

Running head: VERBAL, VOCAL, VISUAL FACTORS ON FIRST IMPRESSIONS

Online First Impressions:

The Role of Verbal, Vocal and Visual Factors On First Impressions

Susan J. Ball

Missouri Western State College

Online First Impressions:

Importance of Verbal, Vocal, and Visual Factors on First Impressions

“On the Internet, nobody knows you’re a dog.” As this caption which accompanies Peter Steiner's cartoon (July 5, 1993: 61) of a dog at a computer suggests, the online world of computer mediated communication (CMC) brings with it a good measure of anonymity for the user. It also speaks to how social perceptions in on-line settings may be influenced by the reduction of social cues available through this communication channel.

For the better part of this century researchers have been trying to determine how we go about forming impressions of others. The general conclusion drawn from this research is that first impressions are frequently based on the social cues, communicated to the perceiver through a mixture of the verbal and nonverbal channels available in face-to-face interactions. Relying heavily on such visual-nonverbal variables as physical appearance, facial expressions, bodily movement, in addition to vocal qualities such as tone, pitch, amplitude (see Noller, 1985 for a review).

But, the recent explosion of CMC channels, especially the Internet (e.g., e-mail, chat groups, discussion groups, etc.), has radically changed the manner in which social linkages can be formed (Parks, 1996). In on-line settings the social cues (i.e., contextual, visual, aural) normally used to form impressions in face-to-face interactions are filtered out in this textual dominant medium (Culnan & Markus, 1987). Raising questions for communication and social psychologists as to how this reduction in communication channel's effects interpersonal perceptions formed in on-line settings.

Though the bulk of research on modality effects on impression formation, and the theories from which conclusions were drawn, predates the current explosion of computer-mediated communication technology, it is important to review this body of literature as a basis from which to compare the emerging communication theories regarding the role social cues play in forming our impressions of others.

The majority of research in the last thirty years has been an effort to determine whether nonverbal cues contribute more than verbal cues to an observer's judgement of personality. The nonverbal category includes both visual cues (e.g., facial expressions, posture, distance, gesture, etc.), and the vocal or paralinguistic cues (e.g., pitch, amplitude, rate, voice quality, etc.). While the verbal category consists of cues received from the content of speech.

A common research methodology used to determine channel dominance is channel comparison. In such research, observers are exposed to information from a single channel (e.g., visual, vocal, or content). For example, some subjects see only the video portion of a test, some hear only the audio portion, and others read a sample document (e.g., Ekman, Friesen, O'Sullivan & Scherer, 1980). Comparisons are then made between the effects of visual, vocal, or content information. A criticism of cross channel comparison methodology (e.g., visual vs. verbal vs. vocal) is that it does not represent the manner in which first impressions are formed in "real life". Lyman, Hatlelid, & Macurdy (1981), argue that in real life situations "the stimulus person is engaged in activity in a particular setting or context, and physical features are not isolated from gestures, facial expressions, and other behavior" (p. 59). As a result, data collected

in this manner may reflect a bias that will lead to erroneous conclusions. Noller (1985), expresses a similar concern about using methodologies not related to real life situations and notes this would limit their generalizability.

Much of the early research pointed to the nonverbal-visual channel being more important than verbal or vocal cues (Argyle, Alkema, & Gilmour, 1972; Mehrabian & Wiener, 1967; Posner, Nissen & Klein, 1976). For example, in a series of studies done by Mehrabian (1972) it was estimated that 59% of the communication of emotion is accomplished in the visual channel, whereas the verbal and paralinguistic channels contributed only 7% and 38% respectively. DePaulo, Rosenthal, Eisenstat, Rogers and Finkelstein (1978), refer to this as the video primacy effect. Moreover, they claim that video primacy was greater for face than for body, a finding supported in several studies (Argyle & et al., 1971; Burns & Beier, 1973; Mehrabian & Ferris, 1967; Zaiel & Mehrabian, 1969).

Furthermore, facial appearance has been shown to influence attributions about the target person's attractiveness, pleasantness, social skills, and intellect (Adams, 1977; Conover, Seymour, Marx, & Moore, 1978; Dion, Berscheid, & Walster, 1972). A study by Dion et al., (1972), found that individuals, both male and female, who were perceived as physically attractive tended to be stereotyped with more desirable personality traits than physically unattractive persons. In addition, physically attractive persons were expected to attain more prestigious occupations, and be more competent husbands and wives. The general conclusion is that observers seem to apply a generally positive stereotype to persons who are physically attractive. Thorndike (1920), identified this

tendency as the “halo effect”. Whereby, if a person is rated highly on a given trait this tends to elevate ratings of other traits on which there is little or no information.

Several possible explanations for visual dominance have been identified: First, visual cues may contain more information than verbal and vocal cues (Burgoon, Buller, & Woodall, 1989). Second, there is greater deliberate attention paid to the visual than to the auditory cues (Posner, Nissen, & Klein, 1976). Third, because persons have more control over their facial reactions than the body or the voice it provides more information (Ekman & Friesen, 1969). Fourth, visual information is a more efficient processing modality (Posner et al.).

Later research comparing observers’ judgments of affect made from single channels (verbal, vocal, or visual) with those from multiple channel (e.g., verbal, vocal, and visual together) judgments identified several determinants involved in making judgments about another persons emotional state, attitude, or personality. There seems to be a consensus among researchers that judgments are highly dependent on the type of attribute being judged, as well as, the situation in which the behavior occurred (DeMeuse, 1987; Ekman, Friesen, O’Sullivan & Scherer, 1980; Patterson, Churchill, Burger, & Powell, 1992).

Warner and Sugarman (1986), examined the effect of facial appearance, speech style, and handwriting on personality attributions. Their findings indicate that each communication channel provides information about different personality dimensions. Specifically, handwriting was found to provide more information about a person’s

potency, and facial appearances were used more in judgments of social and intellectual attributes. Their results supported the earlier findings of Ekman et al., (1980).

Two studies done by Krauss, Apple, Morency, Wenzel, & Winton (1981), using a more-or-less natural setting of the 1976 Dole-Mondale vice-presidential debate, compared the extent of variance in observer's judgment of affect based on either full-channel (verbal plus nonverbal) presentation or single-channel presentation (written transcripts, content-filtered speech, or silent video). They found no support for the assumption that nonverbal channels form the primary basis for the communication of affect. Furthermore, they state that in the full-channel condition affective judgments depend on the type of judgment being made, the particular setting, and the configuration of cues among channels. In addition to the determining factors indicated above, DePaulo et al., (1980) included the nature of the message, and the characteristics of encoders and decoders.

A similar study conducted Patterson et al., (1992) examined the role of presentation modality in evaluations of Ronald Reagan and Walter Mondale during the second presidential debate in 1984. Their findings support the visual primacy effect on judgments of expressiveness and physical attractiveness. Noting, however, that because of the sharp contrast between the candidates in expressiveness and physical attractiveness, observers' may have focused on the visual information, and attended less to the content of the message. Furthermore, they are in agreement with DePaulo et al., (1980) suggestion that the importance of presentation modality is dependent on a variety of factors.

Despite the differing methodologies used in these studies they all seem to be in agreement on two points. First, although the visual modality seems to play a dominant role in communicating information used in the process of impression formation, no one channel can be definitively stated as being equally effective in communicating all types of information. Secondly, individuals do tend to rely heavily on information gathered through the visual channel when forming impressions of others. The most apparent conclusion that can be drawn from this review of social psychology research is that nonverbal influences on person perception are significant and varied. Because of this, it may also be inferred that impressions formed through text based, or content only channels which exclude the nonverbal cues may differ from those formed on the basis of multi-channel information which includes both verbal and nonverbal cues.

Communication analysts are also interested in the modality affects on person perception and impression formation. They are particularly interested in the Internet because of its unique ability to transcend the traditional boundaries between interpersonal and mass communication. According to Lea and Spears (1995), the Internet raises new opportunities and risks for the way individuals relate to one another.

Some communication analysts consider media to vary in their “richness”, which is a function of their capacity to provide immediate feedback and to support the multiple verbal and non-verbal cues that convey social presence (Daft & Lengel, 1984; Rice & Love, 1987). According to Short, Williams, and Christie (1976), social presence is a function of the medium that permits users to become more or less aware of the other person in the interaction. Therefore, social presence is the feeling that communication

exchanges are social, warm, personal, and sensitive. As such, a communication media's social presence is defined by the user's subjective perception of its ability to provide social presence.

Thus, the fewer communication channels (e.g., audio, and visual) a medium utilizes the less social presence a medium is seen to provide. For example, face-to-face communication is considered to be the "richest" media because of the participant's ability to receive immediate feedback by means of both verbal and non-verbal cues. Followed by a lesser degree of richness are the telephone, electronic mail (e-mail), and written letters or memos (Daft, & Lengel, 1986; Hathornthwaite, Wellman, & Mantei, 1995; Rice, & Love, 1987). In like manner, social presence is seen to be lower in telephone communication because it is limited to verbal cues, and social presence is seen to be all but removed from e-mail and written documents (Perse, Burton, Kovner, Lears, & Sen, 1992; Short et al., 1976).

Furthermore, it is suggested that the reduction in social presence in online settings causes communication to be more impersonal, and nonconforming (Kiesler, Siegel, & McGuire, 1984; Short et al., 1976). A study done by Kiesler & Sproull (1986), comparing responses from computer-mediated surveys to paper and pencil surveys, found that people described themselves in less socially desirable terms when responding to the computerized survey. They concluded, people were relatively unconcerned with social norms, and with impression management in the on-line setting. Some researchers' attribute these behavioral differences to less public self-awareness felt by computer users (Matheson & Zanna, 1988).

Matheson and Zanna (1988, 1989) have suggested an alternative explanation to these behavioral differences, on the part of computer users. They propose that such differences may result from enhanced private self-awareness. They define private self-awareness as, “a greater awareness of internal aspects of one’s self, such as feelings, attitudes, values, and so on” (Matheson, 1991, p. 138). Furthermore, they suggest that private self-awareness may indirectly affect computer users’ awareness of others, and enhance their responsiveness to cues in the social context. In a subsequent study, it was found that during a computer-mediated communication task users were sensitive to social cues (e.g. gender) and that this sensitivity may lead to stereotypical responses. These findings suggest that despite the lack of nonverbal cues in on-line settings some social cues may be communicated verbally and invoke stereotypical impressions of others.

Although e-mail provides few nonverbal cues such as facial expression, gaze, or posture, it is not always seen as low in social presence (Perse et al., 1992). Studies have shown that as users become more familiar with using this media they begin to personalize their messages. Users try to convey their social presence by using such things as humor, insults, or symbols to express their feelings and individual personality (Rice & Love, 1987). In a study of collage students, CMC has been shown to be used more by those students who felt they could convey more interpersonal presence (Perse et al., 1992). Thus, the “richness” of a particular media is a very subjective matter that may vary greatly from one individual to another.

Walther (1992), disputes claims that CMC is a less socioemotional or personal media than face-to-face communication because of its inability to convey nonverbal cues.

He argues that relational and personal information can be conveyed through CMC channels but it takes more time than in face-to-face communication. Studies of e-mail in the workplace add support to Walther's claim (e.g., Ertmer, Evenbeck, Cennamo, & Lehman, 1994; Garver, 1996). Several studies report that the longer individual's use e-mail the more they use it to socialize, maintain relationships, and receive emotional support (e.g., Fulk, Steinfield, Schmitz & Power, 1987; Hathornthwaite et al., 1995; Rice & Love, 1987).

Obviously, many people are forming relationships through CMC channels. Hahn and Stout (1994), reported there were over 5,000 Internet discussion groups, and that number is steadily increasing. Nevertheless, neither social psychology or communication researchers have examined whether impressions formed through on-line channels (i.e., e-mail, chat groups, etc.) differ from those made in off-line channels (i.e., face-to-face, video, telephone, etc.). Therefore, the purpose of this study is to see if impressions are affected by the mode of presentation (visual, audio, audiovisual, on-line text). Primarily, to see whether judges who are provided with only one information channel (visual, audio, or on-line text) can consistently differentiate the actors along several personality traits. Secondly, are judgments of personality traits made from single-channel presentations (visual, audio, or on-line text) different from those made from multi-channel (audiovisual) presentations.

It is expected that judges will produce similar personality traits for each actor regardless of the information condition; that is, if Actor 1 is rated as warm in the visual condition then they will also be rated as warm in the audio, audiovisual, and the textual

condition. If this were found, it would be consistent with Allport's (1961) suggestion that the physical appearance and behavior displayed by an actor emits a consistent message about personality.

However, certain traits may be more difficult to judge in one channel than another. Burns and Beier (1973) concluded that channels differ in the amount of information they conveyed about various mood states. Their findings indicate that anxiety attributions were influenced more by the vocal than the visual channel. For instance, it may be more difficult to judge if a person is rude or courteous from visual information than from verbal information. For these reasons, it is predicted that judge's ratings of an actor may vary in strength on a particular trait. For instance, Actor 1 may be judged high on warmth by a judge in the visual condition and only moderately warm by the judge in the text condition. It is also expected that more extreme ratings will be found in the audiovisual condition because judges will feel more confidence in their judgment when they have both verbal and nonverbal cues present.

Method

Participants

Seventy-one undergraduate students (21 men and 50 women) volunteered to participate in the study. Each volunteer participated in one of three experimental conditions (audiovisual, audio-only, or on-line transcript only). The time slot selected by participant determined which condition they would participate in. Twenty-five participants (8 men and 17 women) participated in the video condition, twenty-one participants (8 men and 13 women) in the audio-only condition and twenty-five

participants (5 men and 20 women) in the on-line transcript condition. All were given extra credit by their instructors for their participation and were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 1992).

Materials

The stimuli materials for this study consisted of eight interview questions (i.e., “Why did you come to this college?” “What is your major?”). To help control for preexisting familiarity, psychology students from a community college in another town were selected as actors for the videotaped interviews. In choosing actors, it was decided that the gender of actor variable would be avoided because it was not feasible to include a large enough sample of actors to examine both sex stereotype effects on ratings and variability of rating received by individual actors within each sex. Thirteen female actors were videotaped answering the eight interview questions. From these thirteen videotaped segments two were randomly selected for use in the study.

Each of the two videotapes selected for the study was digitized and coded as Real Video. All testing took place using Netscape 3.02 on IBM compatible computers in the psychology computer lab. Both interviews were divided into eight segments (the eight interview questions). The eight interview questions appeared as text on the computer screen and were paired with the eight videotaped responses. In the video condition participants were presented both the audio and video portions of the video taped interviews, while only the audio portion was heard in the audio-only condition. For the

on-line condition, transcripts were made of the two videotaped segments and were presented as eight separate questions via a computer screen.

After viewing, hearing, or reading the interviews participants were asked to complete a personality index containing 15 bipolar trait pairs (i.e., nasty-nice; unfriendly-friendly; mean-kind; unhappy-happy; cold-warm; gloomy-cheerful; cruel-kind; rude-courteous; negative-positive; obnoxious-polite; uncaring-caring; disagreeable-agreeable; unpleasant-pleasant; inconsiderate-considerate; unlikable-likable) for each of the two actors. The 15 adjective trait pairs were taken from Garlick's (1993) study. Trait terms were arranged using a 15-item, nine-point (i.e., 0 to 8) differential semantic format with a maximum rating of 135 and a minimum rating of zero possible. The personality index was used by participants to assess the perceived personalities of the two actors in one of the three experimental conditions (audiovisual, audio only, on-line text only), and was completed via an IBM computer terminal in the psychology department lab.

Design and Procedure

In all conditions groups of one to ten participants were seated facing the computer monitor and received information via the computer. . Each group of participants was presented two interviews in one of the three experimental conditions (audiovisual, audio only or on-line transcripts). Depending on the condition, participants were told they would be seeing, hearing, or conducting on-line, two interviews presented one at a time. Participants were also instructed that after each interview they were to provide personality ratings of the Actor by completing a personality index on the computer

screen. In each condition one interview was presented and the participant completed a personality index via the computer terminal before the next interview was presented.

In all three conditions the eight interview questions appeared on the computer terminal screen. Participants were instructed to select one question at a time in any order they desired, and the interviewee's response to that question would either appear on the screen in the video and transcript condition, or would be heard through the headphones in the audio condition. In the audiovisual condition both the visual and audio portions of the interviews were presented. Participants saw the actor's videotaped interview on the computer screen while simultaneously hearing the audio portion of response through headphones connected to the computer speakers. During the audio condition (i.e., verbal and vocal channels) the monitor screen was darkened but participants heard the responses through headphones connected to the computer speakers. In the on-line interview condition, the eight interview questions were presented on the computer screen. The participants selected each question, one at a time, and the transcribed videotape responses were viewed on the computer terminal screen.

When all eight-interview questions had been selected the personality index appeared on the computer screen and prompted participants to complete the 15 questions about the person they just interviewed. Participants had been instructed on how to complete the on-line questionnaire prior to starting the experiment. The participants answers to each of the fifteen bipolar trait questions were recorded by using the computer mouse and left clicking in the box they determined most closely represented the personality trait of the actor in the interview. When all participants in a group had

completed the two personality index's they were debriefed, asked not to discuss the experiment with anyone, thanked for their participation, and dismissed.

Since the participants completed the personality indexes on-line, scoring of questionnaires was performed on the computer. Results were then analyzed using the SPSS statistical software program.

Results

A 3x2 MANOVA was performed on the 15 personality traits (nasty-nice, unfriendly-friendly, mean-kind, unhappy-happy, cold-warm, gloomy-cheerful, cruel-kind, rude-courteous, negative-positive, obnoxious-polite, uncaring-caring, disagreeable-agreeable, unpleasant-pleasant, inconsiderate-considerate, unlikable-likable) as dependent variables. The independent factors were the three presentation conditions (audiovisual, video, transcript) and the two videos. Thus, each of the 6 cells in the design corresponds to an actor/presentation stimulus combination (e.g. Actor 1's transcript or Actor 2's speech).

Results of the MANOVA indicated a significant Video x Condition interaction, $\Lambda(30) = .707, p = .05$. Interpreting the significant interaction in light of the hypotheses, it appears the pattern of judgements differs from one information type to another depending on which video the subject saw. The main effect for Video was significant, $\Lambda(15) = .69, p < .01$, however, this difference was encompassed in the interaction. The main effect for the three different conditions was not significant, $\Lambda(30) = .751, p > .05$. Mean ratings by observers for each of the three conditions for both Video 1 and Video 2 are displayed in Figure 1 and Figure 2 respectively.

To obtain more detailed information about possible differences between information types, a follow-up analysis of the main effects of each interview was done separately for each of the three information conditions. Thus, 15 one-way ANOVA's were calculated for each interviewee comparing the perception of the interviewee between the three interview types. There was a significant effect for interview type using Interview 1 on all questions except for 2, 5 and 9, while there were no significant effects shown for Interview 2 (see Table 1). Tukey's post hoc analysis of significant ANOVA's was used to identify differences. As can be seen in Table there were no significant differences found between the Video and Audio conditions for any of the traits for Video 1. There were significant differences found between the Video and Transcript conditions for twelve of the traits, and significant differences were also found between the Audio and Transcript conditions for eight of the traits. But, for Video 2 no significant differences were found between any of the three conditions for any of the traits.

Discussion

The results from this experiment show that it would be unwise to claim that any one channel predominates when judging other people. These findings add no support to the claims of DePaul et al. (1978) for the video primacy effect, nor the numerous claims found in the literature that the face is most important in making these judgements. Though the visual modality may indeed play a dominate role in communicating information used in the process of impression formation, no one channel can be definitively stated as being equally effective in communicating all types of information. This seems to indicate that impression formation is a more complex question than can be

judged simply by comparing the mean ratings of single channel presentation to ratings of persons made when both verbal and nonverbal inputs are available.

The results of the current study do add support to Krauss et al. (1981) assertion that judgements are highly dependent of the type of attribute being judged. Additionally it supports claims that judgements are influenced by such factors as the particular setting, the nature of the message, and the characteristics of encoders and decoders. The results from the current study indicate that there is a significant interaction between the message and the messenger when making first impressions. Therefore, it is suggested that any further studies investigating the effect of modality or “richness” should take into account differences in both the message and the messenger.

This study has several limitations that restrict the types of conclusions that can be drawn. First, there were only 2 female actors. There is no way of knowing whether the results obtained may be partly due to peculiarities of these particular actors. This may also account for the extreme differences in the results for Video 1 and Video 2. Secondly, these findings could not be generalized to males until the findings were replicated using male actors. Thirdly, the adjective traits terms used certainly do not cover the full array of possible personality dimensions, it is possible that other scales such as the Buss and Plomin (1975) temperament scales may have been better suited for this type of study. The trait terms used in the current study were originally pretested and selected by Garlick (1993) as being related to pleasant-unpleasant in his study on trait relationships in situations of behavior inconsistency. Since the current study did not deal with the issue of inconsistent messages/behaviors these particular traits may not be as

relevant or reliable for studies of consistent behavior. Additionally, Garlick's study examined only ratings from full-channel presentations (audio-video) while the current study also examined single channel presentation.

It should also be noted that the sample sizes for each of the conditions was relatively small. Without additional testing it would not be possible to determine if the current findings would be strengthened or weakened with a larger sample.

It is also possible that using all college students as participant raters may have influenced the results of this study. Since computer usage has become such an integral part of most academic programs it is likely the student participants in this study have engaged in such on-line activities as e-mail and discussion groups prior to participating in this study. Walther (1992) suggests that on-line communicators ability to make individuating impressions of others increases with usage, if this assumption is correct then the rating of the participants in this study would not generalize to segments of the population unfamiliar with the on-line media. Future studies might examine this variable by using participant raters that are not familiar with computer mediated communication.

Though the results of this study give no clear cut answers to the role that presentation modality plays in impression formation, they do show the complexity of the phenomena involved in judging another person's personality. They may also suggest that computer mediated communication may be more effective in communicating social presence than had previously been understood. Perhaps on-line communication in and of itself does not significantly reduce the effect social cues have on impression formation. Instead, Matheson and Zanna (1988, 1989) may be correct in their assertion that

computer user's may have an enhanced awareness of others that makes them more responsive to cues in the online social context.

References

- Adams, G.R. (1977). Physical attractiveness research: Toward a developmental social psychology of beauty. Human Development, 20, 217-238.
- Allport, G.W. (1961). Pattern and growth in personality. New York: Holt, Rinehart & Winston.
- Argyle, M., Alkema, F., & Gilmour, R. (1972). The communication of friendly and hostile attitudes by verbal and non-verbal signals. European Journal of Social Psychology, 1, 385-400.
- Burgoon, J.K., Buller, D.B., & Woodall, W.G. (1989). Nonverbal communication: The unspoken dialogue. New York: Harper Collins.
- Burns, K.L., & Beir, E.G. (1973). Significance of vocal and visual channels in the decoding of emotional meaning. Journal of Communication, 23, 118-130.
- Buss, A. & Plomin, R. (1975). A temperament theory of personality development. New York: Wiley.
- Conover, J.N., Seymour, G.D., Marx, M.H., & Moore, M.M. (1978). Stereotyped personality trait ratings of concrete and “typical” stimulus persons. Bulletin of the Psychonomic Society, 12, 400-402.
- Culnan, M.J., & Markus, M.L. (1987). Information technologies. In .F. Jablin, L.L., Putnam, K., Roberts, & L. Porter (Eds.), Handbook of organizational communication (pp. 420-443). Newbury Park, CA: Sage.

Daft, R.L., & Lengel, R.H. (1984). Information richness: A new approach to managerial behavior and organization design. Research In Organizational Behavior, 6, 191-233.

Daft, R.L., & Lengel, R.H. (1986). A proposed integration among organizational information requirements, media richness, and structural design. Management Science, 32, 191-233.

DePaulo, B.M., Rosenthal, R., Eisenstat, R.A., Rogers, R.L., Finkelstein, S. (1978). Decoding discrepant nonverbal cues. Journal of Personality and Social Psychology, 36, 313-323.

Dion, K., Berscheid, E., & Walster, E. (1972). What is beautiful is good. Journal of Personality and Social Psychology, 24, 285-290.

Ekman, P., & Friesen, W.V. (1969). Nonverbal leakage and clues to deception. Psychiatry, 32, 88-105.

Ekman, P., Friesen, W.V., O' Sullivan, M., & Scherer, K. (1980). Relative importance of face, body, and speech in judgments of personality and affect. Journal of Personality and Social Psychology, 38, 270-277.

Ertmer, P.A., Evenbeck, E., Cennamo, K.S., Lehman, J. (1994). Enhancing self-efficacy for computer technologies through the use of positive classroom experiences. Educational Technology Research and Development, 42, 45-62.

Fulk, J., Steinfield, C.W., Schmitz, J., & Power, J.G. (1987). A social information processing model of media use in organizations. Communication Research, 14, 529-552.

- Garlick, R. (1993). Trait relationship in situations of behavioral inconsistency. Journal of Social Behavior and Personality, 8, 203-220.
- Gaver, W.W. (1996). Situating actions II: Affordances for interaction: The social is material for design. Ecological Psychology, 8, 111-120.
- Hahn, J., & Stout, R. (1994). The Internet complete reference. Berkeley, CA: Osborne McGraw-Hill.
- Haythornthwaite, C., Wellman, B., & Mantei, M. (1995). Work relationships and media use: A social network analysis. Group Decision and Negotiation, 4, 193-211.
- Kiesler, S.B., Siegal, J., & McGuire, T.W. (1984). Social psychological aspects of computer-mediated communication. American Psychologist, 39, 1123-1134.
- Kiesler, S.B., & Sproull, L.S. (1986). Response effects in the electronic survey. Public Opinion Quarterly, 50, 402-413.
- Krauss, R.M., Apple, W., Morency, N., Wenzel, C., & Winton, W. (1981). Verbal, vocal, and visible factors in judgments of another's affect. Journal of Personality and Social Psychology, 40, 312-320.
- Lea, M. & Spears, R. (1995). Love at first byte? Building personal relationships over computer networks. In J.T. Wood & S. Duck (Eds.), Understudied Relationships: Off the Beaten Track (pp. 197-233). Newbury Park, CA: Sage.
- Lyman, B., Hatlelid, D., & Macurdy, C. (1981). Stimulus-person cues in first-impression attraction. Perceptual and Motor Skills, 52, 55-66.
- Matheson, K. (1991). Social cues in computer-mediated negotiations: Gender makes a difference. Computers in Human Behavior, 7, 137-145.

- Matheson, K., & Zanna, M.P. (1988). Self-awareness in computer-mediated communication. Computers in Human Behavior, 4, 221-233.
- Matheson, K., & Zanna, M.P. (1989). Persuasion as a function of self-awareness in computer mediated communication. Social Behavior, 4, 99-111.
- Mehrabian, A. (1972). Nonverbal communication. Chicago: Aldine.
- Mehrabian, A., & Ferris, S.R. (1967). Inference of attitudes on nonverbal communication in two channels. Journal of Consulting Psychology, 32, 248-251.
- Mehrabian, A., & Wiener, M. (1967). Decoding of inconsistent communication. Journal of Personality and social Psychology, 6, 109-114.
- Noller, P. (1985). Video primacy-a further look. Journal of Nonverbal Behavior, 9, 28-47.
- Patterson, M.L., Churchill, G.K., Burger, G.K., & Powell, J.L. (1992). Verbal and nonverbal modality effects on impressions of political candidates: Analysis from the 1984 presidential debates. Communication Monographs, 59, 231-241.
- Parks, M. (1996). Making friends in cyberspace. Journal of Communication, 46, 80-97.
- Perse, E.M., Burton, P.I., Kovner, E.S., Lears, M.E., Sen, R.J. (1992). Predicting computer-mediated communication in a college class. Communication Research Reports, 9, 161-170.
- Posner, M.I., Nissen, M.J., Klein, R.M. (1976). Visual dominance: An information-processing account of its origins and significance. Psychological Review, 83, 157-171.

Rafaeli, S. (1986). The electronic bulletin board: A computer-driven mass medium. Computers and the Social Sciences, 2, 123-136.

Rice, R.E., & Love, G. (1987). Electronic emotion: Socioemotional content in a computer mediated communication network. Communication Research, 14, 85-108.

Short, J., Williams, E., & Christie, B. (1976). The social psychology of telecommunication. London: John Wiley.

Steiner, P. (1993, July 5). The New Yorker, p. 61.

Thorndike, E.L. (1920). A constant error in psychological rating. Journal of Applied Psychology, 4, 25-29.

Walther, J.B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. Communication Research, 19, 52-90.

Warner, R.M., & Sugarman, D.B. (1986). Attributions of personality based on physical appearance, speech, and handwriting. Journal of Personality and Social Psychology, 50, 792-799.

Zaiel, S.F., & Mehrabian, A. (1969). The ability to communicate and infer positive and negative attitudes facially and vocally. Journal of Experimental Research in Personality, 3, 233-241.

