This research attempted to quantify specific behaviors in the physician's initial interviewing style and relate them to patients' perception of satisfaction. Five physicians were tape recorded during their initial interviews with 52 adult patients. The patients were asked to complete the Medical Interview Satisfaction Scale, a 29-item instrument with a 7-point response scale. These interviews were transcribed, timed, coded, and analyzed with the use of the Computerized Language Analysis System. Selected variables of the language dimensions were entered as the predictor variables in a multiple regression, along with satisfaction scores as the dependent variables. Twenty-seven percent of the variance ($p < .01$) in the satisfaction scores of initial interviews were explained by three aspects of a physician's language style: (a) use of silence or reaction time latency between speakers in an interview, (b) whether there was language reciprocity as determined through the reciprocal use of word-lists, and (c) the reflective use of interruptions within an interview. Considering the complexity of human communication, the fact that three variables were identified, which accounted for 27% of the variance in patients' satisfaction, is considered a substantial finding.

VERBAL COMMUNICATION SKILLS AND PATIENT SATISFACTION

A Study of Doctor-Patient Interviews

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The processes and outcomes of doctor-patient communication have been of significant interest both to communication scholars and to investigators in health care, health promotion, and health education. An extensive research literature has developed along with a variety of disciplinary and interdisciplinary approaches to studying this form of communication. Thus, the "medical consultation," as it is alternatively referred to, has become a common object of study for researchers in the domain of health communication (e.g., Kreps & Thornton, 1984), medical education (e.g., Rezler & Flaherty, 1985), and clinical medicine (e.g., Enelow & Swisher, 1986).

Since the 1960's there has been a dramatic increase in the teaching of patient communication skills as a formal component of the medical curriculum. Until then, communication skills were generally subsumed under the heading of "bedside manner," which was to be observed and imitated as the clinical clerk and medical resident participated in teaching rounds with the senior clinicians who served as their mentors. This apprenticeship approach has been replaced more and more by formal didactic courses, patient simulation techniques, and various forms of programmed instruction, supervised practice, and specific feedback from instructors and observers trained in patient communication skills. A survey of 111 medical schools in 1979 revealed that 96% of the institutions responding reported formal courses in communication skills in their curricula. Of the courses reported, less than 20% were more than five years old (Kahn, Cohen, & Jason, 1979).

A review of 36 empirical studies on the effects of such instructional programs was reported by Carroll and Monroe (1980). The authors of this review found strong evidence for student gains from such programs in terms of cognitive knowledge about and attitudes toward patient communication skills. There was also strong evidence for significant training effects in terms of the students' observed interviewing behavior. However, the authors noted a lack of research on the effects of such training programs on patient variables such as satisfaction with the quality of care, of patient compliance with medical advice and directions. This review and an unpublished 1979 review by Stone, Rowe, and Obedzinski (1979) have seriously ques-

tioned the theoretical and empirical bases on which doctor-patient communication courses have generally been grounded.

Stone et al. (1979) reviewed 72 papers on medical communication skills programs, including both descriptive and empirical reports. "While there appeared to be a high degree of agreement among these reports on the broad goals of the IPS (Interpersonal Skills) programs, there was disagreement as to the specific behaviors to be taught, e.g., the use of silence and the optimal degree of interviewer control, focus, or guidance.... The majority of reports made no reference to research that would validate the interpersonal skills or behaviors being taught" (Carroll, 1982, p. 5). Although there appears to be a high level of effort devoted to training and testing programs in doctor-patient communication, there has been relatively little research on the basis for such programs in terms of patient outcome such as satisfaction and compliance.

Pendleton's (1983) theoretical model of model of the medical consultation has helped to clarify relationships among three types of variables: input, process, and outcome measures. Input variables include contextual factors as well as attributes of the physician and patient, such as the patient's level of understanding about an illness or the patient's beliefs about health, treatment, or the causes of illness.

Process variables include measures of the verbal and non-verbal interactions between doctor and patient, such as various forms of content analysis, interaction analysis, linguistic and paralinguistic variables, and non-verbal and various forms of content analysis, interaction analysis, factors such as proxemics and kinesics. Pendleton's model is explicit, however, in directing research attention toward the relationships among input, process, and outcome variables.

Immediate outcomes include the patient's satisfaction with medical care and the patient's memory of the doctor's advice or instructions. Intermediate outcome variables include the level of patient compliance or adherence to a medical regimen, and long-term outcomes include changes in one's overall health status or life style. Pendleton's work has been valuable to the present research project in providing a framework within which to study the relationship between certain verbal behaviors of the physician and the level of patient satisfaction with the physician's care.

LITERATURE REVIEW

There is considerable evidence to indicate that patient dissatisfaction is widespread with respect to the quality of communication with physicians (Hulka, 1979; Korsch, Gozzi, & Francis, 1968; Ley, 1982; Pendleton, 1983). There is also extensive research to document that patient non-compliance with medication instructions is also widespread (as reviewed by Barofsky, 1980; Food and Drug Administration, 1979; and Ley, 1976) and that patient dissatisfaction and non-compliance are clearly related (Ley, 1979). In reviewing the correlates of patient dissatisfaction and non-compliance, Ley(1983) indicates that "Related factors include poor transmission of information from patient to doctor, low understandability of communications addressed to the patient, and low levels of recall of information by patients" (p. 241). Conversely, high levels of patient satisfaction have been correlated with patient reports that they felt their statements and concerns were well understood and that they had the opportunity to tell their physician what they wanted (Treadway, 1983). Furthermore, there is considerable evidence that patient satisfaction with a clinical encounter depends largely on the effective flow of information from the patient to the doctor early in the interview and from the doctor to the patient late in the interview (Stiles, Putnam, Wolf, & James, 1979a,b; Wolf, Putnam, James, & Stiles, 1978).

A number of investigators have attempted to identify more specific process measures of doctor-patient verbal communication which may be contributing to this level of patient dissatisfaction and non-compliance and which may be amenable through training in specific communication skills. In these studies, investigators have correlated patient satisfaction measures with communication process data obtained from trained observers through interaction analysis, rating forms, or behavioral checklists. High levels of patient satisfaction have been correlated with each of the following: (a) physician's expressions of personal warmth and courtesy toward the patient – formally greets the patient, shows personal interest, is warm and friendly and provides closure (Comstock, Hooper, Goodwin, & Goodwin, 1982; Freemon, Negrete, Davis, & Korsch, 1971; Korsch, Freemon, & Negrete, 1971);

(b) physician's active listening—open-ended questions, clarifying questions, empathetic questions, encouraging questions, and eliciting the patient's concerns and expectations (Comstock et al., 1982; Korsch & Negrete, 1972; Wooley, Kane, Hughes & Wright, 1978); (c) freely volunteering information to the patient—clarifying and summarizing information received, conveying information at a level of discourse appropriate to the patient's background and knowledge (Comstock et al., 1982; Freemon et al., 1971; Korsch & Negrete, 1972); (d) providing explanations of the patient's conditions, its causes, and treatment and eliciting patient statements of understanding and agreement (Freemon et al., 1971; Stiles et al., 1979a,b); and (e) expressing emotional support and trust in the patient (Korsch & Negrete, 1972). Patient satisfaction has been negatively correlated with highly directive interview techniques, such as frequently interrupting the patient (Lane, 1983).

Street and Wiemann (1987) have applied the constructs of interpersonal involvement, expressiveness, and dominance as explanatory variables in doctor-patient communication. Defining interpersonal involvement as "the extent to which interactants are cognitively, emotionally, and behaviorally enmeshed with a topic or partner during social interaction" (Cappella, 1983; Cegala, Savage, Brunner, & Conrad, 1982), the authors hypothesized that the physician's level of interpersonal involvement in a patient interview will correlate positively with patient satisfaction. Interpersonal involvement is further defined as affectively neutral in that the involvement could reflect positive, neutral, or negative emotions on the part of the physician in different situations. The authors interpret the previously reported correlations between physician warmth and patient satisfaction as one indication of the predicted relationship for interpersonal involvement, but they argue that similar positive relationships between patient satisfaction and physician communications of tension, anxiety, or even anger (Waltzkin, 1984) are also consistent with the predicted relationship for interpersonal involvement.

Physician expressivity or activity is described by the authors as a second construct (Cappella, 1983) that is predicted to correlate positively with patient satisfaction. Physician dominance of the patient

interview, as indicated by interruptions and the level of control exerted by the physician, was hypothesized to correlate negatively with patient satisfaction. The results of the study confirmed the predicted relationships between patient satisfaction and each of the three physician variables. The measures employed in this study were patient questionnaires regarding the physicians' communication style and patient satisfaction. No direct observations or interaction analyses of the clinical interviews were reported, and the use of more specific communication behaviors by the more highly rated physicians is, therefore, unknown.

A construct from communication theory which has not been studied in the patient satisfaction literature is that of speech convergence. According to speech accommodation theory (Cappella, 1983; Street & Giles, 1982), when one member of a dyad adapts his or her speech patterns to that of the other member, favorable impressions are likely to result, even though the participants may not be overtly aware of the speech similarities (see Giles, 1977; Natale, 1975; Street, Brady, & Putnam, 1983). This theory appears to be a promising direction for research on doctor-patient dyads and is examined in the present study through a language analysis of similar word lists used by both the physician and patient during an interview. According to speech accommodation theory, one would expect greater use of similar word lists to be associated with greater patient satisfaction.

If it is true that patient satisfaction is significantly affected by the interviewing style of doctors, then it is important to identify specific variables in the interviewer's style that produce such an effect. Thus, the purposes of the present study are: (a) to define a physician's global style of interviewing in terms of specific language variables; and (b) to discover which of these variables, if any, are significantly related to patient satisfaction.

It was generally hypothesized that patient satisfaction would be positively associated with physicians' verbal behaviors that convey high levels of involvement and expressiveness and low levels of communication dominance. It was also predicted that there would be a positive relationship between patient satisfaction and the degree of speech convergence indicated between the physician and patient.

METHODS

A convenience sample of five male academic primary-care physicians, located in university-based teaching hospitals, agreed to participate in the research project. All were preceptors for medical students and residents and, in effect, acted as role models for future physicians. The 52 patients that participated were all new adult patients (22-82 years of age) who had never met the participating physicians. As in most teaching hospital clinics, they had been randomly assigned to a physician (faculty or resident) by a receptionist. Since these were initial appointments in an ambulatory setting, another visit would be required to confirm any poor outcomes or diagnosis (e.g., hypertension requires 3 readings for confirmation). All participants signed a hospital-approved patient consent form. Patients were told that they could cancel their participation at any time. Only one patient declined participation because he was involved in litigation as a result of an on-the-job injury.

INITIAL INTERVIEW DATA

Audio tape recorders were placed in the physicians' examination rooms and were activated only after a patient had agreed to participate and had signed a hospital-approved patient consent form. The patient was given the questionnaire with the following instructions:

> We want to know how you feel about today's visit with your doctor. Please answer carefully and honestly. There are no "right" or "wrong" answers to these items. Your personal answers will not be shown to your doctor. Each of the items contains a statement describing your visit with the doctor.

The tapes recorded the entire interview, including the physical examination. Each tape recording was transcribed and checked for reliability by two researchers. Areas of disagreement were reviewed in small group meetings until consensus was reached. The same method was used to account for coding reliability. The codes at the beginning of each line of the transcript were straightforward. The 10 spaces were

used for coding the age of the patient, sex of the speaker, physician, and problem.

LANGUAGE ANALYSIS

The language analysis consisted of categorizing the data in terms of the following variables: (a) interruptive behaviors; (b) verbal times; (c) silence times; (d) number of questions; (e) number of statements; (f) number of sentences; and (g) types of concept words. The variables were defined and measured as follows:

Interruptive behaviors were those verbal behaviors that resulted in the speaker discontinuing his or her turn. Verbal reinforcers by the listener (e.g., uh, hmm) that did not cause the speaker to stop speaking were not counted as interruptions. Places of interruption were marked on each transcript and totaled separately for each physician and patient. The numbers of physician/patient interruptions for each interview were categorized into one of three levels (I-high reciprocity, II-medium, III-low). Category I was an interview with an equal number or a difference of 1 interruption between the physician and patient. Category II included a difference of 2 or 3 between the number of interruptions a physician and patient had within an interview. Category III included those interviews with a difference of 4 or more between the physician's and patient's use of interruptions.

Verbal length was measured by starting the stopwatch at the start of an utterance and stopping the watch when that person stopped speaking. Each interview was also timed for total length. This was measured from the beginning of the first utterance to the end of the last.

Silence time or *reaction time latency* was computed by subtracting the length of the turn totals for the physician and patient from the total length of the interview time. This does not account for silence within turns, only between speakers.

The numbers of *questions*, *statements*, and *sentences* were counted. When these conversations were transcribed for analysis, a period indicated the end of a statement. Unlike written style, oral style is repetitive and speckled with sentence fragments and grammatical

errors, making it difficult to determine period placement. For the purpose of content analysis, the researcher scanned for periods to indicate statements. Some form of punctuation followed the end of each individual turn during turn-taking sequences; therefore, the count of sentences may be considered approximate. The question count was obviously more accurate. A total count of the number of statements and questions was compiled for each interview and participant.

To measure *language reciprocity*, the words in the text of each dialogue for each doctor and patient were compared to the selected concept-word lists from the *Harvard Inquirer II Dictionary*. The concept-word lists in this study were words that were grouped under specific concepts or themes. These lists were a means of measuring the degree of reflectivity in the interview by either the patient or the doctor. This was accomplished by compiling lists from the transcript of all the words used by the physician and the patient. All transcripts were scanned for words that matched those in the lists. For example, if Doctor One used many concept-words of *distress*, the researcher would check for occurrences of concept-words of *distress* by the patient in that interview. Then, if Doctor One used concept-word lists of *technical, distress*, *male,* and *selves*, and patient 47 used concept-word lists *female, distress,* and *family*, the researcher would indicate that, for interview 47, there was a reciprocal use of only the concept-word list *distress*. The researcher would then assign a value of 1 under word-lists for interview 47. The Computerized Language Analysis System (CLAS) computer program was used to sort the data and match transcripts with concept words.

PATIENT SATISFACTION

To determine patient perception of satisfaction in the initial interview, patients were asked to complete the Medical Interview Satisfaction Scale (1 = high, 7 = low). The research reflected or reversed the scores on 11 items because they were negatively worded. A global indication of patient satisfaction was then obtained by adding the score on each of the items and dividing the score by the number of scored items. Wolf et al. (1978) developed the scale and reported a Cronbach alpha coefficient of 0.93 for the total instrument, thus indicating

TABLE 1
Correlation Matrix for 3 Independent Variables and Patient Satisfaction

	Independent Variables		
Correlated Variables	*Silence Time*	*Differences in Interruptions*	*Concept-Word Lists*
Differences in interruptions	-0.109		
Concept-word lists	.347**	-0.275**	
Patient satisfaction***	0.254	0.255	0.479*

*$p \leq .01$; **$p \leq .05$; ***for clarity, the algebraic signs have been reversed.

acceptable reliability (internal consistency) for the instrument. Stiles (1978) reported item-remainder correlation coefficients which also demonstrated that the MISS is internally consistent.

Therefore, the global score on the MISS scale was used in the present research to determine patient perception of satisfaction for each physician by dividing the total MISS score by the number of items responded to. This yielded a mean item score for each interview.

RESULTS

Silence Time

Silence time or reaction time latency was first determined for each of the 52 initial interviews. The percentage of silence time in an individual interview averaged 21.68% (median = 18.97%). Silence ranged from 3.67%-71.05% of the total interview time. These silence times do not include silent pauses within a turn. For example, at least 3 interviews had instances of long pauses (greater than 10 seconds) within a speaker's turn.

As shown in Table 1, silence time and the use of similar concept-word lists showed a significant positive correlation ($r = 0.347$, $p \leq .05$). When the percentage of silence within an interview increased, the number of similar concept-word lists used by the physician and patient tended to increase. However, the correlation between silence time and patient satisfaction was not significant ($r = 0.254$, $p > .05$).

Interruptions

Only 4 out of the 52 interviews did not have any interruptions. The average number of interruption differences between physicians and patients was 2.92 (median = 1.5) with a range of 0-15. There was no significant correlation ($r = .255$) between differences in interruptions and patient satisfaction, although there was a significant correlation between interruption differences and word lists ($r = -0.275$, $p < .05$). When the physician and patient used more similar concept-word lists, they also developed more similar patterns in their use of interruptions.

Language Reciprocity

Almost all of the interviews (47) reflected at least one of the concept-word lists ($N = 52$). The average number reflected was 1.87 (median = 2.0), ranging from 0-5.0 with a standard deviation of 1.17. There was a significant correlation between language reciprocity ($r = 0.479$), $p \leq .01$) and patient satisfaction. The more that similar concept-word lists were used by the physician and patient in an interview, the greater the patient satisfaction with that interview.

Contingency Tables

When the differences of interruptions, number of similar concept-word lists, silence times, and satisfaction scores were entered into 2×2 contingency tables, there was a highly significant relationship ($\chi^2 = 13.50$) between concept-word lists and patient satisfaction ($p \leq .001$) but no significance ($p > .10$) for silence time and patient satisfaction ($\chi^2 = .277$) or for interruptions and patient satisfaction ($\chi^2 = .32$).

Hypothesis Testing

To test the hypothesized relationships between the communication variables and patient satisfaction, the variables of silence, interruption differences, and similarity of concept-word lists were entered in a multiple regression analysis. The first multiple regression analysis

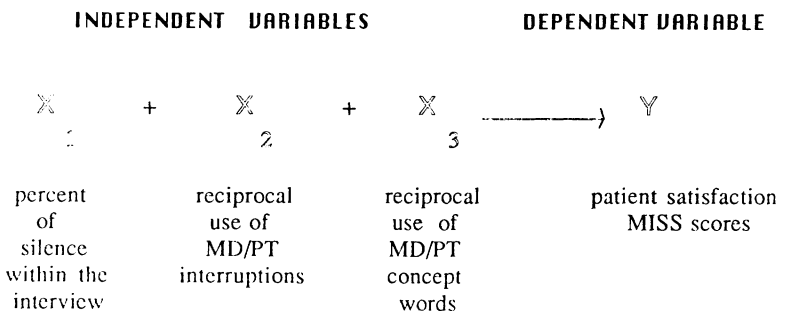

Figure 1: Variables in the Multiple Regression Analysis

(MRA) included a fourth independent variable representing the ratio between the number of questions asked by the doctor and the number asked by the patient. However, it was found that adding this variable did not significantly increase the amount of variance explained and it was dropped from further analysis.

The variables of silence, interruption differences, and use of similar word lists were entered into the multiple regression analysis as shown in Figure 1 where $X_1 + X_2 + X_3$ were the independent variables and the MISS scores were the dependent variable.

To determine whether the individual differences among the five physicians had a significant effect on patient satisfaction, an additional MRA was performed. In this analysis, each physician's identity was coded as a dummy independent variable and added first in the MRA. The results of both analyses were virtually identical. The findings of the analysis including the dummy variable are reported here.

As shown in Table 2, the results indicated a significant relationship between the three language variables and patient satisfaction ($R = .55$, $p \leq .01$). In fact, 27% of the variance in the satisfaction scores can be attributed to these three aspects of the physicians' language styles: (a) length of silence between turns in an interview, (b) the difference between patient-generated interruptions and physician-generated interruptions, and (c) use of similar concept-words by the physician and patient.

TABLE 2
Multiple Regression Analysis

Variable Name	*Beta Weights*	*t*
Physician	−0.065	−1.021
Silence	−0.003	−0.466
Interruptions	0.078	.884
Word lists	−0.223	−3.07*
Dependent Variable: Score on MISS (Satisfaction Scale)		
Score mean: 2.28		
F value: 4.36		
R^2: 0.27		
Interaction effects		
Silence x Word lists	4.11	2.66**
Silence x Interruptions	−1.658	−0.777
Word lists x Interruptions	−0.35	−2.03

*$p \leq .01$; **$p \leq .05$.

DISCUSSION

The correlational data among independent and dependent variables supported the general hypotheses tested. Patient satisfaction was found to have a significant positive multiple correlation with (a) the amount of silent time recorded between turns in the interview, (b) the difference between patient-generated interruptions and physician-generated interruptions, and (c) the use of similar word-lists by the physician and patient during the verbal interaction. The data did not show any significant additional covariation that could be accounted for by the number of questions asked.

Taken together, these findings indicate that patients reported significantly higher satisfaction with interactions characterized by a higher degree of reciprocity between physicians and patients. Taken separately, the findings are consistent with the construct cited earlier for physicians' interpersonal involvement, expressiveness, and dominance.

Similar Word Lists

A higher degree of similarity in word usage by the doctor and patient would be likely to increase the level of information transfer and to

contribute to the patient's sense of being better understood by the physician. It could also be indicative of the physician's level of interpersonal involvement and the degree of speech convergence within the dyad. Earlier studies have shown correlations between patient satisfaction and (a) the degree of information transfer (Ley, 1982); (b) patient reports of feeling well understood by their physician (Treadway, 1983); and (c) the physician's level of interpersonal involvement (Street & Wiemann, 1987). Thus, the positive relationship obtained here between patient satisfaction and the similarity of word usage is consistent with earlier research on these theoretical constructs. Results from the contingency table analysis and the direct correlation between this variable and patient satisfaction confirmed that the use of similar word lists showed a strong and significant association with patient satisfaction ($p \leq .01$).

Silent Time/Reaction Time Latency

Greater periods of silence in the medical interview would generally be expected to indicate a greater opportunity and encouragement for the patient to volunteer information, ask questions, or identify concerns. In this study, silence time was measured as the non-speaking time or reaction-time latency between speakers. Often this type of reaction time latency is negotiated between speakers in the initial portions of the encounter. However, lack of negotiation on the speakers' part may result in one party (patient) trying to keep up with the other person's (physician) rate. This may negatively manifest itself in a situation where the physician is simply regurgitating a memorized "review of systems" question list to a patient no matter what the patient says. As soon as the patient stops speaking another question is articulated. The patient usually will try to increase his or her response rate to "catch up" to the physician.

The more communicatively competent physician will pause long enough to indicate that he or she is listening and then respond. It is likely that, within limits, greater silence time would generally be associated with greater information transfer, more positive patient feelings of being well understood, and lower levels of physician dominance. In other studies, each of these processes has been found

to correlate positively with patient satisfaction (Ley, 1982; Treadway, 1983; Street & Wiemann, 1987). In this study, silence time correlated significantly with the use of similar word lists ($p \leq .05$), but neither the contingency table analysis nor the simple correlation coefficients reported in Table 1 confirmed a significant direct correlation between silence time and patient satisfaction. However, the significant interaction effects reported in Table 2 indicate that silence is an important intervening variable in the relationship between patient satisfaction and similarity of word lists.

Interruptions

A large difference between the numbers of physician-initiated versus patient-initiated interruptions would indicate a high level of dominance by either party. In either case, it would be expected to deter the flow of information and the patient's feeling well-understood by the physician and thus to be negatively correlated with patient satisfaction. Conversely, similar use of interruptions between the physician and patient when they are both discussing the same topics would be expected to contribute positively to patient satisfaction. In this study, similarity in interruption patterns correlated significantly with the use of similar word lists ($p \leq .05$), but once again, neither the contingency table analysis nor the simple correlation coefficient reported in Table 1 confirmed a significant correlation with patient satisfaction directly.

Numbers of Questions Asked

Although a high rate of questioning may facilitate information transfer, it is likely to contribute to higher levels of physician dominance and to lower levels of patient reports that they felt well-understood. Interviews of this type generally resemble an interrogation in which patients find it difficult to articulate concerns or personal feelings about their medical condition. Thus, the lack of a correlation between patient satisfaction and the number of questions asked is consistent with earlier correlational research on patient satisfaction

and (a) information transfer, (b) physician dominance, and (c) patients' feeling well-understood.

CONCLUSIONS

It is noteworthy that 27% of the variance in patient satisfaction could be explained by the measures described of physician verbal communication. Although the relationship must be interpreted as strictly correlational in nature, it is important to recognize that these verbal communication behaviors are consistent with principles of patient-centered interviewing and they represent concrete, operational behaviors that appear to be exemplary of more general constructs such as involvement, expressiveness, and lack of dominance. They also reflect a communication style that can be characterized by reciprocity between physician and patient in that both use the same word lists, interrupt one another at a similar rate, and allow sufficient response time for reflective silence in the interview.

Several limitations must also be recognized in interpreting these results. The data were drawn from interviews involving only five physicians and 52 patients in a similar hospital. Thus, the generalizability of the findings may be low and the relationships described may be confounded by features of these particular samples and setting. Secondly, the research focused only on the verbal aspects of the doctor-patient interaction and only on a single measure of patient satisfaction at a single point in time. These factors may further limit the generalizability of the findings.

The results of the current study underscore the need for further research on the relationships between process and outcome measures in doctor-patient communication.

Additional research should seek to cross-validate these findings in other settings and with more diverse samples. To further extend this line of research, studies with experimental designs are needed. Such studies could provide systematic variations in the independent variables and measure their effects on patient satisfaction, for example. Covariation of multiple independent variables would make it possible

to study the interaction effects among intervening variables on the outcome measures.

Investigators should also explore possible relationships with nonverbal communication variables, particularly with respect to interpersonal involvement and expressiveness on the part of the physician. Research should also examine additional dependent variables such as patient comprehension and adherence to medical advice or treatment. Studies would be especially useful if they allow investigators to measure the impact of different combinations of communication variables. In addition, they need to examine differences between physicians trained and untrained in specific techniques of interpersonal involvement, expressiveness, and patient-centered interview skills.

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