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Consistency of Nonverbal Affect and Affect Reciprocity in Marital Interaction

John M. Gottman
University of Illinois at Urbana-Champaign

This article reexamines the issue of cross-situational consistency by studying the consistency of the nonverbal behavior of married couples on two tasks, a high-conflict, decision-making task about sex and a low-conflict, non-decision-making, conversational task. Consistency is explored separately for (a) the frequencies of positiveness and negativeness of affect coded from facial expressions, voice-tone cues, and selected body position and movement cues and (b) sequential analyses of positive and negative affect reciprocity. Consistency was found to be highest for negative rather than positive affect and for negative rather than positive affect reciprocity. Furthermore, there was more evidence of consistency across tasks using the sequential rather than the nonsequential variables.

This article recasts the issue of cross-situational consistency in human behavior in a new mold, that of interpersonal interaction. Also, the question is asked, Does more consistency exist in sequences of behavior than in relative frequencies, which collapse the occurrences of the behavior over time? Although many constructs in the area of interpersonal behavior (such as dominance) are discussed theoretically in terms of sequences (e.g., one person's actions influence the other person's subsequent actions), hypotheses about the constructs have usually only been tested for frequency or relative frequency of a selected behavior (e.g., interruptions during a conversation).

The present investigation explored the consistency of nonverbal aspects of social interaction on a high- and a low-conflict task by examining both frequency and sequential measures of the same interactions within married couples. There are several reasons for these experimental choices. The general issue of cross-situational consistency of married people has already been explored to some extent. Three studies have explored whether the interactions of married people with their spouses differ from their interactions with a cross-sex, married stranger. Ryder (1968), Winter, Ferreira, and Bowers (1973), and Birchler, Weiss, and Vincent (1975) all reported that married people are far less polite to their spouses than they are to strangers. However, these studies clearly do not assess whether social interaction is consistent within a relationship across different contexts.

Evidence is scant on the issue of the consistency of social interaction within a marriage across different interaction tasks. Gottman (1979b) reported consistency in marital interaction patterns on a high-conflict task when the setting was varied from the laboratory to the home. However, few studies have systematically varied the nature of the interaction task.

There is some evidence that greater consistency in marital interaction across tasks can be obtained by studying nonverbal rather than verbal behavior. Vincent, Friedman, Nugent, and Messerly (1979) found that when couples were asked to present a socially desirable (happy) interaction profile, distressed and nondistressed couples could not be discriminated using

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Requests for reprints should be sent to John M. Gottman, Department of Psychology, University of Illinois, Champaign, Illinois 61820.

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positive and negative verbal codes (such as one might obtain from a typed verbatim transcript) but that the two groups of couples could be discriminated using nonverbal codes. Gottman, Markman, and Notarius (1977), in a study of marital interaction, separately coded verbal and nonverbal behavior and reported that although it was possible to discriminate distressed from nondistressed couples using both verbal and nonverbal codes, the discrimination was more powerful using the nonverbal codes. The most useful dimension of nonverbal behavior in describing relationship formation (Mehrabian, 1972) and its continued functioning (Gottman, Notarius, Markman, Yoppi, & Rubin, 1976) is a positive/negative affect dimension. Thus, to summarize, it is reasonable to investigate cross-situational consistency by studying marital interaction on high- and low-conflict tasks, using affective measures of nonverbal behavior. This approach was implemented in the present investigation.

Sequential analysis, another concern of the present study, is an area of increasing prominence in the study of social interaction. It employs information theory (Shannon & Weaver, 1949) to detect probabilistic connection between two types of behaviors, A and B. Using a definition originally proposed by ethologists (Wilson, 1975), a sequential connection is suggested if knowledge that B has occurred reduces uncertainty in the ability to predict A's occurrence. Stated mathematically, this means that the conditional probability, $p(A/B)$, is different from the unconditional probability of A's occurrence, $p(A)$. The comparison deals with what has been called the base-rate problem in examining only conditional probabilities. The base-rate problem is that $p(A/B)$ is higher if $p(A)$ is higher and not only if A is more likely to follow B. The statistic that is currently in wide use to compare these two probabilities is the z-score normal approximation to the binomial distribution, $z = \{p(A) - p(A/B)\} \{p(A)[1 - p(A)] / N\}^{-1/2}$, where N is the frequency of joint occurrence of A and B (Bakeman, 1978; Bakeman & Dabbs, 1976; Gottman, 1979a, 1979b; Gottman & Bakeman, 1979; Gottman & Notarius, 1978; Gottman & Parkhurst, 1980; Sackett, 1979).

The present investigation examined the consistency of positive and negative nonverbal behavior (defined below) and that of positive and negative reciprocity. Positive reciprocity implies the existence of a common sequence, husband positive followed by wife positive or the converse. Similarly, negative reciprocity implies a common sequence, husband negative followed by wife negative or the converse. Thus there were four nonsequential variables for each task: the relative frequencies of husband positive, $p(H+)$; wife positive, $p(W+)$; husband negative, $p(H-)$; and wife negative, $p(W-)$. The two sequential variables for positive reciprocity were $Z(H+/W+)$ and $Z(W+/H+)$, and the two for negative reciprocity were $Z(H-/W-)$ and $Z(W-/H-)$.

Reciprocity in the present investigation is limited to relatively immediate temporal connection; the author recognizes that the concept has been used more broadly in much theorizing about marital and family relationships (e.g., Patterson & Reid, 1970). Nonetheless, since the concept of reciprocity has been central in the theorizing about marital satisfaction, it is theoretically interesting to determine the consistency of temporal reciprocity variables across tasks.[1]

Method

This article is a reanalysis of data presented elsewhere (Gottman, 1979b) and is specifically designed to examine cross-situational consistency of nonverbal affect in marital interaction. As a result, the Method section will be somewhat abbreviated; the reader is referred to Gottman (1979b) for additional detail as well as for results comparing clinic with nonclinic couples (defined below).

Subjects

Thirty-eight couples were recruited; 19 were seeking marriage counseling (called "clinic" couples), and 19

[1] The z scores assume that a first-order Markov model is adequate to characterize longer sequences. Gottman (1979b) found that this was a reasonable assumption. Positive and negative cycles continued for as many lags as was feasible for lag sequence analysis (Sackett, 1979).

responded to a news release requesting the participation of couples whose marriages were mutually satisfying (called "nonclinic" couples). Participating couples were paid $20. All couples completed the Locke-Williamson Marital Relationship Inventory (MRI; Burgess, Locke, & Thomes, 1971) and a demographic information form. The 19 clinic couples had an average MRI score of 80.53 (SD = 12.20), and the 19 nonclinic couples had an average score of 103.16 (SD = 6.53), $t(36) = 7.13$, $p < .001$. Clinic and nonclinic couples did not differ significantly on any demographic variable; husbands' average age was 34 years, and wives' was 32; the average couple had been married for 9 years, had one child, and earned $11,200 per year. The sample was drawn from a nonuniversity community in rural southern Indiana.

Procedure

The improvised conflict method, devised by Raush, Barry, Hertel, and Swain (1974), was employed in the present study. In this method, a conflict is created artificially; for example, the husband is excited about sharing with his wife something he experienced during the day, but she has been feeling harassed and is looking forward to some privacy and time to herself. Husband and wife are seen separately by a "coach" who explains one side of the situation and tries to personalize the situation by getting the subject to fill in appropriate realistic details from everyday life. The couple is then videotaped attempting to resolve the conflict.

To enhance their ecological validity, two methods were used to derive the improvised conflict situations. First, the improvisations were empirically generated from a previous interview study in which 60 couples, 30 clinic and 30 nonclinic, described in detail three recent arguments that they had had. The tapes of these interviews were transcribed, and the 180 problems were categorized into the six highest conflict areas for both groups of couples. The areas were used to generate six improvised conflict situations that concerned having sex, spending money, visiting in-laws, sharing events of the day, the decision to have (or have additional) children, and the discipline of children. Second, Gottman (1979b) used nonsequential analyses of the data from all improvisations to determine which improvisations replicated the clinic/nonclinic discrimination in a previous study that did not standardize the marital issue across couples but instead had each couple discuss their major marital conflict. Using this validation procedure, the sex improvisation was selected as the most ecologically valid, standardized, high-conflict improvisation.

An additional group of couples supplied items for another task, the "fun deck," which formed the basis for the non-decision-making and presumably lowest conflict task. Each item on the fun deck (a deck of cards) contained an activity that a couple said was fun to do together and typical of their enjoyable leisure interactions (e.g., "turn down the sound on the TV and make up our own dialogue"). First, the consent and demographic information forms were completed. Next, each spouse was asked to complete the MRI. After this task, the following instructions were read for administering the fun deck:

> Here is a deck of cards. We call this deck the "fun deck" because it contains things that some couples enjoy doing together. Look through the deck, talk to each other, try to have a conversation about anything that comes to mind as you look through the deck. You could reminisce, or plan, or talk about anything you like. Try to have an enjoyable conversation.

The coaches then left the couple and went to the observation corridor where they videotaped the couple's interaction for 15 minutes. Following the fun deck, the improvisations were administered in a random order for each couple. Male coaches met with husbands in one room, and female coaches met with wives in another. An example of the coach's instructions for the sex improvisation is given in Table 1.

For each improvised conflict task, the spouses were brought together and instructed to let the discussion unfold as it might at home. They were asked to signal the coaches when they felt that they had reached a resolution. After all improvisations had been administered, the couple was debriefed and thanked for participating.

Coding of the Videotapes

Verbatim transcripts were made of each videotape, and two groups of coders categorized the tapes; one group coded the content of each utterance, and another group categorized the nonverbal behaviors of the speaker. These coding systems are described in detail in Gottman et al. (1977) and Gottman (1979b). For the present investigation, the salient variables are the content codes of agreement (AG) and disagreement (DG), which were used to provide a check on the level of conflict induced. In their decade review, Riskin and Faunce (1972) wrote that "there appears to be a general opinion that a ratio of AG to DG of more than 'one' is healthy, i.e., families should have more agreements than disagreements for healthy functioning" (p. 402). This ratio was also used as a manipulation check by Gottman et al. (1976).

The use of generalizability theory for the assessment of reliability between observers has recently been strongly advocated by Mitchell (1979). A generalizability study was conducted (Cronbach, Gleser, Nanda, & Rajaratnam, 1972) to test reliability between independent coders for both content and nonverbal codes. An independent reliability checker coded a random sample of each videotape. Cronbach alphas were .968 and .954, respectively. An additional generalizability study found that these alphas were independent of the length of the tape sample used by the reliability checker and that there was no reliability decay over time (Gottman, 1979b).

Each utterance unit received an affect code, either positive, neutral, or negative, which was determined using a hierarchical decision rule. The hierarchical rule was based on a regression equation derived by Mehrabian (1972). First, the coder scanned for a list

Table 1
Coach's Instructions for Sex Improvisation

Wife's side:
It's after dinner (the children are in bed, if you have children). You've finished what you have to get done for the day and are reading a book or watching TV. (How might you be spending time alone in the evening?) You are actually feeling a little restless and bored and would very much like to get close to your husband tonight, to spend some time alone together. He has seemed kind of preoccupied the past few days and just hasn't been very attentive or affectionate. And besides, it's been very hectic and you haven't had much of a sexual relationship recently. You decide tonight you'd really like to be close to him and to make love. You put aside what you are doing and go into the room where your husband is working on some things. Any questions?

Husband's side:
It's after dinner (the children are in bed, if you have children). You've been concerned the past few days about getting some project finished. (Coach can find out what this might be—some project that would need some length of time—if husband is a student it might be a paper that's due, or perhaps a report or account for work—or maybe some major repair work that needs to be done.) You've decided tonight's the night to get it done. You go to your (study, cellar, garage. Where would this be for you? Where do you like to work when you want to get something finished?) and get to working. You are quite involved in your work and feeling good about finally getting it done and having some time to yourself at last. It's been hectic lately and it seems like you have had so many demands on you recently—even from your wife. You just want to get this work done and you've finally managed to get some time alone. Any questions?

of facial cues (see Table 2). If the coder was unable to code the utterance as positive or negative, the set of voice-tone cues in Table 2 was scanned; if the coder was still unable to code the utterance as positive or negative, the set of body cues in Table 2 was scanned. Since sequential analyses were performed on the data, it was necessary to use a stringent criterion for agreement between observers that tied agreement to the specific utterance. No time window was used, nor were instances of the codes summed over time as in Jones, Reid, and Patterson (1975). Using this assessment of reliability, Cronbach alphas for affect were .902, .964, and .995 for positive, neutral, and negative affect codes, respectively. To control for agreement by chance alone, Cohen's kappas were computed. For the content codes, the average kappa was .909 (SD = .040), and for the affect, the average kappa was .715 (SD = .169).

Results and Discussion

Agreement to disagreement ratios for the tasks were for sex, 1.27; having children, 1.32; money, 1.54; in-laws, 1.56; sharing events of the day, 1.58; disciplining children, 2.12; and the fun deck, 3.72. Thus, sex improvisation was the highest conflict task, and the fun deck was the lowest conflict task; agreement and disagreement frequencies differed significantly on these two tasks, $\chi^2(1) = 12.06$, $p < .001$. For each task, Rubin (1977) and Gottman (1979b) separately examined the data for content, affect, and content-by-affect codes

Table 2
Cues Used to Code Nonverbal Behavior

Nonverbal channel	Cue	
	Positive	Negative
Face	Smile, empathetic expression, and head nod.	Frown, sneer, fearful expression, cry, smirk, angry expression, disgust, and glare.
Voice	Caring, satisfied, warm, buoyant, soft, bubbly, tender, cheerful, relieved, chuckling, empathetic, happy, concerned, joyful, affectionate, laughter, and loving.	Cold, blaming, tense, sarcastic, scared, angry, impatient, furious, hard, blaring, clipped, hurt, staccato, depressed, whining, accusing, and mocking laughter.
Body	Touching, distance reduction, open arms, attention, relaxation, and forward lean.	Arms akimbo, neck or hand tension, rude gestures, hands thrown up in disgust, pointing, jabbing, slicing, and inattention.

Table 3
Correlations for Nonsequential Variables Across Tasks

Fun deck	Sex			
	p(H+)	p(H−)	p(W+)	p(W−)
p(H+)	.03	.11	−.06	.27
p(H−)	.02	.36*	−.22	.23
p(W+)	.20	−.13	.18	.02
p(W−)	−.17	.29	−.32*	.34*

Note. H+ = husband positive; H− = husband negative; W+ = wife positive; W− = wife negative.
* $p < .05$, two-tailed target.

to determine which conflict task produced patterns discriminating clinic from nonclinic couples that were most consistent with a previous study (Gottman et al., 1977) of couples talking about their own most serious marital problem. This was an additional check of the ecological validity of the conflict improvisation for selecting a high-conflict task for the cross-situational consistency analyses. The sex improvisation gave results nearly identical to the results of the previous investigation.[2] The remainder of the present study gives results of the consistency of nonsequential and sequential variables for the two tasks, sex and fun deck.

Tables 3 and 4 present the results for the nonsequential and sequential variables, respectively. The correlations are generally higher in Table 4 than in Table 3. Also, the significant correlations in Table 3 involved negative affect in every case. In Table 3, positive affect was involved in only one correlation, and each spouse's affect on one task predicted the same spouse's affect on the other task; there were no significant husband-to-wife correlations. This could be taken as evidence for consistency in individual behavior in an interpersonal context. In Table 4, on the other hand, the *z* scores controlled for individual base-rate differences and, hence, can be taken as evidence for consistency in the relationship across tasks. With this interpretation, consistency on the dimension of negative affect reciprocity is clearly greatest. Thus, more cross-situational consistency is manifested using the sequential analyses than using the nonsequential analyses.

The fact that negative affect frequency and negative affect reciprocity variables produced the greatest consistency corresponds well with the fact that negative affect and negative affect reciprocity seem to be more consistent discriminators of clinic from nonclinic couples than are positive affect and positive affect reciprocity variables (Gottman et al., 1977; Gottman, 1979b). Similar results have been obtained in studies that have combined verbal with nonverbal behavior (e.g., Birchler et al., 1975) and couples' self-monitoring of pleasing and displeasing events (Wills, Weiss, & Patterson, 1974).

What is potentially the theoretical basis for negative affect reciprocity's demonstration of strong cross-task consistency? There is some support for the notion that negative affect creates a temporal physiological linkage between interacting people, whereas positive affect does not. In two studies, Kaplan, Burch, and Bloom (1964)

[2] Detailed analyses of differences between clinic and nonclinic couples were presented in Gottman (1979b).

Table 4
Correlations for Sequential Variables Across Tasks

Fun deck	Sex			
	Z(W+/H+)	Z(W−/H−)	Z(H+/W+)	Z(H−/W−)
Z(W+/H+)	.14	.11	.07	−.04
Z(W−/H−)	.10	.39*	.12	.62**
Z(H+/W+)	.12	−.07	.24	−.04
Z(H−/W−)	.03	.54**	.07	.46*

Note. H+ = husband positive; H− = husband negative; W+ = wife positive; W− = wife negative.
* $p < .01$. ** $p < .001$, two-tailed.

correlated the galvanic skin responses (GSR) summed over a minute of interactions of people who were paired on the basis of mutual like, dislike, or a neutral rating, using a peer sociometric measure. They found that in positive pairs, a person's GSR predicted only his or her own subsequent GSR, whereas in negative pairs, there was prediction both within and across people.

The creation of a strong temporal interaction structure based on negative affective interaction has been discussed for primates by Chance and Jolly (1970), who suggested that attention structures are created in a dominance hierarchy; the subordinate animal attends to the dominant animal far more than the dominant animal attends to the subordinate. Chance and Jolly's work is not cited to propose that negative affect reciprocity is in any sense asymmetrical or indicative of a dominance hierarchy but simply to suggest that negative interaction has the unique power to create strong temporal connection. Patterson and Reid (1970) called attention to this fact in their discussion of the negative acts of aggressive children in family interaction as "coercive" acts in the sense that they demand an immediate and usually negative response from the parent.

Most current theorizing about marital interaction focuses on positive interaction and positive reciprocity. This study does not deny the importance of positive affective interaction; it simply highlights its ephemeral qualities. Negative affect and negative affect reciprocity appear to be robust properties of marital interaction, and they also have been found to discriminate satisfied from dissatisfied marriages (Gottman, 1979b). Subsequent research might profit from exploring the basis for the usefulness and robustness of these variables.

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