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Correspondence Among Patients' Self-Reports, Chart Records, and Audio/Videotapes of Medical Visits

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This pilot study examined the covariation of patients' self-reports of instrumental and affective aspects of communication during physician–patient visits with 2 other sources of data: medical chart records and audio/videotapes. Participants were 17 community-based (nonuniversity) primary-care physicians and 77 of their patients, ages 50 to 80. Patients were interviewed by telephone within 1 week after their medical visits. Thirty-five of these visits were audio- and videotaped. Patients were asked to report on their receipt of specific cancer screening in the previous 2 years, the oc-

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currence of instrumental communication events during the visit (e.g., recommendations), their affect, and their visit experiences and communication with their physicians. Results showed (a) noteworthy disagreements between patients' self-reports and medical charts regarding cancer screening; (b) better agreement of patients' self-reports with videotape records than with chart records regarding physicians' recommendations; (c) accurate recognition of patients' self-reported affect, communication, and visit experiences by third-party raters of both audiotapes and videotapes; and (d) similar correlations of audio- and videotape ratings with patients' self-reports as well as substantial correlations between audio and video ratings. The implications of these findings are discussed, and recommendations are made for future research.

Effective physician–patient communication is essential to achieving important health-care outcomes such as patients' satisfaction, adherence to physicians' treatment and prevention recommendations, and health-related quality of life (Burgoon et al., 1990; DiMatteo, Reiter, & Gambone, 1994; Goldstein, DePue, Kazura, & Niaura, 1998). It is well documented that understanding both the instrumental and affective dimensions of physicians' and patients' verbal and nonverbal communication is crucial to fully comprehending the dynamics of medical visits and outcomes (Adelman, Greene, & Ory, 2000; Cegala, Coleman, & Turner, 1998; Lambert et al., 1997; Roter & Hall, 1992; Scherz, Edwards, & Kallail, 1995; Stewart, 1995; Wyatt, 1991). Of course, accurate representations of communication in the medical visit rely on accurate methods for its assessment. Given that the same communication can be assessed from different sources of data—such as patients' self-reports, chart records, and audio/videotape recordings—the important question arises: What constitutes the most accurate or valid source of data for measuring instrumental and affective aspects of medical care? So pressing is this question that the Centers for Disease Control and Prevention have recently made it part of their new health communication research agenda, which urges researchers to identify effective means for integrating multiple sources and types of data to make strategic decisions and to assess the reliability and validity of data sources and data collection methods (see www.cdc.gov).

One approach to answering this question has been to use descriptive or correlational statistics to examine the correspondence among what different sources of data indicate has occurred during a given medical visit. For example, these statistics can reveal the extent to which patients' self-reports about interactional events (e.g., the occurrence of cancer-screening recommendations), their experience of their physicians' behavior and communication (e.g., information giving), and their own affect (e.g., depression) correspond or "agree" with medical chart entries made about those visits or with what is evident from audio- and videotape recordings. This article (a) briefly reviews the literature on the correspondence between patients' self-reports and two other sources of data: medical chart records and audio- and videotapes of visits; (b) presents the results of a pilot study examining the correspondence among all three sources in terms of instru-

mental and affective aspects of care; and (c) discusses the implications of the findings for theory and research on physician–patient communication, as well as the challenges of this research agenda.

PATIENTS' SELF-REPORTS AND OTHER SOURCES OF DATA

Patients' self-report data are commonly used to assess a broad array of visit-related phenomena and thus heavily influence research conclusions, clinical and policy applications, and diagnostic and treatment decisions (Adelman, Greene, Charon, & Friedmann, 1992; DiMatteo & Lepper, 1998). Relative to other sources, such as medical records and audio- and videotapes of visits, self-report data have a number of advantages in that they (a) are easier, more straightforward, and less expensive to collect (Gerbert & Hargreaves, 1986); (b) are often more "acceptable" to human subjects committees; and (c) can provide unique insight into patients' knowledge, perceptions, attitudes, values, and socioemotional experiences (Ellingson & Buzzanell, 1999; Fink & Kosecoff, 1998; Kleinman, 1988). Self-report data also have limitations, however. They can be misinformed by lapses in memory (Callahan et al., 2000; Hodes, Ory, & Pruzan, 1995), and, at least when sensitive topics are at issue (e.g., weight and substance abuse), they can be distorted by social desirability, self-deception, and sociolegal considerations (Little, Uhl, Labbe, Abkowitz, & Phillips, 1986; Muhlheim, Allison, Heshka, & Heymsfield, 1998; Zanis, McLellan, & Randall, 1994). Additionally, patients' anxiety and confusion and inadequate time to clarify expectations, physicians' use of medical terminology, and other elements of problematic communication can limit patients' abilities to understand and remember details of their medical visits (Beisecker & Beisecker, 1990; Rose, Bowman, & Kresevic, 2000; Thompson & Pledger, 1993; West & Frankel, 1991). Conclusions from the literature regarding the correspondence between patients' self-reports and other sources of data are difficult to draw because (a) the accuracy of self-report data varies according to both the topic being examined and the data source to which the self-report is compared (McGovern, Lurie, Margolis, & Slater, 1998; Stange et al., 1998) and (b) many studies assess correspondence using the statistic of "percentage-agreement," which can have questionable validity (Rosenthal & Rosnow, 1991, p. 54).

Medical Chart Records

The correspondence between patients' self-reports of cancer-screening activities and their documentation, such as with insurance records and automated chart audits, is generally high, although correspondence between patients' and physicians' reports about the medical visit is generally moderate to low (Montano &

Phillips, 1995; and see Cegala, McNeilis, McGee, & Jonas, 1995, for a review). The correspondence of insurance-documentation or of other automated medical records (such as pathology records or billing) with patient reports suggest that patients generally know and report to a high degree of accuracy (approximately 80%) what has occurred regarding their medical-care screening (Baier et al., 2000; Bowman, Redman, Dickinson, Gibberd, & Sanson-Fisher, 1991; Brown & Adams, 1992; Degnan et al., 1992; Fowles, Fowler, Craft, & McCoy, 1997; Johnson, Archer, & Campos-Outcalt, 1995; Warnecke et al., 1997; Zapka et al., 1996). Some studies have shown poor correspondence between patient reports and what physicians write in patients' charts or report on questionnaires regarding certain medical-care activities that occur during the visit (Brown & Adams, 1992; Montano & Phillips, 1995; Roter & Russell, 1994; Russell & Roter, 1993). Other studies suggest reasonably good correspondence between the two (Gerbert, Stone, Stulbarg, Gullion, & Greenfield, 1988, Hulka, Kupper, Cassel, & Efird, 1975; Stange et al., 1998). Consistent trends involving characteristics (such as embarrassment or salience) that affect the reporting of medical visit events have not yet been identified, although data suggest that counseling activities about prevention and lifestyle modification have particularly low agreement, prompting Roter and Russell (1994) to note that in their study "it hardly seems as if the doctor and patient were in the same room" (p. 35).

Observation and Audiotapes/Videotapes

The convergence of what patients indicate has occurred in their medical care with what is recorded on audio- and videotapes of that care is indeed a compelling association to examine, and a few studies have directly compared patients' self-reports with audio- and videotapes of their visits (for a general review, see Boon & Stewart, 1998). Studies show that patients generally overestimate the occurrence of their physicians' counseling regarding alcohol and tobacco habits (Adams, Ockene, Wheller & Hurley, 1998; Cornuz et al., 1997; Frank, Winkleby, Altman, Rockhill, & Fortmann, 1991; Humair & Ward, 1998; Jaen, Crabtree, Zyzanski, Goodwin, & Stange, 1998). Roter and Russell (1994) found that when assessing specific occurrences of lifestyle counseling, neither patients' nor physicians' reports had high agreement with audiotape records of the visit, although discussions of smoking and weight loss were reported more accurately than counseling about exercise, alcohol use, and stress. Some studies have focused on communication behaviors and examined the concordance among patients' reports, observations, audiotapes, and videotapes. In the context of hospital rounds, Blanchard, Labrecque, Ruckdeschel, and Blanchard (1990) found that patients' reports agreed significantly with observations on only 2 out of 17 physician behaviors studied. Street (1992) found that parents' self-reports of the knowledge they gained from pediatric medical visits were significantly corre-

lated with the frequency with which physicians actually gave information and directives during those visits, but that parents' perceptions of physicians' informativeness were not correlated with information-giving and were significantly negatively correlated with directive-giving by physicians. Of course, audio- and videotape records may fall short when evaluating behaviors that are not apparent or salient (Gerbert & Hargreaves, 1986; Gerbert et al., 1988), including emotional expressions that participants, for whatever reason, tend to suppress (Roter & Ewart, 1992).

Although a significant body of prior research has used ratings of audio- and videotapes to assess physicians' and patients' affect (Ambady & Rosenthal, 1992; DiMatteo, Hays, & Prince, 1986; Hall, Harrigan, & Rosenthal, 1995; Hall, Irish, Roter, & Erlich, 1994), we are not aware of any research that has directly examined the correspondence between patients' self-reports and third-party ratings of affect or communication process in the doctor–patient relationship.

THIS STUDY

This pilot study is unique in that it simultaneously examines the correspondence between patients' self-reports, medical chart records, and audiotapes/videotapes of instrumental and affective aspects of care during medical visits. Based on prior research, this study seeks to answer four research questions (RQ):

RQ1: (a) What percentage of patients report having had the following cancer-screening procedures during the past 2 years: mammogram, clinical breast exam (CBE), and Pap smear for women, and a fecal-occult blood test for all patients. (b) To what degree do these self-reports agree with medical chart records?

RQ2: To what extent do patients' reports of the occurrence of instrumental communication events (e.g., discussion of medication, lifestyle alteration) during their most recent medical visit correspond with medical and videotape records?

RQ3: To what extent do patients' self-reports of their visit in terms of their experiences of their physicians, the communication process, and their own affect correlate with third-party raters' assessments of these elements of the visit in audiotapes coded with the Roter Interaction Analysis System (RIAS: Roter, 1991) and videotapes coded with a method developed for this study?

RQ4: What is the correlation between codings of identical (or similar) variables using the RIAS audio- and videotape rating methods of this present study?

METHOD

Participants and Procedure

This study is part of a larger project called Communication in Medical Care (see Asch, Connor, Hamilton, & Fox, 2000). The entire sample, including this pilot, consisted of nearly one thousand 50- to 80-year-old patients (all women except for those in this pilot) and 63 of their physicians. The physicians were board certified (in equal numbers) in family/general practice, general internal medicine, and obstetrics/gynecology; spent at least 50% of their time providing routine, general health care; and practiced full-time in selected Los Angeles communities. Physicians were randomly selected from state records (California Medical Association), telephone books, and professional association lists (American Board of Medical Specialties; Asch et al., 2000). This pilot study involved a subset (consisting of those who agreed to participate) of 77 male and female patients (including 63 women and 14 men) who identified 1 of 17 physicians (11 men, 6 women) as their primary-care doctor. Patients completed a 30-min telephone survey within 1 week of a reference medical visit. Medical chart records made by physicians during or for these visit were abstracted, along with chart entries of cancer screening over the previous 2 years. Of these 77 patients, 35 (5 men, 30 women) who visited 1 of 7 physicians (5 men, 2 women) agreed to have their reference visit recorded on both audio and visual channels with a video camera placed unobtrusively in the examining room. All aspects of this procedure were approved by the Human Subjects Protection Committee.

Measurement

Patients' self-reports. In the telephone survey, patients were asked questions about events that occurred during their most recent (reference) visit. Patients were asked if their physicians had (a) recommended that they reduce their stress, get more exercise, alter their diet, and/or stop smoking; (b) discussed their taking medication; (c) recommended making another appointment; and (d) recommended making an appointment for a mammogram (women only). All patients were asked if during the previous 2 years they had received a fecal-occult blood test (to screen for colon cancer) and the female patients were asked if they had a mammogram or a CBE (to screen for breast cancer) and a Pap smear (to screen for cervical cancer). Using 5-point Likert-type scales ranging from 1 (*never*) to *5* (*very often*), (Stewart & Ware, 1992), all patients were asked to rate individual items regarding their own affect during the period of time that included the medical visit (specifically, how much of the time in the previous 4 weeks they were happy, nervous, calm/peaceful, and depressed/downhearted). Using 4-point Likert-type scales of 1 (*strongly disagree*), 2 (*disagree*), 3(*agree*), and 4 (*strongly agree*), pa-

tients were asked to rate the following individual items: their liking of the physician; their dissatisfaction with the physician; and their perception of whether the physician hurried too much during treatment, acted in a friendly and courteous manner, explained effectively, and discussed goals or built a partnership with them. Finally, patients were asked to rate the extent to which they asked the physician questions about their treatment and felt confused during the medical visit.

Medical chart records. The following information was abstracted from physicians' notes made during or about the reference visit: specific orders or counseling advice given to the patient regarding stress reduction, exercise, smoking cessation, and diet, and whether a recommendation was made to obtain a mammogram (women only) and return for another appointment. Notation of whether medication was discussed or prescribed during the visit was coded. In addition, the appearance in the chart of any of the following in the previous 2 years was coded: X-ray reports of a mammogram (women only), laboratory reports of fecal-occult blood test (all patients), Pap smear (women only), and any notations that a CBE had been performed (women only).

Audiotape/videotape data. Reference visits were recorded on videotape (audio and visual channels). The audio track of each visit was separately dubbed onto audiotape for analysis using the RIAS. A trained research assistant from Roter's laboratory (who was blind to patients' self-reports, medical records, and analysis of the videotapes) coded the visits (Roter, 1991; Roter et al., 1997). Specifically, physicians' and patients' statements were coded into one of 34 mutually exclusive categories. The categories used in this study, which were determined a priori to be relevant to the study's purpose of cross-validating patients' self-reports, were the following: (a) patient interpersonal behavior (shows approval, shows disapproval); (b) patient affect (anxious, dominant, friendly/warm, responsive/engaged, sad/depressed); (c) patient task-oriented behavior (asks questions about therapy, checks understanding); (d) physician affect (anxious, dominant, hurried, sympathetic, warm/friendly); (e) physician behavior (gives information about medical condition); and (f) evidence of physician-facilitated partnership with the patient. These variables used absolute measurements of communication-process variables (e.g., the frequency of information-giving utterances), which appear to be slightly more predictive of patients' self-reports than proportional measurements (Street, 1992).

A coding scheme for the videotapes (which contained both audio and video channels) was developed based on previous work by two of the authors on the analysis of verbal communication (Heritage & Lindstrom, 1998; Heritage & Stivers, 1999) and nonverbal communication (DiMatteo et al., 1986; DiMatteo, Taranta, Friedman, & Prince, 1980) in physician–patient visits. The occurrence (vs. nonoccurrence) of events during the office visit was coded from the videotapes using a

dichotomous assessment (yes or no) of whether physicians (a) mentioned or counseled patients about stress, exercise, diet, and smoking; and (b) instructed patients to take prescribed medication, make an appointment for another visit, and get a mammogram. These elements of the visit were chosen because they address several specific aspects of prevention and are salient components of the medical visit. Coding of all the visits was initially done by one trained research assistant, and then 50% of the visits were recoded by a second trained research assistant with perfect agreement. Videotapes were also coded (using 6-point, bipolar Likert scales) by one trained research assistant[1] for the following affect and behavior variables, which were chosen a priori to be compared with patients' self-reports: (a) physician affect (warm/cold, relaxed/nervous, dominant/submissive); (b) physician behavior (likes the patient, is an effective communicator); (c) patient affect (warm/cold, relaxed/nervous, dominant/submissive); and (d) patient behavior (likes the physician, asks questions). These variables were chosen because they were believed by the research team to be basic components of interaction (particularly nonverbal) and to have high face validity in the physician–patient relationship. All research assistants were blind to patients' self-reports, medical records, and RIAS coding. Five consultations were conducted in Spanish, and these were coded by trained research assistants who were fluent in Spanish; these visits were similar in content and structure (Stiles, Putman, Wolf, & James, 1979) to the visits in English.

Data Analysis

Specific sets of cross-tabulation analyses and correlations were planned a priori to examine the correspondence among patients' self-report data, medical record data, RIAS audio-coded variables, and video-coded variables. When it was not possible to match items exactly, constructs were identified that approximated each other as closely as possible. For example, in a relatively precise match, a patient's report of whether her physician recommended a mammogram during the reference visit was compared with whether such a recommendation was documented in the patient's medical chart, and whether it was coded as having occurred in analysis of the videotape of the visit. Construct matching was somewhat less precise concerning certain other variables, such as affect. For example, patient self-report of dissatisfaction with the physician was compared with the RIAS audio variable "patient shows disapproval" and with the video variable "patient likes the physician" (expecting a negative correlation). Patient self-report that the physician hurries too much did

[1]The use of a single coder in this pilot prevented assessment of the reliability of the video assessment. However, as noted in the Results section, these ratings demonstrated consistent validity. Because assessment of reliability is necessary only to explore the reasons for low validity, such assessment is not necessary in this case (Rosenthal & Rosnow, 1991).

have a comparable RIAS variable ("provider hurried") but was compared in the video coding to "physician is cold" because this latter variable was judged to be the most comparable one available. Imperfect matches would be expected to reduce the correlations that result and provide more conservative tests of the research questions.

Relations among self-reports, medical records, RIAS audio codings, and video codings were calculated in the following manner. For 2 × 2 tables (when both variables had two ordered categories, such as yes or no), a phi coefficient was computed from the Fisher exact probability test when at least one expected frequency was 5 or less (or from chi-square otherwise; Rosenthal & Rosnow, 1991). Point-biserial correlations were computed in cases in which one variable was dichotomous (and ordered, e.g., yes or no) while the other had at least three ordinal levels or interval scores (Rosenthal, Rosnow, & Rubin, 2000). Pearson product–moment correlations were computed in cases in which both variables had three or more ordinal or interval levels. Parametric analysis was appropriate in this case because response scales such as those used here are typically treated as interval scales representing constant differences between scale points (Cohen & Cohen, 1983). Although for most psychological scales this assumption is not literally true, empirical work indicates that it results in little if any distortion in the validity of conclusions based on parametric analysis (Baker, Hardyk, & Petrinovich, 1966).

These coefficients were calculated in the following domains: (a) comparison of patient and chart reports of cancer screening activity in the past 2 years, (b) comparison of patient self-reports of physician directives during the visit (health behavior, medication, and appointment-making) with chart and video coding, (c) comparison of patient self-reported affect and perceptions of the physician–patient relationship with RIAS audio coding and ratings from the video coding, and (d) comparison of RIAS audio coding and ratings from the video coding on comparable variables of physician and patient affect. Because of small sample sizes, sole reliance on significance testing is potentially limiting. Effect sizes and trends were attended to, and borderline significance ($p < .10$) is reported in the tables (Rosenthal et al., 2000). In addition, the variables of patient self-reported affect and perceptions of visit experience and communication were subjected to factor analysis using principal components analysis with scree-plot to determine the number of factors and with Varimax orthogonal rotation (Rosenthal & Rosnow, 1991). Although this factor analyses was based on a small sample and was therefore not ideal statistically, the resultant grouping of self-report variables (into three factors: Patient Affect During the Visit, Physician Interpersonal Effectiveness, and Patient Participation) informed the calculation of composite variables, which increased reliability of the measures and allowed for more powerful assessments of the research questions. Thus, based on the factor analysis results, composite scores were calculated by averaging component variables (with reversal of variables that had negative factor loadings) for each of the re-

sultant factors of the self-report measures as well as for their corresponding RIAS coding and video-coding variables.

RESULTS

RQ1 addressed the percentage of patients who reported having had cancer-screening procedures in the previous 2 years and to what extent these self-reports agreed with medical chart records. Table 1 presents these screening rates, which were generally quite high with the exception of the fecal occult blood test. Regarding the measures of agreement, the only screening procedure for which patients' reports did not agree significantly with the chart was CBE. At first, this appears odd because the self-report occurrence of CBE was 89% and the chart entry was 88%. Closer examination of the data showed that of those patients for whom there was a chart entry of CBE, 10% reported that they had not had a CBE, and of those with no CBE chart entry, 75% reported having had a CBE.

RQ2 addressed the extent to which patients' reports about visit-specific instrumental communication events corresponded to entries in medical records and evidence of their occurrence on videotapes of the visit. The results are presented in Table 2. Evidence for occurrence of each event varied considerably depending on the source of that evidence. Except for discussion of medication, patients' self-reports were the most frequent, followed by the videotape, and lastly by entry in the chart. According to videotape records, the most common event was the physician's discussion of medication, yet this event was recorded in less than half of the medical records. Similarly, the second most common event on the videotape record was the physician's recommendation to make another appointment, yet this was recorded in less than a third of the medical records. Patients' self-reports were not

TABLE 1
Comparison of Self-Reports of Cancer Screening in Past 2 Years With Medical Records[a]

		Percent having test according to	
Screening Test	*Measure of Agreement*[b]	*Self-Report*	*Medical Chart*
Mammogram	.62**	84	72
Clinical breast exam	.16	89	88
Pap test	.39*	80	72
Fecal occult blood test	.60**	54	24

[a]Based on 63 women (Mammogram, clinical breast exam, Pap) and 77 total men and women (fecal occult blood test). [b]Phi coefficient computed for 2 × 2 tables (from Fisher exact probability test when any expected frequency was 5 or less, otherwise from chi-square).

**$p < .01$. *$p < .05$.

TABLE 2
Comparison of SR of Office Visit Events with Medical Chart and Videotape[a]

	Percent "yes" according to			*Measure of SR Agreement[b] with*	
Patient Reported That Doctor	*SR*	*Chart*	*Videotape*	*Chart*	*Videotape*
Discussed taking medication	76	49	87	.00	.40*
Recommended making another appointment	68	32	60	–.05	.26†
Recommended making appointment for mammogram	33	6	17	.27†	.41*
Said to reduce stress[c]	25	0	11	—	.10
Said to get more exercise[c]	20	0	7	—	.05
Said to alter diet[c]	33	0	24	—	.18
Said to stop smoking[c]	10	0	7	—	.16

Note. SR = self report.

[a]Based on 77 men and women for comparisons of SR with chart (63 women for mammogram recommendation) and on 35 men and women for comparisons of SR with video (30 women for mammogram recommendation). [b]Phi coefficient computed for 2 × 2 tables (from Fisher exact probability test when any expected frequency was 5 or less, otherwise from chi-square). [c]Number of chart entries was zero, making computation of measure of agreement between SR and chart impossible.

*$p < .05$. †$p < .10$.

significantly correlated with chart records regarding discussion of medication or recommendation to make another appointment; they approached a significant correlation for the recommendation to make a mammogram appointment. No comparison could be made between chart records and self-reports for lifestyle recommendations (stress reduction, exercise, diet, and smoking) because these events were not recorded in the charts at all (although videotape records showed that they actually did occur 7% to 24% of the time). Patients' self-reports were significantly correlated with videotape records of physicians discussing medication and making a recommendation for a mammogram; they approached a significant correlation for recommendations to make another appointment. Patients' self-reports were not significantly correlated with videotape records of physicians' recommendations to reduce stress, exercise, alter diet, or stop smoking. Comparing chart and videotape, the correlations for discussion of medication and for the recommendation to make another appointment were .01 and .02, respectively. The correlation between chart and videotape record of whether the physician recommended a mammogram was significant ($\phi = .36$, $N = 30$, $p < .05$).

RQ3 addressed the extent to which patients' self-reports of their visit experiences with their physicians, the communication process, and their own affect corresponded with the perceptions of third-party raters of the audio- and videotape records of the visit. The first step was to match, as closely as possible a priori, the self-report variables of interest with the audiotape (RIAS) and videotape variables.

TABLE 3
Correlations of Patients' SR of Affect, Communication, and Visit Experience With Audiotape (RIAS) and Videotape Ratings[a]

	Correlations With Audiotape Ratings		*Correlations With Videotape Ratings*	
Patient SR	*RIAS Variable*	*Correlation With SR*	*Video Variable*	*Correlation With SR*
Patient affect during time of visit				
Happy	Patient is responsive/engaged	.36*	Patient is active	.37*
Calm and peaceful	Patient is anxious	–.39*	Patient is relaxed	–.07
Depressed/downhearted	Patient is sad/depressed	.08	Patient is passive	.35*
SR variables above combined[c]	RIAS audio variables above combined[c]	.43*	Video variables above combined[c]	.43*
Physician interpersonal effectivenss				
Patient likes doctor	Patient shows approval	.25	Patient likes doctor	.38*
Patient dissatisfied with doctor	Patient shows disapproval	.17	Patient likes doctor	–.16
Doctor hurries too much	Provider is hurried	.37*	Doctor is cold	.41*
Doctor is friendly and courteous	Provider is friendly	.31†	Doctor is warm	.26
Doctor explains effectively	Provider gives information about medical condition	.15	Doctor is effective communicator	.02
SR variables above combined[c]	RIAS audio variables above combined[c]	.44*	Video variables above combined[c]	.33†
Patient participation				
Patient asked doctor about treatment	Patient asks questions about therapy	.11	Patient asks questions about treatment	.24
Patient discussed goals/had partnership with doctor	Provider facilitates partnership	.14	Doctor is submissive	.27
Patient felt confused during visit	Patient checked understanding	.31†	Doctor is effective communicator	–.16
Patient nervous	Patient is anxious	–.02	Patient is nervous	.26
SR variables above combined[c]	RIAS audio variables above combined[c]	.41*	Video variables above combined[c]	.43*

Note. SR = self-report.

[a]Based on 35 men and women. [b]Correlations are point-biserial in cases in which one variable is dichotomous while the other has at least three ordinal levels or interval scores. Correlations are Pearson in cases in which both variables are ordinal or interval (based on robustness of Pearson correlation to ordinal data: Baker, Hardyk, & Petrinovich, 1966). [c]Averaged.

*$p < .05$. †$p < .10$.

Pearson product–moment correlations between the self-report and corresponding individual RIAS and videotape-rating variables are presented in Table 3 (grouped for presentation according to the results of the factor analysis, detailed later).

The relation between individual self-report variables and the identical, or conceptually similar, audiotape or videotape variables first bears examination. On the whole, there was limited agreement between individual variables reflecting patients' evaluations of their own affective states during the period of time encompassing the visit and third-party audiotape or videotape ratings of such affective states exhibited during the visit. Of eight correlations between individual variables measuring patients' self-reported affective state (happy, calm, depressed, nervous) and either audio or video ratings of affect, only four are significant and in the expected direction. The conceptual differences between the variables (self-reports of affect during the period of time surrounding the visit compared with audio and video ratings of affect during the visit) may have accounted for the limited number of significant correlations among these variables. There is agreement between patients' evaluations of physicians' interpersonal style and third-party raters' audiotape- or videotape-based assessments of patients' evaluations for the following variables: the patient's liking of the doctor, the doctor's hurried behavior, and marginally for the doctor's friendliness and the patient's feelings of confusion. There is little individual variable correspondence of self-report with audiotape or videotape for patient dissatisfaction, physician explanation, patient question asking, and the discussion of goals.

In an effort to group the individual self-report variables meaningfully and improve the power of the analysis of RQ3, a factor analysis was computed of the 12 self-report variables using principal components analysis and Varimax orthogonal rotation with Kaiser normalization. Three factors accounted for 25%, 24%, and 12% of the variance, respectively. In Table 3, as noted previously, the self-report variables (none reversed) are organized simply according to their grouping on the three factors. Based on the direction of their factor-loadings, five patient self-report variables (depressed/downhearted; patient dissatisfied; doctor hurried; patient confused; patient nervous) were then reverse-coded. By averaging the component variables within each factor, three combined self-report variables were calculated. Cronbach's alpha reliabilities (Rosenthal & Rosnow, 1991) for these three combined self-report variables were .83 for Patient Affect, .87 for Physician Interpersonal Effectiveness, and .34 for Patient Participation.[2] The comparable audio and video variables were then combined (reversing variable coding for those with comparably reversed self-report variables), and correlations between the self-report composite variables and the composite audiotape and videotape variables were computed. Except for one that achieved marginal significance, there were substan-

[2]This low reliability (.34) would be of concern only as an explanation for low validity, if that were to occur (Rosenthal & Rosnow, 1991).

tial and significant correlations between the self-report composite variables and their comparable composite audio and video variables (even despite a low alpha reliability for Patient Participation), suggesting that patient self-reports of affect, experience, and the communication process could be accurately assessed by third-party raters of recordings of the medical visit.

RQ4 addressed the relation between the audiotape and videotape coding of similar affective variables. This analysis was of interest because in this research, the coding of the audio channel was achieved with a well-documented instrument, the RIAS, whereas the video-coding strategy was developed by the researchers based on their previous work in videotape analysis of affect and interactional process. The relations between conceptually similar audio and video variables are presented in Table 4. Significant correlations were found for ratings of the doctor's warmth, patient's warmth, and patient's activity/dominance. Correlations of all the other variables approached significance.

DISCUSSION

This pilot study investigated four important research questions and provided several initial answers regarding the correspondence among patients' self-reports, chart records, audiotape recordings, and videotape recordings of instrumental and affective care in the medical visit. This work examined the following: (a) the concordance of patients' reports and chart records regarding recent cancer screening; (b) patients' reports of counseling and recommendations made during the visit

TABLE 4
Correlations Between Video Codes and Audio Codes for Select Affect and Communication Variables[a]

Video Variable	*RIAS Audio Variable*	*Correlation*[b]
Patient likes doctor	Patient shows approval	.31†
Doctor likes patient	Provider is sympathetic	.35†
Doctor is warm (vs. cold)	Provider is friendly, warm	.61**
Patient is warm (vs. cold)	Patient is friendly, warm	.42*
Doctor is nervous (vs. relaxed)	Provider is anxious	.33†
Patient is nervous (vs. relaxed)	Patient is anxious	.30†
Doctor is dominant (vs. submissive)	Provider is dominant	.30†
Patient is active (vs. passive)	Patient is dominant	.67**

[a]Based on 35 men and women. Ratings of audio and video done by different raters who had no contact with each other. [b]Correlations are point-biserial in cases in which one variable is dichotomous while the other has at least three ordinal levels or interval scores. Correlations are Pearson in cases in which both variables have three or more ordinal or interval levels, because of robustness of Pearson correlation to ordinal data (Baker, Hardyk, & Petrinovich, 1966).

**$p < .01$. *$p < .05$. †$p < .10$.

compared with chart records and videotapes; (c) patients' reports of their affect, visit experience, and physician–patient communication compared with third-party ratings of audiotapes and videotapes; and (d) comparison of RIAS audio ratings with the results of a video-rating system developed for this study.

The results showed that, with the exception of fecal-occult blood testing, cancer screening (as reported by patients and medical chart records) was quite prevalent and in line with the research reviewed previously. Screening for colon cancer with a fecal-occult blood test had the lowest rate of occurrence, possibly because it may currently be less well accepted by physicians or patients than other screening. For all but CBEs, patients' self-reports agreed with chart entries. Low agreement for CBE may have been the result of patients' limited awareness or recall, or physicians' incomplete charting procedures, or both. This low agreement has implications for patient care because health professionals typically rely on charts, patient reports, or both for assessments of previous screening and medical care.

Just as in related research, lifestyle recommendations were relatively infrequent in this study (Lewis, Clancy, Leake, & Schwartz, 1991; Schwartz et al., 1991). Self-reporting of discussions of stress, exercise, diet, and smoking occurred at nearly identical rates to those reported by Roter and Russell (1994). Lifestyle recommendations were never entered in the chart for this sample. Further, agreement between self-reports of instrumental events in the visit (e.g., discussion of medication and recommendations for appointments) did not correspond well with entries in the chart. Again, although it may be that patients did not report visit events accurately, it is possible that medical charting did not accurately reflect what happened in the visit. In this pilot study, the limited correlations between chart and videotape records of the visit suggest that the latter explanation may be the more tenable (a finding supported by previous research; Aaronson & Burman, 1994; Stange et al., 1998). Charts are legal documents and are held as the gold standard for what recommendations were made during the medical visit regarding discussions of medication and recommendations for follow-up and adherence to health behaviors (DiMatteo & Lepper, 1998). Low agreement between videotapes and charts has implications for malpractice litigation and might be cause for clinical concern about the accuracy of medical records for patient care. This is certainly an important area for further research investigation.

Although it is possible that low reported rates of patient advising about health behavior are due to oversights in physician charting, they may also be due to patients' poor understanding and recall (Bertakis, 1977; Ley, 1979) or to physicians' failure to convey prevention issues that were intended (Rost, Roter, Bertakis, & Quill, 1990; Svarstad, 1976)—a problem that might be remedied somewhat by patient educational materials and protocols. Our design did not allow for analysis of possible explanations, but future programs of research to determine the best source of correct information about what actually occurred during medical visits will likely have very important research, clinical, and medical-legal applications.

Assessments of affect and the process of physician–patient interaction do not involve issues of accuracy but rather explore the extent to which external observers of professional–patient interaction have responses to the medical visit that are similar to those that patients express in their self-reports. Although these ratings are essentially subjective, the findings here agree with the results of studies showing that raters of psychosocial "information" in observations of others' behavior can have surprisingly high validity (Ambady & Rosenthal, 1992, 1993). This validity is evident despite variations in coding format, length of exposure, channel of communication, and characteristics of raters. This pilot study suggests that both RIAS coding and the video coding developed for this research well reflected patients' perceptions and captured the richness of physician–patient interaction. Although they have some limitations (Gerbert & Hargreaves, 1986; Gerbert et al., 1988), audio- and videotapes do appear to be the best device for comparison when dealing with verbal and nonverbal communication process.

Despite their significance, the correlations in this study were generally moderate in size, suggesting either a certain degree of measurement inaccuracy or simply unique variance, depending on the point of view taken (Blanchard et al., 1990). In addition, significant correlations between communication process and outcome variables would not necessarily mean that such variables were meaningfully related, causally or otherwise (Stiles, 1989). As Street (1992) noted, tape-based, objective counts of specific communication behaviors and patients' subjective evaluations of related communication processes or outcomes may constitute quite different constructs entirely. (For example, consider the difference between patients' self-reports of dissatisfaction and observers' recognition of interactional behavior potentially constitutive of patients' disapproval.) In this research, patients' ratings of their affect and their experience of communication in the physician–patient relationship generally did agree rather well with audio and video ratings of such, suggesting that what was experienced and perceived by patients tended also to be perceived by those listening to or observing the interactions.

This pilot project presents a sophisticated methodological strategy that can provide a template for future research in this area. This work has several limitations, however. First, the sample size is small and statistical power is therefore low (although with combined variables, many of the effect sizes are moderate and significant, and the patterns of findings are generally consistent and informative). Even the modestly sized relations make sense theoretically and can be appreciated (Rosenthal & DiMatteo, 2001). Second, the sample is limited to patients 50 to 80 years of age, and considerable evidence exists that physician interactions with older patients can be appreciably different from their interactions with those who are younger (Adelman et al., 1992). Certain unique challenges to communication might be more prevalent in this age group than across the population (Hodes et al, 1995). Third, patients were not interviewed immediately af-

ter their visit but rather within a week, possibly diluting their memory for the events of the visit about which they were asked to report. Finally, although the physicians came from a sample that was drawn randomly, only physicians and patients who were willing to allow extensive data collection participated in the study, limiting generalizability of the results. These findings are probably more applicable than usual to medical practice, however, because they involve community-office practice, whereas the research literature on physician–patient communication is dominated by university- and medical school based studies. Nevertheless, their generalizability might be conversely limited by having only seven (probably) selective medical practices represented.

These results contribute to a growing body of evidence suggesting that the details of health care communication process can be very well studied through the use of audio- and videotape recordings of medical visits (e.g., Frankel, 1990; Linnel, Gustavsson, & Juvonen, 1988; Waitzkin, 1985; West, 1984; for review, see Roter & Hall, 1992). Videotaping may be slightly more expensive than audiotaping but does not take more research time procedurally and does not appear to affect patients' acceptance rates (compare Robinson, 2001, with Levinson, Roter, Mullooly, Dull, & Frankel, 1997) or patients' satisfaction (Campbell, Sullivan, & Stuart, 1995). Given the benefits of having access to a wide range of participants' nonverbal behaviors, including its ability to inform the meaning of verbal communication that might otherwise be misinterpreted and the availability of the audio channel for analysis by RIAS or a comparable system, researchers should, whenever possible, collect videotape data. This research also suggests that chart records, under some circumstances, have quite low validity and that patients' self-reports can have value in many areas (although caution should be used when complex and multifaceted constructs are being studied; Roter & Hall, 1992; Whaley, 2000). Recording the medical visit does provide the richest source of analysis of its interaction process and content, but self-report is considerably less costly and cumbersome and can identify key aspects of the medical interaction. As a reflection of the patient's understanding and experience of the visit, self-report provides important insight into the patient's perspective on medical care.

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