affinity will rise dramatically due to a shift from virtual to physical contact. Although there are many cases of relationships spawned on-line that lead to ongoing friendships and even marriage (e.g., Landis, 1994), there are also abundant anecdotal reports of relational failure upon first physical encounter (e.g., Albright & Conran, 1995; "Romance and the Internet," 1994). Although some efforts have been made to recognize both favorable and unfavorable outcomes in FtF uncertainty reduction (Berger, 1986; Berger & Bradac, 1982), these models are less clear than the original. We qualify this critique by noting that URT speaks most directly to the context of initial interactions, and does not as often address ongoing relationships (although some researchers have introduced modifications to URT in attempts to do so; e.g., Gudykunst, Yang, & Nishida, 1985; Parks & Adelman, 1983). In general, however, URT may not be up to explaining mixed-mode relationship development.

Social information processing theory (Walther, 1992) suggests that uncertainty

reduction and social penetration can ultimately be as effective in CMC as in FtF interaction. A strict SIP interpretation suggests very little impact or value of FtF-based information once a virtual relationship is formed. If one can truly get to know another on-line, physical appearance or other data that might uniquely become apparent FtF should be superfluous to impressions and relationships. This is consistent with Baker's (1998) report of respondents who discounted the impact of photos. In other cases, as Jacobson's (1999) research and Mitchell's (1995) observations suggest, "real-life" characteristics may depart substantially from virtual ones, in which case SIP theory is found wanting.

SIDE theory, in contrast to URT and SIP theory, might account for MMRs that fail upon physical meeting, but cannot account for ones that succeed. Although SIDE theory has been offered as a framework with which to understand virtual romantic relationships (Lea & Spears, 1995), it depends on CMC users' keeping hidden their individuating characteristics (especially their physical characteristics). When partners are seen they are individuated and differentiation occurs; in SIDE theory, this undermines social attraction. Thus when a virtual relationship becomes physical, it should immediately individuate and suffer as a result. Although there are probably more cases of on-line romances that do not culminate in marriage than there are of those that do—as is the case in off-line life as well—those that do are not explainable from a SIDE perspective.

The *hyperpersonal* perspective is predicated on users' taking advantage of the opportunities that CMC affords them to enhance self-presentation and nonvisual interaction's ability to inflate perceptions of others. Because attraction in this framework presumes a good degree of selective processing of input and output information, the position does not bode well for the success of a shift to substantially less controlled information sharing, especially considering the observed dampening of affect of even a photo in otherwise hyperpersonal relations (Walther et al., 2001).

Identity Warranting in Mixed Modes

The link between the self and a given self-presentation offers one starting point for reformulating our approach to communication in relationships that move from virtual to physical. The connection between who we are and who we claim to be on the Internet is by no means obvious. According to the Pew Internet & American Life Project (2001b), "Fully 56% of online teens have more than one email address or screen name and most use different screen names or email addresses to compartmentalize different parts of their lives online, or so that they can experiment with different personas." This research found that most teen deceptions were for pranks or privacy, but that adults used subtle deceptions about age, appearance, occupation, or life circumstances to achieve a wider range of goals. Such fabrications are performed in the context of games or simple curiosity, as potentially self-therapeutic investigations of aspects of the personality, to avoid on-line harassment or elevate social standing, or merely to impress (Curtis, 1992; Donath, 1999; Roberts & Parks, 1999; Turkle, 1995).

Stone (1995) suggests that we may conceive of a *warrant* connecting the self with an on-line presentation. In FtF settings, she observes, we typically have a strong and generally unquestioned warrant between the presented identity and the body's self. This reflects, among other things, a political necessity of society: When a personality commits a crime, some body must be incarcerated; when an identity performs salable, taxable services, the government must warrant that person to a body to whom retirement benefits may be sent. In interpersonal interaction in the physical world, it is a commonplace to warrant a relatively stable identity to a physical entity. But in cyberspace, the connection between

the self and the self-presentation becomes mutable.

This notion of warrant has powerful implications as a construct for the analysis of virtual identities and relationships. In identities and relationships that exist entirely on-line, there is no necessary warrant between identity and corporeal self. There may be no necessary connection between the typist and the typed. To make her case, Stone (1995) draws on a radical but logical extension of symbolic interactionism, which holds that the shapes and meanings of things emerge initially through the instigation of one person but primarily through the social interaction of many. It is social interaction that defines a thing, an idea, or a self, as it evolves over time. Thus a spark of personality that may even be peripheral or antithetical to an individual's normal proclivities may provide the beginnings of the evolution of an on-line entity that has little or no relationship to the typist. Although Stone's work offers a provocative starting point, it does not help us approach issues in the movement from virtual (potentially warrantless) relationships toward physical (warranted) ones.

We can do four things to transform this construct for the present purposes. First, we can reconceptualize warrant from a binary state (cyberself and physically presented self are unconnected) to a continuum (cyberself and physical self may be more or less connected). Second, we can recognize that the less a communication system requires a warrant between the text-presented self and the physical self, the greater the freedom of the actor to diverge the two presentations. In cases where the system allows great anonymity (such as MOOs), the on-line presentation may differ radically from the physical self, but in less anonymous systems, radical departures would be less likely without potential exposure and sanction. Third, we can posit that in systems where any degree of anonymity is offered, no matter how similar an individual's self-presentation on-line is to the presentation of self off-line, the perceiver of the on-line presentation must still decide what degree of warrant to attribute to that presentation. This, of course, is where suspicion of another person's deceptive presentation emerges. We assume that people generally prefer that the personality of a partner be consistent between one mode and another, as a basis of trust and a foundation for interpersonal vulnerability. The recognition of this need drives the behavior of the fourth implication: Actors can undertake behaviors that may increase the apparent warrant of their performance for the receiver's benefit, through the presentation of warranting information. We define the warranting value of information about a person as being derived from the receiver's perception about the extent to which the content of that information is immune to manipulation by the person to whom it refers.

Warranting is potentially quite limited in CMC settings in which individuals do not know each other off-line and do not expect to meet outside of their virtual interaction. Face-to-face communication, on the other hand, generally promotes fully warranted relationships over time. It does so by providing frequent exposure to partners' relatively uncontrolled behavior. Although office partners or roommates certainly can and do employ CMC when they are not copresent, we would not expect radical transformations in personality or excessively hyperpersonal interactions between such partners. When relationships that originated FtF become primarily mediated (e.g., the partners go for long periods without physical exposure to one another), the frequency of warranting information over time declines, and warrant may lessen somewhat. So it is that long-distance premarital couples idealize their beloveds, especially the more they use low-bandwidth media (e.g., letters versus the phone or FtF; Stafford & Reske, 1990).

Although the characteristics of the communication system set limits on possible warrantlessness, the degree of warrant in a relationship is not determined by the communication

system alone. We suggest that warrant is also affected by the social structures in which relationships are embedded and by the symbolic efforts partners undertake to make credible their self-presentations when their purposes make it desirable to do so.

Warranting and Social Structure

Being aware of and being able to access a partner's social network should limit the degree of warrantlessness in an on-line relationship. An example will help illustrate this situation: Two students become virtual friends as they interact with each other in a distributed college course involving classes at two universities, with no initial FtF meeting and no planned terminal FtF encounter. At first glance, these arrangements seem very similar to those facilitating no warrant whatsoever. However, in this case, each partner is aware that the other also operates in a social network (i.e., the distant students), which she can access. Contact with members of another person's social network has been shown to provide significant uncertainty-reducing information about relational partners (Parks & Adelman, 1983). Even the potential to access a partner's social network provides a known ability to corroborate some aspects of the partner's disclosures (is the partner male or female, tall or short, athletic or sedate, married or single?). The network also provides an audience in which a partner could be held accountable for misstatements, gross exaggerations, or false claims.

Warranting and Symbolic Efforts

Partial warranting in a potentially warrantless environment should involve an individual's proffering information that can be corroborated or used for corroboration. Simple examples might include a verifiable "real name," a traceable address, identification of biographical (not autobiographical) information in an information system (e.g., a directory), indication of some matter of public record, or direct access to the individual's FtF social network. Reference to a Web page with an identifiable and accountable address (such as an address at a corporation or educational institution, more so than at an ISP of unknown origin) should provide some value. If an individual's home page appears to be created by someone other than the subject of the page, so much more the warrant value that information might provide. Even self-description may work if it is specific and verifiable (e.g., "five feet, nine inches tall" rather than "tall"). Such aspects would *not* include self-disclosure of ambiguous information or events that cannot be corroborated. Attitudinal statements or biographical/historical details that are not generally known in the individual's social circles should have little effect in increasing warrant, and are more likely to serve as the kind of selective self-disclosure posited to be part of the hyperpersonal process (see Tidwell & Walther, 2002). One might think that the provision of stereotypically socially *undesirable* information may have a warranting effect, but without the potential for corroboration, it should be no more useful than any other well-timed self-disclosure.

As for the observation of partners through incrementally expanded bandwidth, from private mail to phone and photos before FtF, we can conjecture that these activities, too, provide warranting information. We make many trait inferences from vocal qualities (Siegman, 1987) and physical appearance (Berscheid & Walster, 1974), and we rely on nonverbal cues to detect deception because we assume they are less controllable than language content. Which physical cues through which channels matter most in this context is not yet known. It may depend on the receiver's preferences and/or the sender's self-concept. Physical appearance can be important, but photographs can be retouched or may be outdated, whereas vocal qualities generally cannot be altered. Perhaps the characteristic that the sender would least want to

share would therefore be the one about which the receiver most wants to know.

Warrant Invites Traditional Interpersonal Constructs

Whether or not this reformulated construct of warrant will ultimately illuminate how relational partners move from on-line to physical relationships remains to be seen. At the same time, the warrant notion does create intriguing opportunities to connect previous research on interpersonal communication and relational development to the domain of MMRs. For example, it suggests potential application of Sunnafrank's (1986) predicted outcome value theory to relationships moving from CMC to FtF. This theory argues that each bit of uncertainty-reducing information triggers a receiver's evaluations of the sender. If the information suggests continued potential for interpersonal reward, the relationship is pursued. If revelations are seen as negative, the relationship may be curtailed. We suggest that in an MMR context, from this perspective, incremental exchanges of higher-bandwidth cues, and other warranting information, act as break points for decisions about relational escalation or termination.

Similarly, the request and provision of warranting information may constitute "secret tests" of relationships that on-line partners make and may explain why they make them (Baxter & Wilmot, 1984). Cases in which warranting information deviates from virtual expectations create significant opportunities for researchers to study "uncertainty-increasing events" (Planalp & Honeycutt, 1985). Additionally, the progression from an exclusively on-line context through a series of additional media to arrive at a face-to-face meeting might be approached as a series of relationship "turning points" (Baxter & Bullis, 1986). Useful as they are, however, these approaches provide no clear guidelines for predicting the degree to which the weight of warranting information may influence relationship judgments relative to the weight they might have had in normal FtF acquaintance processes.

Alternative Interpretive Frameworks

In this last subsection we want to speculate on alternative ways in which appearance and behavior characteristics presented FtF may be processed in the context of a preexisting on-line relationship. Although some laud cyberspace as "a realm in which physical markers such as sex, race, age, body type, and size will eventually lose their salience as a basis for the categorization of self/other" (O'Brien, 1999, p. 77), Jacobson's (1999) research indicates that CMC users often construct impressions of their on-line partners that include imagined physical characteristics. This raises the question of whether judgments made from these imagined characteristics have as much, more, or less impact on interpersonal judgments when they appear later rather than earlier in relationship development. Is physicality just one layer in the unpeeling onion of social penetration, or does it hold particular potency? To address this issue, we suggest three plausible interpretive frameworks that CMC partners might employ with respect to the treatment of warranting information, using exposure to a partner's physical appearance as the paradigm case.

One interpretive option is *indefinite postponement.* A certain kind of uncertainty is never resolved in the absence of physical data, and ultimate judgments are held in check until such data appear. (Sunnafrank, 1986, might call this the recognition of "limited outcome experiences"; p. 9.) Communication between the first encounter and the physical encounter transpires under a "willing suspension of disbelief," but the eventual encounter of physical appearance is evaluated against standard individual criteria for attractiveness, and evaluations have similar force on relational judgments as if they had happened during initial acquaintanceship. That is to say, physically related

judgments of attraction will have as strong an effect on the desire to escalate or terminate interaction as if no other uncertainty reduction or affinity development had taken place.

This process is likely to vary due to two factors: the perceiver's gender (males tend to value physical attractiveness more than do females) and the type of relationship (i.e., intellectual/professional versus romantic/erotic). According to Baxter and Wilmot (1984), those who are becoming involved in romantic relationships tend to value and make greater effort to obtain information about their partners than those who are in platonic relationships.

Alternatively, the Internet allows users to prescreen for prospective partners who find exceptional characteristics acceptable. Cooper and Sportolari (1997) describe cases in which users canvass prospective partners in advance about whether they object to this or that physical characteristic. Such users then pursue relationships only with those for whom they are already likely to pass physical appearance tests when they meet FtF.

A second interpretive frame might be labeled *irrelevance/assimilation.* Uncertainty reduction through alternative data and media is entirely sufficient for the formation of impressions and relational development, and the eventual introduction of physical characteristics is irrelevant insofar as relational judgments are concerned. According to Cooper and Sportolari (1997), "By the time these people meet each other in person, an intimate bond can already be formed. . . . unappealing physical traits are then more likely to be mitigated by the overall attraction that exists" (p. 9). Drawing on schema theory, it is reasonable that an individual's cognitive representation of a partner can assimilate within it a range of particulars. Could a wide disparity between the virtual and physical on some characteristic be integrated in this fashion? The "schema-plus-tag" model (Graesser, Gordon, & Sawyer, 1979; Woll & Graesser, 1982) suggests that a particular anomaly may be cognitively "appended" to a previous impression without disrupting the initial impression itself.

Expectancy violations offer a third framework. New information is compared against expectations, and if it contrasts significantly with preconceptions, a positive or negative relationship decision ensues (Burgoon & Hale, 1988). Although nonverbal expectancy violations theory specifies different outcome dynamics depending on whether or not the violator is previously held to be well regarded and socially attractive, we can confine ourselves in this case to the dynamics in which on-line partners feel positive (enough to want to meet FtF). In this application, expectations theoretically may be formed through virtual interaction for a range of attributes. Upon exposure, actual appearance and physical behavior may be compared against such expectations. The theory predicts extraordinary positive reactions and intimacy when expectations are violated positively. When a violation is negative, extraordinary disregard occurs. When expectations are met, positive regard continues. Although the original theory discusses active nonverbal behaviors (spatial movement), it may apply to more passive characteristics as well; the theory's incorporation of expectancy violations for conversation management and self-presentation (Burgoon, 1993) offers especially interesting possibilities for potentially unexpected behavior that may contrast with virtual preconceptions.

An interesting question is opened by this framework regarding the range of expected behaviors that result from virtual relationship development. Will the range of expectations be expanded or constricted and heightened? If partners idealize each other through hyperpersonal on-line interaction, this might constrict expectations to a very high and narrow range of acceptability (as is the case for high-reward communicators off-line as well; Burgoon & Walther, 1990). Thus the chances of creating a positive violation, or even of

avoiding a negative violation, become more remote. This would also suggest that unless incremental increases in warrant are enacted on the path to FtF meeting, otherwise favorable impressions are likely to be disappointed and the relationship short-lived. It also suggests that, in the case of warranting, individuals might find it useful to attempt to lower their partners' expectations and to deprecate their own characteristics convincingly (as did some females in Baker's 1998 research). Whether it is to this end that partners exchange successively higher-bandwidth information or whether this serves some other relational function are questions awaiting additional exploration.

CONCLUSIONS

The research we have reviewed suggests that there are two primary aspects related to CMC and the Internet that have fundamental impacts on interpersonal communication: how we communicate (using typed text) and with whom (related to the sociometric structures of on-line interaction). The restriction or adaptation of relational communication without the nonverbal cues available in FtF interaction was originally thought to divert users' attention from social and emotional aspects of communication, dampening (positive) affect and interpersonal relations. Alternative perspectives indicate that the very lack of nonverbal cues affords users certain opportunities and potential liberation for the management of identity and the accentuation of interpersonal dynamics. The effects of the CMC channel depend not on bandwidth alone, but on the interactions of media characteristics with social contexts, relational goals, salient norms, and temporal frames that promote or inhibit the strategic use of CMC in relationally supportive or detrimental ways.

The social structures of on-line interaction are also affected by the Internet. The extent to which people interact with strangers or with preestablished relationship partners offers contingencies for benefit or detriment. Research involving social support makes this paradoxically clear. Some studies suggest that the extent to which we avail ourselves of new connections to established links can improve our mental well-being. Others suggest that access to strangers who share our concerns over health problems or other interests (in addition to the mathematical probability of finding like-minded acquaintances among a relatively huge pool of prospects) offers several advantages, including the availability of superior expertise, access to optimal support messages, and the potential for the development of meaningful relationships based on similarity rather than propinquity alone.

Recent surveys reflect what many of us already know with respect to the diffusion of CMC into our lives: It is increasingly common for people to use the Internet as one among many channels for communication with work partners, social partners, and family members. How this technology affects such relationships is not well understood. Our theoretical models and experimental tests force the separation of channels. Field research shows that this is becoming a false dichotomy in many instances, but most such research has yet to aspire to theoretically elegant propositions that can explain and predict how these combinations affect interaction and long-term relationship development. The topic of relationship maintenance may hold promise, but forays into this domain have not as yet evolved beyond descriptive research. Moving in the other direction, toward the development of relationships from on-line to off-line, also points to the need for new thinking and alterations in our existing theories of relationships. The closest we have come to studying the dynamics of MMRs has been, once again, in research concerning groups—in particular, distributed work groups in organizations. Conclusions coming out of this research suggest that "virtual teams" need at least one, and maybe more, FtF meetings in

order to be effective (e.g., Hinds & Bailey, 2000; Lipnack & Stamps, 1997). Such proclamations, which are based on field observations of such teams, unfortunately do not specify theoretical reasons for the researchers' conclusions; at best, we are given lists of the myriad ways in which CMC differs from FtF meetings, without specific identification of the crucial variables involved in the relative success of such groups. In other words, CMC becomes a "black box." Without more specific theoretical specification, our ability to correct, improve, or replace human adaptation failings with alternative procedures, or technological substitutions, will remain thwarted.

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