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Review

Improving Patient and Provider Communication: A Synthesis and Review of Communication Interventions

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Abstract

Results of 40 experimental trials designed to enhance communication skills of patients or health-care providers are summarized. Calculation of effect sizes (ES) offered a method for comparing the impact of these interventions on communicative behaviors. Communicative behaviors were categorized into interpersonal processes and interviewing skills. For patient-targeted interventions that examined interpersonal process variables (n = 10), modeling and skill-practice interventions exhibited the largest ES values. For provider-targeted interventions (n = 30), 21 assessed interviewing skills, 5 examined interpersonal processes and 4 examined both categories. Effect sizes were moderate to large for interviewing skills interventions targeted at medical students. For other provider groups, the majority of studies failed to include the necessary data to calculate ES. The dearth of studies examining interpersonal processes prevented drawing any conclusive statements about their relative efficacy. On the basis of these findings, current methodological concerns are described, recommendations for future research presented and practical implications discussed.

Keywords: Physician-patient relations; Communication; Meta-analysis; Patient participation.

Introduction

Since the mid-1960s, the growth of published studies on patient-provider communication has increased exponentially. Clinicians and researchers are becoming progressively more aware of the importance of communication on patient-care outcomes. Several excellent reviews of descriptive studies of patient-provider communication and its relationship to patient-care outcomes are available in the published literature (see [1,2] for the most recent reviews).

Although previous reviews include some intervention studies in their synopsis, their focus is on the relationship between communicative behaviors and patient outcomes rather than the effects of interventions on communication behavior. If patient educators are to have an impact on patient-provider communication, there is a pressing need to understand the methods and results of empirical studies of interventions applied to patient-provider communication across diverse disciplines. The present

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review is designed to fill this gap in the literature.

This review is undertaken with four major objectives: (a) to provide a review of intervention studies designed to enhance the communicative skills of health-care providers and/or patients; (b) to address similarities and differences in methodologies, strategies and outcomes of these investigations; (c) to contrast and summarize interventions targeted at various communicative behaviors; (d) to suggest guidelines for future research and discuss implications for practice.

Methods

The research proceeded in three stages: (1) development of criteria for inclusion and literature search; (2) coding of study attributes; (3) calculation of effect sizes and data analysis.

Criteria for inclusion and search procedures

Studies included in this review met the following criteria: (a) examined an intervention designed to facilitate verbal or nonverbal communication; (b) targeted the intervention toward modifying the communicative behaviors of health-care providers and/or patients; (c) included a control or comparison group; (d) presented quantitative findings regarding verbal or nonverbal communicative behaviors; (e) focused on medical encounters that were not strictly psychotherapeutic; (f) published in English.

Studies assessing communicative behaviors through indirect methods such as medical record reviews, case reports, paper and pencil tests, or self-reports from subjects were excluded. Although such studies provide interesting results, they were excluded because there has been little empirical evidence to date that these indirect methods represent veritable communicative behaviors. In addition, studies using single-group, pretest-posttest designs were excluded. Kraemer and Andrews demonstrated that the effect of a single group, pretest-posttest design is only equal to that of an experimental-control design "if one has prior certainty of the absence of time effects and of placebo effects" [3, p. 407]. Several studies examined in the current review revealed that time effects do occur in this line of research. Moreover, Oetting [4] forewarned that control groups are essential in scientific inquiries when the purpose is to understand why something has occurred rather than simply to document that something has occurred. References for single-group, pretest-posttest designs are available upon request from the first author.

The studies in this review were identified according to the following procedures: (a) *Medline* on-line database search (using the key terms physician-patient relations, patient participation, patient education, communication, medical history taking); (b) hand searches of *Academic Medicine* (formerly the *Journal of Medical Education*) and *Medical Education* (formerly the *British Journal of Medical Education*); (c) *Psychological Abstracts* database search (key term therapeutic processes). Combinations of key words were also used and no exclusion was made on year of publication. Additional sources included the reference lists of all articles found by the above procedures.

Coding of study attributes

A total of 40 articles describing 45 studies met the initial inclusion criteria. Whenever the same study was described in more than one article, the results were merged, bringing the total number of eligible studies to 42. Each of the authors reviewed all studies independently using a standard format that assessed study design, sample characteristics, intervention strategy, dependent variables and measures, and major findings. During this process two other studies were eliminated because the nature of the intervention could not be determined [5] (i.e., the intervention was not described) or the researchers confounded the communicative behaviors of trainers with study participants [6]. Thus, 40 studies are described in this review. Interrater agreement was calculated for all key components of the rating scale. Using the

Table 1. Methodological quality rating.

1.	**Design of study/assignment**
	Experimental, random assignment (1 point)
	Quasi-experimental design (0 points)
2.	**Selection and specification of study sample**
	Random sample of all subjects from a specified population (1 point)
	Convenience sample or nonspecified sample (0 points)
3.	**Sample size**
	An n per group sufficient to detect a significant effect ($P < 0.05$) with a power of 0.80 or reported calculation of power (1 point)
	An n per group insufficient to detect a significant effect ($P < 0.05$) with a power of 0.80 or no reported calculation of power (0 points)
4.	**Coder reliability** (determined by assessment and reports of interrater and/or intrarater reliability based on data from the current study)
	Reliability greater than or equal to 0.80 (1 point)
	Reliability less than or equal to 0.79 (0 points)
5.	**Specification and use of blinding for interaction analysis**
	Coders were blinded (1 point)
	Coders were not blinded or not reported (0 points)

chance-corrected kappa coefficient [7], interrater agreement prior to consensus was good, k ranged from 0.72 to 1 (complete agreement). Data reported herein were established by final consensus of the authors.

Ratings of methodological quality. As recommended by Glass et al. [8], we included all studies regardless of their quality and later rated their level of quality, thereby eliminating the potential for bias. A rating system based on prior meta-analysis [9] was devised for use in this study (see Table 1). Ratings (up to a maximum of five points) were awarded to each study depending on how well it addressed issues related to internal and external validity. Ratings were established by consensus of the authors.

Types of interventions. Various types of interventions were represented by these studies. Based on criteria suggested in the literature [10], interventions were classified hierarchically into one of four groups: (a) instruction; (b) feedback; (c) modeling; (d) skill practice. When a study included multiple strategies, the most powerful technique was used to group the intervention. Note that interventions were classified as to their source of influence (e.g., instruction and modeling) rather than their mode of presentation (e.g., live or videotaped presentations) [10,11].

Interventions categorized as instruction employed strategies based on oral or written persuasion [12—15]. Methods of presentation included videotaped lectures, self-instruction and face-to-face didactic sessions aimed at facilitating the communicative behaviors of participants. In one case, the intervention focused on teaching about disease processes rather than communication skills [15].

Interventions categorized as feedback involved strategies that provided detailed assessment/evaluation of the participant's performance related to the medical interview [16—22]. Methods of presentation included oral or written critiques of an interview by oneself or others (e.g., trainer). Feedback was most often used alone but was sometimes supplemented with instruction (i.e., lectures or readings). Interventions categorized as feedback did not include modeling or skill practice as a definitive element of the program.

Interventions categorized as modeling employed strategies based on an extensive research literature that indicates that exposing

an individual to a model that depicts the behavior of interest can affect the observer's behavior in a positive manner [11]. Modeling displays are most often created by human actors (models) who perform various behaviors embodying a certain principle or rule. Observation of a model can provide knowledge of what to do as well as a concrete example of how to do it. Modeling strategies were sometimes used alone but were often combined with instruction and/or feedback [23—28].

Interventions categorized as skill practice involved participants actually producing the behavior(s) of interest [29—46]. Skill practice included one or more of the following: initiation of the behavior, monitoring and skill refinements based on repeated practice. Skill practice is considered a powerful means of intervention because it provides information based on actual accomplishments and allows for skill refinements [10]. Programs focused on skill practice frequently included didactic instruction, multiple feedback sessions and, on occasion, modeling.

Conceptual groupings of communicative behaviors. Communicative behaviors were categorized into two broad categories: (a) interpersonal processes; (b) interviewing skills. The first major category of communication, *interpersonal processes*, refers to the linguistic and paralinguistic elements of communication. Within the domain of interpersonal processes, language use and speech patterns are examined in order to describe how communication may reflect underlying social relationships [47]. Commonly known as discourse analysis, these interaction analysis systems have largely developed from the social science literature. Studies may examine both patient and provider communicative behaviors. Communicative behavior is often analyzed at the level of the utterance (i.e., individual speech acts) and generally reported in terms of its frequency of occurrence. Communicative behaviors are generally classified into a priori categories, such as task-oriented behaviors (e.g., disclosure) or socioemotional behaviors (e.g., empathy) [1].

The second major category of communication focuses on *interviewing skills*. The medical interview is viewed as an important means of reaching a diagnosis and initiating appropriate treatment [48]. It enables the clinician to elicit information about the onset, severity and course of the patient's problems and determine the contribution of psychological and social factors. Similarly, during the medical interview a patient can gain a better understanding of his/her problem and obtain recommendations to alleviate or control the problem. Numerous coding systems are designed to examine interviewing skills and offer a means by which such skills can be taught and evaluated. These studies examine two subcategories of interviewing skills: content and technique.

Interviewing skills related to content refer to the ability to gather, synthesize and provide information during a clinical interview [48]. Content pertains to the data acquired and provided by all parties during the clinical interview, including providers, patients and their companions. However, content-oriented analysis systems have tended to focus only on the behavior of the clinician. Definitions appearing in the literature reflect this fact. Information gathering, or data collection, concerns the medical and psychosocial information gathered during the medical history and/or physical examination. Information giving refers to feedback to the patient in the form of education and counseling. Content of the interview is usually reported in terms of the amount of data obtained (i.e., percentage of relevant data solicited from a patient) or ratings of the clinician's ability to gather information during the medical interview.

The second category of interviewing skills, technique, focuses on the competency of the provider to conduct and manage an interview. These skills are believed to form the foundation for a therapeutic relationship [48]. Generally, techniques used in the medical interview are rated with a checklist of competency-based skills. Although the checklists vary in terms of specific skill components, they usually include

the following basic elements: opening and closing an interview; the use of open-ended versus closed-ended questions; listening skills; nonleading questions; transitional statements and/or behaviors that connote the establishment of rapport [49]. Interviewing technique is most often evaluated by trained observers and reported as frequency counts (e.g., presence or absence of a specific skill) or as ratings of various interviewing skills.

Calculation of effect size. For every study that provided the necessary data, effect size was calculated for each subcategory of communicative behavior using Cohen's d [50]. An effect size is used to describe "the degree to which the phenomenon is present in the population" [50, p. 9]. Cohen's d was calculated by dividing the difference between the mean experimental and control groups posttest scores by the pooled (within) standard deviation of the two scores [50]. For studies that did not provide the requisite means and standard deviations, effect sizes were calculated by transforming t-, F- and chi-square statistics [51]. The sign of effect size was set according to the direction of the outcome, with a positive effect size connoting positive outcome and a negative sign before the effect size denoting a negative outcome for the experimental group compared to the control/comparison group. Cohen [50] provides the following guidelines for interpreting effect size: $d = 0.20$ (small effect), $d = 0.50$ (medium effect) and $d = 0.80$ (large effect). For studies that compared more than two experimental conditions (or did not employ a true control or placebo control group), the theoretically most powerful intervention was compared to the least powerful intervention.

Once effect sizes were calculated for individual studies, a test for homogeneity [51] was performed to determine the appropriateness of synthesizing a subgroup of studies. The test for homogeneity of effect sizes (H) is interpreted as a chi-square distribution with $n - 1$ degrees of freedom [51]. Significant heterogeneity among effect sizes was indicated when P was less than 0.05. When effect sizes were deemed to be homogeneous, a mean effect size for the subgroup was calculated and a confidence interval was constructed to assist with interpretation.

Results

Description of studies

Appendices A—D provide a detailed description of each investigation. Studies are grouped according to the type and target of intervention. In the following sections we briefly describe the studies detailed in the appendices. Major issues summarized are: (a) study design; (b) sample characteristics; (c) types of intervention; (d) outcomes.

Study design. A total of 35 studies reported data from a primary study (immediate posttest) and 5 studies were designed to assess the long-term impact of the intervention (herein referred to as behavioral retention studies). Among studies labeled primary investigations, randomization procedures for assigning subjects to treatment conditions were employed in 80% of the studies directed at patient populations and 56% of studies targeted at providers. Quasi-experimental designs were used most frequently in interventions conducted during clerkship and residency rotations. Among behavioral retention studies, three of the five used randomized control designs.

Sample. Twenty-five percent of the studies ($n = 10$) involved interventions directed at patients and 75% ($n = 30$) were directed at providers. In the behavioral retention studies, medical students were followed into their clerkships [16 (three studies are reported)] or residencies/internships [44—45].

Column 2 in each appendix provides a descriptive profile of study participants. There were three particularly noteworthy characteristics of these samples. First, there were sizable differences in the mean number of subjects by both type and target of intervention. Sample sizes in patient-directed interventions were, on average, about twice that of provider-directed

interventions (n = 10, mean = 96.3 (SD = 55)) for patient-directed interventions and n = 30, mean 49.8 (SD = 55) for provider-directed interventions).

Second, considerable variation was found in the thoroughness with which the sample characteristics were reported. Most studies directed at patients supplied information on two or more of the attributes of the study samples. Mean age of the samples ranged from 28 to 58 years. The gender composition of the samples also varied, with about half favoring women and half men. Among provider interventions, one study described the demographic characteristics of the participants and interactants [43].

A third distinct characteristic of these investigations was the use of simulated interactants. Among provider interventions, 19 studies assessed providers' communicative skills in interactions with simulated patients, who were trained to play the role of a patient. In seven of these studies, simulated patients also served as trainers and provided feedback regarding providers' interviewing skills [16 (four studies),17,19,40]. Among patient interventions, Wallston et al. [23] used a research assistant trained to play the role of a nurse.

In summary, investigators of patient-directed interventions were better at providing information on their study samples than were provider-directed studies. Nevertheless, most investigators were not very conscientious in describing the characteristics of the interactants.

Types of intervention. As shown in Table 2, five studies were classified as instruction. All instructional interventions involved a single training session completed prior to the clinic visit (see Appendix A for details).

Feedback interventions were targeted solely at health-care providers. As indicated in Table 2, three studies used only a single feedback session. In the seven remaining studies, feedback was supplemented by instruction. Length of training was reported in only four studies, varying between 1.5 and 4 h (see Appendix B for complete details).

Table 2. Frequency of single versus multiple component[a] interventions by type and target of intervention.

Type of intervention	Target of intervention	Single component program	Multiple component program
Instruction	Patients	4	0
	Providers	1	0
Feedback	Patients	0	0
	Providers	3	7
Modeling	Patients	1	1
	Providers	0	4
Skill practice	Patients	0	4
	Providers	0	15

[a]Component refers to the number of different types of intervention strategies that were combined within a single treatment program (e.g., instruction plus modeling).

Among interventions grouped as modeling, two were directed at patients and four at providers. One study employed modeling alone, two combined modeling with instruction, one used feedback and two included instruction and feedback. Training time was reported in three studies; implementation time ranged from 13 min to 15 h (refer to Appendix C).

As revealed in Table 2, skill practice was the most frequently employed intervention. This broad category incorporated multiple strategies. All but one study included instruction, nine incorporated all types of strategies but modeling and nine others included all other intervention strategies. Training time was reported in seven studies, with implementation time ranging between 20 min and 30 h (see Appendix D).

Outcomes: communicative behaviors. Table 3 provides a descriptive summary of the types of communicative behaviors examined, sorted by target of intervention. In addition, a listing of the interaction analysis systems employed and

Table 3. Summary and classification of interaction analysis systems (IAS) and coding reliabilities by type of communicative category and target group.

COMMUNICATIVE BEHAVIOR Category[a]	Target group		Reference for systems used
	Patient (frequency)	Provider (frequency)	
INTERPERSONAL PROCESSES			
Task-oriented behaviors			
Interactional analysis systems[b]			
Standardized system	5	2	52, 53, 54
Modified system	2	—	54, 55
Unique	3	—	—
Reliabilities[c]			
≥0.80	6	1	
≤0.79	1	—	
Not reported	3	1	
Socioemotional behaviors			
Interactional analysis systems[b]			
Standardized system	—	6	33, 56—59
Modified system	1	1	55, 60
Unique	—	—	—
Reliabilities[c]			
≥0.80	—	4	
≤0.79	1	3	
Not reported	—	—	
INTERVIEWING SKILLS			
Content			
Interactional analysis systems[b]			
Standardized system	—	10	17, 33, 56, 61, 62
Modified system	—	3	17, 63
Unique	—	1	—
Reliabilities[c]			
≥0.80	—	10	
≤0.79	—	1	
Not reported	—	3	
Technique			
Interactional analysis systems[b]			
Standardized system	—	14	17, 33, 56, 61—65
Modified system	—	7	17, 33, 62, 66
Unique	—	4	—
Reliabilities[c]			
≥0.80	—	18	
≤0.79	—	1	
Not reported	—	6	

[a]Categories are not mutually exclusive.
[b]Standardized refers to established IAS, modified refers to adapted IAS, and unique refers to studies that developed an IAS for use in the current study.
[c]Reliability was determined by reports of interrater/intrarater reliability for the current study.

interrater reliabilities for coding communicative behaviors are reported.

Regarding interpersonal processes, all 10 patient-directed studies were classified into interpersonal processes categories whereas only nine provider-directed studies involved communicative behaviors in this domain. Standardized interaction analysis systems were most frequently employed, including nine different interaction systems. Overall, 55% of the reported interrater reliabilities were greater than 0.80.

Among those studies that targeted their interventions at interviewing skills, all were provider-directed interventions. The most frequently employed systems were developed by Stillman et al. [17], Maguire et al. [33] and Helfer et al. [63]. Nevertheless, there was considerable variation in use of different analysis systems because many investigators altered standardized systems for their study. Refer to Table 3 for specific data concerning content and technique categories.

Effect size

Although it would be desirable to compare the relative efficacy of different types of interventions, we determined that such an analysis was inappropriate for several reasons. Firstly, many researchers used combinations of various intervention strategies rather than a single type of intervention strategy, with only nine using a single-component intervention. Secondly, 11 studies failed to provide minimal data with which to calculate effect sizes. This occurred primarily among interventions targeted at residents and community-based physicians, which necessitated conducting separate analyses by target groups. Finally, many of the studies included multiple dependent variables, which when combined into a single meta-analysis would inflate the Type I error rate [51]. Thus, comparisons of different types of interventions were not possible.

To overcome these limitations, we followed the recommendations of Kulik [67] and Rosenthal [68] and examined subcategories of communicative behaviors by specific target groups. Moreover, we only calculated a mean effect size when the subgroup was determined to be homogeneous.

Effect sizes (ES) comparing the treatment to the control/comparison group are presented in Table 4 . When comparing results across studies, the following should be kept in mind: types of interventions being compared, type of interactants, study design and quality rating. Studies are divided into three main groups: interpersonal processes, interviewing skills and behavioral retention studies.

Interpersonal processes. All 10 patient intervention studies examined various types of interpersonal processes whereas only 9 out of 30 provider intervention studies assessed interpersonal processes. Patient interventions had a mean quality rating of 2.2, ranging from 0 to 3. Among provider interventions, mean quality rating was 2 and varied between 0 and 3.

Patient-directed interventions were organized together as the first major subgroup of studies in Table 4 . Task-oriented behaviors are behaviors involved in the exchange of information such as question-asking, information-seeking and latency (the number of seconds until the patients' first bid for clarification). Socioemotional behaviors are categorized together as anger and affect.

For question-asking behavior, ES values were homogeneous ($H = 4.37$, 6 df, $P > 0.05$), ranging between 0.28 and 0.68. The mean ES was 0.44 (SD = 0.17), with a 95% confidence interval of +0.32 to +0.56. Overall, this group of interventions had a significant and moderate effect on question-asking behavior. For information-seeking, the ES values from four studies were homogeneous ($H = 3.45$, 3 df, $P > 0.05$), ranging from 0.32 to 1.00. The mean ES was 0.60 (SD = 0.29), with a 95% confidence interval of +0.32 to +0.88. The ES values for latency of patients' first bid for information were not homogeneous (see Table 4). Effect size values were 0.46 and 1.66 [23,24], respectively. For patient disclosive behavior, which

Table 4. Effect sizes of studies by type of communicative behavior and target group.

Reference no.	Intervention[a]				Control/comparison[b]						Study design	Quality rating	Effect sizes[c] communicative behavior			
	IN	FB	MO	SP	NT	PC	IN	FB	MO	SP			Question asking[d]	Information seeking[d]	Latency[d]	Anger/ affect[e]
INTERPERSONAL PROCESSES																
Patients[f]																
[13$_1$]	X				X						QE	0	0.50	—	—	—
[13$_2$]	X				X						QE	0	0.68	—	—	—
[12]	X					X					R	3	0.28	—	—	(−) 0.29
[14]	X					X					R	2	0.28	—	—	—
[23][g]	X		X			X					R	2	NA[i]	—	1.66	—
[24][h]			X			X					R	3	0.61	—	0.46	—
[29]	X	X		X		X					R	3	0.43	1.00	—	0.49
[30]	X	X		X		X					R	3	0.29	0.60	—	NA
[31$_1$]	X	X		X		X					R	3	—	0.32	—	—
[31$_2$]	X	X		X		X					R	3	—	0.48	—	—
Summary statistics																
H[j]													4.37	3.45	7.58[k]	31.62[k]
Mean ES													0.44	0.60	—	—
(SD)													(0.17)	(0.29)		
CI[l]													+0.12	+0.28	—	—

Reference no.	Intervention[a]				Control/comparison[b]						Study design	Quality rating	Effect sizes[c] communicative behavior			
	IN	FB	MO	SP	NT	PC	IN	FB	MO	SP			Explanations/ involvement[d]	Patient expositions[d]	Empathy/ affect[e]	Global rating[e]
Medical students[m]																
[15][n]	X				X						R	3	—	—	—	(−) 0.32
[25]	X		X		X						QE	2	—	—	—	NA
[26]	X	X	X		X						R	3	—	—	—	0.05
[32]	X	X	X	X			X		X		R	2	—	—	1.36	—
[35][n]	X	X	X	X			X	X	X	X	R	1	—	—	4.47	—
Summary statistics																
H													—	—	15.17[k]	1.62
Mean ES													—	—	—	(−) 0.14
(SD)																(0.26)
CI													—	—	—	+0.36
Residents[m]																
[43]	X	X		X	X						QE	2	1.08	1.28	—	—
[39][n]		X	X	X			X	X			QE	0	NA	—	—	—
[41]	X	X	X	X			X				R	2	—	—	NA	—
Summary statistics																
H													NA	—	—	—

Table 4 (*continued*)

Reference no.	Intervention[a]				Control/comparison[b]						Study design	Quality rating	Effect sizes[c] communicative behavior			
	IN	FB	MO	SP	NT	PC	IN	FB	MO	SP			Explanations/ involvment[d]	Patient expositions[d]	Empathy/ affect[c]	Global rating[c]
Nurse practitioners[m]																
[28]	X	X	X				X				R	3	1.53	—	—	—
Summary statistics																
H													—	—	—	—
													Content		Technique	
INTERVIEWING SKILLS																
Medical students[m]																
[15][n]	X				X						R	3	(−) 0.17		(−) 0.27	
[17][n]		X			X						R	1	1.26		2.16	
[18]		X			X						R	2	—		1.13	
[26]	X	X	X		X						R	3	—		0.22	
[36]	X	X		X	X						QE	3	1.00		1.29	
[37][n]	X	X	X	X					X		QE	2	—		NA	
[16$_1$][n]	X	X					X				R	3	0.97		1.34	
[34][n]	X	X		X			X				R	2	0.95		1.21	
[38][n]	X	X	X	X			X				R	3	0.56		0.79	
[32]	X	X	X	X			X		X		R	2	—		1.21	
[33][n]	X	X	X	X					X		R	2	1.56		2.36	
Summary statistics																
H													21.35[k]		153.31[k]	
Residents[m]																
[19][n]	X	X			X						QE	1	NA		NA	
[20]	X	X			X						QE	1	—		NA	
[27][n]		X	X		X						R	4	—		1.11	
[40][n]	X	X	X	X	X						QE	0	NA		NA	
[42]	X	X		X			X				QE	0	—		NA	
[41]	X	X	X	X			X				R	2	NA		NA	
Summary statistics																
H													NA		NA	

Community physicians[m]												
[21]	X			X					QE	2	—	NA
[22][n]	X	X			X				R	2	—	NA
Summary statistics												
H											—	NA
Child Health Associates[n]												
[46]	X	X	X	X			X		QE	1	NA	NA
Summary statistics												
H											—	—
BEHAVIORAL RETENTION STUDIES												
Medical students[n]												
[16_2]	X	X					X		R	3	NA	NA
[16_3]	X	X			X				QE	2	NA	NA
[16_4]		X						X	QE	2	NA	NA
Summary statistics												
H											NA	NA
Residents[m]												
[44]	X	X		X	X				R	4	—	0.93
[45]	X	X		X	X				R	3	—	NA
Summary statistics												
H											—	NA

[a]Abbreviations are: IN = instruction; FB = feedback; MO = modeling; SP = skill practice.
[b]Abbreviations are: NT = No treatment (true control); PC = placebo control.
[c]The sign of the effect size is set according to the nature of the outcome, with a positive effect size always connoting positive outcome for the experimental group compared with the comparison group (i.e., true control, placebo control, or another treatment group).
[d]Task-oriented behavior.
[e]Socioemotional behavior.
[f]The interactant was a physician unless otherwise indicated.
[g]The interactant was a nurse educator.
[h]The interactant was a patient educator.
[i]NA refers to the fact that effect size could not be calculated due to insufficient data.
[j]*H* refers to test for homogeneity.
[k]The *H* statistic is statistically significant, therefore, it is judged inappropriate to combine scores within the subgroup of studies.
[l]Refers to 95% confidence interval.
[m]The interactant was a patient unless otherwise indicated.
[n]The interactant was a simulated patient unless otherwise indicated.

is not reported in Table 4, ES was 0.57 [24].

Turning to patients' socioemotional behaviors, ES values for patient anger and affect were not homogeneous. One study provided data with which to calculate ES for affect [29], which was 0.49. The ES for patient anger was -0.29 [12], indicating that patients in the placebo-control group expressed less anger compared to the experimental group.

In summary, among studies that received a quality rating of 2 or greater, the smallest ES values were found for instructional interventions that assessed question-asking behavior [12—14]. The largest ES values were found among modeling interventions that examined question-asking behaviors and/or latency [23—24] as well as skill practice interventions that examined information-seeking behaviors [29—31].

Provider interventions assessing interpersonal process variables are the next major subgroup of studies in Table 4 . Effect size values for task-oriented behaviors are listed in the first two columns. This includes provider explanations/involvement and patient expositions (i.e., patients talking about their concerns using their own words). The second two columns include the ES values for socioemotional behaviors (empathy/affect and global ratings). Three studies examined explanations/involvement variables [39,43,28], with one study also assessing patient expositions [43]. Homogeneity could not be assessed due to the small number of studies and/or missing data. Effect sizes ranged from 1.08 to 1.53.

For providers' socioemotional behaviors, ES values could be calculated for two of three studies but they were not homogeneous. Effect sizes were 1.36 and 4.47 [32,35], respectively. For global ratings, ES values that could be calculated were negative (-0.32) [15] or small (0.05) [26]. In the case of the former [15], the intervention focused on teaching about disease processes rather than communication skills.

The dearth of studies examining any given behavior and the wide variability of the types of provider-targeted interventions prevents drawing conclusive statements about the relative efficacy of these interventions on interpersonal processes.

Interviewing skills. Effect sizes for content and technique skills are also presented in Table 4 . A total of 20 primary investigations examined interviewing skills. All of these studies were targeted at health care providers, with four also involving interpersonal process variables [15,26,32,41].

Interventions targeted at community physicians and child health associates had mean quality ratings of 2 and 1, respectively. Interventions targeted at medical students had a mean quality rating of 2.36, ranging from 1 to 3. Among the seven studies assessing content, the effect sizes were not homogeneous and ranged from -0.17 to 1.56. The outlier for this study was a negative effect size for the one instructional intervention [15]. Removing this outlier, interventions exhibited moderate to large effects on enhancing content of providers interviewing skills.

Ten of 11 studies examining technique (see Table 4) provided data with which to calculate effect size. Effect sizes were not homogeneous; they ranged from -0.27 to 2.36. As with content skills, results varied within intervention types but generally indicated a moderate to large impact on interviewing technique.

Interventions targeted at residents had a mean quality rating of 1 and ranged from 0 to 4. Effect size could not be calculated for four studies examining content because the necessary data were not provided. For technique, only 1 of 7 studies provided sufficient data with which to calculate effect size [27].

The three studies targeted at community-based physicians and child health associates [21—22,46] were similar to resident interventions, in that no studies provided sufficient data with which to calculate effect size.

Behavioral retention studies. Among behavioral retention studies the mean quality

rating was 2.8 and ranged from 2 to 4. Unfortunately, only one study provided the necessary data to calculate effect size [44].

In summary, among interventions targeted at providers other than medical students, including the behavioral retention studies, the majority of articles failed to include the necessary data to calculate effect sizes. As a result, little can be concluded about the relative efficacy of these interventions on provider interviewing skills.

Patient-care outcomes. Patient-targeted interventions were more likely than provider-targeted interventions to include patient-care outcomes in their studies. Given the diversity of outcomes examined across studies, effect sizes were not calculated for patient-care outcomes. However, major findings for these variables are reported in the appendices.

Summary and discussion

This study was designed to: (a) provide a review of intervention studies designed to enhance the communicative skills of health-care providers and/or patients; (b) address similarities and differences in methodologies, strategies and outcomes of these investigations; (c) contrast and summarize interventions targeted at various communicative behaviors. A descriptive review of 40 studies revealed considerable variation in the types of interventions employed and the types of communicative behaviors studied. A breakdown of interventions and calculation of effect sizes offered the basis for comparison and preliminary discussions of the impact of interventions targeted at interpersonal processes and interviewing skills. The conclusions of this study, however, must be considered in light of the limitations posed by the studies themselves as well as the meta-analytic procedures employed.

Limitations of the data

Only some of the more critical methodological concerns are discussed here. These points generally pertain to a number of studies rather than to one or two isolated studies. The following discussion of critical methodological concerns includes: (a) defining the treatment; (b) sample size and subject descriptions; (c) assessment of dependent variables; (d) maintenance and generalization.

Defining the treatment. One of the most persistent problems encountered is inadequate description. Many studies provide incomplete descriptions of their interventions, with information about the duration, frequency and cost of interventions being most consistently omitted. This is a particular problem for interventions reported in the medical literature. Another limitation of these studies lies in the inadequate conceptualization of the intervention and its intended effects. With few notable exceptions [12,14,23,24,32,35], most studies do not reveal any underlying theory guiding the selection of intervention strategies and communication behaviors. For the purposes of this paper, we employed social cognitive theory [10] to classify and group intervention types. Without clear conceptual linkages between intervention strategies and communicative behaviors it is not possible to identify the mechanisms related to behavioral change.

Sample size and description. Without information about sample size the reader is hard pressed to tell whether nonsignificant findings are due to low power to detect group differences or merely a weak intervention. Study weaknesses are primarily due to small sample sizes and/or failure to employ random assignment. When sample size is small, the power of a statistical test is reduced, thus increasing the probability of a type II error. For example, when the researcher aims for a two-tailed test of means with minimum power of 0.80 at the alpha level of 0.05, a minimum of 64 subjects per group is required to detect a medium-sized effect ($d = 0.50$) [50]. Future studies should indicate safeguards taken against both Type I and II errors [50].

Much information is lost through sparse reporting of the demographic attributes of study samples. For example, among provider

interventions it is rarely possible to abstract more than subjects' year in medical training. Likewise, the characteristics of interactants are often unreported. Given the established importance of demographic characteristics of the interactants in descriptive studies [1], more attention should be paid to reporting and analyzing the impact of these variables in intervention research. Finally, how subjects are selected into the study is frequently confined to a sentence or two and in some cases was altogether absent.

Dependent variables. Analysis of communication exchanges in research on patient-provider relationships is complicated but critical. Perusal of the appendices reveals a number of instances where investigators conducted a separate analysis for each item comprising a scale. Consequently, significant differences between groups are found for some items but not others. The practice of performing multiple tests should be avoided because it is likely to capitalize on chance. In future studies, when authors seek to reduce a large number of items into subcategories, we recommend that factor analytic methods, based on sound theory, be employed [69—70].

Interaction analysis systems used in the studies reviewed vary widely in terms of their origin and methodology. In terms of provider interventions, more attention should be paid to patient education techniques. For patient communication, future studies should be expected to extend assessments beyond question-asking behavior. Examples of variables to be measured include indices of patient information-seeking behavior [29—31], patient disclosures [24] and time disposition measures (e.g., latency of patients' initiation of topics) [23—24]. Future studies need to also attend to content of the interaction, which may help to establish linkages between communication behaviors and patient-provider role relationships [47]. Furthermore, research could benefit from studies that compare various interaction analysis systems [71].

Although there is general agreement that the goal of these interventions is to improve patient care, few of the studies on provider interventions actually examine patient-care outcomes. Although the majority of patient oriented studies examine some type of outcome beyond communicative behaviors, most focus on immediate outcomes such as patient satisfaction. The studies of Greenfield et al. [29—31] are unique in that they report on the impact of interventions on health status variables (see [31] for a summary of this work).

Maintenance and generalization. Most research is being conducted in naturalist medical care settings; however, a large number of the interventions focus on interviewing skills that are specific to a speciality (e.g., psychiatry) and/or do not take into account contextual factors (e.g., type of illness). Teaching preclinical students frequently involved interactions with simulated patients. Whether or not the skills acquired through these mechanisms generalize to other situations is yet to be shown. The long-term efficacy of interventions is largely unknown because so few behavioral-retention studies have been published.

Strengths and limitations of this meta-analysis

This study addressed a primary criticism of meta-analysis by following specified procedures intended to maximize reliability and validity [50]. Interrater reliability of coding was enhanced by independently reviewing all studies. Sampling bias, for example, was reduced by the exhaustive measures taken to search and retrieve studies using both computer and manual strategies. However, other unpublished reports of interventions may exist that are not included in this review. Conclusions drawn from reviews of published studies always run the risk of the so-called file-drawer bias.

The necessity of subgrouping outcomes by target groups produced smaller cell sizes than are desirable. This decision to favor distinct subgroupings of studies was made to avoid the apples and oranges problem discussed by Glass et al. [8] and to provide a more detailed analysis

Table 5. Checklist for patient/provider communication interventions.

1.	Has a needs assessment been conducted (i.e., have the perceptions and needs of patients and providers been determined)?
2.	What communicative behaviors are going to be the target of intervention?
3.	Is there clear theoretical rationale for the strategies chosen to effect the desired outcomes (both communicative behaviors and patient-care outcomes)?
4.	Is there an explicit scheme for planned intervention?
5.	Are the resources required to conduct the intervention available?
6.	Is there support from the staff that will be involved in the program?
7.	Is there a plan for evaluation?
8.	In preparing reports and publications, are the sample characteristics, methods, and statistical analyses described thoroughly?

of the effects of interventions on differing types of outcome. The heterogeneity of most of the subgroups attests to the appropriateness of our decision.

Practical implications

Based on our literature review, we now pose some key questions for patient educators to consider when developing communication interventions. Through examining the questions listed in Table 5 we hope to identify some of the ways in which patient educators can contribute to the development of communication interventions.

The importance of assessing antecedent factors to patient-provider interactions is listed first in Table 5. This is a direct result of the increasing recognition that the success of patient-provider communication is due, in part, to preexisting beliefs brought to the interaction by all participants. Simonds [72], for example, recommends that a behavioral-educational diagnosis can be applied to guide assessment processes. In addition, specific instruments have been developed to assess patients' desires for control in the medical interactions [73]. Patient educators might also benefit from drawing upon the work of other disciplines, such as Kleinman's anthropological conceptualization of explanatory models of illness and the negotiated meaning within the encounter [74]. Patient educators can provide input regarding which patients may benefit from a specific type of intervention and under what conditions.

Questions 2 and 3 pertain directly to developing communication interventions. These issues were discussed in considerable detail in the prior section on dependent variables, therefore, only a few key points will be reiterated here. As noted by Strecher [75], the repertoire of interpersonal skills addressed in much of the medical education literature is based on counseling models and tends to be weighted heavily toward information-gathering skills. Relatively little attention is devoted to information provision, patients' understanding of information given, or education about preventive practices or self-management skills.

Physicians need to develop a repertoire of patient-education strategies for use in their time limited interactions with patients [76]. For example, clinicians who lack training in setting achievable behavioral objectives and goals are likely to focus their educational efforts on outcome (e.g., lose 50 pounds) rather than behaviors and, therefore, leave the patient to his/her own devices. To date, health care providers have not been rewarded for time spent informing and educating patients [77]. The approaches adopted towards communication interventions will obviously be influenced by

professional norms and values. A structural change at the macro level of the health care system, in addition to micro level changes, may be necessary to advance educational interventions.

Surprisingly, most interventions have only examined dyadic relationships between a single patient and provider. As shown quite recently, the presence of a companion is not uncommon in medical consultations [78]. Health care providers' skills in interacting with patients and their companions have received little attention. Strategies designed to marshal support from companions are discussed in the practice-oriented literature [79] but await testing in terms of communication interventions.

As indicated previously, a primary limitation of these studies is the lack of theoretical models to guide investigators. However, this situation appears to be changing of late. For example, Roter et al. [1] have introduced an explanatory model of medical encounters, entitled the "theory of reciprocity." Additionally, models of patient-provider interactions are described by Pendleton et al. [80], Tuckett et al. [81], Kleinman [74] and Demak and Becker [77], to name a few. It is yet to be seen how these models influence the development of communication interventions.

The fourth question posed asks if there is an explicit scheme for planned intervention. In the intervention studies to date, little attention has been given to targeting the communicative behaviors of both providers and patients simultaneously. These two arenas need to be integrated more fully in order to maximize the potential impact of interventions. Patient-provider relations should benefit when both patient and provider give and receive adequate information. Although the majority of interventions targeted at either patients or providers have shown promise for short-term effects on communicative behaviors, unless communication is observed and measured over longer periods of time, conclusions about the long-term effects of these interventions on patient-provider interactions are limited. Long-term maintenance of behaviors may require multiple opportunities for skill practice and reinforcement.

Having stated the ways that patient educators can contribute to the development of interventions, the next set of questions (5 and 6) focuses on the issue of resources, both monetary as well as support from staff. Although cost analyses were not available in this review, interventions clearly vary in their scope and required time of clinical staff. Indeed, a number of the interventions described in this review do not conform to the traditional clinic atmosphere. Some interventions, such as videotaped modeling, may offer several programmatic advantages over face-to-face didactic interventions. For example, modeling interventions may be incorporated directly into patient education videotapes, allowing clinical staff more time to work on elements such as skill practice and feedback. We need interventions that allow for convenient transfer to similar patient populations and clinical settings.

The final set of questions focuses on the design and reporting of communication interventions. Practitioners and researchers must combat a number of fundamental problems for progress to continue. The need for theory to guide the development of interventions, current methodological limitations and the changing complexion of the medical care encounters are among these important considerations [82]. In addition, practitioners have the responsibility of making their research methods and findings accessible to clinical and research audiences. In this regard, intervention programs could benefit from collaborative work with interdisciplinary teams, including health educators, psychologists, clinicians and medical educators.

The next few years will be exciting and challenging. We are facing the challenge of collaborating with other disciplines to construct efficient and effective ways of integrating communication intervention into ongoing medical care. The findings from our review support the

view that communication interventions are a sound approach for enhancing patient and provider communicative skills. The difficulties that we confront are not insignificant but the prize may be improved care for patients and more rewarding interactions for both patients and providers.

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Appendices

Column 1 lists the name of the author(s), year of publication, reference and study design. Column 2 describes the characteristics of the study sample, assessment period, trainers and interactants (i.e., patients or providers). In column 3, a brief synopsis of the treatment, control and/or comparison conditions are presented. Column 4 lists the major communicative variables studied as well as outcomes related to patient care. The final column specifies the major study findings. Note that Column 4 contains each dependent variable and Column 5 the corresponding findings. Other information pertaining to each appendix is provided in the corresponding endnotes.

Statistical significance was defined as $P < 0.05$. The greater than symbol (>) is used to indicate statistically significant differences in the dependent variable among the various treatment conditions being compared. The notation NS indicates that no significant differences were found between the groups on the variable of interest. We included findings based on total scale scores and subscale scores unless selective communicative variables that represented individual speech acts (i.e., question-asking behavior) or patterns (i.e., physician exposition) were assessed by the authors as the major variables of interest. Findings based on individual items that comprised a scale were not reported, even though some authors conducted these analyses in their studies.

Appendix A. A descriptive summary of instructional interventions by target of intervention.

Authors/ design[a]	Methods/ sample	Intervention description[b]	Dependent variable(s)	Major findings
		TARGET: Patients		
Roter, 1977 [12] R Posttest only	*N* 200[c] *Sample:* Outpatients, county health clinic; low SES;[f] majority women *Assessment:* Immediate[g] *Trainers:* Health educator *Providers:* Not described	E Ten-minute session: Educator used protocol to elicit patient's questions and encouraged patient to speak up during visit PC Ten-minute session: Educator described services of clinic	*Interpersonal processes*[d] (AR; B; ≤0.79)[e] 1. Number of direct questions posed by patients 2. Number of indirect questions asked by patients 3. Ratio of direct questions to total number of interrogatives 4. Global rating Negative affect 5. Length of visit *Outcomes:*[h] 1. General satisfaction 2. Appointment keeping 3. Control orientation	 E > PC E vs. PC, NS E > PC E > PC E vs. PC, NS E < PC E > PC E > PC
Robinson and Whitfield, 1985 [13] Study 1 QE Postest only	*N* = 131 *Sample:* Private practice patients; low SES[f] *Assessment:* Immediate[g] *Trainers:* Not applicable, slips handed out by clerk *Providers:* 2 physicians	E_1 Patient given slip to check understanding of instruction during visit E_2 Patient given slip giving permission to ask questions during visit C No treatment	*Interpersonal processes* (AR; NR; NR)[e] Number of questions/comments posed by patients *Outcomes:*[h] 1. Number of patient errors 2. Patient understanding of instructions	 $E_1 > E_2$ and C $E_1 < E_2$ and C Group differences, NS
Robinson and Whitfield, Study 2 [13] QE Posttest only	*N* = 127 *Sample:* Private practice patients; high SES[f] *Assessment:* Immediate[g] *Trainers:* Not applicable, slips handed out by clerk *Providers:* 1 physician	E_1 Patient given slip to check understanding of instruction during visit E_2 Patient given slip giving permission to ask questions during visit C No treatment	*Interpersonal processes* (AR; NR; NR)[e] Number of questions/comments posed by patients	 $E_1 > E_2$ and C

Tabak, 1988 [14] R Posttest only	$N = 67$ *Sample:* Outpatients $\bar{x}$ age 35 years; $\bar{x}$ education 13 years; 81% women *Assessment:* Immediate[g] *Trainers:* Not applicable booklet handed out by research assistant *Providers:* 1st, 2nd year residents	E PC	Booklet: Provided examples of questions to ask physician Booklet: Described clinic services	*Interpersonal processes* (AR; B; NR)[e] Number of questions posed by patients *Outcomes:*[h] Correlation between patients' questions and satisfaction	E vs. PC, NS NS correlation
			TARGET: Medical Students		
Wolraich et al., 1981 [15] 2 × 4 factorial: Treatment × Class (year)	$N = 78$ *Sample:* 1st—4th year students *Assessment:* Immediate[g] *Trainers:* Not described *Simulated patients:* Mother of a child with meningomyelocele	E C	Videotaped lecture (45 min) on meningomyelocele No treatment	*Interpersonal processes* [56][i] (VR; NR; ≥0.80)[e] Number of affective-type responses (CBCS) *Interviewing skills* [56][i] (VR, NR; ≥0.80)[e] *Content:* Relevance of data collected (SPCS) *Technique:* 14 competency-based skills (IAQ)	Treatment × Class, NS; Treatment, NS; Class, main effect: 1st year. < 2—4th year Treatment × class, NS; Main effects, NS. Treatment × class, NS; Main effects, NS

[a]R = randomized to treatment(s); QE = quasi-experimental design.

[b]E = intervention group(s); PC = placebo-control condition; C = no treatment, true control condition.

[c]Although the total number of subjects was equal to 250, 50 subjects from the control group were not included in the analysis and were therefore not reported in this review.

[d]Bales interaction analysis [55] system was modified to characterize patient behavior.

[e]*Observational method:* AR = audiotape recording, VR = videotape recording. *Coder status:* B = raters were blind to treatment group assignment, NR = not reported. *Coder reliability:* Reliability categories correspond to those given in Table 3. Reliability assessments ranged from simple reports of the percent of overall agreement between raters to chance-corrected measures that assessed interrater and intrarater agreement over time. Some information was abstracted from earlier published reports of the same sample but may not be referenced in this article.

[f]SES = socioeconomic status.

Appendix A. (*continued*).

[g]Period of time between the intervention and assessment of communicative behaviors.
[h]Although other types of outcomes were reported in some articles (i.e., written case history scores), outcomes reported herein were limited to patient-related outcomes.
[i]Communication behavior coding scale (CBCS) included five behaviors: reinforcing the patient; determining feelings; understanding; using jargon; reassurance. Specific parameters coding scale (SPCS) involved seven content areas: discussions of prognosis about ambulation; prognosis about intelligence; etiology; marital relations; potential guilt feelings; mother's emotional state and secondary medical problems. Interview attributes questionnaire (IAQ) consisted of 14 behaviors, such as eye contact, body language, speech rate, listening ability, and sensitivity [56].

Appendix B. A descriptive summary of feedback interventions by target of intervention.

Authors/ design[a]	Methods/ sample	Intervention description[b]	Dependent variable(s)	Major findings
		TARGET: Medical Students — Preclinical		
Stillman et al., 1977 [16] Study 1 R Pre-posttest	$N = 60$ *Sample:* 1st year students *Assessment:* 6 weeks[e] *Trainers:* Simulated patients *Simulated patients:* 3 trained mothers presenting a history of a child with common medical problems	E_1 Course on interviewing plus videotaped interview with feedback (from trainer) E_2 Course on interviewing (no interview or feedback)	*Interviewing skills* [17][c] (VR; B; ≥ 0.80)[d] *Content:* Amount of data collected *Technique:* Rating of 16 skills	$E_1 > E_2$ $E_1 > E_2$
		TARGET: Medical Students — Clerkship		
Stillman et al., Study 2 [16] R	$N = 60$ *Sample:* 2nd year students *Assessment:* 6 weeks[f] *Trainers:* See study 1 *Simulated patients:* See study 1	E_1 One year later E_1 group (study 1) was given second feedback interview E_2 One year later E_2 group (study 1) was given an initial feedback interview	*Interviewing skills* [17][c] (VR; B; ≥ 0.80)[d] *Content:* Amount of data collected *Technique:* Rating of 16 skills	E_1 vs. E_2, NS E_1 vs. E_2, NS

Stillman et al., Study 3 [16] QE	*N* = 50 *Sample:* 2nd year students *Assessment:* 1 year[e] *Trainers:* See study 1 *Simulated patients:* See study 1	E C	Students who previously had 1 feedback interview during first year No treatment: Students without exposure to feedback	*Interviewing skills* [17][c] (VR; B; ≥0.80)[d] *Content:* Amount of data collected Technique : Rating of 16 skills	 E > C E > C
Stillman et al., Study 4 [16] QE	*N* = 50 *Sample:* 2nd year students *Assessment:* 1 year and 6 weeks *Trainers:* See study 1 *Simulated patients:* See study 1	E_1 E_2	Treatment followed by evaluation 1 year later Treatment followed by evaluation 6 weeks later	*Interviewing skills* [17][c] (VR; B: ≥0.80)[d] *Content:* Amount of data collected *Technique:* Rating of 16 skills	 E_1 vs. E_2, NS E_1 vs. E_2, NS
Stillman et al., 1976 [17] 2 × 2 factorial Treatment × length of clerkship Posttest only	*N* = 36 *Sample:* 2—4 year students *Assessment:* 6 weeks[f] *Trainers:* Simulated patients *Simulated patients:* 2 trained mothers presenting a history of a child with common medical problems	E_1 E_2 C_1 C_2	Videotaped interview with feedback (trainer) during a 6-week clerkship Same as E_1 12-week clerkship No treatment 6-week clerkship No treatment 12-week clerkship	*Interviewing skills* [17][c] (VR; NR; NR)[d] *Content:* Amount of data collected *Technique:* Rating of 16 skills	 Treatment × length interaction: $E_2 > C_2$ E_1 vs. C_1, NS Treatment × length, NS; Treatment main effect: $E_{1-2} > C_{1-2}$ Length of clerkship, NS
Scheidt et al., 1986 [18] R Posttest only	*N* = 105 *Sample:* Description of sample not given *Assessment:* 2 weeks pediatric rotation[f] *Trainers:* Faculty-pediatricians *Patients:* Parents with infants and school-aged children	E_1 E_2 C	Videotaped interview with feedback (trainer) Videotaped interview with feedback (self-critique checklist) No treatment	*Interviewing skills*[g] (VR; B; Consensus)[d] *Technique:* Subdivided into: (a) medical history (15 skills) (b) physical exam (21 steps)	 $E_1 > E_2$ and C $E_1 > E_2$ and C

Appendix B (*continued*).

Authors/ design[a]	Methods/ sample		Intervention description[b]	Dependent variable(s)	Major findings
			TARGET: Residents/Interns		
Farsad et al., 1978 [19] QE Pre-posttest	N = 13 *Sample:* Description of sample not given *Assessment:* 6-week pediatric rotation[c] *Trainers:* Faculty-pediatrician and simulated patients *Simulated patients:* A trained mother presenting a history of a child with common medical problems	E	Didactic session plus a videotaped interview with feedback (trainers)	*Interviewing skills* (VR; NR; ≥0.80)[d] *Content:* Subdivided into: (a) % available data collected (b) % organic data collected (c) % interpersonal data collected *Technique:* Rating of 5 skills[h]	 E vs. C, NS E vs. C, NS E vs. C, NS E vs. C, NS
		C	No treatment		
Dickenson et al., 1983 [20] QE C given pretest; E and C Posttest	N = Not reported *Sample:* 1—2 year residents *Assessment:* 1 year[f] *Trainers:* Not described *Patients:* Mothers during a well-baby visit	E	Four didactic sessions plus a videotaped interview with feedback (unspecified)	*Interviewing skills*[i] (VR; NR; ≥0.80)[d] *Technique:* Subdivided into: (a) structure (organization) (b) function (c) affect	 E vs. C, NS E vs. C, NS E vs. C, NS
		C	No treatment		
			TARGET: Community-Based Physicians		
Verby et al., 1979 [21] QE Pre-posttest	N = 17 *Sample:* Family Practice physicians *Assessment:* 3—5 months[e] *Trainers:* Faculty Family practice *Patients:* Persons in caseload; description not given	E	Videotaped interview with feedback (peers).	*Interviewing skills*[j] (VR; B; ≥0.80)[d] *Technique:* Total score (17 skills) Correlation between length of interview and technique score	 E > C Positive correlation
		C	No treatment		

Terry et al., 1981 [22] R Delayed Posttest	$N = 44$ *Sample:* Family Practice and Internal Medicine physicians *Assessment:* 24 months[f] *Trainers:* Faculty internists and health educators *Simulated patients:* 4 men presenting histories of various types of respiratory disease	E_1 E_2 E_3 E_4 PC	Physician group meetings plus 2 instructional videotapes (illness specific) with feedback Physician group meetings plus 2 instructional videotapes (no feedback) Two instructional videotapes with feedback (self-critique assessment forms) Two instructional videotapes Two placebo videotapes on respiratory disease	*Interviewing skills* (AR; B; NR)[d] *Technique:* Subdivided into: (a) diagnostic skills (b) education skills	Group differences, NS; $E_{1-4} > PC$

[a]R = randomized to treatment(s); QE = quasi-experimental design.

[b]E = intervention group(s); PC = placebo-control condition; C = no treatment, control condition.

[c]Content was determined by comparing the amount of information the provider collected from a mother to the amount of information the mother was actually trained to give her/him. Technique was rated using the Arizona clinical interviewing rating scale (ACIR). ACIR evaluated 16 skills in the following areas: organization, timeline, questioning, transitional statements, documentation of data, and rapport.

[d]*Observational method:* AR = audiotape recording, VR = videotape recording. *Coder status:* B = coders were blind to treatment group assignment, NB = coders were not blind to treatment group assignment, NR = not reported. *Coder reliability:* Reliability categories correspond to those given in Table 3. Reliability assessments ranged from simple reports of the percent of overall agreement between raters to chance-corrected measures that assessed interrater and intrarater agreement over time. Some information was abstracted from earlier published reports of the same sample but may not be referenced in this article.

[e]Pretest to posttest assessment interval.

[f]Length of the clinical rotation in which the intervention was conducted (posttest only).

[g]Adapted, in part, from Stillman et al. [17]. Included eight information-gathering skills and seven skills related to appropriate patient-provider relationships, judged as adequate or inadequate.

[h]Adapted from Helfer and Hess [62]. Five areas were assessed: hypothesis formation; education; anticipatory guidance; reassurance; support.

[i]Adapted from Stillman et al. [17]. Structure involved whether or not the interview was conducted in an orderly and logical fashion. Function involved those aspects of interview that facilitated mutual exchange of information. Affect involved those elements that contributed a positive emotional tone to the interview.

[j]Adapted, in part, from Maguire et al. [32]. The general practice interview rating scale included 17 competency-based skills (e.g., use of facilitation, clarification, encouragement, silence), rated on a 4-point scale.

Appendix C. A descriptive summary of modeling interventions by target of intervention.

Authors/ design[a]	Methods/ sample	Intervention description[b]	Dependent variable(s)	Major findings
		TARGET: Patients		
Wallston et al., 1979 [23] 2 × 2 × 2 factorial: Assertiveness × Instructions (questions) × Modeling	N = 36 *Sample:* Persons role-playing patients with hypertension; $\bar{x}$ age 28 years; 100% women *Assessment:* Immediate[d] *Trainers:* Videotapes designed by psychologists *Providers:* Nurse (played by research staff)	E Ten-minute videotape of a patient (model) demonstrating question-asking behavior (half of subjects were subsequently given a statement to ask questions in education sessions) PC Nine-minute videotape covering information on low sodium diet (half of subjects were subsequently given a statement to ask questions in education session)	*Interpersonal processes* [51] (AR; B; prior study: "high")[c] 1. Number of questions posed by patients 2. Latency of patients' first bid for clarification	Assertive × Instructions × Model. NS; Instruction, main effect Those who got instructions than those who did not Assertive × Instructions × Model: *High assertive subjects* Patients asked questions sooner when exposed to either a model or instructions; *Low assertive subjects* Patients asked questions sooner only when exposed to both a model plus instructions
Anderson et al., 1987 [24] R Posttest only	N = 150 *Sample:* Outpatients hypertension; $\bar{x}$ age 58 years; $\bar{x}$ education 13 years; 100% men; 57% Black *Assessment:* Immediate[d] *Trainers:* Health educator *Providers:* Patient educator	E_1 A 13-min videotape of a patient (model) demonstrating question-asking behavior E_2 A 13-min videotape of a patient demonstrating self-disclosive communicative behaviors PC An 11-min videotape covering information on hypertension (no model)	*Interpersonal processes*[e] (AR; B; ≥ 0.80)[c] 1. Total number of verbalizations Subdivided into: (a) question-asking (b) disclosures 2. Latency of patients' first bid for clarification *Outcomes:*[f] 1. Knowledge of hypertension	E_{1-2} > PC E_1 > E_2 and PC E_{1-2} > PC E_1 < E_2 and PC Group differences, NS

				2. Correlation between question-asking and satisfaction	Positive correlation
			TARGET: Medical Students - Clerkship		
Alroy et al., 1985 [25] QE Pre-posttest	*N* = Not reported *Sample:* 5th year students *Assessment:* 8 weeks[h] *Trainers:* Not described *Patients:* Clinic patients	E	Eight sessions with films depicting various types of communicative behaviors plus discussion of films	*Interpersonal processes*[g] (NPO; B; ≥0.80)[c] Overall rating: 5 behaviors Subdivided into: (a) supporting behaviors (verbal) (b) supporting behaviors (nonverbal)	E increased, C decreased E increased, C decreased E increased, C decreased
		C	No treatment		
Naji et al., 1986 [26] R Pre-posttest	*N* = 304 *Sample:* Description of sample not given *Assessment:* Not reported *Trainers:* Faculty psychiatrists *Patients:* Inpatients/ outpatients with diagnoses of neurosis, alcoholism, or affective disorders	E	Student training: Handouts, videotaped interview with feedback (trainer) plus video-taped modeling (Trainers were taught as students were)	*Interpersonal processes*[i] (AR; B; ≥0.80)[c] Global score: empathy *Interviewing skills* [33][i] (AR; B; ≥0.80)[c] *Technique:* Total score Subdivided into: (a) introduction score (b) main interview score (c) termination score Correlation between data collected and technique rating	Comparison with C not reported E_1 vs. E_2, NS $E_1 > E_2$ E_1 vs. E_2, NS $E_1 > E_2$ Not reported Positive correlation
		E_2	Same as E_1; however, trainers were taught by didactic methods		
		C	No treatment		
Mason et al., 1988 [27] R Pre-posttest	*N* = 60 *Sample:* 4th year students *Assessment:* 8-week ambulatory care rotation[h] *Trainers:* Videotaped program designed by family practitioners and psychiatrists *Simulated patients:* 5 cases involving several illnesses	E_1	41-min modeling videotape with feedback (self-critique workbook)	*Interviewing skills* (VR; B; ≥0.80)[c] *Technique:* Total score Subdivided into: (a) information gathering (b) information giving (c) interpersonal relations (d) physical setting (e) professional manner (f) terminating interview	$E_{1-2} > E_3$ and C Group difference, NS Group differences, NS $E_{1-2} > E_3$ and C Group differences, NS $E_2 > E_{1,3}$ and C Group differences, NS
		E_2	Modeling videotape with narration only		
		E_3	Interview with feedback (self-critique workbook)		
		C	No treatment		

Appendix C. *(continued).*

Authors/ design[a]	Methods/ sample	Intervention description[b]	Dependent variable(s)	Major findings
		TARGET: Nurse Practitioners		
Sullivan et al., 1975 [28] R, C Posttest only	$N = 12$ *Sample:* Description of sample not given *Assessment:* 6 weeks[k] *Trainers:* Not described *Patients:* Older adults living in a county residential facility	E_1 Three weeks of instruction, modeling videotape, plus interview with feedback (peers and self-critique) E_2 Three weeks of instruction on nondirective interviewing	*Interpersonal processes* [57][j] (AR; B; ≥ 0.80)[c] 1. Indirect/direct ratio score 2. Patient/nurse talk ratio score	$E_1 > E_2$ E_1 vs. E_2, NS

[a]R = randomized to treatment(s); QE = quasi-experimental design.

[b]E = intervention group(s); PC = placebo-control condition; C = no treatment, true control condition.

[c]*Observational method:* AR = audiotape recording, VR = videotape recording, NPO = nonparticipant observer. *Coder status:* B = coders were blind to treatment group assignment, NR = not reported. *Coder reliability:* Reliability categories correspond to those given in Table 3. Reliability asssessments ranged from simple reports of the percent of overall agreement between raters to chance-corrected measures that assessed interrater and intrarater agreement over time. Some information was abstracted from earlier published reports of the same sample but may not be referenced in this article.

[d]Period of time between the intervention and assessment of communicative behaviors.

[e]Adapted from Stiles *Verbal Response Mode* system [54].

[f]Although other types of outcomes were reported in some articles (i.e., written case history scores), outcomes reported herein were limited to patient-related outcomes.

[g]Global assessments were determined through semantic differential items: caring vs. indifference, active vs. passive, kind vs. aggressive, self-confident vs. hesitant, and respectful vs. insulting. Communicative behaviors were classified as supporting, neutral, or rejecting. Verbal (e.g., questioning, small talk, listening, calming, empathy) and nonverbal (e.g., writing, nodding, ignoring, smiling, eye contact, supportive) behaviors were scored separately.

[h]Pretest to posttest assessment interval.

[i]Total score involved a summary of 5 areas: introduction to the interview (greetings/seating, and self-introduction); areas of information covered (details of main problem, impact on patient/family, patient's view of problem, predisposing problems, screening questions); main interview (clarifying, rejecting jargon, emotionally loaded material, controlling the interview, repetition, picking up verbal leads, etc.); termination of the interview; global score (warmth, self-assurance, competence, empathy) [33].

[j]Indirect/direct ratio score concerned facilitation of patient involvement. Talk ratio concerned the amount of time each person spoke during the interaction.

[k]Length of the clinical rotation in which the intervention was conducted (posttest-only designs).

Appendix D. A descriptive summary of skill practice interventions by target of intervention.

Authors/ design[a]	Methods/ sample	Intervention description[b]	Dependent variable(s)	Major findings
		TARGET: Patients		
Greenfield et al., 1985 [29,31] R Pre-posttest	*N*= 45 *Sample:* Outpatients peptic ulcer disease; $\bar{x}$ age 55 years; $\bar{x}$ education 13 years; low SES;[d] 91% men *Assessment:* Immediate[e] *Trainers:* Trained clinic assistants *Providers:* 8 staff physicians	E A 20-min didactic session on decision making (medical record review) plus practice with feedback (trainer) PC A 20-min didactic session on ulcer disease	*Interpersonal processes* [53] (AR; B; ≥0.80)[c] 1. Number of questions asked by patients 2. Total number of conversational acts/minute by patients 3. Number of controlling behaviors by patients 4. Ratio of patient to physician conversational utterances 5. Effectiveness of patients' information seeking (Ratio of physician to patient control attempts) 6. Length of interview *Outcomes:*[f] 1. Patient satisfaction 2. Knowledge of ulcer disease 3. Preference for active role 4. Patients' perceptions of: (a) role limitations (b) physical limitations	 E vs. PC, NS E > PC E > PC E > PC E > PC E vs. PC, NS E vs. PC, NS E vs. PC, NS E > PC E < PC E < PC
Greenfield et al., 1987 [30,31] R Pre-posttest	*N*= 59 *Sample:* Outpatients diabetes mellitus; $\bar{x}$ age 49 years; $\bar{x}$ education 13 years; approximately 50% women *Assessment:* Immediate[e] *Trainers:* Trained clinic assistants	E A 20-min didactic session on decision making (medical record review) plus practice with feedback (trainer) PC A 20-min didactic session regarding diabetes mellitus	*Interpersonal processes* [53] (AR; B; ≥0.80)[c] 1. Number of questions asked by patients 2. Total number of conversational acts/minute by patients 3. Number of controlling behaviors by patients	 E vs. PC, NS E > PC E > PC

Appendix D. (*continued*).

Authors/ design[a]	Methods/ sample	Intervention description[b]	Dependent variable(s)	Major findings
	Providers: Clinic personnel characterized as 8 Fellows, and 47 residents/interns		4. Ratio of patient to physician conversational utterances	E > PC
			5. Effectiveness of patients' information seeking (Ratio of physician to patient control attempts)	E > PC
			6. Length of interview	E vs. PC, NS
			Outcomes:[f]	
			1. Patient satisfaction	E vs. PC, NS
			2. Knowledge of diabetes	E vs. PC, NS
			3. Metabolic control Blood glucose levels (Hba1c) (lower levels = better control)	E < PC
			4. Patients' perceptions of:	
			(a) role limitations	E < PC
			(b) physical limitations	E < PC
			(c) self-care	E vs. PC, NS
			(d) overall health	E > PC
			(e) health concerns	E < PC
Kaplan et al., 1989 [31] Study 1 R Pre-posttest	*N*= 105 *Sample:* Outpatients with hypertension; $\bar{x}$ age 54 years; $\bar{x}$ education 8 years; 68% were women; 62% Spanish speaking *Assessment:* Immediate *Trainers:* Trained clinic assistants *Providers:* Physicians working in a free clinic	E A 20-min didactic session on decision making (medical record review) plus practice with feedback (trainer) PC A 20-min didactic session regarding hypertension	*Interpersonal processes* [53] (AR; B; >0.80)[c]	
			1. Number of controlling behaviors by patients	E > PC
			2. Effectiveness of patients' information seeking (Ratio of physician to patient control attempts)	E > PC

Kaplan et al., Study 2 [31] R Pre-posttest	*N*= 43 *Sample:* Outpatients Postmastectomy patients; $\bar{x}$ age 47 years; $\bar{x}$ education 14 years; 100% were women *Assessment:* Immediate[e] *Trainers:* Trained clinic assistants *Providers:* Physicians in private practice	E	A 20-min didactic session on decision making (medical record review) plus practice with feedback (trainer)	*Interpersonal processes* [53] (AR; B; ≥0.80)[c] 1. Number of controlling behaviors by patients 2. Effectiveness of patients' information seeking (Ratio of physician to patient control attempts)	E > PC E > PC
		PC	A 20-min didactic session concerning general information on the etiology, prevalence, and nature of illness		
TARGET: Medical Students — Preclinical					
Moreland et al., 1973 [32] R Pre-posttest	*N*= 24 *Sample:* 2nd year students *Assessment:* 9 weeks[h] *Trainers:* Faculty psychiatrists *Patients:* Outpatients in psychiatry; 4 women	E_1	Interviewing skills course (6 sessions), videotaped modeling, plus videotaped interviews with feedback (trainer)	*Interpersonal processes* [58][g] (VR; B; NR)[c] Attending behaviors *Interviewing skills* [64] (VR; B; ≥0.80)[c]	$E_1 > E_2$ Treatment × Time interaction
		E_2	Interviewing skills course plus observation of other students (no feedback)	*Technique:* Total score (type of utterance)	E_1 demonstrated increases in good statements and decreases in poor statements compared to E_2
Maguire et al., 1977 [33] R Pretest (control) Posttest	*N*= 30 *Sample:* Year of students, not reported *Assessment:* 3 weeks[h] *Trainers:* Faculty psychiatrists *Simulated patients:* 2 cases, not described (students not told they were simulations)	E_1	Handout ("desirable" interviewing behaviors), videotaped modeling, plus videotaped interviews with feedback (trainer)	*Interviewing skills*[i] (VR; NR; NR)[c] *Content:* Amount of data collected *Technique:* Total score Subdivided into:	$E_{1-2} > E_3$ $E_{1-2} > E_3$
		E_2	Videotaped modeling (student created own interviewing technique prior to seeing model) plus videotaped interviews with feedback (trainer)	(a) introduction score (b) main interview score (c) termination score	$E_{1-2} > E_3$ $E_{1-2} > E_3$ $E_{1-2} > E_3$
		E_3	Live modeling (instructor modeled desired behaviors)		

Appendix D. (*continued*).

Authors/ design[a]	Methods/ sample	Intervention description[b]	Dependent variable(s)	Major findings
Betchart et al., 1984 [34] R Pre-posttest	*N*= 12 *Sample:* 2nd year students *Assessment:* Not reported *Trainers:* Not described *Simulated patients:* One case, not described	E_1 Interview skills course plus 4 videotaped interviews with feedback (trained raters) E_2 Interview skills course	*Interviewing skills* [61][j] (NPO; NB; ≥0.80)[c] *Content:* Amount of data collected *Technique:* Total score (rating 12 skills)	$E_1 > E_2$ $E_1 > E_2$
Weihs and Chapadas, 1986 [35] R Pre-posttest	*N*= 32 *Sample:* 1st year students; Family medicine track *Assessment:* 10 weeks[h] *Trainers:* Faculty family medicine *Simulated patients:* 2 cases: swallowing disorder and newly detected breast lump	E_1 Course on interpersonal skills, live modeling, plus videotaped interviews with feedback (peers) E_2 Same as E_1; however no specific model was used for skill definition	*Interpersonal processes* [59] (VR; NR; ≥0.80)[c] Empathy	$E_1 > E_2$
		TARGET: Medical Students — Clerkship		
Maguire et al., 1978 [36] QE Pre-posttest	*N*= 48 *Sample:* Description of sample not given *Assessment:* 3-week Psychiatry clerkship[j] *Trainers:* Faculty psychiatrists *Patients:* Inpatients/ outpatients with diagnoses of neurosis, alcoholism, and affective disorders	E_1 Handouts plus 3 video-taped interviews with feedback (trainer) E_2 Handouts plus 3 audio-taped interviews with feedback (trainer) E_3 Handouts plus 3 interviews with feedback (observation of interview in person by trainer) C No treatment	*Interviewing skills* [33][i] (VR; B; ≥0.80)[c] *Content:* Amount of data collected *Technique:* Total score Subdivided into: (a) main interview score	$E_{1-3} > C$ $E_{1-3} > C$ $E_{1-2} > E_3$ & C
Quirk and Babineau, 1982 [37] QE Pre-posttest	*N*= 84 *Sample:* 3—4 year students *Assessment:* 6-week Family Medicine clerkship[h] *Trainers:* Faculty family practitioners and behavioral scientists *Simulated patients:* Not described	E_1 Readings on interviewing techniques, live modeling (trainer), multiple practice interviews with feedback (trainer) E_2 Same as E_1 (no feedback) E_3 Live modeling plus practice interviews (no instruction or feedback)	*Interviewing skills*[k] (VR; B; ≥0.80)[c] *Technique:* Total score (rating 12 skills)	$E_1 > E_2$ and E_3

Faber et al., 1984 [38] 2 × 2 × 2 × 2 factorial: Observer × Type of interview × Preinterview × Feedback	*N*= 48 *Sample:* 5th year students *Assessment:* 3-week pediatric clerkship[j] *Trainers:* Faculty pediatricians and simulated patients *Simulated patients:* A trained mother presenting history of a child with vomiting or poor appetite	E_1	Instruction on interviewing techniques, videotaped model on history taking, plus practice sessions with feedback (trainer)	*Interviewing skills*[l] (VR; B; ≥0.80)[c] *Content:* Subdivided into: (a) medical history (specific)	Observer × Type Preinterview × Feedback, NS; Preinterview, main effect; Feedback, NS
		E_2	Instruction on interviewing techniques, videotaped modeling, plus practice sessions (no feedback)		
		E_3	Instruction on interviewing techniques	(b) medical history (general)	Observer × Type × Preinterview × Feedback, NS; Preinterview, NS; Feedback, NS
				Technique: Total score (rating 6 skills)	Observer × Type × Preinterview × Feedback, NS Preinterview, main effect; Feedback, NS
			TARGET: Residents/Interns		
Adler et al., 1970 [39] QE Pre-posttest	*N*= 16 *Sample:* 1—3 year Orthopedic residents *Assessment:* 3 weeks[h] *Trainers:* Faculty psychiatrists *Simulated patients:* 2 cases, women with history of headaches/stiff neck and low back pain	E_1	Ten simulated patient interviews designed to model a particular type of communicative behavior (e.g., empathy), plus feedback with portrayal of consequences (feedback programmed into videotape)	*Interpersonal processes* [53] (NPO; NB; NR)[c] 1. Number of direct questions asked by interviewer	E_1 increased; E_2, NC
		E_2	Videotaped interviews with patients plus feedback of selected interviews in large group (peer and trainer)	2. Total number of conversational acts/minute by interviewer	E_1 decreased; E_2, NC
				3. Number of controlling behaviors of interviewer	E_1 decreased; E_2, NC
				4. Engagement index	E_1 increased; E_2, NC
				5. Information ratio	E_1 increased; E_2 increased
				6. Affect index	E_1 and E_2, NC
				7. Number of directions	E_1 decreased; E_2, NC
				8. Number of facilitations	E_1 increased; E_2, NC
				9. Number of confrontations	E_1 and E_2, NC
				10. Number of suggestions	E_1 and E_2, NC
				11. Number of supportive acts	E_1 and E_2, NC

Appendix D. (*continued*).

Authors/ design[a]	Methods/ sample	Intervention description[b]		Dependent variable(s)	Major findings
Levin et al., 1979 [40] QE Pre-posttest	*N*= 24 *Sample:* Internal Medicine residents, no other information (senior medical students served as controls) *Assessment:* 10 weeks[h] *Trainers:* Faculty internist and clinical psychologist *Simulated patients:* 2 cases, medical history containing medical and psychosocial problems	E	Instruction (seminar and readings), videotaped modeling, and individual supervision with feedback (simulated patients)	*Interviewing skills* (VR; NB; NR)[c] *Content:* Subdivided into: (a) medical data collected (b) psychosocial data collected *Technique:* Total score [17][m]	 E and C, NC E increased; C, NC E and C, NC
		C	No treatment		
Robbins et al., 1979 [41] R Pre-posttest	*N*= 51 *Sample:* Internal Medicine residents, no other information given *Assessment:* 8 weeks[h] *Trainers:* Faculty internists, psychiatrist, and psychologist *Patients:* Persons in caseload; first-time interactions	E_1	Instruction (group meetings), videotaped modeling, plus videotaped interview with actual patients and feedback (trainer)	*Interpersonal processes* [59] (VR; B; 0.45)[c] Empathy level Number of empathic responses *Interviewing skills*[n] (VR; B; 0.77)[c] *Content:* [62] Subdivided into: (a) medical data collected (b) psychosocial data *Technique:* Total score [65]	 E_1 increased; E_2, NC E_1 increased; E_2, NC E_1 increased; E_2, NC E_1 increased; E_2, NC E_1 increased; E_2, NC
		E_2	Interviewing skills course		
Verby et al., 1980 [42] QE Pre-posttest	*N*= 17 *Sample:* General practitioners in community *Assessment:* 3—5 months[h] *Trainers:* Faculty family practitioners and psychologists *Patients:* Persons in caseload, not described	E_1	Course on interviewing techniques, plus 6 videotaped interviews with feedback (trainer)	*Interviewing skills*[o] (VR; NR; NR)[c] *Technique:* 1. Total score (17 skills) 2. Correlation between length of interview and technique rating	 E_1 vs. E_2, NS NS correlation
		E_2	Course on interviewing techniques		

Putnam et al., 1988 [43] QE Pre-posttest	*N*= 19 *Sample:* 2nd year Internal Medicine residents; $\bar{x}$ age 27.5 years; 90% men *Assessment:* Not reported *Trainers:* Faculty-internists *Patients:* Persons in caseload; *N*= 268; $\bar{x}$ age 26.8 years; $\bar{x}$ education 12 years; 53% White	E	Two small group sessions plus 5—6 individual sessions reviewing audiotapes with feedback (trainer)	*Interpersonal processes* [54] (AR; B; ≥0.80)[c] 1. Patient exposition 2. Physician explanation *Outcomes:*[f] 1. Patient satisfaction 2. Patient adherence 3. Patient symptom status	 E > C E > C E vs. C, NS E vs. C, NS E vs. C, NS
		C	No treatment		
Maguire et al., 1986 [44] R	*N*= 36 *Sample:* Description of sample not given *Assessment:* 5 year follow-up *Trainers:* Not described *Patients:* Both simulated and actual patients; history of anxiety and acute life-threatening or chronic illnesses	E	Physicians who had received training 5 years earlier	*Interpersonal processes* [33][i] (VR; B; ≥0.80)[c] Overall rating: 4 aspects *Interviewing skills* [32][i] (VR; B; ≥0.80)[c] *Technique:* Subdivided into: (a) introduction score (b) main interview score (c) termination score	 E > C E vs. C, NS E > C E vs. C, NS
		C	No treatment (no prior training in interviewing)		
Maguire et al., 1986 [45] R	*N*= 40 *Sample:* [See 44] *Assessment:* [See 44] *Trainers:* [See 36] *Patients:* [See 36]	E	Physicians who had received training 5 years earlier	*Interviewing skills*[p] (VR; NR; ≥ 0.80)[c] *Technique:* 1. Skill in handling topics 2. Information giving	 E vs. C, NS E vs. C, NS
		C	No treatment (no prior training in interviewing)		
			TARGET: Physician Assistants		
Hutter et al., 1977 [46] QE Posttest only	*N*= 25 *Sample:* Child Health Associates *Assessment:* 15-month program[p] *Trainers:* Faculty-child health associates, social workers, and pediatricians *Simulated patients:* A trained mother presenting child's medical history	E_1	15-month course involving didactic instruction, modeling, and practice with feedback (team of trainers)	*Interviewing skills* [63] (VR; NR; ≥0.80)[c] *Content:* Ability to collect data	 $E_1 \geq E_2$
		$1E_2$	20-hour course on interviewing	*Technique:* Total	$E_1 > E_2$

[a]R = randomized to treatment(s); QE = quasi-experimental design.

[b]E = intervention group(s); PC = placebo-control condition; C = no treatment, true control condition.

[c]*Observational method:* AR = audiotape recording, VR = videotape recording, NPO = nonparticipant observer. *Coder status:* B = raters were blind to treatment group assignment, NB = raters were not blind to treatment status, NR = not reported. *Coder reliability:* Reliability categories correspond to those given in Table 3. Reliability assessments ranged from simple reports of the percent of overall agreement between raters to chance-corrected measures that assessed interrater and intrarater agreement over time. Some information was abstracted from earlier published reports of the same sample but may not be referenced in this article.

[d]SES = Socioeconomic status.

[e]Period of time between the intervention and assessment of communicative behaviors.

[f]Although other types of outcomes were reported in some articles (i.e., written case history scores), outcomes reported herein were limited to patient-related outcomes.

[g]Attending behavior rating scale [57] involved open-ended questions, closed-ended questions, minimal-activity responses, paraphrases, reflections of feeling, and summarization. The therapist error checklist [63] was used to classify utterances as good, fair, or poor.

[h]Pretest to posttest assessment interval.

[i]Total score involved a summary of 5 areas: introduction to the interview (greetings/seating, and self-introduction); areas of information covered (details of main problem, impact on patient/family, patient's view of problem, predisposing problems, screening questions); main interview (clarifying, rejecting jargon, emotionally loaded material, controlling the interview, repetition, picking up verbal leads, etc.); termination of the interview; and global score (warmth, self-assurance, competence, empathy) [33].

[j]Adapted from Stillman et al. [17]. The following skills were rated on a 5-point continuum (unacceptable to advanced): introduction, open-ended questions, simple questions, clarification, transitional statements, facilitation, concerns, eye contact, posture, cover major areas, directs the interview, closing.

[k]Scoring system developed for study. Involved 12 skills: opening, discovering reasons(s) for visit, questioning, direction, feelings, eliciting feelings, understanding, summarizing and paraphrasing, vocal expression, eye contact, posture, and closing.

[l]Content concerned the ability to get information from the mother that was complete and accurate. Technique included skills such as interviewer manner, listening, formulation of questions, rapport, attention to relationship, responsiveness to patient's concerns.

[m]Content was determined by comparing the amount of information the provider collected from a mother to the amount of information the mother was actually trained to give her/him. Technique was rated using the Arizona clinical interviewing rating scale (ACIR) [17]. The ACIR evaluated 16 skills in the following areas: organization, timeline, questioning, transitional statements, documentation of data, an rapport.

[n]Content referred to the amount of medical, psychosocial, general information elicited. Technique concerned the use of the following skills: exploratory, listening, affective, honest labeling, yes/no responses, and semiexploratory responses.

[o]Adapted, in part, from Maguire et al. [33]. The general practice interview rating scale included 17 competency-based skills (e.g., use of facilitation, clarification, encouragement, silence), rated on a 4-point scale.

[p]Based on the work of Ley [66], involved skills related to information-giving behaviors.