Sequential Nonverbal Behavior in the Patient-Physician Interview

C. Kent Smith, MD, and Kathryn M. Larsen, MD
Seattle, Washington, and Irvine, California

This study demonstrates that there is a definite constancy to nonverbal behavioral interaction between patient and physician in a defined office interview setting. This work also introduces the technique of lag sequential analysis into family medicine research. Further refinements of study design and technique are needed in future studies to elucidate information that would be helpful to physicians in the management and care of patients and in patient education.

Nonverbal communication figures importantly in the outcome of any patient-physician interaction. In a previous study,[1] it was demonstrated that certain nonverbal behaviors of the physician correlated significantly with two outcome parameters, patient satisfaction and patient understanding. In that study data were analyzed using participant scores in several nonverbal communication categories that had been summed for the entire interview. As such, those scores represented static composites, which neglected sequential nonverbal interactions involving patient and physician. The current study is a re-examination of the interview data from the earlier study using the method of lag sequential analysis.

Lag sequential analysis was developed by Sackett[2] to identify dependency, or contingency, relationships among interacting animals or individuals. It has been used widely since then as a research tool in the social sciences.[3,4] Basically, lag sequential analysis divides a certain "stream" of behavior into units either by "event" or by "time." For event analysis a behavior is selected as the criterion conditional behavior. If a behavior occurs at the same time as the criterion, it represents lag 0; if a behavior follows the criterion as the very next behavior, it represents lag 1; and so on, depending on the maximum lag to be examined. The behaviors examined in relationship to the criterion behavior are usually those of the other participant in a specified interaction. Time-lag sequential analysis is similar except that the data are "lagged" in equal time intervals instead of sequences of events.

The following example may help to illustrate time-lag sequential analysis, which is used in this study. Suppose that for two participants in an interview, participants 1 and 2, three types of identifiable behaviors are focused on for each specified time period of the interaction (Table 1). Examples of nonverbal behaviors might be forward lean (behavior A), crossed legs (behavior B), and hands supporting the chin (behavior C). If behavior A of participant 1 is the behavior of interest, it is called the criterion behavior. Any sequential pattern of behavior in participant 2 in relationship to the criterion behavior is revealed by totaling the frequency of possible behaviors of participant 2 over successive equal time intervals, for this example lag 1 through lag 3 (Table 2). In this hypothetical example the criterion behavior is behavior A (forward lean) of participant 1. This

From the Department of Family Medicine, School of Medicine, University of Washington, Seattle, Washington. Requests for reprints should be addressed to Dr. C. Kent Smith, Department of Family Medicine, RF-30, School of Medicine, University of Washington, Seattle, WA 98195.

Table 1. Behavior in Interaction Between Participants 1 and 2

Participant 1	B A B C A B B C A C B C
Participant 2	A B A B C A B C C A B C

Table 2. Frequency of Behavior Type Exhibited by Participant 2 (criterion behavior = A of participant 1)

	Behavior		
	A	B	C
Lag 1	3	0	0
Lag 2	0	3	0
Lag 3	0	0	3

criterion behavior then is followed in the first lag period by behavior A (forward lean) of participant 2 three times. It is followed in the second lag period by behavior B (crossed legs) of participant 2 three times and so on. Examination of the data identifies a common sequence of behaviors, A-B-C, demonstrated by participant 2 following behavior A in participant 1. This does not imply cause and effect, ie, that behavior A in participant 1 caused participant 2 to react with sequence of behavior A-B-C. It does, however, identify contingency patterns of behavior in the interaction.

Currently there is no satisfactory significance test for lagged output data. Some have suggested use of the binomial test to evaluate the importance of any difference between lagged conditional probabilities and those expected under the null hypothesis.[5] The null hypothesis, however, assumes no sequential dependencies, which does not apply for most coding schemes.[2]

Table 3. List of Criterion and Corresponding Lagged Behavior

Criterion Conditional Behaviors	Lagged Behaviors
Patient immediacy	Physician immediacy
Patient immediacy	Physician relaxation
Patient relaxation	Physician immediacy
Patient relaxation	Physician relaxation
Physician immediacy	Patient immediacy
Physician immediacy	Patient relaxation
Physician relaxation	Patient immediacy
Physician relaxation	Patient relaxation

Methods

Previously described videotapes were made of 34 patient-physician interviews conducted at the University of Washington Family Medical Center.[1,6] Each videotape was screened by two judges using a reference coding scheme for nonverbal behavior developed by Mehrabian[7,8] and modified for simplicity of scoring. For each participant in every interview, a nonverbal score was assigned in 11 different categories for each successive 40-second time unit. Analysis was done by correlating summation scores for two major nonverbal categories: (1) immediacy (touching + forward lean + body orientation), and (2) relaxation (arm asymmetry + sideways lean + leg relaxation + hand relaxation + neck relaxation + reclining angle). Also analyzed were the component subcategories with selected patient outcome parameters.

In this study, the emphasis was on sequential nonverbal behavior in both patient and physician. For each of the 34 interviews, individual scores representing participant immediacy or relaxation for each 40-second interview were classified as low, average, or high (based on simple score distribution) and assessed a ranking (score) of 1, 2, or 3, respectively. The subcategories of distance and touching were eliminated in the study calculations because the distance scores for participants canceled each other and touching was infrequent. Then, for each separate interview, lag sequential analysis was performed using each ranking in the categories of patient immediacy, patient relaxation, physician immediacy, and physician relaxation as criterion behaviors successively. Table 3

Table 4. Distribution of Two Unit Scores Based on Minor Modifications of Mehrabian Classifications[1]

Category	Ranking	Score Distribution	Frequency
Patient immediacy	1 (low)	1—3	168
	2 (average)	4—6	437
	3 (high)	7—8	151
Patient relaxation	1 (low)	0—3	74
	2 (average)	4—7	384
	3 (high)	8—11	298
Physician immediacy	1 (low)	2—2	23
	2 (average)	3—5	336
	3 (high)	6—8	337
Physician relaxation	1 (low)	0—3	73
	2 (average)	4—7	266
	3 (high)	8—11	417

lists criterion behaviors and corresponding lagged behaviors examined in this study.

Results

Table 4 shows the distribution of time unit scores using the scheme in Table 2 of the previous paper[1] for patient immediacy, patient relaxation, physician immediacy, and physician relaxation in low, average, and high groups. This is illustrated graphically for patient immediacy in Figure 1. The 34 interviews comprise 756 time units.

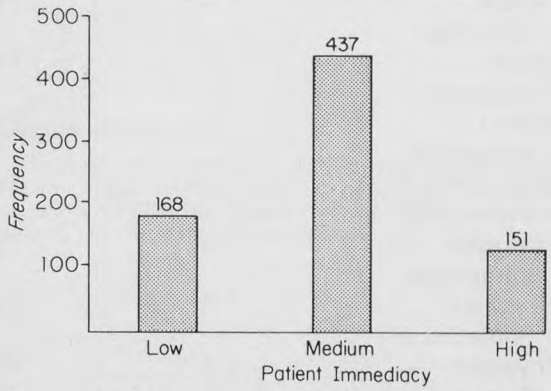

Figure 1. Distribution of time unit scores for patient immediacy based on minor modifications of Mehrabian classifications

Lag Sequential Analysis

A representative sample of lag sequential analysis is shown in Table 5. Alongside all criterion behaviors listed are the predominant ranking(s) in lag 0 through lag 5 for the respective category examined. Only those numerical rankings that occurred with a frequency of greater than 33 percent are listed (numerical odds dictate that the probability of one of three scores occurring is 33 percent). A ranking is underlined if it occurred with a frequency of greater than 50 percent. This table is an attempt to provide a general notion of significance of the pattern of the behavior, as the statistical treatment of lag sequential analysis remains inadequate.

Comment

Scores in each major category were uniquely distributed (Table 4). In the patient immediacy category, 58 percent of the scores were 2, with the

Table 5. Lag Sequential Analysis Data

Criterion Behavior	Ranking for Criterion Behavior* 1, 2, 3,	Lagged Behavior	Lag**(successive 40-second units) 0	1	2	3	4	5
Patient immediacy	1	Physician immediacy	2,3	2,3	2,3	2,3	2,3	2,3
Patient immediacy	1	Physician relaxation	2,3	2,3	2,3	2,3	2,3	2,3
Patient immediacy	2	Physician immediacy	2,3	2,3	2,3	2,3	2,3	2,3
Patient immediacy	2	Physician relaxation	2,3	2,3	2,3	2,3	2,3	2,3
Patient immediacy	3	Physician immediacy	2,3	2,3	2,3	2,3	2,3	2,3
Patient immediacy	3	Physician relaxation	2,3	2,3	2,3	3	2,3	3
Patient relaxation	1	Physician immediacy	2,3	2,3	2,3	2,3	2,3	2,3
Patient relaxation	1	Physician relaxation	2,3	2,3	2,3	2,3	2,3	2,3
Patient relaxation	2	Physician immediacy	2,3	2,3	2,3	2,3	2,3	2,3
Patient relaxation	2	Physician relaxation	2,3	2,3	2,3	2,3	2,3	2,3
Patient relaxation	3	Physician immediacy	2,3	2,3	2,3	2,3	2,3	2,3
Patient relaxation	3	Physician relaxation	3	3	3	3	3	3
Physician immediacy	1	Patient immediacy	1,2	1,2	1,2	2	2	2
Physician immediacy	1	Patient relaxation	2,3	2,3	2,3	2,3	1,2	2,3
Physician immediacy	2	Patient immediacy	2	2	2	2	2	2
Physician immediacy	2	Patient relaxation	2,3	2,3	2,3	2,3	2,3	2,3
Physician immediacy	3	Patient immediacy	2	2	2	2	2	2
Physician immediacy	3	Patient relaxation	2,3	2,3	2,3	2,3	2,3	2,3
Physician relaxation	1	Patient immediacy	2	2	2	2	2	2
Physician relaxation	1	Patient relaxation	2,3	2,3	2,3	2,3	2,3	2,3
Physician relaxation	2	Patient immediacy	2	2	2	2	2	2
Physician relaxation	2	Patient relaxation	2	2,3	2	2	2	2
Physician relaxation	3	Patient immediacy	2	2	2	2	2	2
Physician relaxation	3	Patient relaxation	2,3	2,3	2,3	2,3	2,3	2,3

*1=low, 2=medium, 3=high
**Numerical ranking listed only if they occurred with a frequency of over 33 percent. Underlined numbers occurred with a frequency of over 50 percent.

remainder about equally divided between scores 1 and 3 (21 percent each). In the physician immediacy category, the scores were skewed more toward average and high immediacy: more than 90 percent of the scores were either 2 or 3. For the patient there is a certain degree of self-consciousness with that infrequent role and the need for a distancing (lower immediacy) in a new patient-physician encounter. On the other hand, the physician, although new to a particular patient, has had the experiences of many similar first-time encounters, which have probably fostered a security with a higher degree of immediacy. In addition, the physician has been trained to elicit various diagnostic clues by observation alone. To gain that visual information, he or she may sit close to the patient, look at the patient frequently, lean toward the patient and directly face the patient, or even touch the patient (all components of the immediacy category). In both categories of patient relaxation and physician relaxation, approximately 90 percent of the scores were either 2 or 3. There are more scores of 3 in the physician category than in the patient category (55 percent vs 39 percent), however. Again the physician is probably more relaxed because of the benefits of past similar interactions with patients and also because of well-known comfortable surroundings. The patient does not have the same past experiences and must deal with new surroundings, perhaps with apprehension or fear of an impending physical examination, and with the unpredictability of the diagnostic outcome.

In examining the lag sequential analysis data, regardless of the criterion or observed (lagged) behavior, there is a remarkable constancy to the lagged behavior scores. The predominant score in the lagged physician behavior is 3 and the predominant score in the lagged patient behavior is 2. Although problems inherent in the coding scheme hide the subtleties of nonverbal communication, immediacy and relaxation behavior in the interview setting are fairly persistent regardless of the behavior of the other participant. Both patient and physician appear to assume a certain immediacy and relaxation in an interview and show little deviation.

The chief weaknesses of this study lie in two areas. First, verbal communication is a critical aspect of any behavioral interaction. Certainly in future studies it would be important to attempt to examine the effects of verbal communication on nonverbal behavior and vice versa. Second, the 40-second time intervals may be too long to describe the subtleties and finer points of nonverbal communication. An experiment designed with shorter time intervals might give greater credence to lagged behavior further removed from a given behavior under analysis. In some of the lag sequential analysis studies done earlier in the primate population,[2] the analysis was done using specific behaviors rather than summations of behaviors. Perhaps this technique could be used to define more clearly patient-physician nonverbal communication.

This study demonstrates that there is a definite constancy to the nonverbal interaction between patients and physicians in this defined office interview setting. This detailed level of analysis is necessary to understand more fully the medical interview so critical to patient care.

Acknowledgment

This work was carried out with the support of a student research program, Predoctoral Training Grant, Family Medicine 5D15 PB8000-05, Department of Health and Human Services, University of Washington.

References

1. Larsen KM, Smith CK: Assessment of nonverbal communication in the patient-physician interview. J Fam Pract 12:481, 1981

2. Sackett GP: The lag sequential analysis of contingency and cyclicity in behavioral interaction research. In Osotsky JD (ed): Handbook of Infant Development. New York, John Wiley & Sons, 1979, chap 17, pp 623-649

3. Gottman JM, Notarius C: Sequential analysis of observational data using Markov chains. In Kratochwill T: Strategies to Evaluate Change in Single Subject Research. New York, Academic Press, 1976, pp 237-283

4. Bakeman R: Untangling streams of behavior. In Sackett GP (ed): Observing Behavior. Baltimore, University Park Press, 1978, vol 2, chap 4

5. Bakeman R, Dobbs JM: Social interaction observed: Some approaches to the analysis of behavior streams. Personal Soc Psychol Bull 2:335, 1976

6. Smith CK, Polis E, Hadac RR: Characteristics of the initial medical interview associated with patient satisfaction and understanding. J Fam Pract 12:283, 1981

7. Mehrabian A: Significance of posture and position in the communication of attitude and status relationships. Psychol Bull 71:359, 1969

8. Mehrabian A: Nonverbal Communication. New York, Aldine-Atherton, 1972