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Epilogue

11.1 Kepler and Brahe

When Johannes Kepler went to work for the astronomer Tycho Brahe, he found himself in the midst of a strange set of circumstances. Brahe lived in a castle on an island, and there he conducted his painstakingly careful observations. Brahe had a dwarf who scrambled for food in the dining hall. Brahe also had a silver nose that replaced the natural nose he had lost in a duel. Kepler was given the problem of computing the orbit of Mars, and he wrote in one of his letters that Brahe fed him data in little bits, just as the dwarf received crumbs under the table.

Kepler had come to Brahe because of the observations. He was hungry for the observations. Without them, the principles of planetary motion – the patterns he discovered – would never have been discovered. Without these patterns, Newton's explanation – the universal theory of gravitation – would never have emerged.

We need to observe, and we need to do it very well, with imagination, with boldness, and with dedication. If we do not observe, we shall never see what is there. If we never see what is there, we shall never see the patterns in what is there. Without the patterns, there will never be the kind of theory that we can build with.

Observing and discovering pattern is what this book is about. We do this kind of thing for a living, and we have chosen to do it because it is what we think science is about. Obviously we think it is not really that hard to do. But we are lonely. We want company in this enterprise. Only about 8% of all psychological research is based on any kind of observation. A fraction of that is programmatic research. And, a fraction of that is sequential in its thinking.

This will not do. Those of us who are applying these new methods of observational research are having great success. We are beginning to find consistent results in areas previously recalcitrant to quantitative analysis: how babies learn to interact with their parents and organize their behavior; how young children make friends or are rejected by their peers; how

marriages succeed or fail by how spouses interact; how families weather stress or create pathology.

In many senses, in developmental, social, and clinical psychology we are returning to earlier efforts with a new conceptual technology, and it is paying off. We are able to return to the spirit of observation that characterized developmental psychology in the 1930s and ask questions about social and emotional development more clearly. We are now able to return to initial clinical theorizing about families in the 1950s and bring a great deal of precision to the task.

What is new is not a new statistical technique. It is a whole new way of thinking about interaction in terms of its temporal form, about pattern that occurs and recurs in time. We believe that great conceptual clarity can be obtained by thinking about temporal patterning, and we believe that anyone who has collected observational data over time and ignores time is missing an opportunity.

Kepler needed the observations. The observations needed Kepler.

11.2 Soskin and John on marital interaction

Over 30 years ago, Roger Barker edited a classic book titled *The Stream of Behavior*, which was seminal in the history of naturalistic observational research. The book also focused on social interaction. We believe that it would be useful to review a chapter in that book by Soskin and John that tackled the description of marital interaction. We shall compare their analysis with what we currently know about marital interaction. Our objective is to make the point that we can now confront old problems with new tools.

Soskin and John (1963) spent a year pilot-testing a 3-pound radio transmitter to be worn in a kind of backpack arrangement by two young husband–wife pairs. The subjects received an expense-free vacation in a resort community; they lived in a small cottage at the edge of a large lake, though they mingled freely with other guests. The transmitters could be disconnected by the subjects if they felt the need for privacy, but neither couple did so during the day. Transmitters were turned off after midnight. Soskin and John presented an extensive fragment of one couple's conversation while they were rowing. The episode contains good natural humor:

Jock: Yo-ho, heave ho. You do the rowing.
Roz: Nuts to that idea. You're a big strong man. Mmmm!
Jock: Yeah, but I have a handicap.
Roz: Yeah, you have a handicap in your head.

The episode also contains come conflict:

Roz: You're dipping your oars too deep, dear.
Jock: I can't feather them, either.

Roz: You should be able to . . .
Jock: Change places with me.
Roz: Let me get this off first.
Jock: No, change places first. Hold it up and . . . you can stand up. It's perfectly all right.
Roz: That's the first thing I learned about water safety, love. Don't stand up in a boat . . .
Jock: Well I wanted you to stay into the waves, whatever you did.
Roz: Well, why didn't you tell me so!
Jock: Go up that way.
Roz: (slightly irritated) Which way *do* you want to go?
Jock: This way.

Soskin and John analyzed their corpus of data in three ways: (a) a "structural analysis"; (b) a "functional analysis"; and, (c) a "dynamic analysis." The structural analysis primarily computed talk times. The functional analysis began by distinguishing between "informational" messages ("It's four miles from here") and "relational" messages ("Then get going"). They wrote that relational talk "encompasses the range of verbal acts by which a speaker manages his interpersonal relations" (p. 253).

In their functional analysis they eventually identified six categories of messages: (a) expressive statements ("Ouch!" "Wow!" "Darn!"); (b) "excogitative" statements, which are "most commonly described as 'thinking aloud' "(p. 255) ("Humm . . . what have I done wrong here?" "Oh, I see!"); (c) "signomes," which are "messages that report the speaker's present physical or psychological state" (p. 255) ("I'm cold!" "Oh, Jock, I like that!"); (d) "metrones," which are evaluative statements arising out of the subject's belief system ("What a fool I've been!" "You shouldn't do that!"); (e) "regones," which control or channel the behavior of the listener ("Why don't you do it right now?"); and (f) "structones," which include information statements ("I weigh 181 pounds").

The dynamic analysis distinguished three variables: state, locus-direction, and bond. State involved affective information: (a) joy, glee, high pleasure; (b) satisfaction, contentment, liking; (c) ambivalence; (d) mild apprehension, dislike, frustration, disappointment; (e) pain, anger, fear, grief; and (f) neutrality. The locus-direction variable was indicated with arrows up or down "for the direction and locus of state change it would produce from the point of view of a neutral observer" (p. 258). These categories were (a) wants, wishes, self-praise; (b) mutually complimentary statements; (c) derogation, reproof, rebuffs, which imply the speaker's superiority; (d) self-criticism; (e) apology, praise; (f) compliments, permission; (g) mutually unfavorable statements; (h) accusations, reproof; and (i) no inferable change. "Bonds" referred to "the degree of intimacy the speaker was willing to tolerate in the relationship" (p. 258).

Soskin and John reported several findings based on their analysis of their tapes. The structural analysis showed that, in most situations, Jock talked a lot and could be described as highly gregarious (he talked about 36% of the total talk time in a four-person group). His longer utterances were predominantly structones (factual-information exchanges).

The functional analysis of 1850 messages of Roz and Jock's talk showed that Roz was significantly more expressive (8.6% vs. Jock's 3.8%), less controlling (fewer regones: 11.0% vs. Jock's 13.9%), and less informational (fewer structones: 24.5% vs. Jock's 31.3%). They concluded:

> Roz produced a high percentage of expressive messages whenever the two were out of the public view and became noticeably more controlled in the presence of others. Jock's output, on the other hand, was relatively low throughout. (p. 267)

This is not quite consistent with the earlier analysis of Jock as gregarious and a high-output talker. They then turned to the results of their dynamic analysis, which they began describing as follows:

> The very dimensions by which it was hoped to identify inter- and intrapersonal changes in the sequential development of an episode proved most difficult to isolate. (p 267)

Unfortunately, they could find no consistent patterns in the way Roz and Jock tried to influence and control one another. They wrote:

> The very subtle shifts and variations in the way in which these two people attempted to modify each other's states sequentially throughout this episode obliged us to question whether summaries of very long segments of a record reflect the actual sequential dynamics of the behavior in a given episode. (p. 268)

Equally disappointing was their analysis of affect; they wrote:

> As with locus-direction shift, the assessment of affective state changes met with only marginal success. (p. 270)

However, they did conclude that:

> the coders saw Roz as producing a higher percent of mildly negative statements than her husband in all five of the episodes, in three of which the difference was statistically significant. By contrast, in all five episodes Jock was seen as producing a higher percent of neutral statements, and in four of the five episodes the difference between them was significant. (p. 272)

In these results, we can see a struggle with coding systems that are unwieldy, that are hard to fit together, and that lack a clear purpose or focus. The research questions are missing.

11.3 Marital interaction research since 1963

In the early 1970s, psychologists began systematically applying observational methods to the study of marital interaction. The first important such study was Raush, Barry, Hertel, and Swain's (1974) book *Communication, Conflict, and Marriage.* This was a longitudinal study that followed couples from a newlywed stage through the pregnancy and birth of the couple's first child. There were major research questions: (1) Was there consistency over time in couples' interactional style in resolving conflict? (2) How did the pregnancy period affect the marriage? (3) What sex differences exist? (4) How are happily and unhappily married couples different in the way they resolve conflict? Raush et al. employed one coding system, a series of improvised conflict situations, and they used sequential analysis (employing multivariate information theory).

Raush et al. found that couples had an interactive style that was consistent over time. In a later study, Gottman (1980b) found that there was greater cross-situational consistency within couples (from high- to low-conflict interactions) when sequential z scores rather than unconditional probabilities were used.

Contrary to what Soskin and John reported about Jock and Roz, Raush et al. found no evidence to support the contention that in marriages men were less expressive and more instrumental than women. However, consistent with Sokin and John's affect results, they did report that women were more coercive than men, whereas men were more reconciling. These sex differences were enhanced during the pregnancy phase. However, in general, "discordant" couples were far more coercive than "harmonious" couples.

Subsequent sequential analytic research on the question of differences between satisfied and dissatisfied couples has produced a clear picture in conflict-resolution strategies. There is now a body of literature that can be called upon. We shall not review this literature here because our purposes are methodological. For a recent review, see Noller (1984). One series of studies with one coding system was reported in a research monograph by Gottman (1979a). We shall summarize the consistent results of these studies by giving examples of conversation sequences.

Historically, three methodological innovations were necessary before this work could proceed: appropriate observational methods, sequential analysis, and the systematic study of affect displayed through nonverbal behavior. Consider the following dialogue of a dissatisfied couple discussing how their day went (H = husband, W = wife; extracts are from unpublished transcripts):

H: You'll never guess who I saw today, Frank Dugan.
W: So, big deal, you saw Frank Dugan.

H: Don't you remember I had that argument with him last week?
W: I forgot.
H: Yeah.
W: So I'm sorry I forgot, all right?
H: So it is a big deal to him.
W: So what do you want me to do, jump up and down?
H: Well, how was your day, honey?
W: Oh brother, here we go again.
H: (pause) You don't have to look at me that way.
W: So what d'ya want me to do, put a paper bag over my head?

Using the Couples Interaction Scoring System (CISS), which codes both verbal and nonverbal behaviors of both speaker and listener, Gottman and his associates coded the interaction of couples who were satisfied or dissatisfied with their marriages. Among other tasks, couples were studied attempting to resolve a major area of disagreement in their marriages.

Gottman's results

The major question in this research was "what were the differences between satisfied and dissatisfied couples in the way they 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 "agenda-building," the objective of which is to get the issues out as they are viewed by each partner. The second phase is the "arguing phase," the goal of which 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," the goal of which 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. A cross-complaining sequence is one in which a complaint by one person is followed by a countercomplaint by the other. For example:

W: I'm tired of spending all my time on the housework. You're not doing your share.
H: 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 making a counterstatement. Usually the validation sequence differs from the cross-complaining sequence by the use of "assent codes" such as "Yeah," "Oh," "Mmmhmmm," and so on. For example, below is a cross-complaining sequence followed by the same exchange as a validation sequence.

Cross-complaining:

W: I've been home alone all day, cooped up with the kids.
H: I come home tired and just want to relax.

Validation:

W: I've been home alone all day.
H: Uh-huh.
W: Cooped up with the kids.
H: Yeah, I come home tired.
W: Mmm.
H: And just want to relax.
W: Yeah.

In the negotiation phase, counterproposal sequences characterize the interaction of dissatisfied couples, whereas contracting sequences characterize the interaction of satisfied couples. In a counterproposal sequence, a proposal by one partner is met immediately by a proposal by the other partner, whereas in a contracting sequence there is first some acceptance of the partner's proposal. The agreement codes that discriminate counterproposal and contracting sequences are very different from those that discriminate cross-complaining and validation sequences. Instead of simple agreement or assent, contracting sequences include direct modification of one's own view:

Counterproposal:

W: We spent all of Christmas at your mother's last year. This time let's spend Christmas at my mother's.
H: Let's spend it again at my mother's this year. It's too late to change it. We can discuss our plans for next year now.

Contracting:

W: We spent all of Christmas at your mother's last year. This time let's spend Christmas at my mother's.
H: Yeah you're right, that's not fair. How about 50-50 this year?

At some points the conversation of the two groups of couples would be indistinguishable without the use of nonverbal codes.

The anatomy of negative affect

The deescalation of negative affect, not the reciprocation of positive affect (known in the literature on marital therapy as the quid pro quo hypothesis), discriminated happy from unhappy marriages in these studies. Another finding concerned the role of statements about the process of communication (metacommunication), such as "You're interrupting me." There were no differences in the amount of metacommunication between satisfied and dissatisfied couples, but the sequences in the two groups differed markedly. Metacommunication tends to be what is called, in Markov model theory, an "absorbing state" for unhappily married couples, i.e., it becomes nearly impossible to exit once entered. For satisfied couples, metacommunicative chains are brief and contain agreements that lead rapidly to other codes. For example, a metacommunicative chain in a satisfied marriage might be:

H: You're interrupting me.
W: Sorry, what were you saying?
H: I was saying we should take separate vacations this year.

For a dissatisfied couple the chain might be:

H: You're interrupting me.
W: I wouldn't have to if I could get a word in edgewise.
H: Oh, now I talk too much. Maybe you'd like me never to say anything.
W: Be nice for a change.
H: Then you'd never have to listen to me, which you never do anyway.
W: If you'd say something instead of jabbering all the time maybe I would listen.

It is not the amount of metacommunication, but how it is delivered that determines the sequence that follows and whether its role facilitates communication. This fact could not have been discovered without a sequential analysis of the data. Note that what makes the metacommunication effective is that it changes the affective nature of the interaction. If the affect simply transfers to the metacommunication, it cannot function as a repair mechanism.

Another pattern common to both satisfied and dissatisfied couples is called "mind reading" – making attributions of emotions, opinions, states of mind, etc., to a spouse. The effect of mind reading depends entirely on the affect with which it is delivered. If mind reading is delivered with neutral or positive affect, it is responded to as if it were a question about feelings; it is agreed with and elaborated upon, usually with neutral affect:

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 mind reading is delivered with negative affect, it is responded to as if it were a criticism; it is disagreed with and elaborated upon, usually with negative affect:

> 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.

Satisfied couples continually intersperse various subcodes of agreement into their sequences. In the agenda-building phase, this is primarily a simple "assent" form of agreement, as in "oh yeah," "uh huh," "I see," and so on, whereas in the negotiation phase, this is primarily actual acceptance of the other's point of view and modification of one's own point of view. These listener responses or "backchanneling" (Duncan & Fiske, 1977) are clear communications to the speaker that the listener is "tracking" the speaker. But they do more than regulate turns, especially in the beginning phases of marital conflict resolution. They communicate agreement not with the speaker's point of view or content, but with the speaker's affect. By indicating that it might make sense to see things as the other does, these responses grease the wheels for affective expression.

In the negotiation phase of the discussion, the agreement codes are very different. They are not "assent," but direct agreement with the other's point of view ("Yes, you're right," or "I agree with that"). They may even involve accepting some modification of one's own point of view in order to reach a solution to the problem. This creates a climate of agreement that has profound consequences for the quality of the interaction.

We see in all these results that in dissatisfied marriages couples are far more defensive and less receptive to their partners. To investigate the nature of this defensiveness, Robert Levenson and John Gottman began collecting autonomic nervous system (ANS) data during marital interaction. They discovered that ANS arousal during conflict resolution is *highly* predictive (simple correlations in the 90s) of changes in marital satisfaction over a 3-year longitudinal period, controlling initial levels of marital satisfaction. Here we have the possibility of a theoretical basis for the observational results. What are the setting conditions of ANS arousal? Will all discussions of disagreements produce arousal? What are the consequences of ANS arousal? Are there sex differences in ANS arousal in response to intense negative affect? These questions are currently being pursued in Gottman's and Levenson's laboratories.

To summarize, in this section we have suggested that we are now in a position to tackle old and venerable questions with new tools. Observational techniques have been successful in the study of marital interaction (and in other areas) in *identifying stable phenomena*. This is the first step

toward the construction of theory, which seeks elegant, far-reaching, and parsimonious *explanations* for the observed phenomena.

Just as Kepler needed Brahe's observations, the observations needed Kepler. Kepler found the patterns. Newton explained them with the theory of gravitation. We need our Brahes, our Keplers, and our Newtons. This book is an advertisement for all of the "instrument makers" who have developed observational methodology to its current handy state.