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## Why Marriages Fail: Affective and Physiological Patterns in Marital Interaction\*

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JOHN M. GOTTMAN  
ROBERT W. LEVENSON

### EDITORS' INTRODUCTION

*John Gottman and Robert Levenson provide a thorough and careful treatment of the literature on marital satisfaction and dissatisfaction, critically examining both methodological and conceptual aspects. In a detailed review of the literature, they illustrate the importance of construing relationships molecularly, interactively, and across time as the relationships develop and dissolve. The authors make a clear case that the social interactions in a close relationship, such as marriage, should be viewed as integrated patterns of social behavior and affective responding that can be construed as ongoing, active systems and as both the product and context of mutual social learning. The relevance of psychometric considerations from both a social and a developmental perspective is well demonstrated, especially in their thorough review of measurement techniques designed to investigate marital satisfaction among distressed and nondistressed couples. Gottman and Levenson's work takes into account the growing literature in social psychology on close relationships (e.g., Kelley, 1977, 1979) and the problems leading to marital dissolution (e.g., Levinger, 1976; Duck, 1982; Harvey, Weber, Yarkin,*

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& Stewart, 1982), as well as relevant methodological and conceptual contributions from developmental psychology (e.g., Lamb, Soumi, & Stephenson, 1979; Hetherington & Martin, 1972). They provide a thorough treatment of the role of affect in the interactions that occur within close personal relationships and argue that a symmetry in emotional responding underlies closeness in satisfactory marriages.

## INTRODUCTION

By far the oldest research question in the study of marriage is why some marriages are sources of misery, stress, and unhappiness whereas others bring fulfillment and promote harmony. Many psychologists are unaware of the excellent psychometric foundation the literature has built for further inquiry. It is important for psychologists to become aware of what is currently known because psychology has some unique contributions to make in our understanding of how marriages function.

## THE MEASUREMENT OF MARITAL SATISFACTION

Burgess, Locke, and Thomes (1971) assembled a thorough introductory-level review of the measurement of marital satisfaction. Initially researchers included a variety of dimensions of marital functioning in their assessment instruments, including couples' judgments of permanence, happiness, adjustment, general satisfaction, specific satisfactions, consensus, love, the quality of the sexual relationship, companionship, compatibility of temperament and personality, and the number of marital problems. However, the questionnaires constructed to assess each of these apparently different concepts correlated very highly. Burgess and Wallin (1953) then concluded that a general factor they called *marital success* could be defined on the basis of correlations in the high 80s and low 90s between Locke's measures of happiness and the Burgess-Cottrell measure of adjustment. Subsequent research has borne out their conclusion.

For example, a measure of the extent to which a couple reported having problems correlated highly with the Burgess-Wallin scale of marital happiness in one study of 984 Catholic couples (Matthews & Milhanovitch, 1963). Also, the independent criterion of whether or not a father is seeking psychiatric assistance (not necessarily for marital distress) correlated .90 with Locke's Marital Relationship Inventory (Locke & Williamson, 1958; Navran, 1967). Terman and Wallin (1949) found that their inventory of marital happiness had moderate success ( $r = .47$ ) in predicting marital

stability. Except for Markman's (1977, 1981) work, this is the largest correlation establishing predictive validity in this area. In ratings of marital happiness that were obtained under conditions in which pairs of raters could not collaborate, Burgess and Cottrell (1939) found that when the ratings of outsiders were compared to the ratings of the couple, "of the 272 pairs of ratings only 24, or 8.8 percent, show a disagreement by two or more scale steps. The tetrachoric coefficient of correlation . . . is .91" (p. 31).

In measuring marital satisfaction, two short inventories are in common use: the 15-item Locke-Wallace (1959) inventory and the 22-item factor-analyzed Locke-Williamson (1958) inventory. The two correlated highly (see Gottman, 1979); however, the Locke-Williamson self-administered forms and face-to-face interviews were employed by Locke (1951) in his classic validity study. Furthermore, the personal interview format tolerated various modifications in order to elicit the cooperation of spouses. Locke (1951 p. 19) wrote that

sometimes the interview took place in a bedroom; at other times it was in the interviewer's car or at the office. One divorced man was located in a tavern, and was induced to go to the university. Then he was talked to until he was relatively sober. . . . Two were interviewed in prison and two were questioned in the woods with the subject sitting on one stump and the author on another. The author played rummy with one man to get him into the spirit of cooperating. Another man was shearing sheep, and the interview was carried on in this situation.

Modifications in the phrasing of questions were also made according to the respondent's degree of literacy and religion, as well as to minimize the obtrusiveness of the items on sexual functioning, especially with elderly respondents.

Of the 15 items contained in the Locke-Wallace inventory, 14 were among those found on the marital adjustment test factor-analyzed by Locke and Williamson (1958) in another classic study in this area. The interview format for this study included personal inventories. The 14 Locke-Wallace items were among the 19 found to have significant loadings on one or more marital adjustment factor.

In 1959, Locke and Wallace published a report on a research project whose aim was to develop a shortened version of the marital adjustment tests used in previous research. By omitting redundant items and including only those items with the highest discriminative validity in previous studies, they derived a 15-item Locke-Wallace inventory. The questionnaire was then administered to a sample of so-called adjusted and maladjusted married persons and was found to differentiate "clearly" between these two groups.

During the 1970s, the Locke-Wallace inventory was used with self-ad-

ministered formats in research on marital interaction and therapy. Marital satisfaction scores on the inventory are predictive of spouses' self-reports of home marital interactions (Gottman, 1979; Wills, Weiss, & Patterson, 1974) and spouses' and observer's descriptions of marital interaction at home and in the laboratory (see Gottman, 1979). In our laboratory we recently compared a telephone-administered form of the Locke-Wallace with a self-administered form with good results.

Scores on these two inventories appear to be robust, reflecting favorably on the procedures of administration. The history of the items contained on both the Locke-Williamson and the Locke-Wallace inventories reveals that differences in item phrasing and administration have been tolerated without sacrificing their psychometric properties. These items first appeared on Locke's (1951) 29-item marital adjustment test and were among the items found to discriminate between a divorced group and a happily married group of husbands and wives.

Every few years a new inventory of marital satisfaction appears in the literature, either to focus on a more specific construct, such as communication (Navran, 1967), or to control for some variable, such as traditionality or presumed secular changes in the conception of marriage. Usually subsequent research discovers that these new inventories correlate very highly with the Locke-Wallace and Locke-Williamson, and the new inventories usually have higher test-retest reliability than the Locke-Wallace. The Locke-Wallace appears to be a better measure of *current* attitude toward the marriage than the Locke-Williamson and hence has lower test-retest reliability. This is because more items on the Locke-Williamson than on the Locke-Wallace refer to the unchanging past of the couple, and because one item on the Locke-Wallace that rates general marital happiness is more heavily weighted than the other items assessing more specific areas of marital functioning. Nonetheless, most new inventories are hardly better measures than the Locke-Wallace or Locke-Williamson. For example, the new Spanier measure of marital satisfaction (Spanier, 1976) correlates .86 with the Locke-Wallace (1959) measure. Our experience indicates that if a couple is unhappy, they will agree that almost any dimension of marriage that could be negative is in fact negative. All such dimensions will correlate highly if a sufficient range of marital satisfaction is sampled.

Thus it is reasonable to conclude that the constructs designed to assess various aspects of marital functioning converge to form one dimension, and that current questionnaires provide a reasonably good psychometric network with more-than-acceptable levels of reliabilities and validities. The term "satisfaction" seems more acceptable and less pejorative than the family sociologist's term "success." The major task now is not to design a better measure of this construct, but to account for variation in marital

satisfaction in a coherent, theoretical manner. It is satisfying that this preliminary psychometric foundation is reasonably solid and need not be re-done; it lays the foundation for more interesting work. We now review the history of concomitants of marital satisfaction.

### HIISTORY OF RESEARCH ON MARITAL SATISFACTION

The first report on marital happiness and unhappiness was published in 1938 by Terman, Bittenweiser, Ferguson, Johnson, and Wilson. They stated their goals as testing what they called the "chaos of opinion on the determiners of marital happiness." They were referring to a set of strongly held beliefs about the importance of such dimensions as "the effect of shock at first intercourse on the wedding night." Today these opinions sound quaint and anachronistic—except possibly to those who yearn for the simplicity of a bygone age of innocence. More important, even at that time Terman and his associates found that most of these opinions were wrong. Their findings were subsequently borne out by a series of other studies.

Terman and his associates were in for some surprises of their own. Armed with the psychometric devices of early twentieth-century personality theory, they hoped to discover the ideal psychological profile of the happy marriage. They found no such profile. There were no relationships between personality traits and marital satisfaction. Subsequent research has found very low (albeit sometimes significant) correlations between personality variables and marital satisfaction and only for specific kinds of personality variables, which we discuss later in this chapter.

Terman *et al.* (1938) were amazed by their negative results. They found, for example, no relationship between the frequency of sexual intercourse and marital satisfaction. They wrote, "One might suppose that a high degree of congeniality between mates would tend to express itself in a relatively high frequency of copulation, a lack of congeniality in a relatively low frequency" (pp. 275–276). Early researchers on marriage were also amazed that there was no relationship between demographic variables and marital satisfaction. For example, Burgess and Cottrell (1939) intensively studied 526 couples, once again with questionnaires, and their results were largely consistent with those of Terman *et al.* (1938). They were particularly surprised to learn that "the economic factor, in itself, is not significant for adjustment in marriage" (p. 346).

However, these early investigations were by no means characterized by negative findings. For example, in the area of sexual intercourse, Terman and his associates did find a strong relation between the *discrepancy* between desired and actual frequency of sexual intercourse and marital happi-

ness. Their findings led them to recognize the importance in predicting marital satisfaction from variables that describe the marital relationship. For example, they reported, "The highest ranking item is the one about avoiding arguments. From these data it appears that among the 545 items the greatest single danger to marital happiness is for one spouse to like and the other to dislike to argue" (p. 29). In their investigation of "domestic grievances," they were amazed at the amount of consistency in their data. The rank-order correlation between seriousness of grievances between husbands and wives was .76. They found that of 220 comparisons between happy and unhappy couples (based on a median split), all but 7 were statistically significant. From a long list of gripes, the following were cited the most frequently across all marriages: *husbands*—insufficient income, wife's feelings too easily hurt, wife criticizes me, in-laws, wife nervous or emotional; *wives*—insufficient income, in-laws, husband nervous or impatient, poor management of income, husband criticizes me. They thus discovered a remarkable consistency in these results.

This consistency was echoed in subsequent investigations that employed questionnaire and interview methods. For example, although Burgess and Cottrell (1939) found no relation between income and marital satisfaction, they did find that "the outstanding features in marital adjustment seem to be those of affection, temperamental compatibility, and social adaptability. The biological and economic factors are of less importance and appear to be largely determined by these other factors" (p. 349).

The major conclusion that emerged from these investigations was that most important were variables describing the relationship in accounting for variance in marital satisfaction. Burgess and Cottrell's findings were also largely corroborated in Burgess and Wallin's 1953 longitudinal study with 1000 engaged couples. In both cross-sectional and longitudinal research, the same patterns of results emerged. The point is critical because a research tradition grounded in individual personality theory was paving the ground for the study of relationships and demonstrating that the two modes of thinking (individual and relational) are by no means identical.

The point cannot be made too strongly. For example, let us consider research directed at the study of personality in marriages. Studies comparing happily married with unhappily married couples found low to moderate correlations between self-ratings of happiness and personality indices. For men, these correlations ranged from .28 (Dean, 1966) to .39 (Burchinal, Hawkes, & Gardner, 1957). For women, the correlations were slightly higher, ranging from .35 (Dean, 1966) to .42 (Burchinal *et al.*, 1957; Terman *et al.*, 1938). However, the variables that characterized happily married spouses tended to be interpersonal rather than intrapsychic in nature. For example, in Burgess and Wallin's (1953) summary of the earliest investiga-

tions dealing with the relationship between marital adjustment and personality scale variables, happily married couples were characterized as emotionally stable, considerate of others, yielding, companionable, self-confident, and emotionally dependent.

Dean (1966) noted that the personality variable with the highest correlation with both husbands' and wives' marital adjustment scores was wives' positive rating of their husbands' emotional maturity. Thus it seems that the *perception* of a personality dimension by the spouse predicts marital satisfaction better than the dimension itself. Corsini (1956) noted that the only significant correlation between marital happiness and interspouse Q-sort predictions occurred when the wife predicted the husband's Q-sort. The Q-sort is a task in which a set of statements about someone's personality are sorted into categories ranging from "extremely characteristic" to "extremely uncharacteristic." In a Q-sort prediction, one person predicts how the other will describe himself or herself. Corsini's findings are consistent with Tharp's (1963) review of interpersonal perception among spouses: Tharp concluded that marital happiness is related to the wife's perception of the husband being congruent with his self-perception. This, again, may be interpreted in terms of the predictive value of perception of personality rather than of personality variables *per se*.

In the late 1930s the point that relationships could not be understood by reference to individual personality theory was not well understood. For example, the prominent means of therapy for distressed marriages was individual therapy. As late as the 1950s it was considered unethical for the therapist to see husband and wife together, and questionable practice for the same therapist to see both partners individually. Such was the influence of individual personality theory (for a review, see Gottman, 1979, chap. 14).

One lone voice challenged these assumptions. As early as 1937 Ackerman suggested that two neurotic individuals could have a happy marriage and that the focus of therapy should be on *interaction patterns* (Ackerman, 1937, 1954; Ackerman & Sobel, 1950). Ackerman was eventually joined by a group of maverick psychiatrists led by Gregory Bateson. They published an extremely influential paper on the relation between a type of family communication called "double-bind messages" and schizophrenic symptoms in children (Bateson, Jackson, Haley, & Weakland, 1956).

The double-bind hypothesis paper stimulated a great deal of interesting thinking about marital and family interaction patterns. The basic motto of this literature was "the whole is greater than the sum of its parts," by which its authors meant that an *interactional system* is not capable of being understood by isolating its separate parts (for example, see Watzlawick, Beavin, & Jackson, 1967).

The point was forcefully made and it has become largely accepted as

truth, despite the fact that no consistent scientific evidence exists supporting the original double-bind hypothesis (for example, see Beels & Ferber, 1969; Olson, 1972). Ten years after the double-bind paper was published, a paper by Mishler and Waxler (1966) about the hypothesis humbly noted: "Our persistent concern with whether we had fully understood the meaning of one or another concept is obviously related to what we feel to be an unnecessarily high level of ambiguity and imprecision in their writings" (p. 409). In the same journal, Bateson (1966) responded as follows:

The authors have been generous and—so far as this was possible—have been understanding in their critique of the "double-bind" theory. They say with some justice that the phrasings of the theory are sometimes ambiguous. They might have gone further and said that (like much psychoanalytic theory) the double-bind theory of schizophrenia is *slippery*—so slippery that perhaps no imaginable set of empirical facts could contradict it. . . . [U]nfortunately, but necessarily, there is a basic formal truth about all abstract premises, namely: *The more abstract the premise, the more likely it is to be self-validating* [pp. 415–416; italics added].

Despite the dead ends of general systems theory, by the 1960s it became clear that the study of interaction per se might be valuable in understanding how *systems* functioned or malfunctioned. By the mid-1960s a great deal of observational-based literature existed suggesting how social groups functioned (e.g., Bales, 1950) and also suggesting that groups with an interactional history were different from groups of strangers (Hall & Williams, 1966). A great deal of interactional research had been done on families; furthermore, some consistencies existed in this literature. Unfortunately, these consistencies were largely ignored. For example, Riskin and Faunce's (1970) decade review paper suggested that one consistent finding was that agreement-to-disagreement ratios greater than 1.0 characterized normal families and that ratios less than 1.0 characterized distressed families. This consistent finding was dull and unglamorous; perhaps it even seemed somewhat circular. Researchers tend to be more charmed by and attracted to complex conceptualizations such as Leary's (1956, 1957) circumplex model or what might be called Laing, Phillipson, & Lee's (1966) "meta-meta-etc." model of interaction. To conclude that distressed marriages disagree more than they agree hardly seemed profound.

It is often the case in the history of science that valuable results are overlooked by everyone except those whose thinking is somehow childlike and simple. This was certainly the case in the history of physics. Galileo's observations of changing shadow patterns on the moon convinced him that the moon had mountains and did not give off its own radiance but reflected the radiance of the sun. The same data were available to anyone with a telescope. Newton's observations of the oval instead of circular pattern of

light coming through a round hole in a curtain and through a prism led him to propose the wave theory of light. His colleagues could not see the point for many, many years.

The point that agreement-to-disagreement ratios were consistently different for distressed and nondistressed families was not lost on Patterson and Weiss at University of Oregon, whose work has been motivated by the integration of general systems theory and social learning theory. They had been intrigued by cybernetic, or "general systems theory," concepts, but only after they had come to value the importance of measuring observable behavior and of producing testable hypotheses, and after they had come to value the elegance of simplicity. Perhaps more important were the methodological advances made by the Oregon group—in particular the Family Interaction Coding System (Reid, 1967; Patterson, Ray, Shaw, & Cobb, 1969) and the Marital Interaction Coding System (Hops, Wills, Patterson, & Weiss, 1972). These methodological advances led to thinking about relationships as interacting systems, which led to a search for interaction patterns that characterized distressed marriages.

#### THE SEARCH FOR PATTERN

In an excellent review of the relationship between family interaction and child psychopathology, Hetherington and Martin (1972) wrote:

Most of the studies of family interaction have yielded separate frequency measures of parent and child behavior recorded while they were interacting. However, investigators are usually actually interested in the etiology, contingencies, and sequencing of these observed behaviors and often generalize to such questions on the basis of inappropriate methodology. . . . *Such studies should look sequentially at interchanges involving chains of interpersonal exchanges* and should investigate shifts in probabilities of response in one family member to the specific behavior of others [p. 36; italics added].

Until recently most research on interaction ignored sequence and collapsed data over time. For example, whereas all the hypotheses of pathological family interaction concerned the patterns of interaction, none of the 57 research studies reviewed by Jacob (1975) was concerned with pattern. They all presented analyses of the differences in rates of various behaviors. By their data-analytic methods, these studies therefore assumed that the more of something good, the better and the more of something bad, the worse. This was a tenuous assumption because, for example, not all interruptions in a dialogue may be the same; interruptions may initiate one kind of sequence, such as a negative affect cycle, in distressed families and a different kind of sequence, such as humor, in nondistressed families. In

other words, the vast majority of research on family and marital interaction has not always analyzed the relation between codes over time, and this seems to be a major shortcoming.

This state of affairs, until the 1960s, also characterized the research on marital interaction. For example, perhaps the most influential hypothesis about marital interaction is the quid pro quo hypothesis suggested by Jackson (1965). Jackson cited a study of Leik (1963) that found that "the traditional male role (instrumental, nonemotional behavior) appears when interaction takes place among strangers. These emphases tend to disappear when subjects interact with their own families" (p. 145). As one example of a quid pro quo, Jackson (1965) suggested,

If A says to B, let us do X, spouse B assents because they have established a time-bound relationship in which the next move would be B's. The husband may suggest to his wife that they go to a movie; she says yes, and then she has the right to say, we can have a beer afterwards [p. 1538].

In 1968 Lederer and Jackson published an influential book in which they elaborated on the quid pro quo concept and suggested a form of therapy called *reciprocal contracting* as a treatment for distressed marriages. Note that the quid pro quo interaction pattern had never been carefully established as a phenomenon by quantitative, observational research as characteristic of marriages that both partners consider mutually satisfying or as failing to characterize distressed marriages. The quid pro quo concept nonetheless was so intuitively appealing to behavior-oriented therapists that it was rapidly adopted. In 1969 Stuart published a paper on four couples reporting that a reciprocal contract had been established with all four. In 1976 he reported, rather briefly and casually, that he had obtained high rates of success (approximately 84%) with a large sample (200 couples), measuring improvement with his own Marital Precounseling Inventory. Therefore the reciprocal contract, despite its lack of strong empirical support, began to be the treatment of choice of behavior-oriented marriage counselors (see also Jacobson & Martin, 1976). The treatment was, however, considerably modified by adding training in negotiation and in other communication skills (e.g., Jacobson, 1977; Patterson, Hops, & Weiss, 1975; Weiss, Hops, & Patterson, 1973).

This clinical theorizing ignored existing research that pointed to the potential importance of describing sequential patterning in marital and family interaction. Among this work was Haley's research on a variable called "*R* deviation." This research was based on the most primitive of all possible coding systems; it contained only two codes for each family member: talk and silence.

Haley (1964) studied talk patterns in three-person (two parents and a

child) "disturbed" and "normal" families. The disturbed group of 40 families included those in which some member (1) was diagnosed schizophrenic; (2) had committed a delinquent act; or (3) had been referred for a school problem. Also included in the disturbed group were families in which a member sought help for "a neurotic problem" or in which the parents sought marriage or family therapy. They were considered normal because they had not come to the attention of the community as having problems. Children ranged in age from 10 to 20 years and were living at home with their natural parents.

The process measure that resulted in the greatest separation of disturbed or normal families on Haley's tasks was obtained by using the Family Interaction Analyzer devised by the Alto Scientific Company of Palo Alto, California. Using lavalier microphones, the interaction analyzer automatically records the frequency with which each member's talk is immediately followed by that of another family member. When father speaks, for example, nothing happens until mother speaks; then a click is recorded on the father-mother (FM) counter.

Haley's process measure, called *R-deviation*, was the extent to which the sum of the percentage of speech in each of the six categories (FC, FM, MF, MC, CM, CF) deviated from what would be expected in a random talk pattern (16.66 in each category). Note that the *R-deviation* measure is a naive approximation to an information theory search for "digram structure." *Digram structure* means that immediate temporal linkages exist. Haley is not controlling for imbalance in the frequencies of M, C, and F. Haley hypothesized that one would expect to find greater rigidity, more limited response alternatives chosen, and therefore greater *R-deviation* scores in pathological families.

The results of this experiment were provocative. Haley's hypotheses were supported. Furthermore, Haley found that analyzing individual sequences of three, four, five, six, and seven speech patterns (the series of three would be FMC, FME, etc.) in terms of *R-deviation* produced significant but weaker differentiations of the two groups than in terms of the digram *R-deviation*.

Haley's (1964) results did not extend to four-person families with two children, considered in a later study (Haley, 1967; selected on the same criteria as the 1964 study). In fact, if one reanalyzes Haley's results in the 1964 study for only those families with marital problems, there is a mean *R-deviation* of 21.45, which is not significantly different from the normal mean of 19.16, since the critical difference value of *R-deviation* is 4.42 for two speech sequences.

Waxler and Mishler proposed a *T*-statistic that may be a more useful measure than *R-deviation* with well and problematic family triads in four-

person families. Using the task of the family's discussion of questionnaire items, Waxler and Mishler (1970) also did not succeed in replicating Haley's (1964) results. They suggested a procedure for controlling for relative participation rates and again found (as did Haley, 1967) that there was no difference in predictability of talk sequences. However, there was one important exception. "The exception occurs," they wrote, "when the parents of a schizophrenic child interact with that child (rather than with a well child from their own family). In this case the sequence of *three* speakers is more predictable than that for normal families" (p. 219). Thus it may be that with respect to potentially conflict-producing interaction, distressed families have developed structured interaction rules for family subgroups and that *R*-deviation (or Waxler and Mishler's *T*-statistic) is tapping this interaction structure.

Here we have an example of a program of research that suggests that the presence of a temporal structure is associated with distress in families. This would contradict the quid pro quo hypothesis, which suggests that greater temporal patterning is characteristic of *well-functioning* families. More descriptive detail is, of course, necessary because the quid pro quo hypothesis discusses the functional aspects of *positive* reciprocity, and a simple talk-silence coding system cannot provide such information.<sup>1</sup>

How should positivity and negativity be coded and defined in the study of marital interaction? This is not an easy question to answer. A clue to its answer lies in the remarkable consistency that has been found in the differences between people's interactions with their spouses and opposite-sex strangers.

Ryder (1968) asked the question, "What, if anything, is demonstrably distinctive in interaction between husbands and wives?" Using a decision-making task (The Color Matching Test), he paired husbands with their wives or with female married strangers and found:

Husbands are more likely to take the lead in conversations with their wives than with strangers, suggesting more task orientation with wives. Wives laugh less with spouses than with strangers; but they also use more disapproval of spouse, as do husbands. . . . The differences between married and split dyads seems much better described by noting that Ss treat strangers more gently, and generally more nicely than they do their spouses [p. 237].

<sup>1</sup>It should be noted that in a recent paper Sackett (1980) invented a brilliant system for using lag-sequence analysis with a simple talk-silence coding system in a large group. By using sequence analysis Sackett was able to describe complex patterns that *do* relate to positive interactions. For example, some dyads stimulate one another; that is, when one person speaks, the other is more likely to speak than he or she ordinarily might. Some dyads are asymmetrical; that is, one person stimulates the other, but this person inhibits the partner. And so on. Sackett's innovation demonstrates the conceptual power of sequential methods even with a simple coding system.

The effect was replicated by Birchler, Weiss, & Vincent (1975) for a high-conflict problem-solving task (the IMC) and for simple conversation in a comparison of stranger dyads and nondistressed couples.

Winter, Ferreira, and Bowers (1973) used their standard decision-making task to study interaction in married and unrelated couples. Replicating Ryder (1968) and Birchler *et al.* (1975), they found that "unrelated couples were more polite to each other than were married couples" (p. 91). They also found that married couples intruded on and interrupted each other more often than did unrelated couples and that unrelated strangers listened respectfully to one another, whereas married couples were often rude. Also, interruptions in married couples decreased subsequent talk by the spouse who was interrupted, whereas in strangers interruptions increased subsequent talk.

The concept of "nice versus nasty," rudeness, or negative affect appears to emerge from this literature. In fact, it has turned out to be extremely profitable to invent categories that globally coded interaction along this type of positive-negative affect dimension. Birchler *et al.* (1975), using the Marital Interaction Coding System, combined their categories of positive verbal and nonverbal behavior and negative verbal and nonverbal behavior. They were able to discriminate distressed from nondistressed couples on the mean rate per minute of negative codes in both a problem-solving (IMC) task and in conversation. They were also able to discriminate distressed from nondistressed couples on positive codes, but only on the problem-solving task. These findings are consistent with other research on family interaction. There is more humor and laughter in nondistressed families (Mishler & Waxler, 1968; Riskin & Faunce, 1970), and there is more support and less defensiveness in nondistressed marriages and families (Alexander, 1973a, 1973b; Caputo, 1963; Cheek, 1964; Mishler & Waxler, 1968; Riskin & Faunce, 1970). Alexander (1973) found that parent-child interactions in families without a delinquent child were more positive ("supportive"), or less negative ("defensive"), than in families with a delinquent child.

In a study of couples' behaviors at home, Weiss, *et al.* (1973) computed a "pleases to displeases" ratio using a behavioral checklist kept daily by couples as an outcome measure of their marital therapy program. They reported that the seven couples seen in their program (who were shown to have improved on other variables) increased their pleases:displeases ratio. Wills *et al.* (1974) showed that pleases and displeases were able to account for substantial portions of the variance in a daily global one-item rating of marital satisfaction in seven nondistressed married couples. They also reported that pleases and displeases are essentially unrelated, and they found no relationship when these events were further classified as instrumental

(e.g., helping with household chores) or affectional. Affectional event records were kept with a wrist counter worn by each spouse, as these events were considered too brief to be remembered for subsequent recordings on a checklist. Wills *et al.* (1974) found that instrumental and affectional behaviors over 14 days accounted for 65% of the variance in the global daily rating of satisfaction, but that pleasurable behaviors accounted for only 25% of the variance. They also concluded that "husbands tended to emphasize the instrumental dimension and wives the affectional" (p. 807).

To summarize, in reviewing literature on family interaction, there is remarkable consistency in the general conclusion that distressed couples and families are far more negative toward one another than nondistressed couples and families, and there is some (though less) support for the conclusion that distressed couples and families are less positive toward one another than their nondistressed counterparts. We may also conclude that it makes some sense to code interaction on a positive-negative dimension.

Two issues remain to be addressed. First, what about *pattern*? The quid pro quo hypothesis is not about the amount of positive interaction, but about its *temporal reciprocity*. Second, a great deal more precision is now possible in the study of affect than a simple positive-negative dimension. We turn to a brief review of both issues. First we discuss how pattern should be studied, then how affect should be studied.

### The Detection of Sequential Pattern

The basic concepts of sequential structure were elaborated by Shannon (1949) in a classic monograph on information theory. The basic notions of information have to do with choice and redundancy. What is information? A doorbell is a two-choice information transmitter; it may ring or be silent. A doorbell that never rings is perfectly predictable, and it obviously sends no information. One doorbell provides us with an information channel that can transmit one bit (a binary unit) of information. Viewed as a group, three doorbells that can or cannot ring independently present the eight possibilities for transmitting a more complex set of codes. There are eight possibilities, or  $2 \times 2 \times 2$ , in this system composed of elements, each of which has one bit of information. If we counted the number of 2s in the product above, we could define the information of the three-doorbell system as the sum of the information of its elements, for a total of three bits. Carrying this mode of thinking further would suggest that an information system with a total of  $n$  equally likely messages would have information of the power to which we needed to raise 2 to get  $n$ —that is,  $\log_2 n$ . To understand this better, consider how many (yes-no) questions we would

have to ask to find out on which particular square of the 64-square chessboard someone had placed a king. It would take a minimum of 6 yes-no questions such as, "Is the square on the left half?" to locate the king, and 6 is the  $\log_2 64$ , because  $64 = 2^6$ . Each answer provides one bit of information by reducing the remaining alternatives to half. The information,  $H$ , is thus  $\log_2 n$ , where  $n$  is the number of equiprobable alternatives.

If the messages were not all equally probable, the total amount of information would have to be weighted by the probability of each message.

In analyzing a stream of codes obtained by classifying interaction units of some kind, one searches for repetitive patterns. The task is similar to deciphering a code. To illustrate this notion, consider the approximations to English that Shannon generated. The first approximation was the random one in which all the symbols of the alphabet occur with equal frequency:

XFOML RXKHRJFFJUJ ZLPWCFWKCYJ FFJEYVKCQSCGHYD  
QPAAMKBZAACIBZLHQD (p. 43).

This looks very little like an English sentence. If we next assume that the symbols are temporally independent but occur with the frequencies they have in a usual English text, we might obtain

OCRO HLI RGWR NMIELWIS EU-LL NBNESEBYA TH EEL  
ALHENHITPA OOBTTVA NAH BRL (p. 43).

Now if we add such rules as *U* follows *Q*, we create the lag-one dependency characteristic of English spelling, and we might obtain

ON IE ANTSOUTINYS ARE T INCTORE ST BE S DEAMY  
ACHIN D ILONASIVE TUCCOOWE AT TREASONARE FUSO  
TIZIN ANDY TOBE SEASE CHSBE (p. 43).

This lag-one dependency is also called a "digram structure." If we add the trigram structure of English, we might obtain

IN NO IST LAT WHEY CRATICT FROURE VIRS BROCID  
PONDENOME OF DEMONSTURES OF THE REPTAGIN IS  
REGOACTIONA OF CRE (p. 43).

In each case we get closer to the English code, although we may never be able to generate an interesting passage without understanding the structure among larger units (e.g., words).

The fundamental notion of communication is thus related to temporal structure in the following way: A behavior of one organism has communicative value in a social sense if it reduces uncertainty in the behavior of another organism. This means that, for example, if the quid pro quo hypothesis were correct, if we know that a husband in a happy marriage has



just been positive toward his wife, we would have a greater chance of predicting that she would subsequently be positive toward him, and that this would be less characteristic of couples in unhappy relationships. The test statistic must involve a comparison of a conditional probability of  $(W+|H+)$ , read "the probability that she will be positive right after he has been positive," with an unconditional probability,  $p(W+)$ , "the probability that she will be positive regardless of what occurred previously."

What is the evidence on the truth of the quid pro quo hypothesis? Unfortunately, most research has not employed the temporal contingency-based notion of reciprocity that is necessary. Let us compare the uses of the concept of reciprocity in theoretical writing with the empirical assessment of the concept. Patterson and Reid (1970) wrote, "Reciprocity describes dyadic interaction in which persons A and B reinforce each other, at an equitable rate. In this interaction, positive reinforcers maintain the behavior of both persons" (p. 133). There are several components in this use of the term *reciprocity*. It is apparently still possible in this definition to judge reciprocity from the interactions of one dyad. This is consistent with the use of the term in other literatures. A seemingly new addition is the term *reinforcer*, but by definition, for a behavior emitted by one person in the dyad to be a reinforcer, it must first *follow* the behavior of the other person; second, it must alter the probability of that behavior's taking place. Hence the two definitions of reciprocity are equivalent so far. However, the notion of equitable rates is a new concept, and Patterson and Reid (1970, p. 140) further explicate this idea as follows:

[Reciprocity] would require that, over a series of interactions, two persons reinforce or punish each other for approximately the same proportion of behaviors. For example, if person A reinforces B for 50 percent of the interactions which B has with A, then A, in turn, will *receive* about the same proportion of positive reinforcers from B.

This concept is really one of similar rates of positive behaviors in the two members of the dyad, and this concept is logically independent of the notion of contingency that is central to other uses of the term reciprocity. The similar rate idea is one that Patterson and Reid (1970) called "social economics" (p. 139) in referring to behavior exchange theory (Thibaut & Kelley, 1959).

Stuart (1969) had a similar concept in mind when he described the quid pro quo arrangement. He wrote,

In effect, a quid pro quo or "something for something" arrangement underlies successful marriage (Jackson, 1965, p. 591). The exchange of rewards in a marriage may be viewed as a quasi-legal contract affording distinct safeguards to each partner. Whenever one partner to a reciprocal interaction unilaterally rewards the other, he does so with the confidence that he will be compensated in the future [p. 675].

In addition to the difference between a *rate-matching* definition and a *probability change* definition, the time periods involved in the two definitions are vastly different. Brazelton, Koslowski, and Main (1974) referred to a more moment-to-moment definition, whereas Stuart (1969) proposed the following illustration: "For example, if the husband agrees to entertain his wife's parents for a weekend, he does so with the expectation that his wife will accompany him on a weekend fishing trip at some time in the future" (p. 675).

Researchers have at times discussed the concept of reciprocity as a probability change definition but measured it by rate-matching. For example, Azrin, Naster, and Jones (1973) wrote,

The strategy may be summarized as "reinforce the reinforcer (person)." . . . Since the nature of the reinforcing interactions is changeable, each partner must continuously rediscover the reinforcers. Secondly, *the relationship must be contingent*: the reinforcers are to be given when, but only when, reinforcers are received. This contingent relation is adequately described by the term "reciprocity," a concept which was also central in Stuart's (1969) marital counseling procedure [p. 267; italics added].

Weiss, Birchler, and Vincent (1974) described their intervention procedure with married couples as a means for developing "*mutual gain or reciprocity*" (p. 211; italics added) but never assessed it by probability change methods.

The two definitions of reciprocity are not equivalent. It is easier to see this if we consider nonsocial behaviors, such as eating or typing. A husband may eat or type at a rate similar to his wife's without any contingency between these two activities; they may, for example, have similar physical tempos. In this case, we would merely report that eating or typing took place at similar rates, not that they were reciprocal. If a mother smiles at a rate similar to her infant, their interaction may nonetheless be totally unconnected and noncontingent; the mother's smiling and her infant's smiling would be considered reciprocal only if the acts were somehow connected in the probability change sense.

The two definitions would be similar only if the term *reinforcement* were used strictly in the sense of altering probabilities *within* a dyad. In fact, in research on reciprocity by social learning theorists, the term has been used to mean positive behavior defined as positive on a priori grounds. There has been no demonstration that positive behaviors are reinforcers in the probability change sense. Furthermore, in every case but one the empirical test of reciprocity has been inadequate: Husband-wife correlations of the rates of positive act *across* couples or correlations between family members *across* families were calculated. This test of reciprocity has abandoned the individual dyad in the definition. The correlation of husband-wife rates of

positive behaviors *across* couples also does not deal with base-rate differences of positive behaviors between couples, and it is thus invalid as a test of a reciprocity hypothesis.

Birchler (1972) found a husband–wife correlation of .97 across 12 nondistressed couples for mean frequencies of positive items checked and .74 in 12 distressed couples; the correlations for negative items checked were .26 and .54, respectively. Alexander (1973a) analyzed his data in a similar manner. He obtained high correlations between father-to-son supportiveness and son-to-father supportiveness (.69) across families, and a similarly high correlation for mother-to-son supportiveness and son-to-mother supportiveness (.59); however, the equivalent correlations for defensiveness were not significant. He concluded, “to have developed and maintained these differential rates, the families would have had to reciprocate supportiveness but not defensiveness, which was exactly the finding of the present study” (p. 616). In fact, rate differences between families, not reciprocity, was exactly what was tested by the correlations. The point is similar to one that states that analyses of husband–wife correlations across couples is an inadequate test of a reciprocity hypothesis. Gottman, Notarius, Markman, Bank, Yoppi, & Rubin (1976) wrote,

Although nondistressed couples may seem to be reciprocating positive behavior more frequently than distressed couples, that may only be an artifact of the higher probability of positive behaviors in nondistressed couples. By emitting more positive responses, nondistressed couples increase the probability that one partner's positive response will be followed by the other partner's positive response [p. 14].

High (noncontingent) positive frequencies in some couples and not in others could also be an artifact of many other variables, such as similar physical tempos (couples are more similar to one another than they are to strangers on most variables), or an artifact of the amount of time spent together (for couples who spend more time together each day, both husband and wife will have more items checked on their behavior checklist than will couples who spend less time together).

The only test of correlations of positive and negative checklist items *within* couples was made by Wills *et al.* (1974), who correlated these variables for seven nondistressed couples between each husband and wife across 14 days. Husbands had been instructed (as a validity check) to double their output of positive affectional behaviors on Days 13 and 14. Wives' recording of their husbands' behaviors on these days showed a significant increase in pleasurable instrumental events as well as in pleasurable affectional events. In six of seven couples, there were no significant correlations between husbands' and wives' records of pleasurable behavior, but in four of

seven couples there were significant correlations between husbands' and wives' records of displeasurable behavior.

The Wills *et al.* (1974) study concluded that there was evidence for the reciprocation of displeasurable but not of pleasurable behaviors. They wrote: “The within-couples analysis provides an index of immediate reactions to behavioral events and indicates that in day-to-day affectional interaction, a displeasurable behavior is more likely to be reciprocated than a pleasurable behavior” (p. 809). There is thus evidence to support negative reciprocity but no evidence to support the positive matching or quid pro quo model of nondistressed marriage proposed by Azrin *et al.* (1973), Patterson and Reid (1970), and Stuart (1969).

The within-couple analysis of displeasurable events for these four nondistressed couples also does not constitute support for the conclusion that the *matching* of displeasurable events across days is necessarily related to marital dissatisfaction. This test has never been conducted; however, Murs-stein, Cerreto, and MacDonald (1977) reported that adherence to a quid pro quo belief—particularly by husbands—was related negatively to marital satisfaction. The correlation between an exchange orientation and marital satisfaction was  $-.63$  ( $p < .01$ ) for men and  $-.27$  ( $p < .06$ ) for women. The correlations between each person's exchange orientation score and his or her partner's marital satisfaction score were also negative and significant.

### The Study of Affect

Anyone who seriously investigates emotional communication in the flow of conversation must come to the conclusion that affect is conveyed in every possible channel of communication—linguistic, paralinguistic, facial, gestural, and proxemic. Furthermore, it rapidly becomes obvious that these channels of emotional communication cannot be isolated, separately investigated, and then later reintegrated. Birdwhistell said it nicely: “Studying nonverbal communication is like studying noncardiac physiology” (quoted in Knapp, 1972, p. 3). Birdwhistell was challenging the additive channel model of nonverbal communication that is currently mainstream.

To see the truth in Birdwhistell's point, consider the vocal channel for a moment. Current scientific methods require the removal of content from speech in order to isolate vocal components of emotion. This is done either by electronic filtering of high frequency cycles or random splicing (see Scherer, 1981). There are problems with each method. Emotional communication has been found to occur precisely in high frequency shifts of the voice (Rubenstein & Cameron, 1968), which suggests that electronic filtering

may be eliminating the information of interest. Random splicing techniques lose temporal form so that an angry moment characterized by steadily rising volume will be spliced randomly, rendering its temporal shape unrecognizable.

There is a logical reason for agreeing with Birdwhistell. Suppose you tell your secretary, "I'd like this as soon as possible." Stressing the word "soon" communicates impatience; stressing the word "possible" communicates that you are not in a hurry. Any content filtering will lose the emotional flavor of the *interaction* of paralinguistic cues with the words. A bit of experience with conversation will convince the reader that the argument can be generalized to other cues in the voice, such as pause, whine, and so on. Experience with film or videotape will convince the reader that this is the case for physical cues from every channel of nonverbal communication: *Emotion is communicated by a nonadditive gestalt of channels*. You cannot take Humpty Dumpty apart, study the separate pieces, and even hope to learn about Humpty Dumpty.

This is *not* to say that physical cues of nonverbal behavior do not provide reliable emotional information independent of language. The researcher of emotional communication must know all channels well.

Consider the face. The study of facial expressions was discredited in psychology in a review by Bruner and Tagiuri that appeared in 1954. However, Ekman, Friesen, and Ellsworth (1972) critically reevaluated the evidence before and since the Bruner-Tagiuri review and made several points. First, the research evidence was misrepresented and distorted by Bruner and Tagiuri. Ekman *et al.* (1972) wrote that "Bruner and Tagiuri were factually incorrect and misleading. They enhanced the credibility of negative findings on accuracy by saying that all of those experiments utilized photographs of real emotion elicited in the laboratory. This is true only of Landis and Sherman" (p. 78). Second, the studies in which subjects could not identify emotion accurately from facial expressions suffered from several methodological weaknesses. For example, early investigators of facial expressions expected to find an isomorphism between emotionally arousing situations and universal facial expressions. However, several factors may intervene to ruin this one-to-one relationship. For example, not everyone laughs at a standard set of jokes; nor does everyone react with fear to the threat of shock. Therefore, the assumption that a particular experimental event will produce the same internal state in all subjects is unwarranted. Third, in some studies (Landis, 1924, 1929) the subjects were colleagues of the experimenter, and he marked their faces with burnt cork to highlight facial features. They were thus aware of what was being measured, and in most situations (even suddenly placing excrement under their noses) they produced the same expression—a pained, polite smile. Given that subjects

were asked to pick out which situation produced which photograph, it is predictable that they did no better than chance. Fourth, the situations followed one another in rapid succession, which may have contributed to subjects' producing blends of various affects. Ekman *et al.* (1972) show that when these methodological problems are controlled, subjects can identify facial expressions accurately. This result has been replicated in many investigations by several researchers (for example, Izard, 1971).

The state of the art in measuring facial action is Ekman and Friesen's (1978) anatomically based Facial Action Coding System (FACS). This system is a significant scientific tool because it avoids the use of emotional-laden adjectives in describing facial motion. To explain the great clarity that will eventually be gained by using FACS, consider one category that many researchers use: the smile. Some researchers (e.g., Brannigan and Humphries, 1972) distinguish among various kinds of smiles (e.g., Brannigan and Humphries describe the "simple smile," the "upper smile," and the "broad smile"); often these distinctions are based on adjectives (e.g., "tense smile"). For a comparison of facial coding systems, see Ekman (1982). Most of us think we know what a smile is. Most investigators have simply specified that the lip corners turn up in a smile and that the mouth is shaped somewhat like a U. But this is not sufficient to describe a smile. In a number of different types of smiles the lip corners turn down. This smile is often seen in coy, playful, or flirtatious interaction; it looks like the person is working hard *not* to smile. The FACS would describe this smile in terms of the "action units" (AUs) that are involved in creating the facial configurations that involve upturned corners of the mouth but that are often indexes of negative affect. For example, the symmetrical or asymmetrical configurations produced by AU14—the dimpler—resemble the proper reaction to a bad pun or a common contempt expression. In short, a smile is not a smile; it depends on the specific facial configuration. For an excellent discussion of the variety of possible emotional and conversational functions of brow movements, the reader is referred to Ekman (1979).

Historically, the major concern of the field of nonverbal communication was the communication of emotion. In 1872 Charles Darwin published a book in which he attempted to specify a set of facial expressions and gestures that represented primary, biologically adaptive emotions. He also explored the phylogensis of these expressions. For example, the emotion of disgust, he suggested, which involves wrinkling the nose, is adaptive because it functions to shut the eyes and nasal passages so that a noxious odor will not harm the individual. Similarly, fear involves widening the eyes so that individuals can increase their ability to perceive a threatening stimulus. Darwin's major interest was facial expression. In fact, study of the evolution of social behavior in primates reveals that the evolution of the facial mus-

culature accompanied the evolution of social communities that function in relative physical proximity (see Chevalier-Skolnikov, 1973).

Darwin's emphasis on biologically based, species-universal expressions and gestures that are isomorphic with internal emotional states has been modified to some degree to take into account cultural display rules (see Ekman, 1971; Ekman & Oster, 1979; Ekman & Friesen, 1972). It is now clear, however, that facial expressions can be measured reliably (see Ekman *et al.*, 1972; Scherer & Ekman, 1982), though many basic questions about emotion still remain.

The voice is as important a channel of emotional expression as the face. Although the precise set of physical cues that relate to specific emotions has yet to be discovered, a number of physical cues are important, such as shifts in fundamental frequency (see Scherer, 1979, 1982), speech disturbances (Mahl, 1956), and a variety of other cues including amplitude variation, tone changes, and key shifts, (e.g., major to minor; see Scherer, 1974).

Research on other channels of nonverbal behavior also have produced interesting cues that may suggest emotional states. For reviews of these literatures see Harper, Wiens, and Matarazzo (1978) and Scherer and Ekman (1982). It should be clear at this point that researchers who are interested in studying affect in marital interaction have to become familiar with an important body of literature on emotion. Unfortunately, this familiarity is rarely displayed in the literature on marital interaction.

### THE EVIDENCE ON PATTERNING

What, precisely, has been discovered to date about the interactional differences between happily and unhappily married couples? In this section we summarize some of the principal findings of a program of research reported in detail in Gottman's (1979) book *Marital Interaction*.

Based on a review of the literature, Gottman (1979) proposed a model of marital interaction called the *structural model*. It has three dimensions: a positive-negative affect dimension, a negative affect reciprocity dimension, and an asymmetry in emotional responsiveness dimension. Four hypotheses comprise the structural model.

Hypothesis 1: *Degree of Structure*. There is more patterning and structure in the interaction of dissatisfied couples than in the interaction of satisfied couples.

Hypothesis 2: *Positiveness*. Satisfied couples are more positive and less negative toward one another than dissatisfied couples. The differences should be greater for negative than for

positive interaction, and greater for nonverbal than for verbal behavior.

Hypothesis 3: *Reciprocity*. The reciprocation of negative behavior will discriminate dissatisfied from satisfied couples, with more reciprocity of negative behavior in distressed than in non-distressed couples. Similar discrimination is *not* predicted in the reciprocation of positive behaviors. Such discrimination would be predicted by quid pro quo theory.

Hypothesis 4: *Asymmetry*. The interaction of dissatisfied couples will show more asymmetry in predictability than will the behavior of satisfied couples. This greater asymmetry of predictability, which is in itself a type of patterning in interactions of dissatisfied couples, is also consistent with the hypothesis regarding the differential degree of temporal structure in the two groups.

These hypotheses were confirmed in one study and were replicated in a second. The results generalized across the issues couples discussed in attempting to resolve an area of disagreement in their marriage, and the results generalized across settings (from the laboratory to the home). Also, in a series of training studies it was found that couples who changed along the dimensions specified by the structural model also changed in marital satisfaction. The most central of Gottman's (1979) interactional results have been confirmed by work in other laboratories: in Oregon and California by Margolin and Wampold (1981); in New Jersey by Ting-Toomey (1982); in Germany by Revenstorff, Vogel, Wegener, Hahlweg, and Schindler (1980); and in the Netherlands by Schaap (1982).

Gottman's coding system made it possible to describe differences in the way couples resolve conflict. Basically these differences can be described by using the analogy of a chess game. A chess game has three phases: the beginning game, the middle game, and the end game. Each phase has characteristic good and bad maneuvers and objectives. The objectives can, in fact, be derived inductively from the maneuvers. The goal of the beginning phase is control of the center of the chessboard and development of position. The goal of the middle game is the favorable exchange of pieces. The goal of the end game is checkmate. Similarly there are three phases in the discussion of a marital issue. The first phase is the agenda-building phase. The objective of this phase is to air the issues as they are viewed by each person. The second phase is the arguing phase, whose goal is for partners to argue energetically for their points of view, and for each partner to understand the areas of disagreement between them. The third phase is the negotiation phase, and its goal is compromise.

It is possible to discriminate the interaction of satisfied and dissatisfied couples in each phase. In the agenda-building phase, *cross complaining* sequences characterize dissatisfied couples, while *validation* sequences characterize satisfied couples. A cross complaining sequence is one in which a complaint by one person is followed by a countercomplaint by the other person (e.g., *Wife*: I'm tired of spending all my time on the housework. You're not doing your share. *Husband*: If you used your time efficiently, you wouldn't be tired.). A validation sequence recognizes the potential validity of the other person's viewpoint before complaining (e.g., *W*: I'm tired of spending all my time on the housework. You're not doing your share. *H*: I suppose you're right. If you used your time efficiently you wouldn't be tired.).

In the middle arguing phase, *without the use of the nonverbal codes, the two groups of couples would essentially be indistinguishable*. The nonverbal codes distinguish the two groups throughout the interaction. In the negotiation phase, *counterproposal* sequences characterize the interaction of dissatisfied couples, while *contracting* sequences characterize interactions of satisfied couples. In a counterproposal sequence the proposal is met immediately by another proposal by the partner, whereas in the contracting sequence there is first some acceptance of the partner's proposal.

There were interesting negative results that disconfirmed cherished clinical beliefs about the role of the quid pro quo (or positive reciprocity), the role of metacommunication (i.e., a statement about the processes of communication, such as "You're interrupting me."), and the role of self-disclosure in discriminating the two kinds of marriages. The quid pro quo hypothesis was simply wrong. It is the deescalation of negative affect and not the reciprocation of positive affect that discriminates the two groups. Metacommunication tends to be what is called in Markov model theory an *absorbing state* for unhappily married couples—that is, it becomes nearly impossible to exit once having entered. For satisfied couples metacommunicative chains are brief and contain agreements that lead rapidly to other codes.

Self-disclosure is rare during conflict resolution conversations. Instead, couples *mindread*—that is, they make attributions of emotions, opinions, states of mind, and so on to their spouses. The effect of mindreading depends entirely on the affect with which it is delivered. If it is delivered with neutral affect or with positive affect, it is responded to as if it were a question about feelings; it is agreed with and elaborated on, usually with neutral affect (e.g., *H*: You always get *tense* at my mother's house. *W*: Yes I do. I think she does a lot to make me tense.). If it is delivered with negative affect, it is responded to as if it were a criticism; it is disagreed with and elaborated on, usually with negative affect (e.g., *H*: You *always* get tense at

my mother's house. *W*: I do not. I start off relaxed until she starts criticizing me and *you* take her side.).

A critical role is played by the agreement codes. In effect, satisfied couples continually intersperse various subcodes of agreement into their sequences. In the agenda-building phase this is primarily a simple nonverbal *assent* form of agreement, as in "Oh, yeah," "uh huh," "I see," whereas in the negotiation phase this is primarily direct agreement on actually accepting the other's point of view and modifying one's own point of view. These listener responses have been called *backchanneling* by Duncan and Fiske (1977). They are clear communications to the speaker that the listener is tracking; they can serve to regulate turns; but they are also more than that in the beginning phases of marital conflict resolution. They communicate not agreement with the speaker's point of view or *content*, but that it might make some sense to see things the way the speaker does, (i.e., they communicate agreement with the speaker's *affect*). They thus communicate a great deal. They "grease the wheels" for affective expression.

In the negotiation phase of discussion the agreement codes are very different. They are not assent but agreement with the other's point of view ("yes, you're right," or "I agree with that"), or they involve accepting some modification of one's own point of view for a solution to the problem. The effect of all this is to create a climate of agreement whose presence has profound consequences for the quality of the interaction.

The quality of this interaction is best tapped by the nonverbal codes. Across studies, there was (1) more negative affect in dissatisfied couples; (2) more negative affect reciprocity in dissatisfied couples; and (3) more asymmetry in emotional responsiveness in dissatisfied couples, with the husband less responsive than the wife. These were the three dimensions of the structural model. The overarching construct that emerged is that there was more temporal linkage—that is, interactions among dissatisfied couples were more predictable, or stereotypic than were interaction of satisfied couples. It is worth noting that this was true also for positive affect reciprocity. Each behavior thus provides less information in dissatisfied interaction. Ting-Toomey (1982) replicated this result.

#### THE UNDERSTANDING OF PATTERN

Three models are discussed for explaining the patterns observed that discriminate satisfied from dissatisfied couples. The first is a model of the couple's perception of their interactions. The second is a response deficit model. The third is an emotional responsiveness model.

### Perceptual Models

In a series of studies reported in Gottman (1979) a "talk table" was devised so that as couples interacted each could code the affective impact of messages received from his or her partner, the intended impact of messages received from the partner, and the intended impact of messages sent to the partner. This procedure was used every turn in the conversation. The talk table made it possible to test whether data obtained from the couples' own coding of their interactions on a positive-negative dimension would be veridical with observers' coding of their interactions. Using the intent variable an intent-impact discrepancy model of interaction could also be tested. In addition, the couples' coding of interaction could be tested. Finally, the couples' coding of their interactions could be analyzed sequentially. The results of these studies suggested that negative impact was more likely for dissatisfied than for satisfied couples, as was negative impact reciprocity. Positive impact reciprocity did not discriminate the two groups of couples. Hence the results paralleled the data from other studies in which affect was coded by observers. Subsequent research using a modification of the talk table (Floyd, 1980; Floyd & Markman, 1982) has supported the importance of the impact dimension, particularly for wives' perception of their husbands' messages.

In an important study, Markman (1977) tested the ability of the talk table variable to predict the relationship satisfaction over a 2½-year period among couples planning to marry. Markman found that the impact ratings at Time 1 predicted relationship satisfaction 2½ years later ( $r = .88, p < .01$  for males;  $r = .64, p < .01$  for females). These correlations are the highest ever obtained in this literature. Previously obtained measures correlated the same inventory at two time points, so that the earlier correlations shared common method variance. Markman has subsequently found that the strength of these predictions remains high even after 6½ years. These results suggest that even small initial differences in the perception of behavior may eventually lead to large differences in relationship satisfaction.

Further investigation is necessary. We are currently using oral history interviews from 120 randomly selected couples to discover the relationships between couple's philosophy of their marriage and of relationships in general, their interaction patterns, their relationship satisfaction, and social class.

### Response Deficit Models

Gottman (1979) reported that when individuals in dissatisfied marriages role-play responding to taped situations in which they pretended to be

responding to their spouses, their responses were more negative than were responses by individuals in satisfied marriages. There were no significant interactions on any scale. However, there were main effects for the spouse factor, and these effects had a consistent pattern. Husbands were more positive than wives on the positive scales, whereas wives were more positive than husbands on the negative scales. This crossover effect suggests complementarity of roles: Wives were more likely than their husbands to be agreeable and to express positive affect in response to complaints, even when the complaints were negatively stated. This is consistent with the cognitive editing function of the happily married wife that emerged from sequential analyses of the interaction data—namely, wives were more likely than husbands to deescalate conflict in high-conflict situations.

The results of this study demonstrate that even when individuals *imagine* themselves responding to their spouses, the behavior of low and high marital satisfaction subjects can be discriminated across several content domains of problem situations. This provides support for the individual social competence hypothesis in the marital interaction.

A reanalysis by Gottman of a paper by Birchler *et al.* (1975) showed that people in distressed and nondistressed marriages did not differ in their interactions with strangers; they did, however, differ when interacting with their own spouses. This does not support the notion that response deficits are a cross-relationship trait. Of course, interaction with strangers is not an adequate test of this trait hypothesis; people may replicate interaction patterns only once they develop an intimate relationship.

Gottman (1979), using time-series analysis, reported some evidence to support the notion that in dissatisfied marriages husbands are less emotionally responsive to their wives than wives are to their husbands. This was tested in a recent study (Gottman & Porterfield, 1981) in which spouses sent messages with fixed verbal content to their partners (e.g., "I'm cold, aren't you?"). These messages could have one of three meanings depending on their nonverbal delivery (for example, "Turn up the heat"; "I'm requesting information"; or "I want to snuggle"). By having the messages received by both partners and strangers, it could be determined if there was a deficit in nonverbal communication in dissatisfied couples and, if so, whether it was a listener or a receiver deficit. For example, if a wife could send effectively to a stranger but not to her husband, this was a receiver deficit. The results showed evidence for a deficit as a receiver. Noller (1980) independently conducted a nearly identical study with Australian couples and found exactly the same results. It is possible that the dissatisfied husband's lack of emotional responsiveness to his wife leads to the escalation of negative affect and negative reciprocity in high conflict discussions.

### Emotional Responsiveness Model

Gottman (1980) reported that there is a substantially higher cross-situational consistency (from low- to high-conflict tasks) in negative affect reciprocity than in either negative affect, positive affect, or positive affect reciprocity. He speculated that the theoretical basis of the high consistency of negative affect reciprocity is that it creates a temporal physiological linkage between members of the interacting dyad. Support for this notion comes from a study conducted by Kaplan, Burch, and Bloom (1964), who correlated the electrodermal responses of interacting dyads paired on the basis of either mutual like, mutual dislike, or mutual neutrality. Their results indicated that significant predictability of electrodermal response from one member of the dyad to the other occurred only in the dyads that were paired on the basis of mutual dislike. To the extent that dyads paired on the basis of mutual dislike can be expected to reciprocate negative affect, their finding can be seen as supportive of Gottman's speculation. However, Kaplan *et al.*'s study has several statistical problems that must be considered. Because of serial dependency in these kinds of data across time, the significance test of a simple correlation is invalid. In addition, the authors failed to control for autocorrelation in inferring crosscorrelation. More appropriate analyses that are not subject to these problems (such as bivariate time-series analyses) are available for examining the extent of physiological predictability between members of an interacting dyad.

There are also problems with the physiological measure used by Kaplan *et al.* Skin conductance shares a problem with many other autonomic nervous system (ANS) measures, in that they are inherently nonspecific, responding to a wide range of behavioral states including attention, general arousal, activation, stress, and emotion. Skin conductance has unique problems when used as a single measure of ANS activity, in that it is affected only by the sympathetic branch of the ANS and does not reflect parasympathetic branch activity. Equally important, the use of a skin conductance measure by itself allows no sensitivity to the cardiovascular functions of the ANS. Ideally, a physiological measurement battery would be broad enough to reflect the activity of the ANS in the electrodermal (e.g., skin conductance), cardiovascular, and visceral domains. In addition, it should go beyond the ANS to include measures sensitive to skeletal muscle activity, which is closely linked to parasympathetic ANS cardiovascular functions. The use for breadth of physiological measurement is further strengthened by research indicating that certain individuals tend to respond stereotypically across situations with maximal responses in a single physiological response system. Thus limiting physiological measurement to skin conductance will produce

problems if the sample includes "cardiovascular responders" or "somatic muscle responders."

Despite these reservations, the results of the Kaplan *et al.* study were sufficiently promising to convince us to design a study that utilized improved statistics and broader physiological measurement to test the hypothesis that negative affect reciprocity creates a temporal physiological linkage between members of the interacting dyad.

This section is a brief report of the design and preliminary data analyses of a study by Levenson and Gottman. The subjects were married couples whose marital satisfaction had been assessed using two self-report measures (Locke & Wallace, 1959; Burgess *et al.*, 1971). Couples came to the laboratory at the end of a day after being separated for at least 8 hours. We obtained videotapes and physiological measures from both the husband and wife during two different kinds of interaction. The first of these was a 15-minute discussion of how their day had gone (preceded by 5 minutes of face-to-face silence).<sup>2</sup>

In our study, discussion of the events of the day was followed by an interview to determine the area of major conflict in the marriage. Then videotapes and physiological measures were obtained during a 15-minute period in which the couple discussed that issue and tried to work toward its resolution (as in the earlier interaction, this was preceded by 5 minutes of face-to-face silence).

In a second session, each spouse returned to the laboratory independently to view the videotape of the original session and provide a continuous rating of his or her recall of affect during the interaction on a positive-negative dimension. Videotapes and physiological measures were obtained during these recall sessions as well.

As indicated earlier, we wanted to obtain a broad set of physiological measures. Difficulties in measuring ANS visceral functions (such as stomach and intestinal responses) and practical limitations of obtaining continuous physiological measurement simultaneously from two subjects led us to select four basic measures from the following domains: somatic (general somatic activity), ANS electrodermal (skin conductance), and ANS car-

<sup>2</sup>We chose this topic because it seemed to be typical for American couples. A recent anthropological film by Thomas Gregor of Vanderbilt University provides some indication that this topic might be a cross-culturally universal part of marital interaction in the same way as is gossip, conflict, and decision-making (Strodtbeck, 1951). In this film, the daily life of an Indian tribe, the Mehinaku, in the Amazon region of Brazil (in Xingu Park near Post Leonardo) is explored. The Mehinaku have had very little contact with modern civilization. Theirs is a highly structured society in which men and women have highly specialized traditional roles. Nonetheless, in the evening after supper, husbands and wives are shown lying in their hammocks discussing the events of the day.

diovascular (cardiac interbeat interval and pulse transmission time—PTT—to the finger). Our choice of the two cardiovascular measures was dictated by certain theoretical considerations. Heart rate (measured as heart period or interbeat interval—IBI) is one of the basic ways in which the heart can increase or decrease its output of blood to the body. Unlike skin conductance, which is entirely under sympathetic ANS control, heart rate is usually controlled by the parasympathetic branch of the ANS. Obrist, Webb, Sutterer, and Howard (1970) argued that changes in heart rate under parasympathetic control are closely coupled to the activity of the voluntary (striated) muscles. But heart rate can also be altered by the sympathetic branch of the ANS. This seems to occur under conditions of acute stress when the subject has to do something active to cope with the stress; under these conditions changes in heart rate can become relatively independent of voluntary muscle activity (Obrist, Lawler, Howard, Smithson, Martin, & Manning, 1974). Given that changes in heart rate can be produced by both branches of the ANS, and that sympathetic nervous system activity is an important part of negative emotional states such as anger and fear, as well as playing a crucial role in adaptation to emergency (the so-called fight or flight response), we felt it desirable to have a “purer” sympathetic cardiovascular measure. Pulse transmission time (PTT) to the finger is such a measure; it measures the interval between an electrical event that signals the heart to begin its contraction (we used the R-wave) and the arrival of the pulse pressure wave at the finger (we detected this with a photoplethysmograph). PTT reflects two sympathetically mediated cardiovascular events: (1) changes in the force of the heart’s contraction (the other major method besides changing the rate the heart uses to regulate its output of blood to the body), and (2) changes in the distensibility of the arteries between the heart and the finger. These cardiovascular events are mediated by the beta and alpha subsections of the sympathetic branch of the ANS, with little or no parasympathetic involvement (for a thorough discussion of these cardiovascular measures and their physiological bases, see Newlin & Levenson, 1979). Thus our four measures gave us sensitivity to electrodermal, cardiovascular, and somatic events and within the ANS to the parasympathetic branch and both beta and alpha subsections of the sympathetic branch. In addition to measures of average level, we computed variability measures for (IBI and PTT) to provide additional information.

What were our results? First, we briefly refer to some statistical work by Gottman and Ringland (1981) that solved the statistical problems of inferring a relationship between two time-series controlling for autocorrelation in each series. Basically, if two series are  $X_t$  and  $Y_t$ , we assess the extent to which the past of  $Y_t$  accounts for variance in  $X_t$  over and above that accounted for by the past of  $X_t$  (refer to Figure 4.1). If we find a relationship,

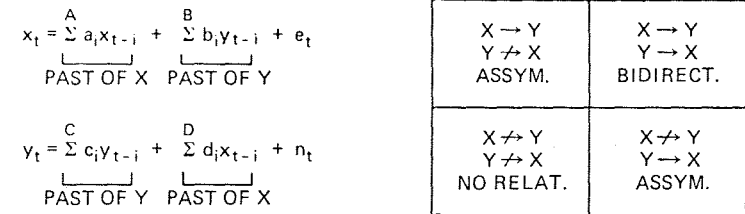


Figure 4.1 Assessing the relationship between two time-series, controlling for autocorrelation in each series.

this implies that  $Y$  influences  $X$  ( $Y \rightarrow X$ ). This is similar to a suggestion made by Pierce (1977) for economic time-series. Four patterns are possible: two asymmetrical patterns ( $Y \rightarrow X$  but  $X \nrightarrow Y$ , and  $X \rightarrow Y$  but  $Y \nrightarrow X$ ), a bidirectional or feedback pattern ( $Y \rightarrow X$  and  $X \rightarrow Y$ ), and no relationship. Also we can assess the strength of these associations statistically.

Our findings supported those of Kaplan *et al.* During the discussion of the events of the day, we found that physiological linkage between the husband and wife across our four measures was related negatively to marital satisfaction using bivariate time-series-analytic techniques. The multiple  $R$  during discussion of the events of the day for all physiological predictability measures and marital satisfaction was .44. During discussion of the conflict issue, the patterns of negative affect and negative affect reciprocity increased and a similar pattern of results held except that the relationship was even stronger; the multiple  $R$  between the predictability measures and marital satisfaction was .77.

To summarize, we found that (a) Kaplan *et al.*'s results held, (b) with time-series analyses across a broad set of physiological measures the results were strengthened, and (c) as the degree of conflict increased, our ability to discriminate between satisfied and dissatisfied marriages also increased. In the same way that earlier studies had identified *behavioral* characteristics of dissatisfied marriages, this new study identified *physiological* characteristics of dissatisfied marriages.

Using multivariate regression techniques, we decided to go a bit further and attempted to determine the amount of variance in marital satisfaction we could account for using only physiological variables. We found that with the physiological linkage variable we discussed earlier and three other categories of physiological measures, we could account for over 84% of the variance in marital satisfaction! These additional three categories were as follows:

1. *Skin conductance before and during conversations.* Skin conductance levels were much higher for satisfied than dissatisfied couples during the 5



minutes of face-to-face silence preceding discussion of the events of the day. Analyzing the content of the discussions, we found the imposed silence to be agony for the satisfied couples and a relief for the dissatisfied couples.

2. *Skin conductance during the video recall session.* Skin conductance responses during the recall session largely paralleled those obtained during the interactions, except that for dissatisfied couples the responses were actually greater in the recall session than in the interaction session. We speculate that for dissatisfied couples, the presence of the partner may inhibit responses and activate avoidance procedures, whereas the partner's absence during the recall session removes these constraints and lowers defenses against experiencing the affect.

3. *Pulse transmission time variability of wife.* In distressed couples the wife showed more variability in this cardiovascular measure of sympathetic ANS response. This single measure was found to be strongly related to how negatively she rated the affect she experienced in the interaction. We speculate that the strong negative emotions experienced by the wife in the dissatisfied couples may be activating the sympathetic ANS response.

As we indicated earlier, these preliminary findings drawn from this study have been largely concerned with the relationship between marital satisfaction and patterns of physiological and affective response that occur between and within members of a couple. We feel that this study will also provide a unique opportunity for exploring basic and long-standing questions pertaining to the nature of emotion per se. The importance of the emotional substrate in close relationships is undeniable, and any progress made in understanding the nature of emotion can only benefit work on relationship processes. With this in mind, we would like to make the case for the desirability of studying emotion in the context of social interaction in an intimate relationship.

Ekman *et al.*'s (1972) extensive review indicates that research on the expression of emotion in the human face has tended to use two methods: (1) using situations and experimental manipulations that are thought to elicit emotions, and (2) using posed expressions by actors. The authors point out that the first method is plagued by the considerable lack of agreement concerning what stimulus elicits a given emotion, by the fact that most stimuli elicit *combinations* of emotions rather than *specific* emotions, and that different individuals respond to a given stimulus with different emotions. They argue that the second method is particularly useful for studying the degree of agreement among judges of the posed expression, and in studying the relationship between observers' judgments of emotions and the subject's phenomenological experience. Of course, legitimate questions can be raised concerning the extent to which emotions associated with posed

expressions differ qualitatively and quantitatively from naturally elicited emotions. Still, despite inherent limitations, both methods have proven quite useful in the study of emotion.

There is, however, a third method that has yet to be explored: studying emotion during social interaction. Studying emotions in a social interactive framework has considerable intuitive appeal. In addition, there is good reason to believe that from an evolutionary viewpoint, an important adaptive function of having a rich repertoire of emotional expressions is their social communicative value for conspecifics (see Chevalier-Skolnikoff, 1973, for a comprehensive discussion of this issue).

It has been noted by many investigators that interaction between married couples produces a high level of spontaneous positive and negative affect. The range and variety of this affect can be further broadened by studying couples who vary in their degree of marital satisfaction. Marital interaction would seem to be an ideal paradigm for the study of emotion. Ekman *et al.* (1972) argued that the interactive context provides a unique opportunity to study the consequences of emotional expression, as well as allowing study of concomitant and antecedent events.

While some investigators of human nonverbal behavior have begun to study interactive sequences, the only studies of the face that utilize this approach have not been concerned with emotion, and have isolated only one aspect of facial behavior for study, looking or not looking at the face of the other person [p. 12].

In part the study of emotion during interactive sequences has awaited the development of appropriate statistical methods for handling the unique kinds of data generated. Now a number of appropriate methods do exist, including Markov models, information theory and lag-sequence analysis, and time-series analysis. Unfortunately, the existence of these analytic techniques does not answer the question, "How should emotion be measured?" Strongman (1978) stated:

Any theory of emotion or any empirical research on emotion deals only with some part of the broad meaning that the term has acquired. Some theorists stress psychological factors, some behavioral, some subjective. . . . There is no consensus of opinion; at present emotion defies description [p. 102].

We argue that a measurement network adequate for the study of emotion must sample from the physiological, phenomenological, nonverbal behavioral (i.e., facial expressions and other kinesic behaviors), paralinguistic, and linguistic domains. There is a problem inherent in studying emotion of choosing a criterion for determining when emotion and which emotion has occurred. The rules for setting criteria using information from the various domains of emotion are not obvious. We do know that criteria based on a single domain are not very reliable. We have already discussed the problems

inherent in the common practice of using the stimulus situation to specify the emotion it produces. Similarly, we would be uncomfortable with criteria based solely on physiological patterns; the evidence for specific physiological patterns for each emotion is inconclusive at best. Linguistic content is so easily manipulated that no researcher would trust it as a single criterion. Similarly, there are problems with using the expressions of the face. For example, most emotional experiences are fleeting and are not accompanied by the classic full-face prototypes of emotion described by Ekman and Friesen (1975) and others. An additional problem pointed to by Ekman *et al.* (1972) is that people sometimes control their faces in ways that mask and distort the signs of emotion. The problem seems at times to be insoluble.

It is our belief that confidence in researchers' ability to identify and classify emotional moments during social interaction requires convergence of information from several domains. For example, if a husband sounds angry (e.g., he is speaking at a high volume with a staccato rhythm) and the linguistic content of his communication fits a template for anger (e.g., "Will you *stop* interrupting me!), and his face looks angry (e.g., brows down and together, eyelids tensed, lips pushed together), and his gestures suggest anger (e.g., fist clenched), and he is physiologically aroused (e.g., heart contracting forcibly), then we would feel quite confident asserting that he was in fact angry. A convergent approach such as this has been used in the Levenson and Gottman study of marital interaction to identify a corpus of "emotional moments"; our confidence in the accuracy of classification will, of course, vary from emotion to emotion and from moment to moment on the basis of the strength of the convergence and the confidence we have in the mapping of that emotion onto the various domains of measurement. For example, we expect increased cardiovascular activity to accompany many moments of anger, but what kind of cardiovascular changes, if any, will accompany moments of happiness?

We should add that the convergent method of identifying emotional moments provides a means for further studying the relation among domains of emotion. Thus, for example, to answer our question as to whether there is a specific cardiovascular pattern associated with happiness, we would first identify all moments of happiness in our data using information gleaned from measurement domains *other than the physiological*, and then look at the cardiovascular patterns. The same approach can be used to study other patterns in other domains. For example, we have noted that it is rare to find full-face prototypes of emotion during social interaction. However, we believe that consistent patterns of facial movements are associated with the different emotions (of course, not all patterns of facial movement signify emotion). The Facial Action Coding System (FACS) provides a method for describing facial movements adequately, but as its authors (Ekman &

Friesen, 1978) indicate, there is a need for an empirically derived basis for translating facial movement codes into emotions. Using sequential clustering methods to go from discrete FACS codes into larger units of facial action and facial action sequences, we will be able to provide this kind of empirically based evidence for assigning emotional labels to certain facial movement sequences, using the emotional moments (defined on bases other than the face) from this study.

## SUMMARY

We wish first to underscore the strength of the relationships found in this research program: These relationships are unparalleled in the study of marital satisfaction and suggest that the study of affect will prove promising. The research program began by describing the kinds of interactive sequences that consistently discriminate satisfied and dissatisfied couples during the resolution of conflict. We have found that these sequences generalize from the laboratory to home settings, across a range of issues, and from conflict decision-making to nonconflict tasks. Using information from these studies and from studies of couples' perceptions of their own interactions, we have been able to predict relationship satisfaction in longitudinal studies and have developed methods for intervening effectively to enhance marital satisfaction.

We propose that the underlying mechanism that maintains closeness in marriages is symmetry in emotional responsiveness, particularly in the kind of low-intensity affective interactions captured by sharing the events of the day. It is precisely the absence of this responsiveness, we hypothesize, that leads to high levels of negative affect, which produces emotional withdrawal and bursts of negative affect reciprocity. Using these constructs and measures drawn from the physiological domain, we have been able to account for a large proportion of the variance in marital satisfaction. We believe that with these measures we are tapping the quality of the friendship in the marriage; it is the quality of this friendship that provides the necessary context for the resolution of conflict.

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## 5

## Social Support Processes\*

SHARON S. BREHM

## EDITORS' INTRODUCTION

*In this chapter, Sharon Brehm presents a theoretical model describing the nature of social support processes in adults. She attempts to provide here a cogent conceptual framework addressing fundamental aspects of social support: its definition, specification of its benefits, and an understanding of the conditions that promote its occurrence. While attribution theory serves as the general theoretical perspective, a number of other social psychological theories are also integrated into the model. Finally, developmental aspects of social support processes are considered in light of the conceptual framework Brehm proposes.*

*This chapter illustrates an area—social support—that has been of concern in both developmental and social psychology, but in very different ways. It is, therefore, a good example of how researchers often find themselves in distinct areas of a discipline that are also boundary areas but not recognizable as such because of the labels that are used to describe the phenomenon under study. Nurturance and social support are two processes that have typically been studied independently by developmental and social psychologists. However, the processes underlying these phenomena may be quite similar, even though nurturance is usually applied to parent-child interactions and social support is reserved to describe adult relationships. In addition, the work on attribution and its relationship to social*

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