

Social Science Computer Review

<http://ssc.sagepub.com>

The Impacts of Emoticons on Message Interpretation in Computer–Mediated Communication

Joseph B. Walther and Kyle P. D'Addario
Social Science Computer Review 2001; 19; 324

The online version of this article can be found at:
<http://ssc.sagepub.com/cgi/content/abstract/19/3/324>

Published by:

 SAGE Publications

<http://www.sagepublications.com>

Additional services and information for *Social Science Computer Review* can be found at:

Email Alerts: <http://ssc.sagepub.com/cgi/alerts>

Subscriptions: <http://ssc.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

The Impacts of Emoticons on Message Interpretation in Computer-Mediated Communication

JOSEPH B. WALTHER
KYLE P. D'ADDARIO

Rensselaer Polytechnic Institute

Emoticons are graphic representations of facial expressions that many e-mail users embed in their messages. These symbols are widely known and commonly recognized among computer-mediated communication (CMC) users, and they are described by most observers as substituting for the nonverbal cues that are missing from CMC in comparison to face-to-face communication. Their empirical impacts, however, are undocumented. An experiment sought to determine the effects of three common emoticons on message interpretations. Hypotheses drawn from literature on nonverbal communication reflect several plausible relationships between emoticons and verbal messages. The results indicate that emoticons' contributions were outweighed by verbal content, but a negativity effect appeared such that any negative message aspect—verbal or graphic—shifts message interpretation in the direction of the negative element.

Keywords: emoticon, smiley, computer-mediated communication, electronic mail, affect

There is little argument that e-mail is the most commonly used form of computer-mediated communication (CMC), and for many, it is becoming one of the most common forms of communication overall (Kraut, Mukhopadhyay, Szczypula, Kiesler, & Scherlis, 1999; Pew Internet & American Life Project, 2000). Some project that e-mail use may even surpass traditional face-to-face (FtF) interaction in the next generation (Negroponte, 1995). However, how e-mail compares to other forms of communication remains unclear in some respects. As traditional (ASCII-based) e-mail has no sound or graphic component, some argue that the social functions normally communicated by nonverbal cues in FtF encounters do not occur in CMC. Kiesler, Siegel, and McGuire (1984) observed that

traditional forms of communication, head nods, smiles, eye contact, distance, tone of voice, and other nonverbal behavior give speakers and listeners information they can use to regulate, modify, and control exchanges. Electronic communication may be inefficient for resolving such . . . problems. (p. 1125)

Echoing a similar point, Sarbaugh-Thompson and Feldman (1998) suggested that the lack of nonverbal cues in CMC limits “the range of communication . . . ; sarcasm, for example, is not well expressed on electronic mail” (p. 686). Due to these and other restrictions, some suggest

that e-mail is limited in scope and best suited for task-oriented purposes. As Rice and Love (1987) summarized the prevailing literature, "as bandwidth narrows, media allow less 'social presence'; communication is likely to be described as less friendly, emotional, or personal and more serious, businesslike, or task oriented" (p. 88).

Despite these limitations, users have found ways to increase the richness of CMC and achieve socially oriented communication through it. Evidence establishes that CMC is sometimes used for explicitly social purposes (McCormick & McCormick, 1992). In other circumstances, users work within the limitations of text-based e-mail to achieve levels of relational communication equal to, or exceeding, parallel FtF encounters (e.g., Walther, 1997; Walther & Burgoon, 1992). They do so by a variety of means, including their interpretation of natural language, questions and disclosures (Tidwell & Walther, 2000), attention to chronemic cues (business hours vs. after hours, swift reply vs. slow reply; Walther & Tidwell, 1995), and other devices (see Carey, 1980).

Another way in which e-mail users may imbue their messages with social meaning is through the creation and use of "emoticons," "smiley faces," or "relational icons" created with typographic symbols that appear sideways as resembling facial expressions. As early as 1982, Hiltz and Turoff stated that "computer conferees also find ways to overcome the lack of personal contact. They have even devised ways of sending computerized screams, hugs and kisses" (cited in Pollack, 1982) by using graphic symbols formed in ASCII characters. Although research clearly indicates that individuals are influenced by the use of nonverbal cues in other contexts (e.g., Childers & Houston, 1984; Shepard, 1967), it is unknown, beyond conjecture, what impact emoticons have in CMC. Do emoticons allow for greater understanding (or misunderstanding) of affect in e-mail messages? Can the absence or presence of emoticons affectively change the meaning of a written message? Also, does the use of graphic nonverbal cues have any effect on the persuasive functions of e-mail communication? This research reports an experiment that attempts to address these questions.

Affect in CMC

CMC in general, and e-mail use in particular, encompasses both impersonal, task-focused activities as well as relational development and maintenance activities. The social information processing (SIP) model (Walther, 1992, 1994) assumes that if communicators in CMC have or expect to have the opportunity to interact over time, they will actively develop social relationships no matter what the ostensible purpose of their interaction. The SIP model posits that users who are unfamiliar with each other form opinions based on textual interactions. This model also suggests that although users achieve "normal" relationships online, doing so requires a sufficient amount of message exchanges, which, when compared with traditional FtF communication, take longer to accrue. The lack of nonverbal cues in CMC limits the scope of exchanges, which then require more messages and more time to bring relational effects in CMC to the same level as in comparable FtF relationships. A key aspect to the SIP model is that users adapt to the medium and find ways to overcome the relative shortage of cue systems. Whereas the theory originally focused on language content and chronemic adaptations (Walther & Burgoon, 1992; Walther & Tidwell, 1995), Utz (2000) formally applied the theory to emoticons, specifying them as another type of accommodation, consistent with now-common understandings of emoticon use. For instance, Rezabek and Cochenour (1998) asserted that "because the use of e-mail eliminates visual cues such as head nodding, facial expressions, posture, and eye contact found in face-to-face communication, CMC users often incorporate emoticons as visual cues to augment the meaning of textual electronic messages" (pp. 201-202).

Emoticons

The use of the emoticons is well documented in a variety of sources in the CMC literature. Asteroff (1987) referred to emoticons as “relational icons” and documented their use in a case study of e-mail. Sanderson (1993) defined emoticons (or “smileys”) as “a sequence of ordinary characters you can find on your computer keyboard. Smileys are used in e-mail and other forms of communication using computers” (p. 1). Rezabek and Cochenour (1998) defined emoticons as “visual cues formed from ordinary typographical symbols that when read sideways represent feelings or emotions” (p. 201). Thompson and Foulger (1996) referred to them as “pictographs” and described their use in CMC “to express emotion or as surrogates for nonverbal communication” (p. 226) “suggestive of facial expression . . . [adding] a paralinguistic component to a message” (p. 230). Godin (1993) agreed that “until the advent of the smiley, otherwise known as an emoticon, individuals using electronic communication had no way to indicate the subtle mood changes. They couldn’t tell jokes, use irony, slip in a pun or become bitingly sarcastic” (p. 4). Although this may be an overstatement, Godin argued that when “properly used, a smiley can spice up virtually any form of written communication. Now you can say, ‘Boy, isn’t he intelligent :-)’ and make it quite clear you think the subject is an idiot.”¹

Danet, Ruedenberg-Wright, and Rosenbaum-Tamari (1997) also reflected this assumption. Danet et al. defined emoticons as “icons for the expression of emotion, or for marking one’s intent as non-serious. . . . The best known ones are a smile, wink, and frown, respectively: :-) ;-) :-(.” Danet and colleagues argued that the development of CMC from a work-related medium to a playful medium is a key ingredient to the continued development and use of emoticons (see also Bolter, 1991).

[CMC] refer[red] to a work-related meeting; thus, many people may have expected the general frame of the messages exchanged to be “serious.” The perception of the medium as cold and anonymous, and lacking in “social presence” because of non-verbal cues such as facial expressions also contributed to this expectation. (Danet et al., 1997, n.p.)

Danet et al. suggested that CMC itself has developed into a playful medium.

Marvin (1995) also observed that the emoticon is finding its way into everyday CMC interactions: “Some attention . . . has been lately put on the emergence of ‘smileys’ as a special feature of writing on the Internet. . . . These symbols are the paralanguage of the internet.” Marvin discusses CMC within the multiple-user domain, object-oriented environment (MOO). A MOO is a type of computer system that allows for synchronous communication via the Internet. They allow users to “chat” as if they were in the same room and move around in a virtual space. According to Marvin (n. p.),

The text that may be communicated within MOOs is limited, as it is in most Internet forms, to the range of characters on a typical computer keyboard. . . . An informal, everyday quality is created through the use of smileys, non-standard spelling reflective of vernacular pronunciation, punctuation to indicate pauses rather than speech clauses, special symbols borrowed from programming languages and an extensive special vocabulary.

Such statements further support the notion that the computer-using society has attempted to incorporate surrogates for traditional types of interactive nonverbal cues.

Although these reflections about the utility of emoticons seem fairly widespread, less is known about their actual use and impact. Regarding their use, Witmer and Katzman (1997)

examined emoticons in a large sample of Usenet newsgroups postings. In a content analysis of roughly 3,000 messages, they found that 13.2% contained emoticons (or intentional misspellings, punctuation, and other CMC-based textual graphics, which the researchers contend function in similar fashion). They also found that women (i.e., users using stereotypical female names) used these symbols approximately twice as frequently as men did. If one is to accept the use of these markers as attempted nonverbal usage, and therefore an attempt at an open display of affect, these findings support classic structures of gender communication (Quina, Wingard, & Bates, 1987), according to Witmer and Katzman. Wolf (2000) reported a similar propensity for emoticons being used primarily by women. She also found them used more frequently in mostly female online groups than in mostly male groups. In an interesting cross-gender accommodation, Wolf (2000) observed that in mixed-sex discussions, men's use of emoticons rose to the level of women's, rather than vice versa. However, women used emoticons primarily to express humor rather than sarcasm, whereas men used them for sarcasm more than humor. Rezaek and Cochenour (1998) also content-analyzed emoticon use online, but unlike Witmer and Katzman (1997), they limited their analysis to face representations. In four academic Listservs, emoticons were present in 19.15% to 75% of messages, and in a sample of Usenet groups, 25% of messages. Approximately 53.5% of the face representations were :-) or :), 10% were ;-), whereas only 7.5% were :-(or :(in the combined samples.²

Only two studies of which we are aware have examined impacts of emoticon use. Utz (2000) analyzed their role in relationship development online. Following SIP theory (Walther, 1992), Utz found that Multi-User Dungeon (MUD) players reported using more emoticons (as well as other MUD-based affective codes) over time, as they learned to accommodate emotional information to a realm with no nonverbal cues available. She 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 relationship development. In another study, Thompson and Foulger (1996) found that an emoticon (presumably a happy face, although the exact emoticon was unspecified) in combination with verbal "flaming" messages modified the perceived hostility of the message (see also Godwin, 1994). The effects were inconsistent, however, such that the same emoticon diminished the hostility of a message showing "tension" but increased the perceived hostility of more antagonistic verbiage. It is clear that emoticons have become commonplace in CMC, and emoticons have obviously found their way into the lexicon of the computer-using world. However, researchers have seldom looked beyond *who* is using these messages, to document *what*, if anything, they do conversationally.

Potential Effects

Despite commentators' descriptions of emoticons as surrogates for nonverbal cues, they are also, in a literal sense, graphic displays. As such, other contexts of research may inform their expected impacts. In print advertising—another medium where textual messages are emphasized or accompanied by pictorial components—people were found to rate advertisements with a pictorial or graphic component higher than those without; ads with a textual/graphic combination are more effective than those with a textual message alone (Childers & Houston, 1984; Shepard, 1967). Research has also shown that imagery has a positive impact on learning and retention (Lutz & Lutz, 1977). The use of visual cues along with text has also been shown to produce a more positive attitude than text alone (A. A. Mitchell, 1986). It would be useful to determine if the nonverbal dialogue in e-mail exerts similar effects on communication outcomes as in more traditional FtF or written contexts.

To predict the effects of emoticons in the CMC environment, it may be useful to examine research on traditional FtF nonverbal communication. A recent comprehensive review of the nonverbal communication literature by Burgoon, Buller, and Woodall (1996) concluded that nonverbal behavior predominates the effects of language content in most conditions. Reviewing the “channel reliance” findings, the authors concluded that “if verbal and nonverbal cues were relatively equal in strength when judged separately, the nonverbal cues dominated verbal ones when they were paired together” (p. 137). This tendency depends, however, on the kind of judgment the observer is making about the communication. When observers are asked to assess objective meaning, persuasive communication, or factual deception, verbal information is more important. For judgments about the speaker’s affect, the reverse is true: “For emotive, relational, or attributional . . . outcomes, nonverbal cues account for varying but greater amounts of the meaning than verbal ones” (Burgoon et al., 1996, p. 140).³

Facial expressions have even greater effects than vocal and spatial nonverbal cues. “Visual cue primacy is also stronger when decoding emotions related to positivity . . . especially when visual cues involve the face,” according to Burgoon et al. (p. 142), who continue that “the face is particularly important in judging positivity because receivers associate the smile with positivity, a link that has no analogue in the body and the voice” (p. 142).

According to Burgoon et al. (1996), reliance on nonverbal cues in FtF interaction is even greater in the case of mixed messages or incongruities between the verbal and nonverbal messages. “The bulk of evidence . . . would suggest that visual cues tend to be counted more strongly than vocal cues, which in turn are counted more heavily than verbal ones” (p. 141). This is especially true for facial expressions. Exceptions to this trend may occur by one of two means. First, observers may use a “discounting strategy,” that is, they discount or ignore the valence of one cue if two or more other cues differ from it in an alternative affective direction. Second, observers may be more sensitive to a single cue, even if it conflicts with others, if its valence is extreme. Although these last contingencies make the picture somewhat conflicted, the overall conclusion seems to be that nonverbal cues—especially visual cues—have impacts as great as, or greater than, verbal messages alone, on the interpretation of emotions in FtF communication and especially in the case of mixed messages. If these principles pertain to the use of emoticons in CMC, similarly strong effects should be expected.

In a different review, Fridlund, Ekman, and Oster (1987) limited their focus to the impacts of facial expressions, rather than nonverbal cues in general, and their conclusions differ from Burgoon et al.’s. Initial studies on the impact of facial affect indicated that these expressions provide more consensual and accurate judgments of emotion than speech content (or vocal cues). Critics of those studies pointed out, however, that the studies involved contrived experimental stimuli. More natural investigations found that speech content was more potent than visual input, whereas other research found that the relative influence of facial expressions to other cues depends on the type of judgment being made about the actor or the actor’s goal (expression or concealment of emotion). Overall, Fridlund et al. (1987) seem skeptical of strong effects due to facial expressions. They did not discuss mixed messages, as Burgoon et al. (1996) did. Taking this more narrow focus on the face into account, the expected impact of emoticons in CMC is somewhat ambiguous and may be relatively weak.

The CMC literature seems to have overlooked these FtF precedents, or projects strong effects in spite of them. Although very few studies actually examine emoticon use, almost all commentators assume that emoticons have meaningful communicative impact. For example, Rezabek and Cochenour (1998) asserted that “the combination of symbols :-) represents a typical smiley face and *conveys the sentiment that the person sending the message* [italics

added] and using that particular emoticon is pleased, happy, agreeable or in a similar state of mind" (p. 201). Even though this assertion may be true, it appears conjectural in Rezaek and Cochenour (1998). As no research of which we are aware has demonstrated the actual effects of emoticons on meaning in electronic communication, it is not known what impacts they have on readers of e-mail messages.

Although it is instructive to consider research on the relationship of verbal to nonverbal cues, the use of emoticons is paradoxical with regard to such comparisons. In the following, we first articulate an assumption that limits the expectations for the effects of emoticons and formulate a prediction about emoticon/language combinations that reflects this limitation. Following, reflecting the common assumption that emoticons have impacts similar to those of nonverbal cues, we formulate predictions reflecting the expected effects of specific combinations of emoticons and verbal messages and the ways they may interact.

The Intentionality Issue

Although emoticons may be employed to replicate nonverbal facial expressions, they are not, literally speaking, nonverbal behavior. This is not a matter of definitional semantics; it addresses a different issue. Emoticons may or may not have the same intentional connotations as physical nonverbal behavior. Whereas nonverbal behavior is thought to reflect general intentions, many of its forms are perceived by observers to be less controlled and deliberate than verbal utterances (see Knapp, Wiemann, & Daly, 1978). Facial expressions are considered by some to be among the most controllable of nonverbal cues (Ekman & Friesen, 1969). Yet, Birdwhistell (1970) reminds us that people "are not always aware that they are or are not smiling" (p. 33). Furthermore, some forms of facial affect displays—those accompanying weeping, for example—are generally considered direct and involuntary representations of internal states (Kendon, 1987). Typed-out textual symbols, whether verbal or iconic, may not be so involuntarily casual, in the minds of receivers. Relative to FtF nonverbal communication, emoticons may be considered more deliberate and voluntary. One may unconsciously smile FtF, but it is hard to imagine someone typing a :-) with less awareness than of the words he or she is selecting. Marvin (1995) recognized this phenomenon in her discussion of MOO interaction, stating that

smiles in face-to-face contexts can be strategic or spontaneous and unintentional. In the context of the MOO . . . every smile must be consciously indicated. In private something flowing across the computer screen might cause a participant to spontaneously smile, but a conscious choice must be made to type it out; a participant might frown at the keyboard and but [*sic*] strategically decide to type a smile.

However, Marvin does not suggest whether emoticons in CMC differ from facial expressions in FtF encounters in their impact on receivers. Although it is conceivable that a sender's generation of emoticons could become habitual and less conscious over time, it is still not clear how they are interpreted in CMC: as iconic and unconscious like nonverbal facial expressions or, like wording, as deliberately encoded elements of intentional communication. If the latter, whereas physical nonverbal behavior may account for up to 63% of the social meaning in many FtF interactions (Philpott 1983, cited in Burgoon et al., 1996), emoticons may be less potent in this regard. From this perspective, the artificiality and constructed nature of emoticons suggest that they would have weak effects, if any, given their restricted range and clearly intentional deployment, relative to the connotations of even simple language varia-

tions. This position is reflected in the first hypothesis, in which “valence” refers to the affective direction (i.e., positivity versus negativity) of verbal messages and of emoticons.

Hypothesis 1: Alterations in the valence of verbal messages account for greater variance in the interpretation of messages than do emoticons.

In other words, the affective dimension of the language in verbal messages makes a bigger difference than the differences among alternative emoticons do in the way readers interpret the overall message.

Emoticons as Nonverbal Cues: Pure Messages

Alternatively, emoticons are emblematic of facial expressions, and because they are described as accommodations for the lack of nonverbal cues in CMC, they may have the effects of nonverbal FtF cues. In relationship with simultaneous verbal behavior, nonverbal behavior may emphasize, repeat, substitute, or contradict verbal messages (Burgoon, 1985; Ekman & Friesen, 1969), yet CMC commentators discuss emoticons in terms of their emphatic function or signaling function, not mere repetition or substitution of otherwise-conveyable verbally transmitted meaning. If this is the case, positively valenced emoticons should enhance positively valenced verbal messages, and negative emoticons make negatively valenced messages more negative. Thus, the following hypotheses are tendered with respect to “pure” combinations of emoticons and verbal messages, that is, messages in which all cues convey either positivity or negativity:

Hypothesis 2a: A smile emoticon, coupled with a positive verbal message, conveys greater positivity than a positive verbal message alone.

Hypothesis 2b: A frown emoticon, coupled with a negative verbal message, conveys greater negativity than a negative verbal message alone.

Mixed Messages

Mixed-message effects are somewhat less predictable. Mixed messages—positive verbal messages with a negative emoticon or vice versa—may not be readily interpretable. According to Leathers (1986), inconsistencies between nonverbal cues and verbal meanings are said to be ambiguous and problematic for successful communication. If so, the affective meaning of mixed messages should be unclear.

Hypothesis 3a: A smile emoticon, coupled with a negative verbal message, is more ambiguous than a negative “pure message” (a negative verbal message alone or with a frown emoticon) or a positive “pure message” (a positive verbal message alone or with a smile emoticon).

Hypothesis 3b: A frown emoticon, coupled with a positive verbal message, is more ambiguous than a positive “pure message” (a positive verbal message alone or with a smile emoticon) or a negative “pure message” (a negative verbal message alone or with a frown emoticon).

Mixed messages may be more communicationally functional, however, suggesting an intentionally ambiguous or conflicted state. In such a case, the valences of verbal and nonverbal messages may cancel each other out, consistent with the contradiction relationship of verbal and nonverbal cues, rendering an overall neutral interpretation. Alternatively, they may effect an interaction and prompt an interpretation of sarcasm.

Hypothesis 4a: A smile emoticon, coupled with a negative verbal message, conveys less negativity than a negative "pure message" and less positivity than a positive "pure message."

Hypothesis 4b: A frown emoticon, coupled with a positive verbal message, conveys less positivity than a positive "pure message" and less negativity than a negative "pure message."

Hypothesis 5a: A smile emoticon, coupled with a negative verbal message, conveys greater sarcasm than a negative or positive "pure message."

Hypothesis 5b: A frown emoticon, coupled with a positive verbal message, conveys greater sarcasm than a positive or negative "pure message."

Drawing again on known relationships between verbal and nonverbal cues, alternative hypotheses may also be predicted. The relative contributions of verbal and nonverbal communication may be combinatory when the two streams are affectively consistent. When they are dissonant, however, greater decoding weight tends to be placed on the nonverbal features (for a review, see Burgoon et al., 1996), among which facial expressions carry as much as twice the interpretive weight as other cues (i.e., body, then voice; DePaulo & Rosenthal, 1979). If e-mail senders are tacitly aware of this combinatory rule, and e-mail readers interpret by it, then deployments and interpretations of such combinations may reflect this rule, and the affective valence connoted by the emoticon alone should be interpreted. Such a finding would be consistent with a "social meaning" model of nonverbal communication, a model that dictates that some nonverbal behaviors, regardless of accompanying verbal behavior or sender characteristics, have consensual meaning (see Burgoon & Le Poire, 1999; Burgoon & Newton, 1991). Further predictions may be offered, refining those previously articulated above, with respect to the magnitude of the effect of the emoticon. Hypotheses 2a and 2b predicted a neutralizing effect of mixed messages. Alternatively, a predominance effect for the emoticon can be predicted, such that the emoticon bears the full weight of interpretive valence only in the case of mixed messages.

Hypothesis 6a: A smile emoticon, coupled with a negative verbal message, conveys as much positivity as a positive "pure message" and more positivity than a negative "pure message."

Hypothesis 6b: A frown emoticon, coupled with a positive verbal message, conveys as much negativity as a negative "pure message" and more negativity than a positive "pure message."

Winks

A special case may be the emoticon suggesting a smiling wink— ;-). Although the smiling aspect of this symbol suggests positivity, the wink connotes an extra dimension of irony. Among other sources, Rezabek and Cochenour (1998) provided specific connotations for the wink: "the joke, wry remark, or bit of wit sent over e-mail can be followed by the visual cue ;-) to emphasize the jesting nature of the comment" (p. 202). The wink may have iconic value, conducting a social meaning function, that is, no matter the valence of the verbal message with which it appears, a double meaning is connoted. Whatever the valence of the verbal message, the appended wink should diminish or entirely reverse that valence, as well as imply sarcasm.

Hypothesis 7a: A wink emoticon, coupled with a negative verbal message, conveys (a) less negativity than a negative "pure message" and (b) greater sarcasm than a negative "pure message."

Hypothesis 7b: A wink emoticon, coupled with a positive verbal message, conveys (a) less positivity than a positive "pure message" and (b) greater sarcasm than a positive "pure message."

Influence

Although when people smile, they often smile *about* something, that is, some subject or topic, there is very little research on the role of facial expression in the social influence of attitude change, according to Heslin and Patterson (1982). Most of the research focuses on gaze, deception, or on the generation of positive feelings toward the speaker (for a review, see Patterson, 1983) but not toward the topic under discussion. Among the few exceptions, one focuses on message senders: Mehrabian and Williams (1969) found that communicators used more facial activity when instructed to be more persuasive. Another focuses on receivers: Greater smiling is associated with more persuasiveness in a counseling setting (LaCrosse, 1975). Other aspects of gaze do influence others' various behaviors (such as turn taking), but little else is known about attitude change or its antecedents as far as facial expressions are concerned. In research on the effect of graphics on persuasion in CMC, altogether aside from facial affect, some evidence exists that even simple graphics accompanying a verbal message achieve greater social influence than a verbal message alone (King, Dent, & Miles, 1991).

If we assume that the exhibition of a facial expression signals the communicator's affective attitude toward an object and that social influence should result in the receiver's attitude taking the same direction as the sender's, tentative hypotheses may be posited for facial expressions in social influence. Thus, for the hypotheses above, the same relationships should be expected to obtain on receivers' evaluation of the conversational topic, as well as their interpretation of the communicator's affect. Measurement of this will provide a replicate of the above hypotheses.

Thus, drawing on perspectives about the relationships between verbal and nonverbal codes, we may expect that emoticons have potent effects, making more extreme the messages with which they are affectively consistent and undermining and/or caricaturing the messages with which they are inconsistent.

METHOD

An experiment was conducted to assess affective and attitude interpretations of emoticon combinations with verbal phrases. The research comprised a 2×4 between-subjects design, with eight stimulus combinations. The two-level variable was verbal message valence: A verbal message was created that was either positive or negative toward the topic it addressed. The four-level variable was emoticons: Each verbal message was combined with either the typographic symbols :-), :-(, or ;-), or as a control condition, with no graphics. Each of these variations was embedded in a mock-up of an e-mail message sent from one friend to another, with some material before the critical stimuli and some after them. Each entire message was presented on a World Wide Web (WWW) page for administration to research participants.

Participants were recruited from two sources at a private technical university in the northeastern United States. Some participants ($n = 160$) participated in class, as part of a demonstration for a large 1st-year course in communication. An additional 66 participants were recruited from a subject pool for research participation credit in psychology courses. These participants were recruited to detect whether the first sample showed any bias due to their study of communication and a brief lecture on nonverbal communication. No differences were detected between the two subsamples in any subsequent analyses, and the samples are collapsed in all analyses reported. Participants were removed from the sample if their responses were incomplete. The participants' mean age was 18.48 years ($SD = 1.28$); 71% of

the sample was male and 29% was female (roughly proportional to the skewed gender ratio at this university).

The procedures for the presentation and evaluation of stimuli were conducted using WWW pages and forms (see, e.g., Birnbaum, 2000; Pettit, 1999), as follows. Participants attended a computer laboratory and were instructed to open a WWW browser to a particular Web page. The first page explained that the research involved learning about how people experience e-mail messages, and it instructed them that they were about to read an e-mail message from one friend to another, after which they would answer a number of questions. Clicking a button activated a computer-based randomization procedure (see Burton & Walther, 2001) that automatically pointed the participants' browsers to one of the eight pages displaying a variant of the stimulus.

Each message contained a brief discussion about a movie that was showing the following weekend and then one of two variations of a statement about an Economics course, which was one experimental stimulus. The statement about the course was immediately followed by one of the three emoticons or left blank in the case of the control condition. The eight stimulus variations are presented in Table 1.

The instructions asked participants to click on a button image on the bottom of that Web page when they had completed reading the e-mail message. This button linked to the common questionnaire, which also appeared on a WWW page. Participants entered their responses via the computers, clicking on "radio buttons" to administer semantic differential scales or typing in responses such as percentage agreement or ages. Responses were collected directly to computer storage, along with automatic indicators of the date and time, using Microsoft FrontPage™ software.

The questionnaire contained the items comprising the dependent variables in this research. Several were created to assess participants' impressions of the message writer's attitude toward the topic (the Econ course), the writer's affect, and other characteristics of the messages. These included several semantic differential items. Four of them asked the participant to assess the e-mail writer's attitude about the course and the participant's likelihood to take the course himself or herself (as a measure of social influence). Another five items assessed how difficult the message was to understand, how serious the message was, how ambiguous the message was, how un/happy the writer was, and how sincere the writer was. Additional items, on a scale from 1 to 100, asked the participants to assess how much happiness, sarcasm, urgency, and humor the writer portrayed. The measures are reproduced in Table 2.

In addition, participants' familiarity with emoticons was assessed in several ways. Participants were asked to indicate with a yes or no whether they had ever seen or ever used several common emoticons. Furthermore, to see whether they shared consensus on the meaning of emoticons, we asked participants to match one of the three emoticons used in the study to each of the following emotions: sad, secretive, happy, honest, sarcastic, seductive, anxious, joking, angry, surprised, disgusted, and afraid. Demographic information was also collected.

RESULTS

Background Data

Participants' characteristics and experiences with emoticons were analyzed to provide context for the interpretation of results. Ninety-nine percent of the participants reported having seen some emoticon in an e-mail message. In contrast to the findings of Witmer and

TABLE 1
Stimuli

That econ class you asked me about, it's a joy. I wish all my classes were just like it.	: -)
That econ class you asked me about, it's a joy. I wish all my classes were just like it.	: -(
That econ class you asked me about, it's a joy. I wish all my classes were just like it.	; -)
That econ class you asked me about, it's a joy. I wish all my classes were just like it.	
That econ class you asked me about, it's hell. I wish I never have another class like it.	: -)
That econ class you asked me about, it's hell. I wish I never have another class like it.	: -(
That econ class you asked me about, it's hell. I wish I never have another class like it.	; -)
That econ class you asked me about, it's hell. I wish I never have another class like it.	

TABLE 2
Measures

How well does the sender of the message like the econ class? (1 = <i>loathes it</i> , 7 = <i>loves it</i>)
Based only on the writer's recommendation, how likely would you be to take the class yourself? (1 = <i>would avoid it</i> , 7 = <i>would seek it</i>)
Based on the sender's message, how good a class do you think the econ class is? (1 = <i>great class</i> , 7 = <i>awful class</i> [reverse scored])
How does the writer feel about the course? (1 = <i>very negatively</i> , 7 = <i>very positively</i>)
On a scale from 1 to 100, with 1 being the least and 100 being the most, how much <i>happiness</i> did the writer of the message portray?
On a scale from 1 to 100, with 1 being the least and 100 being the most, how much <i>sarcasm</i> did the writer of the message portray?
On a scale from 1 to 100, with 1 being the least and 100 being the most, how much <i>urgency</i> did the writer of the message portray?
On a scale from 1 to 100, with 1 being the least and 100 being the most, how much <i>humor</i> did the writer of the message portray?
On the scale below, how easy was it to understand the message? (1 = <i>very difficult</i> , 7 = <i>very easy</i> [reverse scored])
On the scale below, how serious was the message? (1 = <i>not serious at all</i> , 7 = <i>very serious</i>)
On the scale below, how happy was the writer of the message? (1 = <i>very sad</i> , 7 = <i>very happy</i>)
On the scale below, how sincere was the message? (1 = <i>very insincere</i> , 7 = <i>very sincere</i>)
How ambiguous is the message? (1 = <i>very ambiguous</i> , 7 = <i>very clear</i> [reverse scored])

Katzman (1997) and Wolf (2000), there were no gender differences in the tendency to have sent emoticons in e-mail messages of their own creation: A 1 degree-of-freedom chi-square of 1.53 was not significant, but too few cases of women who had not sent emoticons ($n = 3$) undermined this statistic. Descriptively, 84% of men and 92% of women had sent them, for a total sample proportion of 86%.

No manipulation check was conducted to see whether the participants noticed the specific emoticon presented, as doing so may have drawn artificially great attention to the manipulation, and the research was interested in seeing whether emoticons presented effects in as natural a way as possible. Three other checks were performed. The first assessed the degree of attention participants paid to the e-mail message they read by means of a more innocuous element, asking them to recall what movie was mentioned in the message. One hundred and twenty mentioned the correct movie title. Another 7 got part of the title correct, 10 did not remember, and 4 made clear errors. For the most part, there was adequate recall of the message.

The second check ascertained whether participants were in basic agreement about the connotations associated with the three emoticons used in the study. Participants had been asked to select one of the three emoticons to associate with emotion labels. On most emo-

TABLE 3
Association by Percentages of Emoticons With Emotion Labels

	<i>Emoticon</i>		
	<i>:-) or :)</i>	<i>;-) or ;)</i>	<i>:-(or :(</i>
Sad	0	2	98
Happy	98.3	1.6	0
Seductive	8.6	85.4	0.7
Anxious	33.1	18.5	38.4
Joking	32.5	66.2	0
Angry	0	1.3	88.1
Secretive	3.3	88.7	0.7
Honest	84.8	2.6	3.3
Sarcastic	9.9	84.1	0.7
Surprised	66.9	17.9	4.6
Disgusted	0	1.3	88.1
Afraid	0.7	1.3	85.4

NOTE: Percentages that do not add to 100 across rows are due to missing data.

tions, there was near consensus. The disagreements were so small in most cases that they defied statistical analysis. The data for each emotion label, and the emoticons that participants associated with them, are displayed in Table 3. Among those considered most relevant to the present study, there was 98% agreement matching *happiness* with the ;-) emoticon and *sadness* with the :- (emoticon. *Sarcastic* was matched with ;-) in 85% of cases and with :-) in 10% of cases. *Joking* was associated with ;-) most often, by 66.2% of the participants; 32.5% of participants connected joking with :-) but never with :- (. Among these basic connotations, there seems to be a fairly firm semantic understanding of emoticons, whether or not they function this way syntactically. It is noteworthy that the percentages of agreement here are very similar, if not marginally higher, than the level of agreement people exhibit about real human facial expressions of emotion: Ekman and Friesen (1975) reported comparable levels of agreement for universal facial expressions among U.S. participants, with happiness most consensual (97%) and anger the least (67%).

The third check analyzed whether the two versions of the verbal message differed in affective connotation. Using only the control conditions—verbal messages with no emoticons—a *t* test compared scores on measures related to happiness (see below). The two messages invoked significantly different interpretations in the expected directions, $t(55) = 54.89, p < .001$, the positive message with a mean of 4.20 ($SD = 1.49, n = 31$) and the negative message with a mean of 2.73 ($SD = 1.30, n = 26$), indicating that the manipulation of verbal message valence was successful.

Data Transformation

Prior to hypothesis tests, an analysis was conducted to determine whether the affective terms presented on the questionnaire represented clusters or independent emotion judgments. Items were subjected to a principal components factor analysis with Varimax rotation. The analysis produced four factors, accounting for 74% of the variance. Analysis revealed that the two happiness items formed Factor 1. Factor 2 was composed of the ambiguity rating and how difficult the message was to understand. Factor 3 contained the items for urgency, sarcasm, and humor. Factor 4 contained seriousness and sincerity assessments (see Table 4).

TABLE 4
Factor Structure of Emotion Labels

	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>
Happy	<i>.924</i>	-.006	-.001	.006
Sad	<i>.921</i>	.001	.001	.006
Ambiguous	-.004	<i>.900</i>	-.003	.006
Difficult to understand	.001	<i>.863</i>	-.200	-.002
Urgent	-.001	.000	<i>.784</i>	-.290
Humor	.148	-.190	<i>.733</i>	.335
Sarcasm	-.253	-.215	<i>.659</i>	.412
Serious	-.310	-.005	.003	-.813
Sincere	-.330	-.269	.236	.520
Eigenvalues	2.50	2.02	1.17	1.01
% variance accounted for	22.26	20.29	18.56	13.39
α	.83	.74	.74	—

NOTE: Reliability analysis yielded three acceptable composites: happiness, ambiguity, and sarcasm/humor. Items in italics are those retained as measures for the respective composite variables. Other items were dropped from further analysis.

Item groupings were subjected to reliability analyses, with items scaled originally as 1 to 100 transformed into sevenths for comparability with seven-interval scales. The items created to assess the e-mail writer's attitude about the econ course were also analyzed, and obtained a Cronbach's alpha reliability of .95; happiness, $\alpha = .83$; and ambiguity/difficulty, $\alpha = .74$. The urgency/sarcasm/humor composite failed to achieve acceptable reliability, but removal of the urgency item yielded sarcasm/humor $\alpha = .74$. Seriousness and sincerity did not combine for acceptable reliability and were dropped from further analysis.

Hypothesis Tests

Analyses of variance (ANOVAs) were conducted on each dependent measure for the main and interaction effects of message valence, emoticon, and gender. No effects of gender were significant, either in interaction with emoticons or message tone, or as a main effect. The gender variable was dropped from further analysis. A similar check was conducted to see if the naturally occurring differences in e-mail and emoticon experience affected hypothesized relationships. Four independent ANOVAs were conducted on all dependent variables, which included the two hypothesized independent factors (verbal message valence and emoticons), plus one of the following additional terms: number of e-mail messages sent per day, number of e-mail messages read per day, whether the participant had ever seen an emoticon in e-mail, and whether the participant had ever used an emoticon in e-mail. None of these latter variables produced a significant main or interaction effect, except for experience having sent an emoticon. For this term, there appeared to be a main effect on perceived urgency and a three-way interaction with emoticon and verbal message on ambiguity. However, inspection of the frequency data revealed that no one who had sent an emoticon himself or herself had been exposed to the experimental condition featuring a combination of a positive verbal message with the smile emoticon, through randomization. With a mean and variance of zero in this cell, on all analyses, the *F* test was most likely inflated and unreliable. Thus, experience factors were dropped from further analysis and data were reanalyzed in the planned 2×4 design.

TABLE 5
Means, Standard Deviations, *F* Coefficients, and Significant Differences for Message Effects on Interpretations

	<i>Message Valence</i>							
	<i>Negative</i>	<i>Negative</i>	<i>Negative</i>	<i>Negative</i>	<i>Positive</i>	<i>Positive</i>	<i>Positive</i>	<i>Positive</i>
	<i>:(</i>	<i>None</i>	<i>;-)</i>	<i>:-)</i>	<i>:(</i>	<i>None</i>	<i>;-)</i>	<i>:-)</i>
<i>N</i>	26	26	28	23	32	31	33	22
Happiness	2.81 ^a <i>1.31</i>	2.73 ^a <i>1.30</i>	3.23 ^a <i>1.43</i>	3.28 ^a <i>1.18</i>	3.56 ^{a,b} <i>1.52</i>	4.19 ^b <i>1.49</i>	5.04 ^c <i>1.07</i>	5.31 ^c <i>1.11</i>
	$F_{\text{verbiage}}(1, 213) = 69.90^{***}$		$F_{\text{emoticon}}(3, 213) = 9.22^{***}$		$F_{\text{interaction}}(3, 213) = 2.42$			
Course attitude	1.68 ^a <i>0.80</i>	1.56 ^a <i>0.64</i>	1.77 ^a <i>0.88</i>	1.86 ^a <i>1.26</i>	3.70 ^b <i>2.10</i>	4.96 ^c <i>1.83</i>	4.90 ^c <i>1.88</i>	5.18 ^c <i>1.78</i>
	$F_{\text{verbiage}}(1, 213) = 199.23^{***}$		$F_{\text{emoticon}}(3, 213) = 3.37^{**}$		$F_{\text{interaction}}(3, 213) = 2.43^*$			
Ambiguous	5.88 ^b <i>0.96</i>	5.71 ^{a,b} <i>0.93</i>	5.61 ^{a,b} <i>1.21</i>	6.00 ^b <i>0.83</i>	4.89 ^a <i>1.55</i>	5.16 ^{a,b} <i>1.49</i>	5.33 ^{a,b} <i>1.36</i>	5.05 ^{a,b} <i>1.14</i>
	$F_{\text{verbiage}}(1, 213) = 16.19^{***}$		$F_{\text{emoticon}}(3, 213) = 0.15$		$F_{\text{interaction}}(3, 213) = 1.09$			
Sarcasm/humor	1.35 ^a <i>1.27</i>	1.10 ^a <i>1.34</i>	1.38 ^a <i>1.40</i>	1.58 ^{a,b} <i>1.53</i>	2.73 ^{a,b} <i>1.85</i>	1.87 ^{a,b} <i>2.03</i>	2.43 ^b <i>1.81</i>	2.01 ^{a,b} <i>2.04</i>
	$F_{\text{verbiage}}(1, 213) = 16.82^{***}$		$F_{\text{emoticon}}(3, 213) = 1.24$		$F_{\text{interaction}}(3, 213) = 0.74$			

NOTE: Standard deviations are in italics. Common superscripts indicate homogeneous subsets across rows.
 $*p < .07$. $**p < .05$. $***p < .001$. $p > .07$ not marked.

Interaction effects were not significant at the .05 level on any dependent variables in the omnibus 2×4 ANOVA, but main effects for verbal message and emoticon did result (and are reported in Table 5). Newman-Keuls analyses were conducted to detect the precise effects and to identify which combinations of verbal and graphic messages differed from others (also in Table 5). The post hoc analyses suggest that there may be interaction effects, which appeared to have been suppressed in the ANOVA (because most conditions were not different from one another, lowering the overall between-conditions variance, a Type II error to which ANOVA is susceptible; see Rosenthal & Rosnow, 1984). In the following, descriptive patterns of these differences are explained, including their implications for the hypotheses.

Happiness. For the interpretation of happiness, or positivity, Newman-Keuls analyses revealed the following: All messages with any negative element, verbal or graphic, were rated significantly more negative than messages with no negative elements. The most negative messages included a positive verbal message accompanied by a frown, which was rated as unhappy as any combination with a negative verbal message (supporting Hypothesis 6b), but mixed messages did not exhibit the leveling effect posited by Hypothesis 4a or Hypothesis 4b. A positive message with no emoticon of any kind was significantly more happy than the negative-element messages, but significantly even happier were positive messages accompanied by a smile or by a wink, supporting Hypothesis 2a. Overall, a negativity effect was observed—anything with a negative element in it was less happy—as well as an enhancement effect for pure messages only in the case of positively valenced messages. Among negatively worded combinations, emoticons made no differences. Hypothesis 1 is partially supported descriptively, in that all negative wordings were less happy than any positive wordings, with one exception.

Course attitude. The course attitude scores provide an important replicate to the happiness analysis in assessing positivity/negativity interpretations. As measurement reflects the *receivers'* attitudes about the course, as well as the ostensible message sender's, it provides some evidence of social influence. That is, the nature of the message affected the *participants'* self-reported likelihood of taking the course discussed in the message. Results for ratings of attitude toward the course were very slightly different from the happiness ratings and supported different hypotheses. One aspect was the same: Again, all negative verbal messages, with any emoticon (smile, frown, wink, or no emoticon) were significantly more negative than all other messages. A positive verbal message with a frown had a median interpretation, significantly more positive than the negative messages, but less positive than a positive verbal message with any other emoticon (smile, wink, or no emoticon), supporting Hypothesis 4b. Thus, as far as inferring another's attitude about a topic and changing one's own attitude, it appears that there is a negativity effect: Any message containing a negative verbal or graphic element is more negative than any message with no negative elements. Hypothesis 1 is indirectly supported: As all negative verbal messages were rated less favorable about the course than any positive verbal messages, this prediction stands.

Thus far, the affective analyses—ratings of the messages' attitude about the course and the writer's happiness—do not show many of the expected effects of emoticons. The effect of a happy emoticon enhances the positivity of a positive verbal message, as posited in Hypothesis 2a, in the assessment of happiness, but not with regard to the writer's attitude toward the topic. Emoticons made no difference in the assessment of happiness for a negatively worded verbal message, voiding Hypothesis 2b. A frown emoticon affected course attitude, where a frown plus positive statement showed a moderating effect, as is consistent with Hypothesis 4b. However, a frown accompanying a positive statement had a different effect

on happiness, where the frown emoticon shifted the interpretation all the way into the unhappy, negative range, as is consistent with Hypothesis 6b. Of the two forms of mixed messages—a negative verbal message with a positive emoticon or a positive verbal message with a negative emoticon—only the latter combination consistently distinguished the message from the verbal baseline, making it less positive than no emoticon or other emoticons.

Ambiguity. Ambiguity was one of several hypothesized interpretations that might result from mixed messages. Hypotheses 3a and H3b predicted more ambiguity from mixed messages than from pure messages. Ambiguity ratings indicated that although a negative verbal message plus smile had the highest raw score on ambiguity, it was not significantly different than several other combinations (including positive verbal message plus smile, positive plus nothing, negative verbal plus nothing, and oddly, negative verbiage with a frown), failing to support Hypothesis 3a. Moreover, the least ambiguous in absolute scores was the positive verbal message with a frown, rejecting Hypothesis 3b, although it was not significantly less ambiguous than some other combinations. Statistically, the only differences were that a negative verbal message plus a smile emoticon and a negative verbal message with a frown emoticon were more ambiguous than a positive verbal message with a frown. The biggest differences were between two mixed messages. For the positive message plus frown to show such little ambiguity suggests that the combination has a more specific connotation, as the next analysis addresses.

Sarcasm. Ratings on the sarcasm/humor variables were examined to assess Hypotheses 5 and 7. Hypotheses 5a and 5b predicted that mixed messages (verbal message valence inconsistent with emoticon valence) would be seen as more sarcastic than pure messages. These hypotheses were not supported. The most sarcastic message, in raw scores, was a positive verbal message with a wink, but it was not significantly higher than anything except the very least sarcastic messages, negative plus frown and negative alone. Although both mixed messages were in the middle, their ratings did not differ from the extremes or from the pure messages specified in the hypotheses from which they were expected to differ.

Winks. Hypotheses 7a and 7b focused on the winking emoticon. A wink emoticon accompanying a positive verbal message had the highest score on sarcasm/humor, but this rating differed only from the very least sarcastic messages (negative verbal plus nothing and negative verbal plus frown). A wink plus a positive verbal message was not more sarcastic than a positive verbal message with a smile, a frown, or with nothing. The negative verbal message with a wink showed no distinguishing ratings at all. To support Hypothesis 7, the wink needed not only to connote sarcasm but also to affect the positivity/negativity of the verbal message with which it appeared. This was not the case either. Despite the wink-plus-positive verbiage's high sarcasm rating, the same combination was among the highest on perceived happiness and on inferred course attitude. Negative verbiage-plus-wink was no different from negative verbiage with anything on happiness or course attitude. Because of these results, Hypothesis 7 is not supported. Although a negative verbal message alone or with a frown seems to be dead serious, winks do not connote greater sarcasm than most other combinations, and they do not raise sarcasm interpretations relative to the verbal baselines with which they are combined. These patterns suggest informal support for Hypothesis 1 only.

Finally, a formal test of Hypothesis 1 was conducted, which had predicted that verbal message effects would outweigh emoticon effects or the absence of emoticons. ANOVAs

TABLE 6
Effect Size r for Verbal, Emoticon, and Interaction Effects

	<i>Verbal</i>	<i>Emoticon</i>	<i>Interaction</i>
Course attitude	.68	.14	.70
Happiness	.46	.28	.55
Ambiguity	.27	.05	.27
Sarcasm	.27	.13	.30

testing each respective main effect on each dependent variable produced r statistics for each term (see Table 6). These r coefficients were transformed to Fischer z' for comparison. The variance due to verbal statement was significantly greater than that produced by an emoticon in almost every case. This pertained to course attitude, $Z = 7.17$, $p < .001$ (one-tailed); happiness, $Z = 2.18$, $p = .015$; and message ambiguity, $Z = 2.25$, $p = .012$. This difference did not obtain, however, in the case of sarcasm, $Z = 1.52$, $p = .064$. It appears that despite some discrete variations as noted in the previous results, verbal messages account for the predominance of meaning in e-mail, even when accompanied by emoticons. It is also noteworthy that the average variance accounted for by emoticons, an r across conditions of .15 with an $R^2 = .02$, does not approach the meta-analytic estimate of the proportion of social meaning conveyed by nonverbal cues in FtF communication of about 63% (Philpott, 1983). Even the greatest effect of emoticons, $r = .28$, $R^2 = .078$ in the case of happiness interpretations, is still far lower. These findings echo Marvin's (1995) characterization of CMC as creating "worlds made of words." The exception to the greater effect of verbal messages—sarcasm—is also interesting to note. As is commonly held, it may require a nonverbal behavior—if not an emoticon—to signal sarcasm.

Although these comparisons of verbal communication to emoticon effects are potentially interesting, contemporary nonverbal communication research tends to eschew these gross comparisons, recognizing that verbal and nonverbal behaviors interact with one another and emanate from the same basic mechanisms. According to Fridlund et al. (1987),

The whole question of how much information is conveyed by separate channels is misleading. There is no evidence that individuals in actual social interaction selectively attend to another person's face, body, voice, or speech, or that the information conveyed by these channels is simply additive. (p. 190)

From this perspective, and to see if sarcasm indeed was better accounted for by the interaction of text and graphic, additional comparisons were conducted between the r coefficients for the interaction of verbal-by-emoticon combinations, against emoticon variation alone. These comparisons were significant for all dependent variables, course attitude, $Z = 7.56$, $p < .001$; happiness, $Z = 3.44$, $p < .001$; ambiguity, $Z = 2.32$, $p = .01$; and sarcasm, $Z = 1.86$, $p = .03$. These comparisons help clarify that emoticon variations plus verbal message effects help communicate sarcasm. On the other hand, emoticon effects alone would not be expected to be great, or very realistic, when they appear without verbiage. A final analysis revealed no differences between verbiage-plus-emoticon effects, compared with verbal message effects alone, just as we might also expect in some contexts comparing FtF verbal-plus-nonverbal behavior with verbal behavior alone.

A summary of hypotheses and instances of support are given in Table 7.

TABLE 7
Hypotheses and Support Indications

<p><i>Hypothesis 1:</i> Alterations in the valence of verbal messages account for greater variance in the interpretation of messages than do emoticons: <i>Supported.</i></p> <p><i>Hypothesis 2a:</i> A smile emoticon, coupled with a positive verbal message, conveys greater positivity than a positive verbal message alone: <i>Supported on happiness but not on course attitude.</i></p> <p><i>Hypothesis 2b:</i> A frown emoticon, coupled with a negative verbal message, conveys greater negativity than a negative verbal message alone: <i>Not supported.</i></p> <p><i>Hypothesis 3a:</i> A smile emoticon, coupled with a negative verbal message, is more ambiguous than a negative "pure message" (a negative verbal message alone or with a frown emoticon) or a positive "pure message" (a positive verbal message alone or with a smile emoticon): <i>Marginal support.</i></p> <p><i>Hypothesis 3b:</i> A frown emoticon, coupled with a positive verbal message, is more ambiguous than a positive "pure message" (a positive verbal message alone or with a smile emoticon) or a negative "pure message" (a negative verbal message alone or with a frown emoticon): <i>Marginally opposite.</i></p> <p><i>Hypothesis 4a:</i> A smile emoticon, coupled with a negative verbal message, conveys less negativity than a negative "pure message" and less positivity than a positive "pure message": <i>Not supported.</i></p> <p><i>Hypothesis 4b:</i> A frown emoticon, coupled with a positive verbal message, conveys less positivity than a positive "pure message" and less negativity than a negative "pure message": <i>Supported on course attitude but not on happiness.</i></p> <p><i>Hypothesis 5a:</i> A smile emoticon, coupled with a negative verbal message, conveys greater sarcasm than a negative or positive "pure message": <i>Not supported.</i></p> <p><i>Hypothesis 5b:</i> A frown emoticon, coupled with a positive verbal message, conveys greater sarcasm than a positive or negative "pure message": <i>Not supported.</i></p> <p><i>Hypothesis 6a:</i> A smile emoticon, coupled with a negative verbal message, conveys as much positivity as a positive "pure message" and more positivity than a negative "pure message": <i>Not supported (negativity effect).</i></p> <p><i>Hypothesis 6b:</i> A frown emoticon, coupled with a positive verbal message, conveys as much negativity as a negative "pure message" and more negativity than a positive "pure message": <i>Supported on happiness but not on course attitude.</i></p> <p><i>Hypothesis 7a:</i> A wink emoticon, coupled with a negative verbal message, conveys (a) less negativity than a negative "pure message" and (b) greater sarcasm than a negative "pure message": <i>Not supported (negativity effect).</i></p> <p><i>Hypothesis 7b:</i> A wink emoticon, coupled with a positive verbal message, conveys (a) less positivity than a positive "pure message" and (b) greater sarcasm than a positive "pure message": <i>Not supported (negativity effect).</i></p>
--

DISCUSSION

Drawing on the literature regarding the relationships of nonverbal and verbal cues, especially facial affect, the present study formulated numerous hypotheses intended to explore plausible potential effects of emoticons, on the presumption that they function similarly online as nonverbal behavior functions off-line. These hypotheses—often competing ones—specified enhancement effects for pure messages, where emoticon and verbal valence were consistent. Other hypotheses pertained to mixed messages—inconsistent displays of verbal affect and emoticon valence—predicting diluting effects, contradiction effects, ambiguity effects, and sarcasm effects. By and large, however, emoticons had few impacts on message interpretations as hypothesized, and when they did have an impact, they were not consistent across replications. For instance, a smile added to a positive verbal message enhanced happiness ratings but not to an interpretation of the topic to which the statement pertained; a frown added to a positive verbal statement reduced the positivity with regard to feelings about the topic but not with regard to the writer's happiness. In most cases, emoticons were overwhelmed by the valence of verbal statements that they accompanied. In

almost all cases, e-mail messages containing emoticons did not generate different interpretations than did messages without emoticons. In terms of the known functional relationships of nonverbal communication to verbal communication, the emoticon may serve the function of complementing verbal messages at best but not contradicting or enhancing them.

One unpredicted pattern that appeared to persist across all combinations of verbal and graphic elements was a negativity effect. No matter what the message element—emoticon or wording—when there was a negatively valenced component, the message was seen as more negative. A pure negative message (i.e., negative statement plus a frown) was not always alone in the group of most negative combinations. Adding a frown to a positive verbal statement made it more like one of the combinations with a negative verbal component. Yet, the reverse was not the case: Adding a smile to a negative verbal message did not change the verbal connotation (although it may have made the message marginally more ambiguous). Although a negativity effect is not discussed in the nonverbal literature of which we are aware, it is well-known in person-perception dynamics (see Asch, 1946; Kellermann, 1984). Thus, in a communication environment, exclusively verbal and nonphysical, graphic representations of faces may function more as verbal behavior than as nonverbal behavior functions. Alternatively, emoticons may function as “phatic communication” (Malinowski, 1923/1946)—ritualized expressions such as “How do you do?” that are exchanged not to convey meaning but to “fulfill a social function . . . [not] the result of intellectual reflection, nor [to] arouse reflection in the listener” (p. 315). A negative response in this context may draw attention (e.g., “Hi, how are you?”/“Not very good, actually”) and have an inordinate effect, redirecting the function from a phatic one to a content exchange.

In each analysis and overall, verbal message content prevailed over the emoticons’ contributions. It may be that emoticons are recognized as fleeting, requiring little effort, whereas typing text is slightly more involving and effortful. That which a writer takes the trouble to compose, in e-mail, might be valued more heavily in an environment in which even banter requires more work than casual speaking. In FtF interaction, that which is more controllable—language—is considered less revealing than “automatic” nonverbal behavior. In CMC, perhaps, the intentionality of both language and nonverbal surrogates evens things out. Although the SIP theory of social development in CMC (Walther, 1992) contends that CMC users will use whatever cues they have at their disposal to convey emotion online, it is emphatic that they adapt with alacrity to the presentation of affective information through verbal means (see also Utz, 2000). The present results seem to support this aspect of the theory, from a receiver perspective.

It is a limitation of the present study that each verbal message in the stimuli offered two valenced phrases, compared to one emoticon. This may violate potential combinatory rules of verbal/nonverbal communication interpretation: (a) when two or more message elements are consistent but a third differs, the differing cue may be discounted; (b) when several cues are similarly valenced, the affective meaning is averaged rather than magnified (Burgoon et al., 1996). However, these are but some among several possibilities of interpretive rules. Nevertheless, future research should adjust stimuli and measurement to be more sensitive to these factors. Moreover, the present research did not examine the effects of emoticons in combination with affectively *neutral* or no verbal messages. Doing so might parallel the method of determining the degree of social meaning produced by nonverbal behavior, in which Mehrabian and Ferris (1967) held verbal behavior ambiguous and constant, while varying nonverbal affect expressions. That approach led to the oft-quoted statistic that 93% of meaning is communicated nonverbally, which has been criticized as artificial and artifactual. However, it is conceivable that emoticons could be used with neutral verbal mes-

sages, a case in which their meaning might be stronger. Such relationships are currently under study.

Another limitation of the current study is that it did not use actual e-mail messages, directed to the participants as real recipients. Although participants were told to read the message "as if it were written to you by a friend," it was indeed not written by a friend. It is very likely that idiosyncratic interpretations exist within specific relationships, based on familiarity with a sender's style, but the present framework is not amenable to the detection of such idiosyncracies. Observing others' messages rather than being an actual recipient may also have an effect. Participants reading messages from a true friend may have had higher vested interest in the message and thus experience greater cognitive and affective arousal (deTurck & Goldhaber, 1989). Moreover, there are sometimes differences between the perspectives of participants and observers in judgments about the relational meaning of some nonverbal communication (Burgoon & Le Poire, 1999), although the near unanimity with which participants rated emoticons' meanings might reduce this potential problem (see Burgoon & Newton, 1991).

Yet another possible reason for these findings is that the emoticon is now overused, and the impact that it is supposed to have has been diminished, either culturally/historically, or as an individual user is first entertained and later bored with the cuteness of them all. We seem not to be wearing our smiley-face, "have a nice day" buttons much lately, either. Although Rezabek and Cochenour (1998) suggested that the most common, widely recognized emoticons are most useful for communication, and idiosyncratic ones may not be, that may not be the case. It may be that emoticons are a tie sign of sorts, signaling common knowledge. Our findings that e-mail or emoticon experience did not affect interpretations, however, contradicts this possibility somewhat. Our experimentation with the most common emoticons, and the paucity of effects, might lead researchers to explore less typical examples.

Perhaps emoticons do not actually serve direct socially communicative functions but indirect ones. Although writers of e-mail indeed use emoticons, perhaps the generation of an emoticon acts as a self-signaling cue, prompting the writer to write in such a way that is as expressive as he or she intends. Such is considered the sometimes function of nonverbal gesturing, also. Individuals often use gesticulation to help them stimulate their verbal selections and regulate their verbiage by using gesture to make a visible representation of that which they are trying to articulate as they speak (Freedman, 1977). Emoticons may help the writer, not the reader, in a similar way, by helping to express, to check, and if need be to edit, that which may be unclear during initial message production. As such, emoticons are not communicative but generative.

In CMC, as in FtF communication, affective displays do not always carry the day. As Godwin (1994) observed, "ASCII is too intimate": The impact of language spelled out in plain letters is intense, perhaps more intense in CMC than elsewhere. Yet, even in FtF interaction, according to Birdwhistell (1970),

Smiles do not override context. That is, insofar as we can ascertain, whatever smiles are and whatever their genesis, they are not visible transformations of underlying physiological states which are emitted as direct and unmitigated signal forms of that state. (p. 33)

Even more so is the case, at least as interpreted by readers, of the interpretation of smiling graphics and frowning ones embedded in e-mail messages. Despite widespread familiarity with these symbols among the computer-using public as well as among scholars and observers, near consensus on their semantic values, and near-universal speculation that they func-

tion as a replacement for the nonverbal FtF cues that CMC eliminates, their actual communicative effects are minimal in the context of the language cues they may accompany.

NOTES

1. Popular humorist Dave Barry (1996, pp. 144-146) seems to share this perception, as he explains the critical importance of emoticons:

Suppose you're typing a statement such as:

I am feeling happy

The problem with this is that the reader cannot be absolutely, positively, 100 percent sure what emotion you're feeling when you type this . . .

I am feeling happy :)

See the difference?

Without emoticon:

Over 7,000 men died at Gettysburg.

With emoticon:

Over 7,000 men died at Gettysburg :(

See the difference? The readers of the second sentence, merely by turning it sideways, will immediately recognize that it is talking about a sad thing.

2. Rezabek and Cochenour (1998) also noted, in one of the Listservs they analyzed, that 33.33% of emoticons were exhibited by users from the University of Wisconsin–Madison, 21.57% from Texas A&M, 15.69% from San Diego State, 13.72% from the University of New Mexico, and 17.84% from each of the University of Wyoming and Penn State. Despite descriptions of the Internet as a kind of place-irrelevant cyberspace (e.g., W. J. Mitchell, 1995), apparently regional norms hold. One is reminded of Birdwhistell's (1970) observation that "smiling varied from one part of the United States to another" (p. 30).

3. Although these findings are situated in studies of face-to-face interaction, telecommunication research features conclusions that differ in some respects. When it comes to comparisons between audio, videoconferencing, and other forms of mediated and unmediated interaction, research finds that the voice accounts for a substantial degree of variance in understanding, whereas the addition of video or face-to-face channels adds very little (e.g., Ochsman & Chapanis, 1974). However, little in the way of original hypotheses has emerged from these domains to challenge the findings from face-to-face research (for an exception, see, e.g., Whittaker & O'Conaill, 1997).

REFERENCES

- Asch, S. E. (1946). Forming impressions of personality. *Journal of Abnormal and Social Psychology*, 41, 1230-1240.
- Asteroff, J. F. (1987). *Paralanguage in electronic mail: A case study*. Unpublished doctoral dissertation, Columbia University, New York.
- Barry, D. (1996). *Dave Barry in cyberspace*. New York: Fawcett Columbine.
- Birdwhistell, R. L. (1970). *Kinesics and context: Understanding body motion*. Philadelphia: University of Pennsylvania Press.
- Birnbaum, M. H. (Ed.). (2000). *Psychological experiments on the Internet*. San Diego, CA: Academic Press.
- Bolter, J. D. (1991). *Writing space: The computer, hypertext, and the history of writing*. Hillsdale, NJ: Lawrence Erlbaum.
- Burgoon, J. K. (1985). Nonverbal signals. In M. L. Knapp & G. R. Miller (Eds.), *Handbook of interpersonal communication* (pp. 344-392). Beverly Hills, CA: Sage.
- Burgoon, J. K., Buller, D. B., & Woodall, W. G. (1996). *Nonverbal communication: The unspoken dialogue* (2nd ed.). New York: McGraw-Hill.
- Burgoon, J. K., & Le Poire, B. A. (1999). Nonverbal cues and interpersonal judgments: Participant and observer perceptions of intimacy, dominance, composure, and formality. *Communication Monographs*, 66, 105-124.
- Burgoon, J. K., & Newton, D. A. (1991). Applying a social meaning model to relational message interpretations of conversational involvement: Comparing observer and participant perspectives. *Southern Communication Journal*, 56, 96-113.
- Burton, M. C., & Walther, J. B. (2001, January). The value of Web log data in use-based Web design and testing. *Journal of Computer-Mediated Communication*, 6(2). <http://www.ascusc.org/jcmc/vol6/issue3/burton.html>

- Carey, J. (1980). Paralanguage in computer mediated communication. In N. K. Sondheimer (Ed.), *The 18th annual meeting of the Association for Computational Linguistics and parasession on topics in interactive discourse: Proceedings of the conference* (pp. 67-69). Philadelphia: University of Pennsylvania.
- Childers, T. L., & Houston, M. J. (1984). Conditions for a picture-superiority effect on consumer memory. *Journal of Consumer Research*, *11*, 643-654.
- Danet, B., Ruedenberg-Wright, L., & Rosenbaum-Tamari, Y. (1997). "HMMM . . . WHERE'S THAT SMOKE COMING FROM?" Writing, play and performance on Internet Relay Chat. *Journal of Computer-Mediated Communication*, *2* (4). Retrieved June 15, 2000, from the World Wide Web: <http://www.ascusc.org/jcmc/vol2/issue4/danet.html>
- DePaulo, B. M., & Rosenthal, R. (1979). Ambivalence, discrepancy, and deception in nonverbal communication. In R. Rosenthal (Ed.), *Skill in nonverbal communication: Individual differences* (pp. 204-248). Cambridge, MA: Oelgeschlager, Gunn, & Hain.
- deTurck, M. A., & Goldhaber, G. M. (1989). Effectiveness of product warning labels: Effects of consumer's information processing objectives. *Journal of Consumer Affairs*, *23*(1), 111-126.
- Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior: Categories, origins, usage, and coding. *Semiotica*, *1*, 49-98.
- Ekman, P., & Friesen, W. V. (1975). *Unmasking the face: A guide to recognizing emotions from facial cues*. Englewood Cliffs, NJ: Prentice Hall.
- Freedman, N. (1977). Hands, words and mind: On the structuralization of body movements during discourse and the capacity for verbal representation. In N. Freedman & S. Grand (Eds.), *Communicative structures and psychic structures: A psychoanalytic interpretation of communication* (pp. 109-132). New York: Plenum.
- Fridlund, A. J., Ekman, P., & Oster, H. (1987). Facial expression of emotion: Review of the literature, 1970-1983. In A. W. Siegman & S. Feldstein (Eds.), *Nonverbal behavior and communication* (2nd ed., pp. 143-244). Hillsdale, NJ: Lawrence Erlbaum.
- Godin, S. (1993). *The smiley dictionary*. Berkeley, CA: Peachpit.
- Godwin, M. (1994, April). ASCII is too intimate. *Wired*, pp. 69-70.
- Heslin, R., & Patterson, M. L. (1982). *Nonverbal behavior and social psychology*. New York: Plenum.
- Kellermann, K. (1984). The negativity effect and its implications for initial interaction. *Communication Monographs*, *51*, 19-56.
- Kendon, A. (1987). On gesture: Its complementary relationship with speech. In A. W. Siegman & S. Feldstein (Eds.), *Nonverbal communication and behavior* (pp. 65-98). Hillsdale, NJ: Lawrence Erlbaum.
- Kiesler, S., Siegel, J., & McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist*, *39*, 1123-1134.
- King, W. C., Dent, M. M., & Miles, E. W. (1991). The persuasive effect of graphics in computer-mediated communication. *Computers in Human Behavior*, *7*, 269-279.
- Knapp, M. L., Wiemann, J. M., & Daly, J. A. (1978). Nonverbal communication: Issues and appraisal. *Human Communication Research*, *4*, 271-280.
- Kraut, R., Mukhopadhyay, T., Szczypula, J., Kiesler, S., & Scherlis, B. (1999). Information and communication: Alternative uses of the Internet in households. *Information Systems Research*, *10*, 287-303.
- LaCrosse, M. B. (1975). Nonverbal behavior and perceived counselor attractiveness and persuasiveness. *Journal of Counseling Psychology*, *22*, 563-566.
- Leathers, D. G. (1986). *Successful nonverbal communication: Principles and applications*. New York: Macmillan.
- Lutz, K. A., & Lutz, R. J. (1977). Effects of interactive imagery on learning: Applications to advertising. *Journal of Applied Psychology*, *62*, 493-498.
- Malinowski, B. (1946). The problem of meaning in primitive languages. Supplement I in C. K. Ogden & I. A. Richards, *The meaning of meaning* (8th ed., pp. 296-336). New York: Harcourt, Brace, & Co. (Original work published 1923)
- Marvin, L. E. (1995). Spoof, spam, lurk and lag: The aesthetics of text-based virtual realities. *Journal of Computer-Mediated Communication*, *1*(2). Retrieved June 15, 2000, from the World Wide Web: <http://207.201.161.120/jcmc/vol1/issue2/marvin.html>
- McCormick, N. B., & McCormick, J. W. (1992). Computer friends and foes: Content of undergraduates' electronic mail. *Computers in Human Behavior*, *8*, 379-405.
- Mehrabian, A., & Ferris, S. R. (1967). Inference of attitudes from nonverbal communication in two channels. *Journal of Consulting Psychology*, *31*, 248-252.
- Mehrabian, A., & Williams, M. (1969). Nonverbal concomitants of perceived and intended persuasiveness. *Journal of Personality and Social Psychology*, *13*, 37-58.
- Mitchell, A. A. (1986). The effect of verbal and visual components of advertisements on brand attitudes and attitude toward the ad. *Journal of Consumer Research*, *13*, 12-24.

- Mitchell, W. J. (1995). *City of bits: Space, place, and the Infobahn*. Boston: MIT.
- Negroponce, N. (1995). *Being digital*. New York: Alfred A. Knopf.
- Ochsman, R., & Chapanis, A. (1974). The effects of 10 communication modes on the behavior of teams during co-operative problem-solving. *International Journal of Man-Machine Studies*, 6, 579-619.
- Patterson, M. L. (1983). *Nonverbal behavior: A functional perspective*. New York: Springer-Verlag.
- Pettit, F. A. (1999). Exploring the use of the World Wide Web as a psychology data collection tool. *Computers in Human Behavior*, 15, 67-71.
- Pew Internet & American Life Project. (2000). *Tracking online life: How women use the Internet to cultivate relationships with family and friends*. Retrieved May 16, 2000, from the World Wide Web: <http://www.pewinternet.org/reports/pdfs/Report1.pdf>
- Philpott, J. S. (1983). *The relative contribution to meaning of verbal and nonverbal channels of communication: A meta-analysis*. Unpublished master's thesis, University of Nebraska, Lincoln.
- Pollack, A. (1982, May 27). Technology: Conference by computer. *New York Times*, p. D2.
- Quina, K., Wingard, J. A., & Bates, H. G. (1987). Language style and gender stereotypes in person perception. *Psychology of Women Quarterly*, 5(2), 111-122.
- Rezabek, L. L., & Cochenour, J. J. (1998). Visual cues in computer-mediated communication: Supplementing text with emoticons. *Journal of Visual Literacy*, 18, 201-215.
- Rice, R. E., & Love, G. (1987). Electronic emotion: Socioemotional content in a computer-mediated network. *Communication Research*, 14, 85-108.
- Rosenthal, R., & Rosnow, R. L. (1984). *Essentials of behavioral research: Methods and data analysis*. New York: McGraw-Hill.
- Sanderson, D. (1993). *Smileys*. Sebastopol, CA: O'Reilly.
- Sarbaugh-Thompson, M., & Feldman, M. S. (1998). Electronic mail and organizational communication: Does saying "hi" really matter? *Organization Science*, 9, 685-698.
- Shepard, R. N. (1967). Recognition memory for words, sentences, and pictures. *Journal of Verbal Learning and Verbal Behavior*, 6, 156-163.
- Thompson, P. A., & Foulger, D. A. (1996). Effects of pictographs and quoting on flaming in electronic mail. *Computers in Human Behavior*, 12, 225-243.
- Tidwell, L. C., & Walther, J. B. (2000, July). *Getting to know one another a bit at a time: Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations*. Paper presented at the International Conference on Language and Social Psychology, Cardiff, Wales.
- Utz, S. (2000). Social information processing in MUDs: The development of friendships in virtual worlds. *Journal of Online Behavior*, 1(1). Retrieved June 15, 2000, from the World Wide Web: <http://www.behavior.net/JOB/v1n1/utz.html>
- Walther, J. B. (1992). Interpersonal effects in computer-mediated communication: A relational perspective. *Communication Research*, 19, 52-90.
- Walther, J. B. (1994). Anticipated ongoing interaction versus channel effects on relational communication in computer-mediated interaction. *Human Communication Research*, 20, 473-501.
- Walther, J. B. (1997). Group and interpersonal effects in international computer-mediated collaboration. *Human Communication Research*, 23, 342-369.
- Walther, J. B., & Burgoon, J. K. (1992). Relational communication in computer-mediated interaction. *Human Communication Research*, 19, 50-88.
- Walther, J. B., & Tidwell, L. C. (1995). Nonverbal cues in computer-mediated communication, and the effect of chronemics on relational communication. *Journal of Organizational Computing*, 5, 355-378.
- Whittaker, S., & O'Conaill, B. (1997). The role of vision on face-to-face and mediated communication. In K. E. Finn, A. J. Sellen, & S. B. Wilbur (Eds.), *Video-mediated communication* (pp. 23-49). Mahwah, NJ: Lawrence Erlbaum.
- Witmer, D., & Katzman, S. (1997). On-line smiles: Does gender make a difference in the use of graphic accents? *Journal of Computer-Mediated Communication*, 2(4). Retrieved May 23, 2000, from the World Wide Web: <http://www.ascusc.org/jcmc/vol2/issue4/witmer1.html>
- Wolf, A. (2000). Emotional expression online: Gender differences in emoticon use. *CyberPsychology & Behavior*, 3, 827-833.

Joseph B. Walther (Ph.D., University of Arizona) is an associate professor with appointments in communication, social psychology, and information technology at Rensselaer Polytechnic Institute in Troy, New York.

His research involves the relational dynamics of computer-mediated communication in groups, organizations, educational settings, and personal relationships. He can be reached at 4202 Sage Lab, Dept. of Language, Literature, & Communication, R.P.I., Troy, NY 12180; e-mail: walthj@rpi.edu.

Kyle P. D'Addario (B.A., State University of New York at Buffalo) is a doctoral student in communication and rhetoric at Rensselaer Polytechnic Institute in Troy, New York.