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Nonverbal Expressions of Liking and Disliking in Initial Interaction: Encoding and Decoding Perspectives

George B. Ray & Kory Floyd

This experiment investigated nonverbal behaviors associated with the encoding and decoding of liking and disliking in initial interaction. Forty-eight adults interacted with participant confederates in an 8-minute problem-solving activity. Beginning at the midpoint of the activity, confederates were instructed to communicate, through nonverbal channels, that they either really liked or really disliked their partners. Kinesic and vocalic behaviors were measured to allow for examination of the encoding patterns chosen to communicate these messages. Participants and third-party observers provided their perceptions of confederates and their behaviors, to allow for examination of the behaviors that were decoded as expressions of liking and disliking. Results of this study allowed the examination of the simultaneous encoding and decoding of nonverbal behaviors, the precise measurement of vocalic behaviors, and a clarification of nonverbal behaviors most influential in reaching judgments of liking and disliking.

In her review of nonverbal signals, Burgoon (1994) discussed the crucial role played by nonverbal communication in expressing elements of intimacy, including affection. During initial interaction and pursuant to any subsequent goals (e.g., self-presentation, relational, instrumental), individuals notice nonverbal expressions of affect that indicate interest in the ongoing encounter. A common affect cue of interest to researchers has been the nonverbal expression of liking (Floyd, 1997; Floyd & Burgoon, 1999; Palmer & Simmons, 1995).

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Although individuals may express liking toward others through their own nonverbal behaviors, the result is not merely an individual display but rather the simultaneous processing of interactants' behaviors (Palmer, 1998). Furthermore, as with various expressions of affect, the cues contributing to liking often occur in the form of multiple behaviors that are simultaneously enacted (Burgoon & Le Poire, 1999). The expression of liking thus occurs during ongoing interaction in which nonverbal signals are being rapidly exchanged and the participants are making judgments about each other's behaviors (Palmer & Simmons, 1995). How individuals express and evaluate affect cues such as liking has an important bearing not only on the interaction itself, but on future interactions as well (Floyd & Burgoon, 1999).

In the present study, we examined patterns of encoding and decoding of nonverbal expressions of liking and disliking in initial interactions. Our first purpose in this research was to specify how individuals express liking toward others through their kinesic and vocalic behaviors. We further examined the way nonverbal liking and disliking cues were decoded by receivers and third-party observers and how the perceptions of receivers and observers coincided. We extended previous research in two ways. First, by analyzing an array of nonverbal behaviors including acoustic measures of vocalics, we provide a more precise analysis of how individual behaviors contribute to the nonverbal stream of expression. Second, our analysis further clarifies that nonverbal behaviors contribute most to the evaluations reached by participants and observers of dyadic interaction during which liking and disliking are being expressed. Our efforts followed the principles of the social meaning model, described below.

The Social Meaning Model in Dyadic Interaction

The social meaning model (Burgoon, 1994; Burgoon & Le Poire, 1999; Burgoon & Newton, 1991) provides that nonverbal behaviors have connotative meanings that are not only socially constructed but socially consensual. Thus, when a sender smiles to express happiness, others who are of the same culture will recognize the smile as an expression of happiness across contexts in which it occurs. This orientation is contrary to Heider's (1958) principle of meaning embeddedness that asserts that the connotations of behaviors are highly context-specific. Although the social meaning model posits that individual nonverbal behaviors may carry multiple connotations (e.g., prolonged gaze may signal intimacy or dominance), it recognizes that nonverbal cues are often decoded in constellations, making their interpretations more precise. Thus, gaze combined with head nodding and facial and vocal pleasantness would usually be interpreted as an expression of intimacy, whereas gaze combined with frowning, furled eyebrows, crossed arms, and forward lean would usually be interpreted as an expression of dominance. Such interpretations, of course, are important not only for the decoding of a sender's message but also for their implications for the relationship between sender and receiver (see, e.g., Burgoon & Hale, 1987).

During initial interaction it is primarily through nonverbal channels that individuals attend to affect cues as they assess their interest in the ensuing exchange (Cappella, 1984; Palmer & Simmons, 1995). Perhaps the most important relational

judgment individuals must make in their initial interactions with others concerns the extent to which they like or dislike their partners, because such a judgment is likely to influence one's desire to engage in future interactions. Numerous studies suggest that nonverbal behaviors are associated with such judgments. With respect to facial and kinesic behaviors, research has indicated that favorable judgments about a conversation are associated with smiling (Burgoon, Buller, Hale, & DeTurck, 1984; Palmer & Simmons, 1995), gaze (Palmer & Simmons, 1995; Russo, 1975), and forward lean (Burgoon, 1991). Expressiveness (hand gesturing and animation in facial expressions) has been positively associated with liking (Andersen, Andersen, & Jensen, 1979; Coker & Burgoon, 1987; Waldron, 1975) as have proximity (Argyle & Dean, 1965; Gilbert, Kirkland, & Rappoport, 1977; Mehrabian, 1990) and postural matching (Waldron, 1975; Woodall & Burgoon, 1981). Our use of proximity follows Leathers' (1997) discussion of proxemics, the distance individuals maintain between each other during interaction. Leathers (1997) also defined postural matching (or postural mirroring) as exhibiting body positions that are similar to those of another. Although head nodding would appear to be a clear indicator of liking, the evidence on this variable is mixed. Earlier studies (Coker & Burgoon, 1987; Keiser & Altman, 1976; Mehrabian & Ksionsky, 1970) reported head nodding associated with increased liking, although later findings contradicted this (Palmer & Simmons, 1995). Finally, vocal expressiveness in the form of vocal pitch variation has been associated with positive evaluations of communicators and their affiliation with hearers (Coker & Burgoon, 1987).

In general, other vocal variables, including mean pitch, mean loudness, loudness variation, and talk time, have received less attention in research related to liking, and evidence about their association with judgments of liking and disliking is mixed. Regarding measures of pitch and loudness, calculating averages for these two variables results in statistical means with distribution about the means indicating variation. As noted, one previous study (Coker & Burgoon, 1987) examined mean pitch as a variable. Loudness has not been widely researched in relation to liking, but Ray (1986) found lower levels of loudness associated with increased social attractiveness, and Kimble, Forte, and Yoshikawa (1981) found that a louder voice is associated with negative affect (see also Ohala, 1984). Findings on mean pitch are contradictory, with some studies reporting that higher pitch is associated with affiliation and submissiveness (Ohala, 1982) and others finding that higher pitch is associated with dominance and aggressiveness (Buller & Burgoon, 1986). Finally, results have shown that talk time is related both to positive judgments about senders (Coker & Burgoon, 1987; Coutts, Schneider, & Montgomery, 1980) and to negative judgments (Palmer & Simmons, 1995).

Apart from the study of specific kinesic and vocalic behaviors, nonverbal indicators of liking and disliking have also been linked to global perceptions of behaviors, because it is often at a more global, gestalt-type level that individuals process nonverbal cues. Previous studies, including Le Poire and Yoshimura (1999), have capitalized on this by including both microlevel behaviors and macrolevel judgments in their delineation of how liking and disliking are expressed. We follow suit by including here

six such gestalt-type measures, all of which have been linked to the encoding and/or decoding of affection and liking: pleasantness (Coutts & Schneider, 1976; Hale & Burgoon, 1984), friendliness (Keiser & Altman, 1976), warmth (Ho & Mitchell, 1982; McAdams, Jackson, & Kirshnit, 1984), involvement (Burgoon & Le Poire, 1999, Coker & Burgoon, 1987), participativeness (Andersen et al., 1979; Edinger & Patterson, 1983), and interestedness (Coker & Burgoon, 1987).

Examining Multiple Perspectives

Most studies have examined either decoding or encoding patterns but not both simultaneously. In two recent decoding studies (Burgoon & Le Poire, 1999; Floyd & Voloudakis, 1999) confederates were trained to exhibit behaviors commonly associated with pleasantness, involvement, and affection (forward lean, smiling, gaze, moderately close seating, matching posture, and increased pitch variety). The effects of these behaviors on receivers' and/or observers' patterns of decoding were the outcomes of interest. In one encoding study, Palmer and Simmons (1995) instructed untrained confederates to show they liked their conversational partners using whatever behaviors they chose (i.e., confederates were not instructed in the particular behaviors to manipulate).

Prior research has also examined third-party observers' evaluations of nonverbal behaviors during dyadic interaction (Burgoon, Buller, Floyd, & Grandpre, 1996; Street, 1984, 1985). As Burgoon and Le Poire (1999) noted, nonverbal behaviors during interaction are construed to be meaningful by those engaging in the interaction. Although multiple behaviors may be exhibited during interaction, the social meaning model addresses how interactants make sense out of an emergent composite of nonverbal cues, which may differ from how third-party, nonparticipant observers construe the meanings inherent in the same interaction. The social meaning model provides that the interpretations made by receivers and observers of the same interaction will covary (see Street, Mulac, & Wiemann, 1988); however, there is also reason to believe that they will differ in their central tendency. For instance, Kellermann (1989) argued that negative information in interpersonal communication is weighted more heavily than positive information. In initial interactions, positive behavior is normative and negative behavior is atypical, but the negative behavior is weighted more heavily. Yet, as Kellermann (1989) concluded, this pattern is more acute for observers than for receivers. Indeed, Burgoon and Newton (1991) found that observers' and participants' perceptions tended to be positively correlated, but participants' perceptions were consistently more favorable than the perceptions of observers.

Our purpose in the present investigation was three-fold: (a) from an *encoding perspective*, we examined the changes in multiple nonverbal behaviors that accompanied expressions of liking and disliking; (b) from a *decoding perspective*, we addressed the individual behaviors and behavior constellations decoded as expressions of liking and disliking and the relational message interpretations accompanying such behaviors; and (c) from a *social perspective*, we investigated the correspondence between

receivers' and third-party observers' interpretations of senders' behaviors. Thus, whereas other studies have addressed these issues only from the perspectives of senders (e.g., Palmer & Simmons, 1995), receivers (e.g., Burgoon et al, 1984; Floyd & Voloudakis, 1999), or observers (e.g., Floyd, 1999a), or have combined two perspectives (e.g., Burgoon & Newton, 1991), our investigation accounted for all three perspectives simultaneously and, in so doing, soundly and thoroughly tested the social meaning model. Our specific hypotheses and research questions follow.

Hypotheses and Research Questions

The research literature has shown that nonverbal behaviors associated with liking include smiling, forward lean, gaze, animation, and vocal pitch, all of which contribute to judgments of liking. Research also shows that global perceptions of pleasantness, friendliness, warmth, involvement, participativeness, and interestedness will be related to increases in the kinesic and vocalic behaviors associated with liking. We therefore proposed our first hypothesis:

> H_1: Participants encoding liking will increase their animation, smiling, gaze, proximity, forward lean, postural matching, vocal pitch variance, pleasantness, friendliness, warmth, involvement, participativeness, and interestedness, whereas confederates encoding disliking will decrease their use of these same behaviors.

Previous research findings are inconclusive on the effects of modal pitch, talk time, vocal loudness, loudness variation, head nodding, direct body orientation, and the use of illustrator and self- and other-adaptor gestures. As discussed by Leathers (1997), illustrators are hand gestures that accompany speech, aid in the description of content, and facilitate listener interest and clarity. For example, describing a small box and showing its size with one's hands would be a form of illustrator gesturing. We regard adaptor gestures as those hand movements that are thought to indicate degree of communicator comfort (Leathers, 1997). Self-adaptors include touching one's own body, especially the hair or face, and other-adaptors include hand gestures directed toward making contact with another. Due to inconclusive research findings on the aforementioned behaviors, we chose to address their potential effects through a research question:

> RQ_1: Will the encoding of liking and disliking result in changes in participants' modal pitch, talk time, vocal loudness, loudness variation, head nodding, direct body orientation, and the use of illustrator and self- and other-adaptor gestures?

In addition to examining the encoding of liking and disliking, we were also interested in identifying the behaviors that were *decoded* by participants and observers as indicators of liking and disliking. Research employing a social meaning model orientation to nonverbal communication (e.g., Burgoon & Le Poire, 1999, Burgoon & Newton, 1991) has indicated that specific nonverbal behaviors, and behavior constellations, often carry connotative meanings that are socially consensual and

context-invariant. A number of studies have applied the social meaning model orientation to the task of identifying nonverbal referents for various perceptions. For instance, Burgoon (1991) reported that perceptions of social and task attractiveness, credibility, and relational communication themes were systematically influenced by touch, postural changes, and proximity. Similarly, Floyd (1999a) found that the form and duration of an embrace systematically affected the attributions that observers make for it, while Burgoon and Le Poire (1999) reported that particular constellations of nonverbal behaviors consistently influenced perceptions of intimacy, formality, dominance, and composure in videotaped laboratory interactions.

This theoretic orientation allows us to make predictions not only about the encoding of liking and disliking messages but also about the decoding of such behaviors. Specifically, we propose that those behaviors typically used to encode messages of liking and disliking ought also to carry those respective relational messages. Thus we proposed our second hypothesis:

> H_2: Confederates' animation, smiling, gaze, proximity, forward lean, postural matching, vocal pitch variance, pleasantness, friendliness, warmth, involvement, participativeness, and interestedness will be linearly related to positive relational judgments about confederates.

We similarly asked, in the form of a second research question, whether modal pitch, talk time, vocal loudness, etc., will lead to positive judgments about confederates:

> RQ_2: Will changes in participants' modal pitch, talk time, vocal loudness, loudness variation, head nodding, direct body orientation, and the use of illustrator, self- and other-adaptor gestures be related to positive judgments about confederates?

Further, we acknowledge that judgments may be related not only to individual behaviors but also to behavior constellations. For instance, smiling plus forward lean plus gaze may better predict judgments about liking than would any of these behaviors individually (see Burgoon, 1994). Therefore, we posed a third research question concerning the effects of combinations of behaviors:

> RQ_3: What combinations of behaviors best predict positive relational judgments about confederates who express liking?

The social meaning model further provides that the connotative meanings carried by nonverbal behaviors are consensual within communities. From this we can infer that a given individual's behavior will be interpreted similarly by a conversational partner and by others who are third-party, nonparticipant observers of the conversation (see Burgoon & Le Poire, 1999; Burgoon & Newton, 1991), which led us to our third hypothesis:

> H_3: There will be a linear relationship between participants' and observers' perceptions of liking and disliking.

Although participants' and observers' perspectives should covary, they should also differ in their central tendency, such that participants make more positive judgments

about their conversational partners than do third-party observers (Kellermann, 1989). Thus, we advanced our fourth hypothesis:

> H_4: Participants' perceptions of confederates' liking and disliking will be more positive than those of observers.

Method

Participants

Those participating in the study were 144 adults (72 male, 72 female) recruited from undergraduate communication courses at a midwestern university. Participants ranged in age from 18 to 51, with a mean age of 23.14 years ($SD = 6.07$). Most (68%) were Caucasian, while 21% were African-American, 8% were Native American, 4% were Hispanic, 1% were Asian, and 14.5% were of other ethnic origins. Most (90%) had never been married, while 5% were married and 5% were divorced at the time of the study. Participation was voluntary and earned extra course credit.

Procedure

Participants, who were recruited for "a study of problem-solving techniques," signed up in same-sex triads for hour-long experimental sessions and also gave their signed consent to voluntarily participate. Upon reporting to the laboratory facility, participants were randomly assigned to the roles of confederate (C), naïve participant (P), and observer (O), and were told that C and P would be engaging in two videotaped problem-solving activities. O was then ushered to the observation corridor, the site from which the experimental interactions were videotaped. C and P were situated in the interaction area of the laboratory, a small room with a coffee table, two swivel chairs, and a remotely operated video camera mounted on an upper corner of the wall. C and P were given an envelope containing two index cards and were told that each card described a problematic situation or dilemma. They were instructed to begin their activity by reading the first card aloud, by discussing alternatives for addressing the problem described, and by trying to reach consensus on the best way to solve the problem. They were also told that the activity would be timed and that the researcher would indicate by a knock on the door when they were to stop discussing the first problem and begin discussing the second. The problems, adapted from Hale and Burgoon (1984), dealt with (a) the theft of a friend's valuables by a sibling; (b) one's Catholic friend who is contemplating an abortion; (c) the infidelity of a best friend's fiancée; and (d) the impending visit of a cohabiting couple's unsuspecting parents. These situations were selected because of their demonstrated utility in generating conversation (see Floyd, 1999b; White & Burgoon, 1997). The topics were presented in a cyclical, counterbalanced order within conditions.

C and P were left alone to discuss the first problem situation, which was observed by O on the television monitor in the observation corridor. After two minutes, the researcher knocked on the door, indicating to C and P that they should move on

Table 1 Reliabilities for Participants' and Observers' Perceptions and Confederates' Coded Nonverbal Behaviors

Perception	Participants	Observers
Liking	.73	.79
Evaluation	.89	.90
Social Attractiveness	.86	.77
Coded Measure	Intercoder Reliability	
Animation	.63	
Smiling	.79	
Head nodding	.65	
Illustrators	.79	
Self-adaptors	.19	
Other-adaptors	.84	
Gaze	.76	
Proximity	.61	
Forward lean	.72	
Postural matching	.67	
Direct body orientation	.51	
Friendliness	.57	
Pleasantness	.58	
Warmth	.63	
Involvement	.82	
Participativeness	.81	
Interestedness	.77	

Notes: Interitem reliabilities are based on Cronbach's alpha. Intercoder reliabilities are based on Ebel's intraclass correlation.

to the second topic. After two more minutes, the researcher entered the room, stopped the activity and told C and P that they were to complete some measures regarding "how well you think this interaction went." Under the guise that it would prevent them from seeing each other's answers, C and P were separated to complete these measures and C was ushered back to the reception area. P remained in the interaction area and completed postmeasures. O completed the same measures regarding C's behaviors.

C then completed a measure of how much he or she expressed liking to P during the first interaction, and was then asked to be the confederate and was administered the behavior manipulation. C and P were then reunited in the interaction area, were given a new pair of problems to discuss and were instructed to engage in a second interaction that was identical in form to the first. Upon completion of the second interaction, C and P were again separated. C, P, and O again completed postmeasures, and then they were thoroughly debriefed on the purposes of the experiment.

Manipulation

Cs in the liking condition were instructed to "act like you really like your partner" in the second interaction, while Cs in the disliking condition were told to "act like you really dislike your partner." In both instances, Cs were asked to comply with the instructions using whatever nonverbal behaviors they felt would most naturally communicate liking or disliking to P. That is, Cs were given no instructions on particular behaviors to manipulate, nor were they provided with examples of behaviors that should be used. In both conditions, Cs were instructed to begin their manipulations when they were reunited with Ps and to maintain the manipulations throughout the second interaction.

Measures

Expression of liking was assessed using a seven-item measure. Four of the items were derived from the affection subscale of the Role Behavior Test (Foa & Foa, 1974) and the remaining three were adapted from the liking manipulation check employed by Floyd and Burgoon (1999).[1] The Likert-type items had a range of one to seven with higher scores indicating more liking behavior. Two additional measures were taken of Ps' and Os' perceptions of the confederates. *Evaluation* of confederates' behaviors was assessed with seven-point Likert-type items developed by Burgoon, Newton, Walther, and Baesler (1989). The items addressed the extent to which the confederates' behaviors were considered positive or favorable. Confederates' *social attractiveness* was measured with a four-item scale developed by McCroskey and McCain (1974). The items related to one's attraction to another's personality. Internal reliabilities for all scales for participants and observers are reported in Table 1.

Coding of Nonverbal Behavior

Following completion of each interaction, six trained coders, working in pairs, coded the nonverbal behaviors of confederates at eight time points, once during each of the four minutes of the first interaction and once during each of the four minutes of the second interaction. Coders were graduate students and advanced undergraduates who had completed coursework in nonverbal communication and who received independent study credit in exchange for their work.

The kinesic and vocalic behaviors coded were drawn from among those commonly used in previous research, including Burgoon, Le Poire, and Rosenthal (1995), Floyd and Burgoon (1999), Floyd and Voloudakis (1999), Guerrero and Burgoon (1996), and Manusov (1995). Behaviors were coded using seven-point bipolar adjective scales, wherein higher scores indicated a greater presence, frequency, or intensity of the behavior. Following Burgoon and Le Poire (1999), we coded behaviors at both the microbehavioral level (e.g., smiling, forward lean) and at the more global, perceptual level (i.e., coding for degree of pleasantness or engagement rather than for specific behaviors).

Coders received approximately six hours of individual and collective training, which consisted of reviewing the definitions of each nonverbal behavior and conducting practice coding from videotapes. Coders were blind to the experimental hypotheses and manipulations. For reliability purposes, each behavior for each C was rated by two coders, whose scores were then averaged for analysis. Intercoder reliabilities, based on Ebel's intraclass correlation (Guilford, 1954), appear in Table 1.

To measure the acoustic features of the vocalics, videotapes of all 48 dyads were edited into separate segments for each of the participants and each of the confederates. In other words, the edited version of the dyadic interactions isolated the speaking turns of each individual and contained only the speech of individual speakers. Audiotapes were then produced and analyzed through the IBM Speechviewer II computer program that calculated descriptive statistics for vocal pitch and loudness, analyzed ten seconds at a time.[2] Descriptive statistics for the vocalic data included mean and standard deviation for pitch and loudness and were computed by combining the results from the ten-second measurements for each speaker. During this analysis we also calculated the cumulative duration of speech for each individual for each interaction.

Manipulation Checks

To ensure interactions between strangers, C and P were each asked to indicate, on a seven-point scale, how well they knew each other prior to the interaction (with higher scores indicating greater familiarity). Os were given the same seven-item scale to complete in reference to both C and P. Cs, Ps, and Os also completed the measure of Cs' liking behavior (described in measures section above) after the first interaction and again after the second.

Results

Manipulation Checks

When asked how much they knew each other before the interactions began, Cs indicated that they did not know Ps ($M = 1.77$, $SD = 1.32$) and Ps indicated that they did not know Cs ($M = 1.74$, $SD = 1.44$). Likewise, Os indicated that they did not know Ps ($M = 1.12$, $SD = .40$) or Cs ($M = 1.07$, $SD = .35$) prior to the interactions.

We used three reports of confederates' behavior to ascertain whether those in the liking condition increased the extent to which they were communicating liking and those in the disliking condition increased the extent to which they were communicating disliking. Cs' , Ps' , and Os' assessments of Cs' liking behavior were compared in separate mixed-model ANOVAs, with time as the within-subjects factor and behavior manipulation and gender as between-subjects factors. Significant time-by-behavior interactions obtained for Cs' self reports, $F\ (1,\ 44) = 107.45$, $p < .001$, $\eta^2 = .71$, for Ps' reports, $F\ (1,\ 44) = 21.97$, $p < .001$, $\eta^2 = .33$, and for Os' reports, $F\ (1,\ 44) = 5.64$, $p = .023$, $\eta^2 = .13$. The means, appearing in Table 2, indicated success for the manipulation according to all three assessments.

Table 2 Means and Standard Deviations by Time and Behavior Condition for Manipulation Checks

	Premanipulation				Postmanipulation			
	Liking		Disliking		Liking		Disliking	
Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Confederates' self-report	5.67	0.55	5.65	0.70	6.30	0.87	2.95	1.11
Participants' report	5.26	0.60	5.42	0.58	5.55	1.04	4.36	1.19
Observers' report	4.62	0.62	5.44	0.74	4.46	0.69	4.14	1.24

Nonverbal Encoding of Liking and Disliking

To address the first hypothesis and the first research question, the confederates' coded kinesic and vocalic behaviors were compared in mixed-model MANOVAs, with time (premanipulation v. postmanipulation) as the within-subjects factor and behavior manipulation (liking v. disliking condition) and gender as the between-subjects factors. Groups of behaviors were analyzed together when justified by their intercorrelations and Bartlett tests of sphericity. Hunyh-Feldt-corrected degrees of freedom were employed when the Mauchly test indicated violations of compound symmetry assumptions. Role (confederate v. participant) was initially included as a second within-subjects factor and was subsequently eliminated from the MANOVA models after failing to interact with hypothesized effects.

Smiling, animation, head nodding, and gaze (average $r = .47$, Bartlett $\chi^2 = 55.83$, $df = 6$, $p < .001$) were analyzed in the first MANOVA, which produced a significant multivariate time-by-behavior interaction, $\Lambda = .60$, $F\ (4,\ 42) = 6.69$, $p < .001$, $R^2 = .40$. Self-adaptors, other-adaptors, and illustrator gestures (average $r = .25$, Bartlett $\chi^2 = 9.67$, $df = 3$, $p = .02$) were analyzed in a second MANOVA, which produced a near-significant multivariate time-by-behavior interaction, $\Lambda = .86$, $F\ (3,\ 42) = 2.31$, $p = .09$, $R^2 = .14$ (power = .47). Proximity, forward lean, postural matching, and body orientation (average $r = .29$, Bartlett $\chi^2 = 29.80$, $df = 6$, $p < .001$) were analyzed in a third MANOVA, which produced a significant multivariate time-by-behavior interaction, $\Lambda = .78$, $F\ (4, 42) = 2.91$, $p = .033$, $R^2 = .23$.

The global perceptual measures were also analyzed. Involvement, participativeness, and interestedness (average $r = .95$, Bartlett $\chi^2 = 231.415$, $df = 3$, $p < .001$) were analyzed in a fourth MANOVA, which produced a significant multivariate time-by-behavior interaction, $\Lambda = .62$, $F\ (3,\ 42) = 8.62$, $p < .001$, $R^2 = .38$. Finally, pleasantness, friendliness, and warmth (average $r = .93$, Bartlett $\chi^2 = 210.586$, $df = 3$, $p < .001$) were analyzed in a fifth MANOVA, which produced a significant multivariate time-by-behavior interaction, $\Lambda = .53$, $F\ (3,\ 42) = 12.33$, $p < .001$, $R^2 = .47$. Analyses for the global perceptual measures are based on results shown in Table 3.

Table 3 F-test Results, Means, and Standard Deviations for Significant Time-by-Behavior Interactions for Confederates' Coded Behaviors and Global Perceptions

				Liking M/SD		Disliking M/SD	
Measure	*F*	*p*	η^2	Pre	Post	Pre	Post
Behaviors							
Smiling	2.97	.09	.07	3.94/1.69	4.02/1.66	$3.90/1.29_b$	$2.60/1.54_b$
Head nodding	9.44	.004	.18	$3.16/1.37_a$	$3.83/1.43_a$	2.81/0.90	2.53/0.94
Gaze	8.88	.005	.17	$5.04/0.99_a$	$5.39/0.91_a$	$4.82/1.20_b$	$3.78/1.28_b$
Illustrators	5.23	.027	.11	2.44/1.29	2.34/1.07	$2.43/1.35_b$	$1.68/0.79_b$
Proximity	5.35	.026	.11	$3.86/1.06_a$	$4.32/0.94_a$	3.84/0.93	3.51/1.10
Forward lean	8.69	.005	.17	$3.79/1.02_a$	$4.55/0.96_a$	3.77/1.09	3.55/0.70
Direct body orientation	5.35	.026	.11	5.01/1.38	5.15/0.99	$4.96/1.26_b$	$4.14/1.21_b$
Global Perceptions							
Pleasantness	25.05	$<.001$	.36	$4.56/0.97_a$	$4.78/0.87_a$	$4.54/0.54_b$	$3.99/0.57_b$
Friendliness	24.41	$<.001$	.36	$4.57/0.98_a$	$4.80/0.96_a$	$4.56/0.55_b$	$3.98/0.59_b$
Warmth	18.17	$<.001$	.29	4.66/0.80	4.78/0.83	$4.56/0.47_b$	$4.14/0.56_b$
Involvement	37.75	$<.001$	.47	$5.20/0.90_a$	$5.58/0.98_a$	$4.61/0.43_b$	$4.00/0.82_b$
Participativeness	31.06	$<.001$	.42	$5.10/1.09_a$	$5.50/1.09_a$	$4.79/0.52_b$	$3.86/0.89_b$
Interestedness	21.17	$<.001$	.33	$5.27/0.97_a$	$5.50/1.02_a$	$4.70/0.38_b$	$4.08/0.91_b$

Note: Means in the same line with the same subscript differ significantly from each other, per planned contrast.

The vocalic variables of pitch mean, pitch variation, mean intensity, and intensity variation were analyzed in separate ANOVAs due to their lack of intercorrelation. Univariate results of these ANOVAs are reported below.

Significant univariate time-by-behavior interactions were obtained for multiple coded nonverbal behaviors and global perceptions. Table 3 contains the significant *F*-test results, along with means for confederates' behaviors, separated by time and condition. Focused contrasts conducted to compare confederates' behaviors across time within conditions revealed that for nine of the behaviors, confederates in the liking condition increased the behavior after the manipulation, while for ten of the behaviors, confederates in the disliking condition decreased their use of the behavior after the manipulation.[3]

Significant time-by-behavior interactions did not emerge for any of the vocalic measures. However, vocal intensity variance produced a near-significant main effect for time, $F\ (1, 44) = 2.92$, $p = .094$, $\eta^2 = .06$ (power = .71). The means indicated that, irrespective of behavior condition, confederates decreased the variance in their loudness from the premanipulation period ($M = 6.37$, $SD = 4.26$) to the postmanipulation period ($M = 5.44$, $SD = 2.62$). Talk time likewise produced a main effect for time, $F\ (1, 44) = 13.26$, $p = .001$, $\eta^2 = .23$, as well as a time-by-gender interaction, $F\ (1, 44)$, $p = .037$, $\eta^2 = .10$. The ordinal nature of the two-way interaction

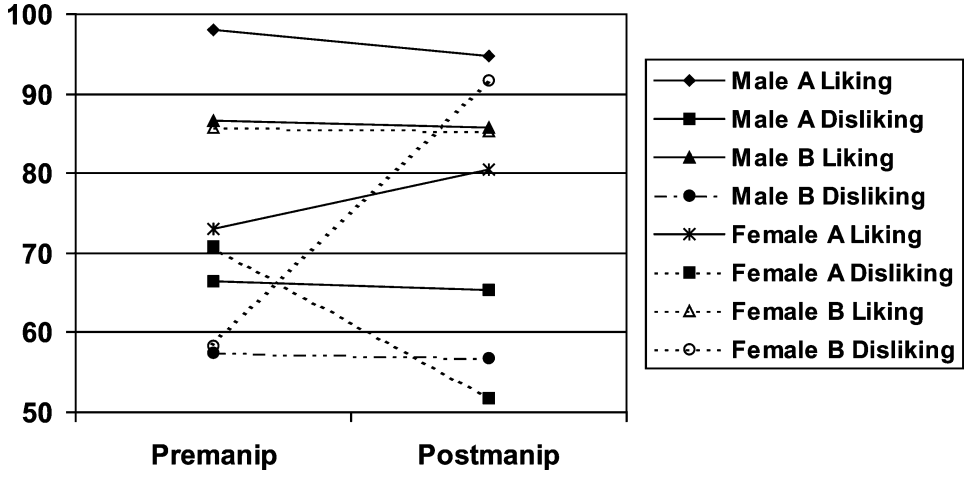

Figure 1 Means for Pitch Variation by Condition for Confederates (A) and Participants (B).

allowed for interpretation of the main effect, in which talk time decreased from the premanipulation period ($M = 88.30$ seconds, $SD = 36.30$) to the postmanipulation period ($M = 69.00$ seconds, $SD = 37.90$). Male confederates decreased their talk time from premanipulation ($M = 89.60$, $SD = 35.60$) to postmanipulation ($M = 81.70$, $SD = 34.00$), as did female confederates from premanipulation ($M = 87.10$, $SD = 37.70$) to postmanipulation ($M = 56.30$, $SD = 3.81$). These effects were irrespective of the behavior condition.

Finally, pitch variance produced a near-significant four-way time-by-behavior-by-role-by-gender interaction, $F(1, 44) = 2.90$, $p = .096$, $\eta^2 = .06$ (power = .78). The means, plotted in Figure 1, indicated minimal change in pitch variance from premanipulation to postmanipulation for most cells. However, female confederates in the liking condition increased their pitch variance as a result of their instructions to show liking, and female confederates in the disliking condition decreased their pitch variance as a result of their instructions to show disliking. Moreover, female naïve participants in the disliking condition substantially increased their pitch variance from the premanipulation to postmanipulation periods.

These results indicated substantial evidence in support of Hypothesis 1. However, the data for pitch variation did not fit the overall expected direction of change. Female confederates displayed increased pitch variation in the liking condition, while male confederates displayed little change in pitch variation. Talk time decreased from premanipulation to postmanipulation, in response to RQ1. The data for vocal loudness showed a nearly significant pattern of decreasing from premanipulation to postmanipulation, irrespective of condition.

Decoding of Confederates' Behavior

To address Hypothesis 2 and the second and third research questions, we examined relationships between confederates' behaviors and positive relational judgments

Table 4 Correlations between Confederates' Behaviors and Participants' and Observers' Perceptions

Coded measure	P Like	O Like	P Eval	O Eval	P Att	O Att
Behaviors						
Animation	.34**	.32*	.28*	.11	.23	.23
Smiling	.40**	.28*	.35**	.14	.33*	.18
Head nodding	.32*	.42**	.38**	.31*	.30*	.29*
Illustrators	.29*	.47**	.25*	.18	.12	.22
Self-adaptors	.01	.11	.06	.27*	−.05	.24
Other-adaptors	−.22	−.32*	−.09	−.39**	−.13	−.15
Gaze	.43**	.35**	.42**	.39**	.25*	.31*
Proximity	.23	.18	.21	.21	.25*	.19
Forward lean	.26*	.14	.31*	.15	.25*	.20
Postural matching	−.19	−.01	−.21	.14	.00	.17
Direct body orientation	.06	.03	.07	.18	.03	.16
Pitch	−.17	−.19	.00	−.18	−.05	−.11
Pitch variation	.47**	.43**	.46**	.21	.25*	.32*
Vocal intensity	−.03	−.04	−.05	−.01	−.18	−.02
Vocal intensity variation	.18	.00	.07	.06	−.09	−.01
Talk time	.06	.20	−.01	.15	−.03	.29*
Global Perceptions						
Pleasantness	.40**	.38**	.35**	.24	.33*	.25
Friendliness	.37**	.38**	.32*	.26*	.30*	.26
Warmth	.40**	.29*	.35**	.21	.29*	.21
Involvement	.41**	.48**	.45**	.45**	.33*	.40**
Participativeness	.41**	.47**	.44**	.42**	.36**	.38**
Interestedness	.42**	.46**	.42**	.46**	.39**	.42**

Notes: $^{*}p < .05$; $^{**}p < .01$. "P Like" & "O Like" = participants' and observers' liking of confederates; "P Eval" & "O Eval" = participants' and observers' evaluation of confederates; "P Att" & "O Att" = participants' and observers' social attraction to confederates. Probability values are one-tailed for variables included in H2 and two-tailed for variables included in RQ2.

reached by participants and observers. Specifically, we correlated confederates' nonverbal behaviors with (a) participants' and observers' perceptions of how much confederates liked participants; (b) participants' and observers' evaluations of confederates' behaviors; and (c) participants' and observers' social attraction toward confederates. Two sets of Pearson product-moment correlations were computed for each outcome measure (one for participants and one for observers), the results of which are presented in Table 4.

These correlations reveal several distinctive patterns relevant to Hypothesis 2 and the second research question. Participants' and observers' perceptions that

confederates liked participants showed significant positive relationships with several of the confederates' behaviors, including their animation, smiling, head nodding, use of illustrator gestures, gaze, and vocal pitch variation, as well as with the global perceptions of pleasantness, friendliness, warmth, involvement, participativeness, and interestedness. Observers' perceptions of liking also showed a significant negative correlation with confederates' use of other-adaptors. Several of these same correlations were also significant for participants' and observers' evaluations of confederates' behavior. Participants' social attraction to the confederates was related to confederates' smiling, head nodding, gaze, proximity, pitch variation, and their forward leaning, while head nodding, gaze, pitch variation, and talk time were related to observers' social attraction to the confederates. These correlations indicated support for Hypothesis 2 on several counts.

To determine whether linear combinations of confederates' coded behaviors would better predict participants' and observers' judgments than would confederates' individual behaviors alone (RQ3), we regressed the three outcome variables (liking, evaluation, social attraction) on confederates' coded behaviors in two stepwise procedures, one for participants and one for observers. Multicollinearity diagnostics led us to use centered predictor variables. For participants, results indicated that liking was best predicted by pitch variance, $\beta = .39$, $t = 3.03$, $p = .004$, and then warmth, $\beta = .30$, $t = 2.34$, $p = .024$, adjusted $R^2 = .27$. Evaluation was best predicted by pitch variance, $\beta = .35$, $t = 2.54$, $p = .015$, and then gaze, $\beta = .29$, $t = 2.14$, $p = .038$, adjusted $R^2 = .25$. Social attractiveness was best predicted by interestedness alone. For observers, results indicated that liking was best predicted by illustrators, $\beta = .42$, $t = 3.05$, $p = .004$, and then pitch variance, $\beta = .32$, $t = 2.33$, $p = .025$, adjusted $R^2 = .31$. Evaluation was best predicted by interestedness alone. Social attractiveness was best predicted by interestedness, $\beta = .46$, $t = 3.28$, $p = .002$, and then by talk time, $\beta = .36$, $t = 2.57$, $p = .014$, adjusted $R^2 = .26$.

Comparing Participants' and Observers' Perspectives

Hypothesis 3 considered the relationship between observers' and participants' perceptions of confederates. The first part of this hypothesis predicted that participants' perceptions and observers' perceptions would be linearly related. To test this relationship we calculated one-tailed correlations between participants' and observers' judgments of liking, evaluation, and social attraction. As predicted, participants' and observers' perceptions were significantly correlated for liking, $r(46) = .45$, $p = .002$; evaluation, $r\ (46) = .27$, $p = .045$; and social attractiveness, $r(46) = .38$, $p = .007$. Hypothesis 3 was supported.

Hypothesis 4 predicted that participants' perceptions of confederates would be more positive than observers' perceptions. Pairwise *t*-tests comparing participants' and observers' perceptions revealed that although the mean differences were all in the predicted direction, none of the differences was significant. Hypothesis 4 was not supported.

Discussion

As several investigations in recent years have shown (Burgoon & Le Poire, 1999; Floyd & Burgoon, 1999; Palmer & Simmons, 1995), how individuals in dyadic interaction express liking, involvement, and affiliation is part of a complex process involving sequences of nonverbal signals. Through the social meaning model one can understand how nonverbal behaviors have connotative and denotative meanings that covary among senders, receivers, and observers. In this investigation we examined the expression of liking and disliking to discover how individuals encode nonverbal liking and disliking behaviors and how receivers and observers judge these persons and their behaviors. With an emphasis on specific kinesic and acoustically measured vocalic behaviors, this study presented a detailed analysis of the nonverbal expressions intended to encode liking and disliking.

Our results confirmed earlier findings on the primary kinesic behaviors associated with the expression of liking and disliking. Behaviors related to pleasantness, involvement, immediacy, and positivity (including smiling, gaze, proximity, and vocal pitch variation) have typically been identified as elements of the communication of liking and we found these same patterns in the behaviors of our untrained confederates. Confederates in the liking condition increased several kinesic behaviors over time, while those in the disliking condition decreased these same behaviors. Because our confederates were untrained, their behaviors reflected their own constructions of consensually recognized interpretations as the social meaning model would suggest.

Vocalic behaviors exhibited some interesting patterns in relation to liking and disliking. Although pitch variance did not significantly change over time, there was a near-significant four-way time-by-behavior-by-role-by-gender interaction. Thus, although other studies reported that increased pitch variety is associated with intimacy and/or involvement, our results indicated that this was true only for females. As Tusing and Dillard (2000) acknowledged in their study on the vocalic correlates of dominance, men and women often use vocal pitch differently in their encoding of relational messages. Therefore, although increased pitch may signal messages of liking and affiliation for women, as our present results suggested, increased pitch may signal entirely different relational messages for men.

Another near-significant effect was observed for loudness, such that decreases in loudness were observed over time irrespective of the experimental condition. This pattern suggests that confederates were lowering their loudness levels in order to express disliking as well as liking. Similarly, talk time was found to decrease significantly over time, a pattern that was true for participants as well as confederates. Although one might intuit that liking is expressed through more verbal interaction, Palmer and Simmons (1995) suggested that decreased talk time may show liking by communicating greater attentiveness. Moreover, our results indicated that decreased talk time may also be a strategy for showing dislike, perhaps by expressing disengagement from the conversation. Taken as a whole, the vocalic behaviors combined in some intricate ways that were less straightforward than those for the kinesic behaviors. Results from the vocalic analyses illustrated that the composite social meanings

emerging from interaction can produce consensual interpretations, but the vocalic portion of the nonverbal stream of expression may manifest itself in more complex patterns.

This study allowed us to examine encoding and decoding simultaneously, which is crucially important to the social meaning model. Socially consensual meanings apply to both how behaviors are encoded and decoded. Our second hypothesis predicted that various confederates' nonverbal behaviors would be related to positive relational judgments about confederates on the parts of receivers and observers. We found considerable evidence to support this hypothesis, especially for kinesic behavior and, to a lesser extent, vocal pitch variance. The data correlating confederates' behaviors with observers' and participants' perceptions of confederates is valuable for its insights into the decoding of liking and disliking behaviors. As confederates attempted to show liking or disliking, their behaviors not only changed over time, but receivers decoded these behaviors as predicted. Data for participant perceptions of confederate behaviors showed that for numerous nonverbal behaviors, there were significant, positive correlations not only with the extent to which liking or disliking was decoded but also with judgments about confederates' social attractiveness and about the valence of their behaviors. Notwithstanding the lack of correlations involving talk duration and loudness, these results clearly show participants and confederates were orienting to the same sets of behaviors in displaying and processing liking and disliking cues.

Another useful feature of the present research was the direct comparison of participants' and third-party observers' perceptions of confederates, thus allowing us to obtain multiple perspectives on the decoding of liking and disliking behavior. By comparing the two sets of observations, we have shed additional light on potential discrepancies between observer and participant judgments. The most recent research (Burgoon & Le Poire, 1999) has found that observers and participants reach similar judgments of confederates' relational messages. Our data showed that participants and third-party observers covary in the judgments they made about the same confederates' behaviors. However, our prediction that participants would make more positive judgments about confederates than would observers was not supported. Although mean differences were all in the predicted direction, these comparisons failed to achieve statistical significance. Given previous findings on the nature of the negativity effect, these results were surprising and we can only speculate that perhaps the negativity effect, as Kellermann (1989) called it, is limited to particular types of judgments that exclude those measured here. Certainly, we encourage replication before additional conclusions are drawn.

Limitations and Conclusions

One limitation of the present study was the relatively small sample size. The sample size can limit both generalizability and statistical power. Smaller samples lead to the attenuation of power; thus, a larger sample might have been helpful in identifying results that did not emerge as significant in this study (such as our tests of Hypothesis

4). Our decision to use untrained confederates, although necessary to address adequately the encoding of liking and disliking, may have created an additional limitation in that receivers and observers may not have been consistently exposed to the same behaviors across the experimental cells. The use of confederates trained to manipulate specific behaviors ensures consistency in the stimuli to which receivers and observers are exposed, resulting in greater experimental control. Because that option was not feasible here, given our inclusion of a focus on encoding, these findings should be compared with those of studies using trained confederates to ascertain how results may be affected by training.

A second limitation relates to the stimulus materials that provided the participants with topics for conversation. These materials were selected because they offered topics that were easily discussed by participants and they had been successfully employed in previous research on initial interaction. There is the possibility, however, that the topics may have introduced content that could have affected the nature of the interaction. Although the researchers observed no indications that content exerted undue influence on the participants' verbal or nonverbal behaviors, one cannot necessarily rule out the potential for such an influence.

This study offered a careful examination of the social meaning model in the context of the nonverbal expression of liking and disliking in initial dyadic interaction. In most respects, our findings were consistent with this model: (a) untrained individuals are able to draw upon their intuitive knowledge to express liking and disliking and they do so in predictable ways; (b) multiple nonverbal behaviors are decoded as indicators of liking and disliking; and (c) participants and observers reach judgments about others' behaviors in ways that are linearly related. One of the aims of this study was to measure precisely the acoustic features of vocalic behaviors. Overall, the vocalic data did not consistently enter into the display of liking or disliking, while kinesic behaviors were much more predictable in their contributions.

Another aim of this study was to clarify the nature of differences between participant and third-party observer perceptions of others who express liking and disliking. The findings suggested that observers tend to judge others less positively than do participants, but participants' and observers' judgments are often correlated. In initial dyadic interaction, it is clear that individuals can show they like or dislike the other and that receivers interpret liking and disliking behaviors as intended.

Notes

[1] RBT items were: "I tried to do things that he or she would like," "I ignored my partner's feelings and showed that I didn't like him or her" (reverse scored), "I showed trust in my partner," and "I tried to let my partner know I can't stand him or her" (reverse scored). Additional items from Floyd and Burgoon (1999) were: "I acted as if I liked my partner," "I made it clear that I was not interested in my partner" (reverse scored), and "I seemed to get along well with my partner."

[2] The IBM Speechviewer II program measures vocal pitch in Herz and loudness in percentage of sound wave amplitude.

[3] Results of the planned contrasts are available on request from the authors.

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