Effects of a Brief Behavioral Manual to Train Patient-physician Pairs in Problem Solving to Manage Insulin-dependent Diabetes

BY

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A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of

DOCTOR OF PHILOSOPHY

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DEDICATION

To my loving family and to Dale, who is a part of all that I do.

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Although I am especially grateful to the patients and physicians who participated in my study, they cannot be named publicly. I extend my thanks and appreciation for their willingness to engage with me in my research.

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CONTENTS

Abstract

A multiple baseline design across five patient-physician pairs was used to determine if a brief manual to train problem identification and goal setting behaviors would increase self-control behaviors, and decrease problems of adherence to treatment protocols, in patients with insulin-dependent diabetes. Data sources were medical records, audio recordings of patient-physician encounters and patients' self-reports. Use of the manual increased patients' problem identification and goal setting verbal behaviors, which served as discriminative stimuli for implementation of plans to achieve goals of improved health behaviors, including blood glucose control. Physicians changed their verbal behavior to be more congruent with a patient-centered approach to care. Pairs expressed high satisfaction with the manual. Cost-effectiveness analysis demonstrated relatively low cost for clinically significant changes in problem solving skills and blood glucose control.

Background

Over the past two decades, improvements in problem solving behaviors of both patients and physicians have been of interest as treatment variables in health care research. One hypothesis is that training physicians in problem solving behavior will enable them to assist the development of self-care behaviors in their patients (Jenkins, 1990; WHO, 1990a; 1990b). Another hypothesis is that training patients in problem solving behaviors will lead to better health outcomes with respect to their management of chronic illness (e.g. Black & Scherba, 1983; Black & Threlfall, 1986; Miller, Leinbach, & Brody, 1989; Rovee-Collier, 1983; Sallis et al., 1990).

Diabetes is a chronic illness that continues to receive a high priority worldwide in the search for curative and preventative measures (Brook, 1992; Connell, 1981). A more detailed description of diabetes is provided in Appendix A.

The effects of having insulin-dependent diabetes on individual self-care behaviors are numerous including but not limited to: (a) self-administering insulin of the appropriate type and amount within a specified time period each day; (b) maintaining a rigid diet; (c) staying on a routine exercise schedule and making adjustments to food intake and insulin as activity varies; (d) recording, several times a day, the level of sugar in the urine or blood; and (e) being watchful for signs of insulin shock (Melamed & Siegel, 1980; Moorman, 1983; Popkess-

Vawter, 1983). Patients must engage in the foregoing self-monitoring and self-care behaviors in order to prevent, or forestall, sequelae of diabetes.

Research on the problem solving behaviors of patients and physicians is not integrated as yet, nor is there a great deal of research in the area of diabetes that focuses on problem solving behaviors. However, reviews of research on diabetes have supported the need for a partnership between patient and physician (Chiasson, 1985a; 1985b). This goal has long been acknowledged by physicians in their efforts to promote mutual participation models or client-centered practice (e.g., Barnard, 1984; Cassell, 1979; Epstein, Campbell, Cohen-Cole, & McWhinney, 1993; Katon & Kleinman, 1981; Szasz & Hollender, 1956). Nonetheless, the goal of patient-physician partnerships has not yet been satisfactorily achieved (Black et al., 1991; Hulka, Kupper, Cassel, & Mayo, 1975; Marteau, Johnston, Baum, & Bloch, 1987; Steele, Blackwell, Gutmann, & Jackson, 1987). The problem of agreement on goals between patients and physicians is believed to be most difficult when the patient is labelled by the physician as non-compliant (Callahan, 1990). Whether the patient is labelled as compliant or non-compliant, mutual participation models imply a verbal, supportive relationship between physician and patient.

One study on physician decision-making behaviors found male nurses and physicians used patterns of verbal behavior that are different than patterns used by female nurses and physicians

(Taylor, Pickens, & Geden, 1989). Males were found to use more command statements, such as "You must do this", or "I want you to...". Females used more consequence statements, such as "If you don't.. then this will happen". Both males and females used concordance statements, such as "Let's see how we might do this" much less frequently. Concordance statements are more congruent with mutual goal setting behaviors then are command or consequence statements.

Roter (1984) analyzed audiotape recordings of two physicians and their patients during 123 office encounters to determine the number, content and form of patient questions. Roter concluded that more frequent question asking on the part of the patient correlated with greater self-report of satisfaction with care. The verbal behavior of the physicians was not reported.

Thus far, research has not been focused on the analysis of verbal problem solving behavior in patient-physician dyads. Even when dyad verbal behavior is audiotaped the focus exclusively has been on verbal behavior of one partner, physician or patient. Functional analysis of verbal behavior of patient-physician dyads is incomplete when attention is only focused on one partner (Skinner, 1957, p. 33; 1982).

Now, we will examine research on the problem solving behaviors of patients who have diabetes. This research is limited to a few studies that will be briefly described. A more detailed review of research on problem solving behavior and on diabetes is included in Appendix A. Epstein et al. (1981) used a multiple

baseline design across groups to determine the effects of targeting specific self control behaviors on improvement in glucose control as measured by urine-glucose monitoring. Blood glucose was also measured. This study satisfies many of the methodological concerns that are limitations in research on problem solving behaviors in the management of diabetes. For example; an adequate description of variables was reported; one aspect of treatment integrity (subject compliance) (Gutkin, Holborn, Walker, & Anderson, 1991), social validity, and observer agreement were assessed. Nineteen families with children having insulin-dependent diabetes were randomly assigned to one of three groups: two groups of six and one of seven participants. The intervention consisted of specific instructions to the children regarding insulin adjustments related to diet. Adherence to urine testing was checked by using marked test tablets. As well, parents did spot checks of urine-glucose. Childrens' attendance at the education sessions could earn points toward the accumulation and public posting of smiley faced stickers for achieving glucose control. Although, at a 22 week follow-up, the treatment had resulted in significant clinical improvements in urine-glucose control in all groups, blood glucose control did not improve. Also, 53% of the children made errors in their judgements of the results of urine testing. Thus, the procedure used to ensure one aspect of treatment integrity; adherence to correct urine testing behaviors, failed to include procedures to ensure correct assessment of test results. One limitation of the

study was that behavioral goals were set for the children that were based on traditional diabetic management regimens. These goals may not have been a priority for participants in the research and the extent to which this impacted the behaviors of interest is not known. It could be that in training specific or general problem solving behaviors, the patient's priorities in goal setting are functionally important. Cost effectiveness of the intervention was not analyzed.

Schafer, Glasgow, and McCaul (1982) used a multiple baseline design across behaviors to assess the effect of a treatment package on the maintenance of self-control behaviors in three insulin-dependent adolescents. The compliance aspects of treatment integrity were implicitly, but not systematically, addressed. For example, patient record-keeping provided some evidence of compliance to behaviors leading to goal attainment, although the researchers did not explicitly discuss this activity as evidence of treatment integrity. The treatment procedures, in the research, included goal setting, identification of criteria for measuring short and long-term goal attainment and the use of behavioral contracts, if compliance goals were not achieved. The treatment was effective in maintaining the following self control behaviors; urine testing, exercise, wearing of diabetic identification bracelet, and home glucose monitoring. It did not improve adherence to scheduled insulin injections. The researchers concluded that contracting for short term behavior change was temporarily helpful, but its use for long term

maintenance of behaviors was not explored. Reasons for lack of adherence to scheduled insulin injections were not reported. Social validation and cost effectiveness of the intervention were not assessed.

Glasgow, Toobert, Hampson, Brown, Lewinsohn, and Donnelly (1992) randomly assigned 102 insulin and non-insulin dependent patients, over 60 years old, to either a self-management training group or a control group to determine if training would improve self care behaviors. The 10 training sessions targeted problem solving and self-efficacy skills. Although treatment integrity was not reported, the researchers found improvements in adherence to dietary regimen and glucose monitoring behaviors in the treatment group that were maintained at six month follow-up. Social validity was not assessed nor was cost effectiveness of the intervention.

In summary, although the problems associated with the management of diabetes continue to pose challenges for clinicians, research has been limited in its identification of behavioral techniques that would assist clinicians and their patients as they address these problems. Strategies are also required to assess, and to ensure, treatment integrity, generalization of problem solving behaviors, cost effectiveness, and social validity. Also needed are strategies that bring physicians and patients together as a team to identify problems and treatment priorities to meet the challenges of self-care in diabetes. In this context, behaviorally-based manuals can be

used to ensure a clear description of the independent, or treatment, variable and thus facilitate the assessment of treatment integrity. Manuals, also are a potentially cost effective approach to training (Hanel, Martin, & Koop, 1982; Welch & Holborn, 1988).

The purpose of my research was to evaluate the effectiveness of a behaviorally based instructional manual designed to train patient-physician pairs in two aspects of problem solving behaviors, specifically, problem identification and goal setting for management of insulin-dependent diabetes. The problem identification and goal setting verbal behaviors were targeted for training rather than initiating a complete behavioral self-management program. I assumed that agreement on the problem and goals was a necessary first step prior to pair decision-making on strategies and resources needed to achieve the goals. I expected that the decision-making could take many directions, for example, the pair could continue together or could bring in family members or other health care professionals.

The training of patients and physicians together, as a health care dyad, integrates research which has focused on patient and physicians separately. Further, training pairs should be a cost effective use of training resources by taking training right to the site of diagnosis and treatment, that is the physician's office, thus increasing the potential for generalization (Kirby & Bickel, 1988; Stokes & Baer, 1977; Stokes & Osnes, 1989). If the physician's office served as a

discriminative stimulus for ineffective problem solving to control adherence to the treatment plan (DiMatteo et al., 1993; Silberschatz & Curtis, 1993), then training of effective problem identification and goal setting behaviors should occur and be reinforced in the physician's office. Then, old ineffective behaviors would be replaced by new effective behaviors in this stimulus context. Finally, clear specification of behavioral techniques and assessment of treatment integrity, social validity, and cost effectiveness were included to improve upon methodological limitations of existing research.

Method

Participants

The patient-physician pairs were five pairs in community family practice settings. Physicians in family practice settings provide the majority of primary care to a large percentage of adult patients who have insulin-dependent diabetes (DiMatteo, et al., 1993). Physician participants were credentialed as Family Practice Physicians by the College of Family Physicians of Canada, and were practising in Winnipeg, Manitoba. The physicians first were approached to participate in the research by a faculty member of the Department of Family Medicine, in the Faculty of Medicine, at the University of Manitoba. The faculty member had

been instrumental in the establishment of the Family Medicine Program at the University of Manitoba and could identify graduates of the program who might be interested in participating in the research. Following a physician's initial expression of interest, I contacted the physician and explained the research. Eleven of the twelve physicians contacted agreed to participate. Of these, one participated in a pilot project prior to the commencement of the research, four were unable to find patients who met the criteria, and one patient was unable to complete the study due to new health problems. Five patient-physician pairs completed the research.

In the interest of holding participant variables as constant as possible, I selected adult patients who had been diagnosed by their physicians as having insulin-dependent diabetes and who were judged by their physicians as having problems with adherence to the treatment regimen. In other research physicians have been easily able to identify such patients, whom they frequently describe as presenting difficult management challenges (DiMatteo et al., 1993); however in my study I asked physicians to use the following guidelines in identifying patient participants:

1. Patients who had self-reported, or whose relatives or friends had self-reported, to the physician that there was difficulty in adhering to any aspect of the treatment plan.

2. Patients who the physician suspected were not adhering to the treatment plan because of a known history of non-adherence to treatment plans in other illness contexts.

3. Patients who the physician suspected were not adhering to the treatment plan because physiologic measures of glucose control used in the physician's offices were not within the range defined as acceptable by the physician for that patient.

4. Patients who were using home blood glucose monitoring procedures.

Patients who fit the criteria initially were approached by their physicians to determine interest in participation in the study. Each physician participant identified one patient participant, who was told that if he or she were interested in participating, I would telephone them with details of the research. All patients who were telephoned agreed to participate. Patients who agreed were told that the study would commence with their next visit to the physician's office. Ethical approval from the Human Ethics Committee in the Department of Psychology at the University of Manitoba was obtained prior to the start of the study. Ethics protocols, for patients and physicians are included in Appendix B.

The age of patient participants ranged from 45 to 67 years. They were experienced with the management of diabetes, since they had functioned with the disease for many years (10, 12, 17, 19, and 20 years). Three patients were male, two were female. Two of the male patients and one of the female patients had advanced complications of diabetes, including neuropathy, cardiac, and renal problems. All of the patients were not achieving an optimum level of glycemic control, as specified for them by their

physicians. Patients were identified, by their physicians, as candidates for participation because of long-standing difficulty adhering to treatment plans.

The age of the physician participants ranged from 30 to 50 years. All had an active caseload of patients with diabetes. One physician was male, four were female. There were two male patient-female physician pairs, one male patient-male physician pair, and two female patient-female physician pairs.

Procedure

A multiple baseline design across patient-physician pairs was used to permit a demonstration of experimental control in order to analyze whether use of the manual was responsible for corresponding behavior change in problem solving skills (Baer, Wolf, & Risley, 1968; 1987; Kazdin, 1982). Other behaviors, including patterns of verbal behavior and physiologic measures of blood glucose were analyzed using a pre-test, post-test, and follow-up design. The patient-physician pairs were in the stimulus context of managing health problems as a result of insulin-dependent diabetes. The rationale for selecting the diabetes context was that this context requires a series of patient-physician encounters to manage the illness over time. Acute illness, on the other hand, is usually managed in only a few encounters and may be resolved completely during those encounters.

Chronic illness frequently presents a variety of stimuli for the management of multiple problems. This is certainly true of diabetes. In such a context, problem solving behavior is critical. The pairs jointly participated in problem solving training through the use of a manual developed for my study (Farrell, 1994). The training was individualized to include problems of particular interest to the pair. The manual could be individualized by the patient-physician pairs to focus on any one of a number of treatment adherence problems including but not limited to: self-administering insulin of the appropriate type and amount within a specific time period each day; staying on a routine diet schedule and adjusting this schedule to physical activity level; recording levels of sugar in blood or urine; and being watchful for signs of complications of the disease. In previous research on adherence to treatment, lack of individualization to include problems of interest as well as lack of opportunities for selection of any one of a wide range of problems have been cited as serious shortcomings (DiMatteo et al., 1993; Epstein & Cluss, 1982; Silberschatz & Curtis, 1993). Training, in part, occurred at the time of the usual patient visit to the physician, but the patient also was required to work through the "homework" in the manual between visits to the physician. Because the patient was guided through self-observation behaviors as part of "homework", the patient and physician had ready access to data that would normally take hours of physician office time to collect. This strategy represented an

immediate saving of time for the physician, and in the long term, also for the patient, by replacing vaguely specified behaviors with clearly specified, targeted behaviors for change.

The patient-physician pairs' verbal behaviors during office visits were audio-recorded (Sony TCM-9, Flat Mic) at the time of the visit. Baseline and treatment data on the patient's health problems including specific problem descriptions, treatment plans, goals of treatment, and physiological indicators of glucose control, were collected through retrospective, and concurrent, review of the physicians' recording on the patients' medical records.

Prior to the use of the manual, I met the patient at the physician's clinic where, in an assigned private space, the patient completed the self report questionnaires described in the instrumentation section that follows. The patient and physician then together discussed their approach to two simulated problems (see No. 11, Appendix C). Thus, pre-test data were collected, via audiotapes, on how they analyzed problems together. Responses to the analogues were content analyzed using the definitions for problem identification and goal setting behaviors, and associated scoring procedures, outlined for the chart audit description (p. 27 - 29). Three pairs achieved a score of 1: two a score of 0. The maximum score that could be achieved was 4.

The physician then left the room and the patient completed the first two exercises in the manual. On completion, the patient and I met with the physician in one of the treatment offices to

review the first two exercises and to make any changes that were required to the treatment plan (Exercise 2). The patient and physician then signed the contract on page 24 of the manual indicating their agreement to work through the manual as partners. Apart from general and specific prompts in the manual, to contact me as work progressed, the next time that we were to meet would be when the manual was completed. Patients were prompted, generally, at the beginning of the research, to contact me if they had questions about the manual. They also were specifically prompted to contact me, if they needed to, twice in the manual. The first time was if they were having difficulty with the priority setting exercise, the second was to review whether they wrote the first set of long and short term goals in behavioral terms. None of the patients chose to contact me as prompted in the manual. Of course, the use of the manual without the need for additional verbal instructions by professionals reduces the costs associated with its use.

Data on treatment integrity were collected by audiotape recording the verbal exchanges among myself, the patients, and the physicians at the time of the introduction of the manual, at its completion, and at follow-up. Data on social validity were collected at follow-up. In addition, social validity was partially addressed through the use of the manual which was designed to allow the pairs to select a problem that was of particular interest to them as opposed to a researcher-selected problem (Hawkins, 1986). It took patients between two to five

weeks to complete the manuals. All patients were seen by their physician the week of, or the week immediately following, completion of the manuals.

Cost-effectiveness of the treatment was assessed using procedures for the calculation of cost-effectiveness ratios outlined by Yates (1985). Cost-effectiveness ratios were calculated for problem solving verbal behaviors and for blood glucose levels.

Settings

The physicians and patients who participated in this research were practising and living in geographically diverse settings in Winnipeg. The physicians' office environments, where the patient-physician encounters occurred, were similar in design. They were all of approximately the same size and shape (approximately 3.20 x 3.35 metres) and contained the standard office equipment (e.g. desk, three chairs, examining table) found in any physician's general practice office. Because of the design and small size of the office space, I was visibly present during office visits. I was able, however, to sit off to the side and the patient and physician were able to maintain direct eye contact with each other and to sit such that their bodies were turned toward each other. Since the office was the usual environment for the pair's interaction, reactivity due to my presence and the tape recording was likely minimized by the

stronger discriminative stimuli of the pair participating in their usual environment (Haynes & Horn, 1982). The tape recorder was situated away from the line of vision between the patient and physician. This conclusion of minimal reactivity was supported by the few remarks addressed to me during the pairs' verbal exchanges. The remarks to me were at the very beginning and at the end of each office visit, when directions on the procedure were provided.

Measures

The independent variable in this study was problem solving behavior training as compared to baseline, specifically, training the behaviors of problem identification and goal setting. Training occurred via the brief manual developed for the study.

The dependent variables in my research included application of aspects of problem solving behaviors, specifically, problem identification and goal setting, to manage the selected effects of chronic illness, specifically, insulin-dependent diabetes. It was hypothesized that training in problem identification and goal setting would lead to better health outcomes, specifically: (a) increased adherence to the treatment plan resulting in improved glucose control in the patient; (b) the selection and implementation of appropriate treatment plans for specifically targeted behaviors; and (c) the development of a problem solving behavior repertoire in patients, and collaterally in physicians.

The manual, developed for the study, consisted of 10 exercises. Exercise 1 required the patient to list his or her health concerns, including a history of disease or illness. Exercise 2 provided a model treatment plan and then required the patient to write his or her own treatment plan in the space provided. The first two exercises were completed in the physician's office. The physician then met with the patient to review, and if necessary, revise the work. In every case, physicians added additional behaviors to the treatment plan. Also, four physicians corrected errors on their own records. For example, two patients were on different insulin dosages than those recorded on their medical records. The pair then signed the contract contained in the manual and the patient completed the subsequent exercises at home. Exercise 3 taught the patient what constitutes observable behavior. Content about behavioral deficits, behavioral excesses, and about when behaviors are absent in behavioral repertoires was included. Tests for skill acquisition were provided. Following this, the patient assessed his or her behavioral repertoire from a list of 66 diabetes related health behaviors. All patients identified deficits and two patients identified excesses. No patients identified behaviors that were absent from their repertoires. Patients assessed their behaviors using a checklist. The checklist included eight categories of behaviors; (a) self medication, (b) skin care, (c) medical care, (d) time management, (e) eating, (f) exercise, (g) testing, and (h) relationships and relaxation.

Exercise 4 assisted the patient in ranking health behaviors that were identified, from the list of 66, as potential areas for improvement. Exercise 5 provided training in writing a complete problem statement of the health behavior of interest. As defined in my study for the purposes of the manual, the health behavior was the complete problem statement of the health behavior and it's shortened label. For example, Gordon identified the following:

> I don't check my blood as often as I should because, (a) I don't like pricking my fingers, (b) getting enough blood and hitting the right spot on my old glucometer is difficult, (c) I have to run my hands under warm water for 5 or 10 minutes to get enough blood, (d) my vision is bad so seeing the right spot on my glucometer to put the blood on is hard and because it takes me so long to get a sample it is frustrating to miss the spot, (e) I now have a new glucometer that should make testing easier, but will that be enough to make me test my blood sugars when I haven't before?

The shortened label for the above was "blood checking behaviors". Also, short term goals, written by the patient, were behaviors that were intended to reach an ultimate goal of behavior change associated with the complete problem statement of the health

behavior. The term "target behavior" was not explicitly used in the manual in order to keep the manual relatively simple. However, for the purposes of analysis, it is important to sort out the various levels of behavior. Rosen and Proctor (1981) suggest a framework for addressing the correspondence between targets for treatment and overall goals for treatment. They define three types of outcomes. First, ultimate outcomes are the criteria for treatment success, that is, the goals. Second, instrumental outcomes are those that are sufficient for the attainment of other outcomes without further interventions, that is, targets. Third, intermediate outcomes are behavioral outcomes of treatments that are facilitative of continued treatment or are preconditions for the employment of a particular intervention, for example, teaching relaxation techniques prior to using systematic desensitization techniques. Each of these outcomes are behaviors.

The application of this framework in my study was as follows. Ultimate outcomes were the achievement of, modified health behaviors. For example, "quitting smoking". Instrumental outcomes were the target behaviors. Problem definitions, e.g. "smoking in excess", and goal setting, e.g. "cut down smoking by one cigarette daily", and the self-monitoring, e.g. "keep track of the last day I smoked", which were required in order to identify problems and formulate goals, were viewed as targets in that they may be sufficient for the attainment of other outcomes without further intervention. Although additional treatment may

be necessary, the self-monitoring process can serve as a discriminative stimulus for attending to and modifying health behavior (Bornstein, Hamilton, & Bornstein, 1986). Intermediate outcomes were the results of behavior teaching in the manual. For example, before self-assessing behavioral deficits, excesses and so forth, patients had to learn what a deficit was. They also had to learn how to write behavioral statements (clear, measurable, observable, etc.,) of health behaviors and goals.

Exercise 6 required the patient to use a companion "Observation Booklet" and to record instances of the behavior including immediate antecedents, the behavior, and immediate consequences. In the booklet, antecedents, behavior and consequences were labelled respectively: situation, behavior, and outcome. Twelve examples were included as models. Although 40 forms for recording behavioral observations were provided in the Booklet, patients could use as many or as few as they decided they needed. Also, they were instructed on how to obtain additional forms if needed. None of the patients chose to obtain additional forms. The number of observations made ranged from 7, in the case of Rachel and David, to 40, in the case of Ronald. Gordon made 16 and Louise made 26 observations.

Exercise 7 instructed the patients to review their observations, and by answering questions, to make judgements about stimulus control. The instructions to the patients did not use the label stimulus control. Rather, they were instructed to search for environmental factors that affected how well or how

poorly they were able to perform their health behavior. For example, Rachel concluded that she was more inclined to snack inappropriately when she was exposed to food commercials while watching her favorite soap operas on television. She also noted some natural contingencies of reinforcement in that her husband and daughter praised her for adhering to her diet and that they verbally stated their concern about her non-adherence when she didn't stick to her diet.

Exercises 8 and 9 provided training in writing goals and the patient was required to write short and long term goals related to the health behavior of interest. All patients learned to write specific, measurable, and achievable long and short term goals. The short term goals were new target behaviors, for example, David had as his long term goal "Establish and maintain a permanent exercise program". Some of his short term goals were, "Start exercising Nov. 17 - ride stationary bike 1/2 hour. Continue every other day until Dec. 15, then increase time to 1 hour every other day until Dec. 29..." and so forth. If the patient completed exercises 1 through 9, they achieved a maximum score of 4; 1 point for each of (a) problem identification, (b) goal setting, (c) statement of goal achievement, and (d) method to measure goal achievement.

Finally, Exercise 10 assisted the patient to identify rewards. Although four of the five patients in my study specified a wide range of "little" and "big" things they could use as rewards, they did not wish to implement additional reinforcement

programs. One patient did not complete Exercise 10 because he did not want to use rewards and therefore did not view completion of that exercise as applicable to his situation. The manual, and the use of a buddy proved to provide sufficient contingencies of reinforcement as did working through the Observation Booklet. Following completion of this exercise, the patient and physician met to review the work in the manual.

Direct measures. The data source to assess effects of problem identification and goal setting training on patients and physicians problem solving behaviors and on treatment adherence, including blood glucose control, was the physicians' written progress notes on the patient which are retained in the physician's office. Although chart audit was one of the first methods to evaluate the quality of physicians' practice (Codman, 1917), the written record has been criticized as a data source (Donabedian, 1980). The criticism is directed at the fact that there are widely varying recording practices, depending on physician preference. Further, many of the elements of good care, such as good interpersonal communication skills, are not recorded. In my study the use of audiotapes of patient-physician verbal behavior during office encounters provided an additional data source with respect to the latter concern. From the point of view of cost, however, the patient record remains the least costly way of measuring baseline behavior in research that trains patient-physician behaviors. It enables the access of baseline data retrospectively, so that the researcher does not have to

impose, by virtue of experimental design, extra office encounters to access the data of interest. This is an important consideration given the current widespread economic concerns with dollars spent on health care and the related need for economic and health care reform (Manitoba Health, 1992; MacDonald & Taylor, 1990; Sutherland & Fulton, 1988).

The physicians who participated in the research each had training in the specialty of family practice. As such, even though there would be variation in recording practices, a basic standard of recording and practice could be expected.

A minimum standard. The criteria for chart audit were those established by the College of Family Physicians of Canada (Appendix D). These are the only criteria for assessing adherence to approved diabetic treatment protocols, for family physician practice in Canada, that have undergone research testing. A list of 26 criteria was tested as part of a quality of care assessment project (Borgiel et al., 1985), and is now widely used in Canada. The criteria include such things as assessment of diet and nutrition counselling, yearly eye examinations, assessment of renal function every three years, and so forth. To determine whether the criteria were met, I reviewed the entire medical records of each patient. The review included reading letters to and from specialists and other health practitioners, summaries of laboratory, radiology and other tests, progress notes, and so forth. This review was conducted at each physician's office. Since the entire charts could not be removed from the office, for

this part of the audit, it was not possible to conduct checks for interobserver agreement.

The five physicians each met the minimum standard, with the exception of one criterion: the assessment and recording of sexual dysfunction. Sexual dysfunction is a problem for most diabetics at some stage of their disease trajectory, specifically where there is neuropathy. Four of the five patients reported some degree of sexual dysfunction, from mild to severe, on the self report measures.

The impact of problem identification and goal-setting training on the physician's recorded treatment plan for the patient. The criteria (definitions) and checklist developed to assess this component were simple. The scoring procedure was outlined as follows. A maximum of four points could be achieved. One point would be given for the presence of each of the following units: (a) the health behavior(s), (b) the goals or a goal related to the health behavior(s), (c) the plan or strategy for goal achievement, and (d) the degree of goal achievement.

A point-by-point agreement ratio was calculated to determine if observers agreed on each unit. The ratio was calculated by dividing the number of agreements by the sum of the agreements and disagreements (Kazdin, 1982). The use of point-by-point agreement was appropriate because there were discrete response categories, for example, the written identification of a health behavior. Also, Kazdin (1982, p.54) notes that agreement can be evaluated on a response-by-response, or point-by-point, basis for

an interval or trial. Two raters were used: one doctorally prepared and one masters prepared. Disagreement was calculated when, for example, one rater identified a written notation as a "health behavior" and another rater identified it as a "goal". These ratios were calculated for each medical record. Because medical records could not be removed from the physicians' offices, the information from the progress notes was abstracted and it was the abstracted records that were analyzed. Fortunately, in two cases, the medical records were completely computerized and it was possible, with the patients' and physicians' permission, to remove copies of the entire computerized progress note. In these two instances, the actual, complete, rather than abstracted records were analyzed.

The point-by-point agreements were 100% in three cases, and 91% in two. In both cases of the 91% ratio, the area of disagreement was in the identification of a goal, when it should have been identified as a health behavior. One of the cases of 91% was using one of the two complete, rather than abstracted, records.

The following definitions were used for the chart audit. While the definitions are not prime examples of behaviorally defined variables, they do represent the reality of physicians' recording practices. The research was not aimed at training improved recording practices in the physician participants, rather it was hoped that the physicians as partners would take note of the patients' work on behavioral self-assessment and that

this would, in turn, reflect itself on the patients' medical record.

The health behavior was defined as that behavior selected by the patient as the focus of work in the manual. For the purpose of the chart audit it could be described generally, as in the label "smoking", even though in the manual the patient described the behavior specifically.

The goal was defined as a behavior or event that leads to the achievement of the health behavior. These may be stated generally in the medical record. For example "quit smoking," or "cut down smoking by the end of the month."

The plan for goal achievement was defined as the identification of a strategy to achieve the goals. The plan may be stated generally, for example, "not one for (to use) rewards," indicating the plan for this patient would not include a reward system. Another example is "try nicotine patch."

The degree of goal achievement was defined as the extent to which the goal had been achieved, described in a measurable unit. For example, "has decreased smoking from one pack per week to two cigarettes per week".

<u>The impact of problem identification and goal-setting training on pairs' verbal behavior.</u> Mutual problem solving and goal setting models are characterized by the number and type of questions asked, as well as statements of respect and statements of concordance. As recommended by Roter (1984), noting the frequency of patient and physician questions in my research, was

one approach used for the content analysis of the audiotaped verbal behaviors obtained during the office encounters. A second approach was the use of Smith and Hoppe's (1991) definitions of verbal behavior that are consistent with a patient-centered approach to interviewing. These include the use of open-ended statements and the use of emotion-handling statements, such as respect for what the other person has accomplished. Statements of respect, for example, "You've really done well!", and open-ended statements or questions, such as "Tell me what you were observing about your health." are considered consistent with a patient-centered approach. These definitions were used for the scoring procedure of the patient-physician transcribed audiotapes. In addition, the transcripts were analyzed for the presence of concordance statements using the definition developed by Taylor, Pickens, and Geden (1989). Concordance statements, such as "If you will do...,then I will do" and "Let's see how we can achieve...", are congruent with mutual problem-solving verbal behavior.

Since the technology for scoring the questions and statements had not been clearly described elsewhere, I developed the following procedure. Scoring units were single sentences. The scoring procedure, including the definitions, is outlined in Appendix F. Also included are the point-by-point agreement ratios, which were in an acceptable range, that is, above 90%. The audiotaped data and the completed manuals also provided the data sources for assessment of treatment integrity.

The impact of problem identification and goal-setting training on blood glucose. At the onset of the study, patients were instructed to continue with their usual blood glucose monitoring behaviors. The usual practice of their physicians was to review, and accept, the patients' recordings of the results of the self monitoring process. Periodically, the self monitoring would be augmented with an office check of blood glucose (mmol/l). HbA_{1c} would be assessed if the patients were not also seeing an internist. The usual practice was to make insulin adjustment decisions based on the patients' recorded self reports.

Although standards for excellent, good, fair, and poor glucose control have been generally accepted (Appendix E) their application varies, depending on the individual patient. The standards are less applicable to older patients who also are experiencing multiple sequelae of diabetes. For example, older patients may require less insulin to maintain good control. Also, older patients who are experiencing episodes of hypoglycemia are better maintained at a higher range of glycemic control with less variability (Davis & Davis, 1982; Gale, Dorman, & Tattersall, 1981; Redmon, Thibault, & Meador, 1982). Hypoglycemia results in more serious health consequences for this age group than does hyperglycemia (Marchesseault, 1983; Moorman, 1983).

Indirect measures. Instruments were selected because they complemented the self-report measures contained in the manual. Even though they had been used in nomothetic research and had

undergone psychometric assessment, their use here was to provide a more molar perspective to complement the molecular approach contained in the manual (Barlow, Hayes, & Nelson, 1984). It has been argued that nomothetic, norm-referenced instruments are inappropriate for single case research designs (Cone, 1988), but it also has been argued that these instruments may be useful, if they are used in combination with instruments for data collection that are designed in the idiographic tradition (Barlow, Hayes, & Nelson, 1984) and if they are used within a behavior analytic framework (Torgrud & Holborn, 1992). In other words as Torgrud and Holborn state, are the instruments useful in accomplishing the goals of behavioral assessment? (p. 273). The instruments used are contained in Appendix C along with a summary of their psychometric assessments.

Several instruments were used to measure the dependent variables, prior to and following completion of the manual, and at three month follow-up. Based on theoretical and clinical significance, only data for three instruments are reported in the results. Descriptions and results obtained from the other measures are reported in Appendix G. The Multidimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978) was used to determine whether patients reported an internal locus of control preference, associated with difficulty adhering to treatment protocols, as had been reported in other patients functioning with diabetes over the long term (Lowery, 1974; Lowery & DuCette, 1976); and whether this preferred behavior

would change following completion of the manual. Patients also were screened for depression using the Inventory for Measuring Depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) since depression may be associated with difficulties with glycemic control (Niemcryk, Speers, Travis, & Gary, 1990; Wrigley & Mayou, 1991), and for hopelessness using the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974). Hopelessness has been identified as increasing in relation to chronic disease, depression, and loss (Janis, 1984; Krantz, 1980; Schmale & Iker, 1971; Stroebe, Stroebe, Gergen & Gergen, 1982).

Treatment Integrity

The two aspects of treatment integrity were addressed; (a) procedural reliability, and (b) compliance (Gutkin, Holborn, Walker, & Anderson, 1991). The central question of procedural reliability is whether the experimenter/therapist accurately follows the experimental protocol. The question of compliance asks whether the participants comply with the therapist's or experimenter's instructions about the treatment. To ensure treatment integrity, key features of the total procedure are evaluated (Billingsley, White, & Munson, 1980).

A fundamental and essential first step in treatment integrity is an accurate description of the independent variable. Unfortunately, this has been lacking in the majority of research on problem solving behaviors, especially so in the case of

diabetes. The most widely used manual to train problem solving behaviors generally (D'Zurilla, 1986) is limited by the use of several non-behavioral instructions that can be interpreted variously. For example, in a section on using emotions to facilitate problem solving effectiveness, the client is instructed that "It is often adaptive to set a problem solving goal of increasing positive affect (e.g. feelings of self worth, sexual pleasure) or reducing negative affect (e.g. anxiety, anger)," (p.110). However, the instruction is never operationalized for the client. Other research currently underway on training problem solving behaviors for the self-management of chronic illness is relying on a training approach that is also lacking in behavioral descriptors (Roberts, Browne, Streiner, & Gafni, 1993). In contrast, manuals that include explicit behavioral instructions have been tested successfully in research in other areas not related to my study (e.g., Hanel, Martin, & Koop, 1982; Pallotta-Cornick & Martin, 1983; Smith, 1992; Welch & Holborn, 1988).

The following behavioral components were included in the manual.

1. Basic operant principles were incorporated. For example, instruction in, and reinforcement of, problem identification and goal setting verbal behaviors; use of natural contingencies of reinforcement, that is, working with a Buddy at home; use of a token economy; and public posting of completion of exercises.

2. The normative steps of problem solving (i.e., problem identification, generating alternatives, etc.), were addressed from an operant perspective (Chesney, 1984; Meyer & Turkat, 1979). Specifically, a) the target behavior was described, b) stimulus control of the behaviors was analyzed, and c) new behaviors were targeted for development and appropriate discriminative stimuli and reinforcers were identified and used.
3. A variety of behaviorally anchored checklists, developed for this research, but modelled after other behaviorally anchored checklists were employed (Cautela & Kastenbaum, 1967; Eldridge & Walker, 1991; Smith, 1992; Welch & Holborn, 1988; Lorig, 1989; Martin & Pear, 1988).
4. An individualized approach to skill acquisition was provided, thus addressing a limitation of existing research (Hanson, St. Lawrence, & Christoff, 1985).

In addition, the manual was informed by practice. It was developed with the assistance of one family physician and two of his patients who fit the criteria for participation but who were not participants in the research. Further, the manual was brief to fit within the 13 minute average for office encounters (Noren, Frazier, Altman, & DeLozier, 1980), but also was of sufficient length to incorporate exercises that were to be completed by the patient at home.

Data sources for treatment integrity checks were the completed manuals and the audiotapes of patient-physician office

encounters. Interobserver agreement on the presence of key elements; that is, whether the treatment was administered as intended, and whether the therapeutic process was received as intended, was 100%. All patients completed the manual and achieved the maximum problem solving behavior score of 4, whereas on baseline, the scores were 1 or 0. The scoring procedure to assess treatment integrity, including the definitions of individual segments of data, is described in Appendix H.

Generalization

An essential component of programming for generalization is attention to stimulus control (Kirby & Bickel, 1988). Elder's (1987) framework was used to this end. Specifically:

1. The physician's office was used to make behavior change convenient.
2. The office assistant prompted the pair that the use of the manual was on the office visit agenda.
3. An exercise to identify suitable reinforcers was included in the guidelines for the use of the manual and a chart for the visible posting of completed exercises was also included (see Appendix I).
4. Contracts between patients and physicians, and between patients and buddies were used (see, for example, Appendix I).
5. Numerous examples of behavioral responses to the various

exercises were included as models.

Finally, part of programming for generalization is to analyze and confirm natural contingencies of reinforcement (Kohler & Greenwood, 1986). The manual was designed so that at all times, the patients used their own experiences, natural home and work settings, and buddies (friends or spouses), selected by them, as part of the process. Social support is believed to be a powerful variable in the management of chronic health problems (Callahan, personal communication, September, 1993; Israel & Schurman, 1990; Norman, 1986; Williams & House, 1991). Individual preference on the choice of buddy was an improvement over previous research (Dubbert & Wilson, 1984). The research process also used the physician's office; thus, future office visits could contribute to stimulus control over problem solving behavior in both patient and physician. The manual also provided opportunities for generalization to new problems, if the pair wished to continue the process after the first completion of the manual. This was monitored by noting requests for additional manuals by either the patient or physician following the study.

Results: Direct Measures

Direct measures of the effects of problem identification and goal setting training were obtained from the patients' medical records, and from the audiotape recordings of the patient-

physician verbal behaviors during office encounters. Each data set now will be described.

Effects of Problem Identification and Goal Setting Training: Chart Behaviors

Figure 1 displays the data obtained from the chart audit. One point could be achieved for each of; (1) problem identification, (2) goal identification, (3) specification of a plan for goal achievement, and (4) specification of degree of goal achievement. Following problem identification and goal-setting training, the medical record of each of the five patients shows evidence of the presence of considerably more of the above four units after, than before, training.

The data points on the graph correspond to the actual office encounters. In the case of David and Dr. Susan, and Ronald and Dr. Grace, the scores below the mean line at post treatment were derived from office encounters where the patients were seeking treatment for acute episodes. For example, Ronald was being assessed for a possible fracture of his arm.

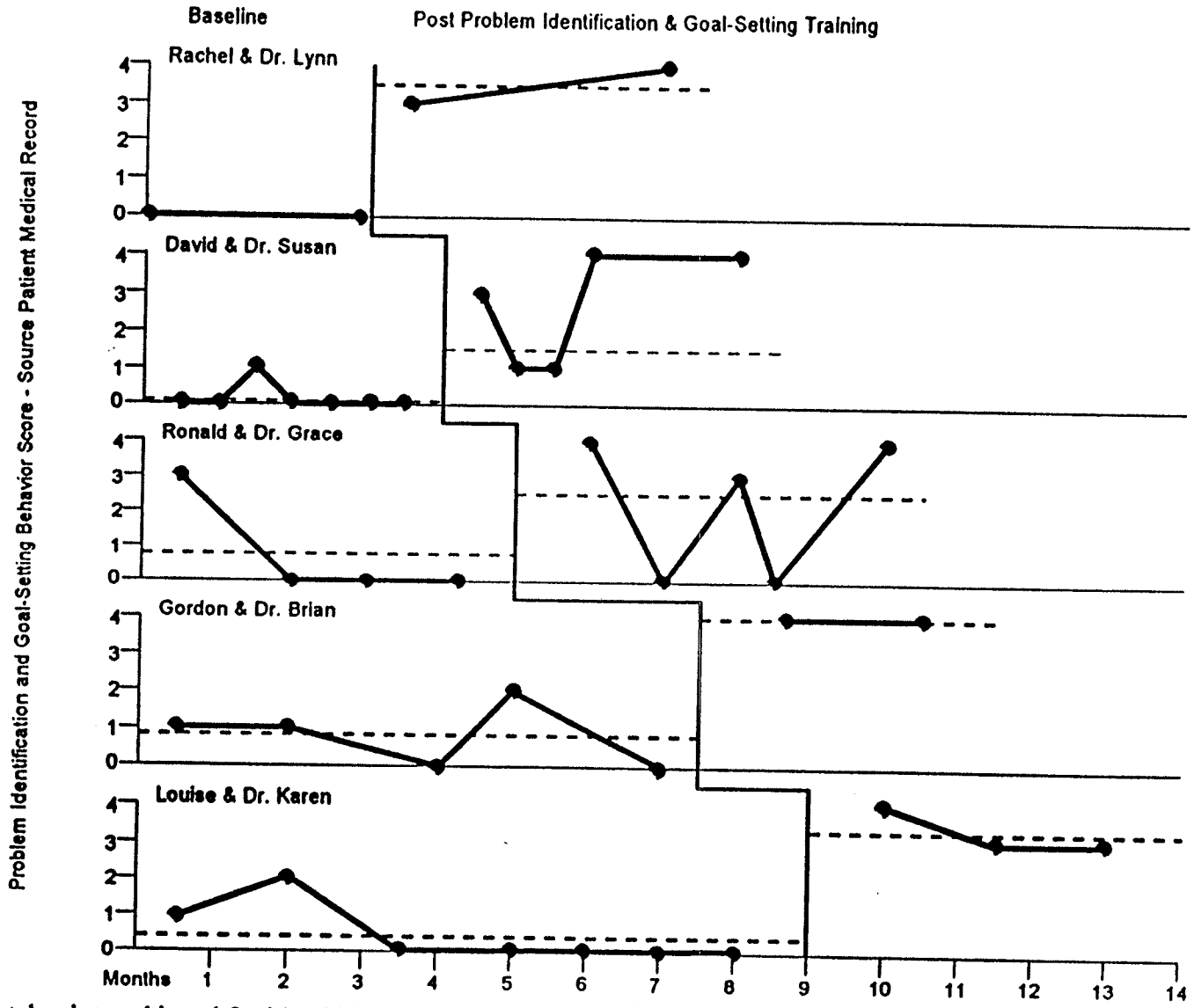

Figure 1. Total points achieved for identifying (a) the problem, (b) goals, (c) plan for goal achievement, and (d) degree of goal achievement. Maximum score = 4.

Effects of Problem Identification and Goal Setting Training: Verbal Behaviors

Because office visits were of different lengths at pretreatment, post treatment, and follow-up, frequency data were transformed to rate measures by dividing by the duration in minutes of verbal behavior during the visit. Time during which the pairs were not speaking were excluded from the calculation. These data appear in Table 1 (the untransformed frequencies and percentages appear in Appendix J).

As can be seen in Table 1, for patients the rates of all categories of verbal behavior had increased by the follow-up visit. The most striking change was in concordance statements which approximated a sixfold increase by the time of follow-up. For physicians, the predominant changes occurred in emotion-handling and concordance statements, both having approximately tripled in rate by the time of follow-up.

Table 1

Rate, per Minute, of Directive and Open-ended Questions, and Emotion-handling and Concordance Statements, Spoken by Patients and Physicians During Office Encounters

	Pretreatment		Post Treatment		Follow-up	
Statement	Patients	Physicians	Patients	Physicians	Patients	Physicians
Directive	.13	1.47	.25	.97	.35	1.74
Open-ended	.03	.57	.03	.53	.15	.68
Emotion-handling	.03	.20	.03	.56	.21	.62
Concordance	.10	.27	.44	.52	.65	.79

Note. Rate = Number of statements divided by length of verbal behavior time, in minutes, during office visits.

Effect of Problem Identification and Goal Setting Training: Blood Glucose Behaviors

One patient rarely, if ever, checked his blood sugars prior to enrolling in the study. Three patients took two to three readings daily before meals. One patient checked his blood weekly at different time periods.

Treatment goals for, and means and ranges of, blood glucose levels are reported for each patient in Table 2. Following the use of the manual, all patients improved either their blood glucose checking behaviors or blood glucose control, or both. Three physicians decided to adjust insulin levels based on new information obtained on completion of the manual. Ranges and means were calculated using both patients' and physicians' recorded notes. The explicitly stated treatment goals for each patient varied as can be expected for patients in this age group who have diabetic sequelae. All of the recorded information was used from the start of baseline to follow-up.

Table 2

Combined Patient Self-report and Physician Office Report of Blood Glucose Levels (mmol/l) and Physician's Blood Glucose Treatment Goals for the Patient

	Treatment Goal		Pretreatment		Post Treatment		Follow-up	
Patient	Range	Mean	Range	Mean	Range	Mean	Range	Mean
Rachel	6 - 8	7	3.9 - 21.6	10.8	3.4 - 21.6	10.8	6 - 6.8	6.4
David	6 - 8	7	4.5 - 12.2	8.38	7.2 - 14.4	8.8	4 - 8.5	6.25
Ronald	8 - 10	9	3 - 24	10.9	10 - 15	12.5	9 - 10	9.5
Gordon	8 - 16	12	3 - 15	7.1	5 -13	7.97	7.1 - 13.1	9.85
Louise	8 - 12	10	3.4 - 18.5	13.2	5.1 - 16	10.12	7 - 12	9.5

Note. Immediately post treatment, patients had identified goals for health behavior change (e.g., exercise, weight-loss, quitting smoking, glucose control, blood glucose monitoring) and had just commenced implementation of plans to achieve their goals. At follow-up, the patients had achieved their health behavior goals and also had achieved blood glucose levels within the range of control specified for them by their physicians.

Although physicians had explicitly stated blood glucose control treatment goals for their patients, the manual instructed the patients to work on a health problem that had significance for them. Only one patient, Rachel, selected glucose control as a priority goal. Three patients selected other health behaviors noting that glucose control management would be an outcome. One patient selected blood testing behaviors as a target.

At follow-up, as an outcome of implementing her diet and exercise plan, Rachel achieved her blood glucose goal and described herself as "in good control". David also achieved improved control at the time of follow-up as he continued to adjust his diet with a goal of weight loss. Ronald's glucose levels were up at post treatment because his goal of quitting smoking resulted in an increase in his snacking behaviors. At follow-up, he was successfully balancing his insulin, diet, and exercise while maintaining his goal of quitting smoking. Gordon's medical record evidenced his absence of blood checking behaviors at pretreatment ("never checks his sugars"). When self monitoring data were available, as a result of working through the manual, his physician decided to decrease his insulin dosage slightly to achieve a more acceptable range of 8 to 16 (mmol/l) and to avoid episodes of hypoglycemia. Louise's physician wanted less variability in blood glucose levels. She recorded at pretreatment in Louise's medical record, "sugars all over the place!". Much less variability was achieved at follow-up.

Results: Indirect Measures

Anecdotal evidence. Writing complete problem statements of the health behavior and long and short term goals proved reactive. All patients reported going further, without being instructed in the manual, to implement behaviors to achieve their goals. They provided physical evidence to their doctors that behavior change was occurring. For example, David lost weight; all patients achieved glucose control within the range that was described as acceptable for them by their doctors; Ronald quit smoking; Rachel started an exercise program and encouraged her husband and daughter to join her; and Louise and Gordon implemented regular programs of blood glucose monitoring. Further, because the patients also wrote long and short term goals to achieve other health behaviors that they had identified as important, they reported making changes in these other behaviors as well. For example, at three month follow-up, David reported that he had tried many exercise options, but his neuropathy was causing pain and lack of sensation in his feet. This did not deter him, however. He set aside his exercise program for a time, and introduced his diet program for weight reduction. He reported a weight loss of 16 pounds which was validated at the physician's office when he was weighed.

Self-report measures. Only findings related to Health Locus of Control, depression, and hopelessness are reported here. Findings obtained using the other measures are reported in

Appendix G. All of the patients in my study reported themselves as having an internal behavioral orientation as measured by the Multi Dimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978). All patients maintained their internal behavioral preference during the course of the study. Rachel and David reported a strengthening of their internal preference following the completion of the manual. For Ronald, Louise, and Gordon the internal preference decreased slightly but still remained high relative to the other preferences measured by the instrument.

Finally, patients completed the Inventory for Measuring Depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974). None of the patients reported depression at pretest. Scores ranged from 0 to 12. Gordon reported mild depression at follow-up (score = 20). This corresponded to the impact which having to wear a urinary drainage bag had on his daily functioning, as well as facing the prospects of possible surgery and of needing a blood transfusion for anemia. Rachel, David, and Ronald did not report themselves as experiencing hopelessness. Scores ranged from 0 to 1. Gordon and Louise reported hopelessness at pre and post treatment and at follow-up. Scores for Gordon ranged from 11 to 14: scores for Louise ranged from 8 to 11. The maximum score for the Hopelessness Scale is 20.

Findings: Cost-effectiveness and Social Validity

A cost effectiveness ratio for problem solving behavior and one for blood glucose control was calculated for each of the pairs using Yates' formulae (1985, p. 226). Effectiveness, in Table 3, represents the difference between the pairs' problem identification and goal setting verbal behaviors at baseline and post treatment. A score of 4 indicates that the pair demonstrated none of the behaviors at baseline and all of them at post treatment. The behaviors were statements of, (a) problem identification, (b) goal setting, (c) a plan for goal achievement, and (d) a method to measure the degree of goal achievement. One point was allocated to each of these statements, for a total of 4. Although each of the statements were equally weighted, the assigned scores represent an ordinal, rather than interval, scale.

For example, in Table 3, we see that the effectiveness score for Ronald and Dr. Grace indicated that at baseline they were achieving a score of 1, and at post treatment they were achieving a score of 4 -- a difference of 3. The cost-effectiveness ratio indicates that, in the case of Ronald and Dr. Grace, the cost for each measure of one unit of problem solving behavior was $30.00. For Gordon and Dr. Brian, who also had an effectiveness score of 1 at baseline, the cost for each measure of one unit of problem solving behavior was $12.00. The lower cost, for Gordon and Dr. Brian, was due to lower office visit costs.

Table 3

Problem Solving Behavior Cost-effectiveness Ratio Across Patient-physician Pairs

	Rachel & Dr. Lynn	David & Dr. Susan	Ronald & Dr. Grace	Gordon & Dr. Brian	Louise & Dr. Karen
Effectiveness[a]	4	3	3	3	4
Billing Costs[b] ($)	54	90	90	36	54
Cost-effectiveness Ratio[c] ($)	13.50	30.00	30.00	12.00	13.50

Note. [a]Effectiveness = difference between problem solving score on baseline measure and problem solving score following treatment where application of each problem solving behavior earns 1 point (maximum 4 behaviors earns 4 points). Behavior units = (a) problem identification, (b) goal setting, (c) plan for goal achievement, and (d) degree of goal achievement. [b]Billing Cost = minimum billing cost at $18.00 multiplied by number of office visits. [c]Cost-effectiveness Ratio = billing cost divided by effectiveness; defined as costs per unit of problem solving behavior.

Table 4 illustrates cost-effectiveness with regard to blood glucose control. The standard of glucose control for each patient was the range specified for that patient by his/her physician (see Table 2, page 44). For each patient, a percentage scale was developed, to correspond with the range of actual blood glucose values ever shown by that patient, where a score of 100% represented the mean value of the physician's standard for that patient. Percentage values then decreased on either side of the 100% score so that both hypoglycemic and hyperglycemic levels could be scored. For example, the range of 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 mmol/l value with the mean value at 7 would take on the scale values of 0%, 20%, 40%, 60%, 80%, 100%, 80%, 60%, 40%, 20%, and 0% respectively. Effectiveness, in Table 4, represents each patient's blood glucose control expressed as a percentage of control relative to his or her physician's mean standard. For example, Rachel, at pretreatment was achieving 24% of what Dr. Lynn wanted her to achieve in relation to blood glucose control. At follow-up, she had achieved 88%. The difference was 64%.

The cost-effectiveness ratio indicates the cost for each unit of blood glucose adherence achieved. For example, for David it cost $90.00 to achieve a 17% improvement in blood glucose levels, yielding a cost per unit of blood glucose control of $5.29.

Table 4

Blood Glucose (mmol/l) Control Cost-effectiveness Ratios Across Patient-physician Pairs

	Rachel & Dr. Lynn	David & Dr. Susan	Ronald & Dr. Grace	Gordon & Dr. Brian	Louise & Dr. Karen
Effectiveness[a]	64%	17%	27%	27%	27%
Billing Costs[b] ($)	54	90	90	36	54
Cost-effectiveness Ratio[c] ($)	0.84	5.29	3.33	1.33	2.00

Note. [a]Effectiveness = maximum score achieved for blood glucose adherence within range specified by physician. The greater the percentage, the more effective the control for the patient, using the physician range for that patient as the standard of effectiveness. [b]Billing Cost = minimum billing cost at $18 multiplied by the number of office visits needed to achieve blood glucose control effectiveness. [c]Cost-effectiveness Ratio = billing cost divided by effectiveness; defining ratio as costs per percentage of blood glucose adherence (control) achieved.

Turning now to social validity, four point Likert scales, with different behavioral anchors, were used for ratings about the manual, the research process and the treatment outcomes (see research instrument in Appendix C, modification of the Bornstein and Rychtarik General Satisfaction Scale, 1983). Data are reported in Appendix K. Both patients and physicians rated the manual, the procedure, and the treatment outcomes very positively; either as excellent or good. Patients and physicians rated the quality of the manual as excellent. They also indicated "the manual met almost all of my needs" or "most of my needs" in helping to look at the challenges of diabetes. They all would recommend the manual to others. Patients and physicians were "mostly or very satisfied" with the amount of help received from me during the research. Patients and physicians were asked whether the use of the manual helped them to manage other problems more effectively. They reported it either "helped a great deal" or "helped somewhat" as opposed to "not really helping" or "making things worse". At follow-up, patients still were working on the goals outlined in their original manuals.

Discussion

Several key issues arise from findings in my research. These include issues related to, (a) the success of the manual in training problem identification and goal setting behaviors, (b)

the impact of training on the verbal behaviors of the pairs (c) the use of the manual and the audiotapes as a data source for treatment integrity checks, and (d) the analyses of cost-effectiveness and social validity. Each of the issues will be addressed, in turn.

The success of the manual. All patients completed the manual, and thus were able to self-assess health behavioral deficits and excesses. Based on this assessment, they were able to priorize and define a problem health behavior, analyze its controlling contingencies, and set goals (targets) to achieve the desired, modified behavior. One central question is to what extent did the completion of the manual act as a stimulus for actual behavior modification on the part of the patient-physician dyad? The broad stimulus context for problem identification and goal setting training was the management of diabetes. The patients were selected by their physicians to participate in the research because they were, according to their physicians, having problems with adherence to their treatment protocols. The patients had functioned with diabetes for many years. They were experienced with the problems of adherence. One of the challenges identified in the general adherence literature is the need to understand the relationship between adherence and clinical outcome (Epstein & Cluss, 1982). The patients in my study had histories of not being adherent and of not having good blood glucose control. Following completion of the manual, they were more adherent than previously and were under clinical control in

that their blood glucose levels were congruent with the physicians' expectations of their acceptable glucose levels.

With regard to direct monitoring of blood glucose levels, I decided at the outset to instruct the patients to continue with their usual methods and measures. Also, for economic reasons, I did not request the use of regular HbA_{1c} monitoring in the physicians offices. Since common, standard measures were not used across patients, the finding of blood glucose control must be viewed as tentative for each patient. However, while the monitoring of HbA_{1c} tracks more permanent, and less variable blood glucose changes over time, the use of the mmol/l approach is useful in single subject research where the goal is to relate changes in health behaviors to physiologic changes.

One reason that the manual only trained problem identification and goal setting behaviors, and did not progress to training behavioral self-management, was that a prior step to self-management should be joint patient and physician decision-making on strategies and resources needed to achieve the goals. This could take many directions. For example, it may be that the Family Physician might not be the most appropriate sole treatment agent to continue problem management. Perhaps a medical or other specialist would be needed, or perhaps a family member would be needed, or some other resource. Achieving agreement on goals was an essential first step (DiMatteo et al., 1993; Hulka, Kupper, Cassel, & Mayo, 1975). However, the problem identification and goal setting exercises and the self-monitoring exercises were

highly reactive. The patients went on, prior to checking with their physicians, to implement strategies to achieve their goals. All made changes to their health behaviors. In other words training in the assessment of target behaviors (instrumental outcomes) and in the writing of clear, measurable, and observable health behaviors and goals (intermediate outcomes) proved sufficient stimuli to the development of a plan for, and the achievement of, modified health behaviors (ultimate outcomes).

While in my study the implementation of plans to achieve goals generally produced positive outcomes, questions remain about whether patients can always implement strategies that are in the best interest of adherence to their treatment protocols. For example, although David lost 16 pounds as a result of his dieting efforts, Dr. Susan was concerned that he was cutting too much fat from his diet and that this might compromise his immune system thus making David more vulnerable to infections. The manual does, however, instruct the patient to meet with the doctor immediately on completion. Thus even though the patient independently might have introduced a program to achieve goals, if other areas of health are compromised, continuation of the program would likely be short lived (providing the patient does meet with the physician on schedule). However, the manual will be revised to prompt the patient not to proceed with implementation of new behaviors without first checking with their physician.

The use of the manual also led patients to generalize the instructed behaviors across health problems. Although patients

self-assessed health behavior deficits, excesses, and so forth, and then were instructed to focus on one problem for the purpose of working through the manual, they also self-assessed other health problems in addition to the problem on which they were focusing. These health problems were apparent in the exercise on goal setting. For example, Ronald focused on his smoking behaviors, but also wrote goals for diet and exercise that would help him achieve his goals of quitting smoking. Thus, he was generalizing his goal setting behaviors across health problems. This generalization effect held with other patients as well. The question of whether physicians generalized the health problem identification and goals setting behaviors across patients was not measured in my research. However, both patients and physicians reported on the social validation measure that the use of the manual helped them with other problems generally. Also, the physician behaviors did extend beyond verbal patient-physician encounters to the physicians' recording practices. Physician recording behaviors, however, were not specifically trained in my research, and the extent to which progress notes serve as a stimulus for mutual agreement on health goals and strategies to achieve these goals remains a question for further research. At minimum, the use of the manual did result in changes in physician recording practices.

Because the manual included several stimulus components, for example, instruction, self-assessment, self-monitoring, behavioral contracts between patients and physicians and patients

and buddies, the use of natural contingencies of reinforcement (buddies), public posting, and training multiple exemplars, at this stage it is not possible to separate the individual treatment component's functional contribution to behavior change. However, as a package, sufficient control was exerted to produce substantial behavior change (Azrin, 1977; Glasgow, Swaney, & Schafer, 1981).

The impact of the manual on verbal behaviors. The use of the manual also resulted in changes in the verbal behaviors of patients and physicians toward a pattern that was more consistent with mutual goal setting and problem solving for the patients' health problems. Although other strategies exist for analyzing functional relationships between patient and therapist verbal behavior (e.g., Skinner, 1957), my first strategy was to use content categories that were already in use in the medical literature and that were suggested as indicative of models for mutual goal setting and problem solving. The use of the manual greatly increased the concordance statements of both patients and physicians. This joint increase supports the conclusion that the use of the manual lead to a more mutually participative verbal behavior pattern of the dyad. This outcome supports the value of patients and physicians working together, as partners, in health care. Also, it satisfies a limitation in previous research by providing verbal data on the dyad partner relationship.

The use of emotion-handling statements by physicians showed a large increase, and by patients, a slight increase. The manual

provided an example of work completed by the patient that was sanctioned by the physician and clearly prompted the physician to praise the patient for this work. Verbal praise, for health goal achievement and for greater adherence to treatment protocols, in patients who have been labelled as non-adherent to these protocols, can serve as a powerful reinforcer for continued adherence. Although not explicitly tested in my study, since this reinforcement occurred in the physicians' office, the potential for generalization to other patients (on the part of the physician) exists.

A source for treatment integrity assessment. The use of the manual, in combination with audiotapes, provided the data source for the assessment of treatment integrity. These two sources provided a check on whether the procedure was administered as intended, and whether the treatment was received as intended: both criteria were satisfied in my study. The use of the techniques to assess treatment integrity satisfied a limitation in research on problem solving in the context of management diabetes.

Cost-effectiveness and social validity. As demonstrated, the manual appears to provide a cost-effective approach to management of diabetes treatment protocol adherence. Neither cost associated with the manual or with researcher time were included because both of these costs were relatively minimal. The cost-effectiveness analysis of the problem identification and goal-setting verbal behavior components should, in future, be

addressed as a total treatment package since many reinforcers were involved in my study. These reinforcers included the manual, the office visit and the family or buddy.

The cost-effectiveness analysis of the blood glucose findings required that I develop a ratio, since at the time of my research there was no standard of comparison that could be used with older patients who had multiple diabetic sequelae and individualized ranges of glucose control. Use of cost-effectiveness ratios can provide a quick comparison of alternative approaches to treatment, if future investigators provide such data. The combination of indicators of self-care or social skills, such as problem solving, coupled with physiologic indicators can provide convincing evidence of the total impact of treatments.

Cost-effective procedures, that are also socially valid, can make a major contribution to the delivery of quality health care. Both patients and physicians were highly satisfied with the manual. In addition, each physician participant directly requested that I provide them with a supply of the manuals for their office use following my research.

Indirect measures of health locus of control, depression, and hopelessness. As with previous research, the patients in my study reported an internal behavioral preference on the Multidimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978). However the suggestion that patients who have an internal preference are non-compliant with treatment

protocols over the long term, does not hold in my research. Clearly, patients who are experienced in functioning with diabetes and who have been assessed as non-compliant to treatment can also, given an appropriate and strong stimulus context such as the use of the manual, achieve greater compliance to treatment protocols.

With regard to depression and hopelessness, even though patients were experiencing sequelae of diabetes, depression was not an issue for all but one patient. Hopelessness was self-reported by two patients. That more depression and hopelessness was not reported was surprising given the day-to-day complex management problems of these patients and the increasingly serious sequelae of their diabetes. Most likely, despite their health situation, they still were able to exercise control over their environments and to gain sufficient reinforcers to forestall depression and hopelessness reactions (Ferster, 1973; Seligman, 1975).

Future Research. One patient suggested, and would like to be instrumental in the implementation of research assessing impact of the manual with groups of patients having diabetes. The intent would be to stimulate self-care behaviors within the group, using the "double whammy" format of the manual and the experience of the participants. Patients who have managed their diabetes over many years have a wealth of information to impart. The manual can potentially assist in the development of a cost-effective behavioral approach to self-care within groups, in addition to

its continued use with individuals toward the same goal.

Other recommendations for future research are as follows. First, the outcomes of the use of the manual with people who have newly diagnosed insulin-dependent, or non-insulin dependent, diabetes should be experimentally evaluated. The patients would not yet be experiencing the complications of their disease process. Would "symptom-free" patients also benefit from problem identification and goal setting behavior training with the outcome of adopting and maintaining healthy lifestyle and illness prevention behaviors? The manual also should be tested with non-insulin-dependent adults who have diabetes, since many of the challenges of treatment adherence are also reported with this group.

Second, since the manual used several behavioral strategies, a component analysis could result in stream-lining its use. For example, the patients did not use the reward system, so it might be eliminated. However, patients recommended that section be retained for newly diagnosed diabetics. Also, the question of the relative usefulness of the contracts remains. Future research could determine the usefulness of the various strategies.

Finally, future research can further assess and program for generalization. For example, what generalization programming is required for generalization of physician behaviors to other patient contexts?

In conclusion, use of the manual to train patient-physician pairs in joint problem solving for management of insulin-

dependent diabetes holds promise as a cost-effective, socially acceptable method to achieve better patient adherence to treatment protocols. The introduction of a treatment manual should make professional practice more cost-effective. Greater patient participation in the treatment plan is desirable in the interest of developing patients' self-care behaviors. The use of the manual can also stimulate verbal behavior patterns, in the patient-physician dyad, that are consistent with a patient-centred, mutual goal-setting, problem solving approach to care which should be the hallmark of family practice.

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Appendix A

Research Framework and Literature Review

Problem solving behavior has been the focus of considerable research since the 1950s and, in the past two decades, has been of interest as a treatment variable in health care research. This research has focused on either patient (client) behavior on the one hand or physician (therapist) behavior on the other. A concerted attempt to bring the two foci together in order to maximally and jointly attend to health care problems is notably absent.

Recently, the World Health Organization (WHO) has issued a world-wide priority for the development of problem solving behavior training modules to increase self-care behavior in individuals and communities (Jenkins, 1990; WHO, 1990a, 1990b). Self-care behavior is defined by WHO as taking greater responsibility for your own health based on an understanding, in your own words, of what health is all about, how to promote it, and what to do when it all goes wrong. Part of the process of self-care behavior is knowing when and where to seek appropriate professional services. The parallel responsibility of health care professionals is to provide services which enhance self-care behaviors in the patient population (Nutbeam, 1986). Since self-care behaviors include problem solving behaviors, training health care professionals to improve their problem solving skills in the context of health care, and to facilitate the growth of patients'

skills in this area, is also part of the World Health Organization priority (WHO, 1990a). Research is required to substantiate the WHO assumption that health care professionals who are trained in problem solving behaviors will be better able to assist patients in managing their self-care behaviors.

Illness behavior has not normally been viewed as self-care behavior. The former is defined as an overt behavior performed by an individual which indicates that he or she is ill or in discomfort (Turkat & Pettegrew, 1983). However, illness behavior may include behaviors such as: frequency and type of use of medical services; time spent in bed or confined to one's home; and other behavioral reactions to chronic or acute disorders; e.g., increased dependence on friends or spouse. According to the WHO, part of the process of self-care behavior is knowing when and where to seek appropriate professional services. Thus, illness behavior may be a component of self-care behavior, or alternatively self-care behavior may be viewed as a component of illness behavior.

Problem solving behavior was defined by Skinner (1974) as follows:

> A person has a problem when some condition will be reinforcing but he [sic] lacks a response that will produce it. Solving a problem, however, is more than emitting a response which is the solution; it's a matter of taking steps to make that response more

> probable, usually by changing the environment... Whether problem solving arises from raw contingencies or from instructions by others, it is acquired in overt form (with possible exception of the strategy learned at the covert level from private circumstances) and can always be carried out at the overt level. (p. 112-113)

Problem solving behavior has been, and continues to be, linked to better health outcomes across a wide variety of mental health problems in inpatient and community settings (e.g., Blechman, Olson, & Hellman, 1976; Bright & Robin, 1981; Christoff, Scott, Kelley, Schlundt, Baer, & Kelley, 1985; Coche & Flick, 1975; Gotlib & Asarnow, 1979; Guerra & Slaby, 1989; Hanson, St. Lawrence, & Christoff, 1985; Jacobson, 1984; Orbach, Bar-Joseph, & Dror, 1990). More recently, problem solving training is being explored as a technique to enable individuals to prevent physical/mental illness, as well as to manage the outcomes of chronic illness including the increase of self-care behaviors (e.g., Black & Scherba, 1983; Black & Threlfall, 1986; DeVellis, Blalock, Hahn, DeVellis, & Hochbaum, 1988; Hawkins, 1986; Miller, Leinbach, & Brody, 1989; Rovee-Collier, 1983; Sallis et al., 1990). Management of health problems in the context of prevention often includes the development of self-control behaviors. In fact, effective models of self-control include problem solving components, that is, the clear specification of the problem in

term of behaviors to be controlled and behavioral techniques to successfully manage these problem behaviors (Elder, 1987; Kaplan, 1990; Martin & Pear, 1988).

Diabetes is a chronic illness that continues to receive a high priority worldwide in the search for curative and preventive measures (Brook, 1992; Connell, 1981). Guthrie and Guthrie (1983) hold that diabetes is not a disease but rather a syndrome, that is, the final common pathway of many diseases that affect insulin secretion or action resulting in altered metabolism, especially carbohydrate metabolism. With the exception of nerve and liver tissue, insulin is necessary for glucose to enter the body cells. Insulin facilitates the amino acid anabolism needed for protein synthesis. Insulin also promotes the storage of fat and enhances the storage of glucose as glycogen. A deficiency of insulin results in abnormally high levels of glucose which, if untreated, leads to acute complications of hyperglycemia; diabetic ketoacidosis or hyperglycemic, hyperosmolar, nonketotic coma (Delprato & McGlynn, 1986; Moorman, 1983). A world classification of diabetes and glucose tolerance levels has been established (Guthrie & Guthrie, 1983; Knowler, Everhart, & Bennett, 1985). Although a valid epidemiological database has not yet been developed, prevalence rates for diabetes are estimated at 6.8 per thousand in the 20 to 74 age group with the highest prevalence at 18.7 per thousand in the 65 to 74 age group (Knowler, Everhart, & Bennett, 1985).

The effects of having insulin-dependent diabetes on

individual behaviors are numerous and include but are not limited to: (a) self-administering insulin of the appropriate type and amount within a specified time period each day; (b) maintaining a rigid diet; (c) staying on a routine exercise schedule and making adjustments to food intake and insulin as activity varies; (d) recording, several times each day, the level of sugar in the urine or blood; and (e) being watchful for signs of insulin shock (Melamed & Siegel, 1980; Moorman, N., 1983; Popkess-Vawter, 1983).

Comprehensive reviews of the status of research on diabetes conclude that: (a) there is uncertainty in medical knowledge about the treatment of diabetes as reflected by clinical differences in diagnostic criteria and in its management (Chiasson, 1985b; Connell, Blide, & Hanken, 1984); (b) prospective, randomized control studies with newer forms of diabetic therapy designed to attain near normal blood glucose control through precision of insulin administration, have failed to demonstrate conclusively prevention or reversal of diverse complications (Chiasson, 1985b); and (c) existing research suffers from numerous methodological flaws such as, the widespread use of instruments with no demonstrated reliability and validity, lack of definitions of what constitutes glycemic control, and the use of differing definitions of what constitutes diabetic control (Johnson, 1980).

Recommendations provided by these reviewers are as follows. A greater reliance on single case experimental research designs

and better assessment methods would assist in sorting out the functional relationships pertaining to glycemic and diabetic control (Chiasson, 1985a; Johnson, 1980; Knowler, Everhart, & Bennet, 1985). This recommendation is supported by clinicians (Germain & Nemchuk, 1988; Marchesseault, 1983). Secondly, the treatment of diabetes calls for a partnership between the patient and physician, and health professionals must learn to be "facilitators rather than teachers" (Chiasson, 1995b, p.335). Common use of the term "teach" is to: "show or explain how to do...to give lessons...to instruct" (Avis, Drysdale, Gregg, Neufeldt, & Scargill, 1983, p.1154). Common use of the term "facilitate" is to: "make easy, lesson the labor of, help forward, assist" (Avis, Drysdale, Gregg, Neufeldt, & Scargill, 1983, p.424). The physician using facilitator behaviors will, together with the patient, identify the environmental contingencies that impact the patient's self-care behaviors and select interventions unique to that patient (rather than unique only to the physician) (Nutbeam, 1986). This conclusion, that facilitator behaviors are needed, has long been acknowledged by physicians in their efforts to promote mutual participation models or client-centered practice (Barnard, 1984; Cassell, 1979; Epstein, Campbell, Cohen-Cole, & McWhinney, 1993; Katon & Kleinman, 1981; Szasz & Hollender, 1956) and is supported by other reviewers of research on patient and physician relationships (Steele, Blackwell, Gutmann, & Jackson, 1987). Finally, much of the research has focused on children and there

is a need for research focusing on adults (Chiasson, 1985b).

Prevention of illness has been described as primary, secondary, or tertiary (Howell, 1987). The distinction can be related to problems solving behavior, in the context of management of diabetes, as follows. In primary prevention, problem solving behavior would be employed by individuals who seek to maintain or develop a repertoire of behaviors that can protect against illness. For example, the use of problem solving behaviors to achieve weight control in individuals who are at risk for developing diabetes. Secondary prevention aims to reduce the rate of progress of disease that has already begun. For example, an individual might learn problem solving behaviors and use them to improve self-monitoring to achieve better glucose control. Finally, in tertiary prevention, individuals who are already exhibiting problems as a result of disease, employ problem solving behaviors to prevent additional health problems and to minimize the effects of illness on their daily living activities. For example, patients who have developed skin ulcers as a result of diabetes might use problem solving behaviors to target specific behaviors that contribute to the problem and then modify these behaviors to prevent injury to the skin and subsequent ulceration.

Poser and Hartman (1979) posed an early challenge to the investigation of strategies for behavioral prevention as follows;

> The implication is that before effective prophylaxis can be claimed, it is necessary

> to specify not only the behavior to be prevented, but also the functional relation between that variable and the strategy of prevention intervention adopted. Most of all, evidence is required that the target problem to be prevented did, in fact, occur less often or with lesser intensity, among recipients of preventive interventions than it did in a control group equally at risk but not subjected to any preventive interventions.
>
> (p. 1)

In summary, problem solving behavioral techniques show promise as an intervention strategy in the field of health care. Diabetes is a chronic health care problem that requires considerable behavioral adjustments in its management, both on the part of individuals who have the syndrome and physicians involved in its treatment. Further, the WHO has issued an imperative for the creation of behavioral training manuals to develop and enhance problem solving behaviors in both patients and health care professionals. The testing of the effects of behavioral training manuals can provide a functional demonstration of the success of preventative interventions.

Summary of Research on the Problem Solving Behaviors of Patients and Physicians on the Management of Diabetes

As stated earlier, research on problem solving behaviors of patients and physicians is not integrated as yet, nor is there a great deal of research in the area of diabetes that focuses on problem solving behaviors. The following summary of existing research includes eight descriptive and seven experimental studies.

Descriptive Research

Toobert and Glasgow (1991), using an interview schedule developed for their study, identified problem solving behaviors that were reported useful by 126 patients in managing their non-insulin-dependent diabetes. Data were collected in two sessions over a two week period. Data included objective records of height, weight, and glycemic control, self recorded data on food consumption, and scores on the problem solving interview. The problem solving interview presented participants with "typical" problems and asked for "coping" behaviors in response to the problems. Actual behaviors were not reported, but were categorized into cognitive, behavioral, and other. At a six month follow-up the researchers reported that the use of these behaviors was correlated with improved diet and exercise behaviors. A limitation of this research is that the relationship

between use of the coping behaviors identified in response to practice problems and actual diet and exercise behavior change was not examined. In other words, knowledge about the functional relationship between behaviors associated with "typical" analogue problems and behaviors associated with actual problems of daily living was not advanced.

Johnson et al. (1982) developed a test of problem solving behaviors, as well as general information about diabetes, which they administered to 151 insulin-dependent youths (6 to 18-years-old) and their parents. They also observed the youths self-injecting insulin and testing their urine. In addition to finding that 80% of the youths made one or more serious errors in their insulin injection and urine testing procedures, the researchers reported that scores on the general information test were better than on the problem solving test. This held true for parents and youths. They concluded that general knowledge about diabetes does not necessarily translate into its use in actual problem situations. Newman and Weaver (1994), in their study of 52 insulin-using adults, also reported behavioral deficits of insulin preparation and injection. Deficits ranged from dosage calculation errors, to improper handling of insulin vials and syringes, to improper mixing of insulin types.

Monitoring glucose levels is one of many daily problems confronting people with diabetes. Home monitoring of blood glucose is believed to be a more accurate objective measure than monitoring of urine glucose (Valenta, 1983). This is because it

helps achieve better control of blood sugar by offering immediate feedback to the patient. Urine glucose testing presents delayed feedback. As well, immediate feedback can assist individuals to identify the functional relationship of their specific glycemic response to food, activity and medications. Sonksen, Lowy, and Judd (1978) described the accuracy and acceptability of the method in 64 insulin-dependent adults. Patient diaries were analyzed for recording of all blood glucose readings, total number of measurements made (grouped into pre-breakfast, pre-lunch, pre-supper, and bedtime), and mean blood glucose overall. Blood glucose concentration was also measured in the physicians' office before and after the seven day period of home monitoring. Significant improvements in blood-glucose control resulted. An additional strength of this study was the inclusion (unusual in the 1970s) of a social validation measure. Participants indicated on a follow-up questionnaire their overwhelming preference for the greater control achieved through home blood-glucose monitoring.

One aspect of problem solving behaviors is goal setting. Congruence of goals of treatment between patients and physicians was assessed in 65 sets of parents having a diabetic child between the ages of 5 and 16 years, and 104 pediatricians (Marteau, Johnston, Baum, & Bloch, 1987). Using a questionnaire designed for the study, data were collected on desirable blood glucose profile and behavioral management of unacceptable profiles, that is, decisions whether to double test the sample of

urine or blood and then intervene with a verbal intervention without testing the sample. The researchers found little agreement between parents and physicians on what constitutes acceptable control. Parents were more concerned with the short-term effects of glucose control while physicians were more concerned with the long-term effects. A limitation of the study was that the physician participants were not the actual physicians of the families enrolled in the research.

In a related study Hulka, Kupper, Cassel, and Mayo (1975), using a sample of 242 patients with diabetes from the practices of 42 physicians, compared patients and physicians on their instruction giving and receiving verbal behavior. Physicians completed check lists on each of their patients enrolled in the study. The check lists identified instructions that had or had not been given to the patients. Patients were interviewed in their homes two weeks after the visit to their physician to determine whether instructions had been received. The researchers reported that only two thirds of physicians' instructions were actually understood by patients. A limitation of the study is that the relationship between congruence of verbal instructions and actual self care behaviors in the patients was not examined. Other research on the problem of agreement on goals between patients and their physicians concluded that about 95% agreement was possible on treatment of specific or acute illness outcomes, but this dropped to 60% on day-to-day problems of management of the effects of illness (Black et al., 1991). The problem of

agreement on goals between physicians and patients for the management of chronic illness is believed to be most difficult when the patient is labelled by the physician as "non-compliant" with the prescribed treatment. One large U.S. study is currently concerned with the training of physician behaviors to manage treatment when faced with "non-compliant" patient behaviors (Callahan, 1990; 1988).

In summary, existing descriptive research on problem solving behaviors in the management of insulin-dependent diabetes in adults has pointed to the need for clarification of the functional relationship pertaining to instructed and actual behaviors in patients. Further, obtaining congruence between patient and physician behaviors, at least in regard to goal setting, continues to be of paramount importance in the management of diabetes and its outcomes.

Experimental Research

Several studies have used problem solving behavioral techniques to improve patient self control behaviors. Kaplan, Chadwick, and Schimmel (1985), measured problem solving behaviors in insulin-dependent teenage patients who had received one of two seminars. One seminar was focused on improving social behaviors to resist peer influence on non-compliance with treatment. The other seminar focused on medical facts about outcomes on non-compliant behaviors. Treatment integrity was not assessed.

Participants who received the social skills seminar had significantly lower hemoglobin A_1 (signifying better glucose control) than the other group four months after the seminars. Social validation of the two interventions was not assessed. Of interest was the finding that the group with better glucose control scored more poorly on problem solving behaviors, as measured by a questionnaire on typical self-management problems and their solutions, than did the medical facts seminar group. Since the researchers defined the problems for the participants on the test, the relationship between salience of problems for the individuals and actual problem solving behaviors is not known. Further, resistance to peer pressure behaviors was not conceptualized as part of problem solving behaviors, yet lack of compliance to treatment regimens due to peer pressure or pressure from others is a daily problem for persons with diabetes.

Epstein et al. (1981), used a multiple baseline design across groups to determine the effects of targeting specific self control behaviors on improvement in glucose control as measured by urine-glucose monitoring. Blood glucose was also measured. This study satisfies many of the methodological concerns that are limitations in most of the research on problems solving behaviors in the management of diabetes. For example: observer agreement was assessed; an adequate description of variables is reported; and one aspect of treatment integrity (subject compliance) and social validity were assessed. Nineteen families with children having insulin-dependent diabetes participated. The intervention

consisted of specific instructions to the children on insulin adjustments related to diet. Adherence to urine testing was checked by using marked test tablets. As well, parents did spot checks of urine-glucose. Childrens' attendance at the education sessions on specific instructions earned tokens points toward the accumulation and public posting of smiley faced stickers for achieving glucose control. Although, at a 22 week follow-up, the targeted approach resulted in significant improvements in urine-glucose control, blood glucose did not improve. Also, the researchers reported that 53% of the children made errors in their judgements of the results of urine testing. Thus, the procedure used to ensure one aspect of treatment integrity; adherence to correct urine testing behaviors, failed to include instructions on how to correctly assess the test results. One limitation of the study is that the behavioral goals were set for the children and were based on traditional diabetic management regimens. These goals may not have been a priority for participants in the research and the extent to which this impacted the behaviors of interest is not known. It could be that in training specific or general problem solving behaviors, the patient's priorities in goal setting are functionally important.

Schafer, Glasgow, and McCaul (1982) used a multiple baseline design across behaviors to assess the effect of training compliance with treatment behaviors in three insulin-dependent adolescents. Although not explicitly stated, the compliance aspects of treatment integrity were implicitly, but not

systematically addressed. For example, patient record-keeping provided some evidence of compliance to behaviors leading to goal attainment, although the researchers did not explicitly discuss this activity as evidence of the compliance aspects of treatment integrity. The procedures, in the research, included goal setting, identification of criteria for measuring short and long-term goal attainment, and the use of behavioral contracts, if compliance goals were not achieved. The treatment was effective in maintaining the following self control behaviors; urine testing, exercise, wearing of diabetic identification bracelet, and home glucose monitoring. It did not improve adherence to scheduled insulin injections. The researchers concluded that contracting for short term behavior change was temporarily helpful, but its use for long term maintenance of behaviors was not explored. Reasons for lack of adherence to scheduled insulin injections were not reported, nor was social validation assessed.

Glasgow, Toobert, Hampson, Brown, Lewinsohn, and Donnelly (1992) randomly assigned 102 patients, over 60 years old with Type II diabetes, to either a self-management training group or a control group to determine if training would improve self-care behaviors. The 10 training sessions targeted problem solving and self-efficacy skills. Although treatment integrity was not reported, the researchers found improvements in adherence to dietary regimen and glucose monitoring behaviors in the treatment group that were maintained at six month follow-up.

Apart from problem solving behaviors, researchers have

explored other related behavioral techniques to improve diabetic glucose control. Rose, Firestone, Heick, and Faught (1983) used anxiety management training in adolescent diabetics, who were identified as in poor glucose control, in order to explore the relationship between the management of stress and urine-glucose levels. They used a multiple baseline design across six subjects. Although the researchers reported lower and more stable urine-glucose levels in five of the subjects, the study has several limitations. The treatment procedure was not clearly reported and no information was provided on treatment integrity. Reporting of averaged results also limits the reader's ability to assess the impact of the treatment on individual participants, especially the participant who did not benefit from the treatment. Overall social validity was not assessed; however the participants were asked to complete a scale indicating their expectancy of improvement in glucose as a result of treatment. Unfortunately, despite considerable author speculation about their findings, the design limitations restrict substantive reporting of results that would add to our knowledge about the functional relationships between behaviors targeted in stress management and urine-glucose control.

Two other studies are included in my review. Although they are not focused on diabetes, they do add to our knowledge of problem solving behaviors in treatment of obesity in adults. Obesity is associated with diabetes risk and is increasing in Canada (Millar, 1991). As well, there is some evidence that young

females with insulin-dependent diabetes may respond to environmental stress by overeating (Balfour, Romano, Schiffrin, Dougherty, & Dufresne, 1993).

Black and Scherba (1983), used behavioral contracting with participants to practice either weight loss skills or general problem solving skills. Seven subjects were randomly assigned to each of two groups. The participants who contracted to practice general problems solving behaviors lost significantly more weight by the six month follow-up than did the participants who practised weight loss behaviors. Although the reporting of averaged data limits our ability to sort out functional relationships in an individual's behavior, continued exploration of the effects of problem solving skill training on the management of chronic health problems appears warranted.

Finally, Dubbert and Wilson (1984) report that one aspect of problem solving behavior, goal setting, effected weight loss in 62 obese adults. These losses were maintained at six month follow-up and did not vary with spousal involvement or non-involvement in goal setting. These findings are contrary to other studies which identify the need for social support in behavioral change. Social support is believed to be a powerful variable in the management of chronic health problems (Callahan, personal communication, September, 1993; Israel & Schurman, 1990; Norman 1986; Williams & House, 1991). The Dubbert and Wilson study did not allow the participants to choose their preferred source of social support. It may be that the spouse was not the preferred

choice. Again, the reporting of averaged data does not allow inspection of individual functional relationships; however, this study supports the need for continued exploration of problem solving behaviors in the management of chronic health problems.

In summary, although the problems associated with the management of diabetes continue to pose challenges for clinicians, research has been limited in its identification of behavioral techniques that would assist clinicians and their patients as they address these problems. The need for more single case research to sort out functional relationships has been identified in this review. Strategies are also required to assess treatment integrity, generalization of problem solving behaviors, cost effectiveness, and social validity. Also needed are strategies that bring physicians and patients together as they identify problems and treatment priorities to meet the challenges of self-care in chronic illness.

Appendix B

Protocol to Enrol Physicians into the Study

Hello. My name is Pat Farrell. I am a doctoral student in Psychology at the University of Manitoba.

I am calling you to invite you to participate in my thesis research. I have designed a manual for use by physicians and patients to help patients who are having problems adhering to their diabetic treatment plans. The manual requires testing under research conditions and that is the focus of my thesis. The research has been reviewed and approved by the Human Ethical Review Committee, Department of Psychology, University of Manitoba.

I selected your name, with the help of Dr. Gary Beazley (Faculty of Medicine) who is a member of my thesis committee, from the roster of doctors who are Certified Family Physicians practicing in Winnipeg, Manitoba. My committee members from the Department of Psychology are; Dr. Stephen Holborn (advisor), Dr. Rayleen DeLuca, and Dr. Garry Martin.

My particular interest in developing the manual was to help patients who are having problems with adherence to treatment plans, clearly define the problems with adherence to their treatment plans, and further, to assist them in defining specific, measurable goals to resolve these problems. Because much of the work in problem identification and goal definition is work that the patient does between physician office visits, I

believe that the use of the manual will decrease the amount of office time required to sort out the patient's problems and assist in determining the most effective and efficient treatment plan.

Your participation in my study requires that you identify one patient who is having problems with treatment plan adherence. Criteria indicating adherence problems are;

1. A patient who has self-reported, or whose relatives or friends have self-reported to you that he or she is having difficulty adhering to any aspect of your treatment plan.
2. A patient whom you suspect is not adhering to your treatment plan because he or she has a known history of non-adherence to treatment plans in other illness contexts.
3. A patient whom you suspect is not adhering to the treatment plan because physiologic measures of glucose control are nt within what you consider to be an acceptable range for that patient.

Additional selection criteria are:

4. A patient who has been insulin-dependent for five or more years.
5. A patient who is using blood glucose monitoring procedures.
6. A patient who you anticipate is on a health trajectory that will permit completion of the manual (two to three weeks) and permit two and four month follow-up after completion of the manual.

7. A patient who is living with a family member or friend who can help them work through the exercises in the manual.

I will contact the patient and indicate that I have received his or her name from you and that he or she is entirely free to participate or refuse to participate. Refusal to participate will not reflect in any way on their relationship with you. I will tell them that your treatment of them will continue whether or not they agree to participate.

I have developed guidelines for your use of my manual should you agree to participate. I will send these to you along with a copy of the manual for your perusal prior to meeting with you to discuss any questions you might have about the research.

The research requires that you continue to treat your patients as you normally would, and in addition, to facilitate your patient's use of the manual as part of your treatment plan. You will see, in the manual, for example, signing a behavioral contract to work together.

The testing of the manual with your patient should take about two to four weeks. The test will include: data collection which will include audiotapes of you and your patient working through two practice problems together; completion of the manual by your patient; responding to questionnaires (by your patient); audiotaping your patient's visits with you to ensure adherence to the manual, and to collect data on how you usually work together; a chart audit of your patient's medical record to determine the history of compliance to the treatment regimen as well as blood

glucose control statistics; and responding to a survey follow-up after your patient completes the manual and at two and four month follow-up.

If the test of the manual indicates that office time is saved, or more effectively used, and that your selection of a treatment plan is adhered to by the patient, then the test will have proven successful and the manual can be used more broadly.

If you agree to participate, I will meet with you to discuss the manual and any questions you might have, as well as to collect your signature as consent to participate in my study.

Consent to Participate

I _____ (Physician's name) have read the above, and have reviewed the manual entitled "Managing Diabetes: Patient and Doctor...Partners in Care: A Brief Manual to Increase Joint Problem Solving Behaviors in the Management of Diabetes", as well as the Physician Guidelines for the Use of the Manual. I agree to participate in the study and understand that I will not be identified by name, or by any other means that will reveal my identity, in the research report. I understand that if, during the course of the study, I have concerns that are not satisfactorily addressed by the principal investigator, I may withdraw my participation and that of my patient. I further understand that I will have access to the results of this study in the form of its final report that is approved by the

dissertation committee of the principal investigator.

Physician's Signature _____

Principal Investigator Signature _____

Date _____

Protocol to Enrol Patients Into the Study

Hello. My name is Pat Farrell. I am a doctoral student in the Department of Psychology at the University of Manitoba. I am calling to invite your participation in my thesis research. My research is designed to test a manual that I have developed to help people, who have insulin-dependent diabetes, manage their care.

I was given your name by your doctor (insert doctor's name). He/she thought that you might be interested in participating in my study, but also knows that if you decide not to participate, your care will not in any way be interrupted. It will continue as usual.

Let me tell you about my research so that you can decide whether you will participate. I asked your doctor to suggest patients that have insulin-dependent diabetes to participate in my study because I have developed a manual for doctors and patients to use to help them clearly identify specific challenges they are concerned with in day-to-day management of diabetes. The manual also assists in the development of specific goals related to these challenges. Because the manual is newly developed, it needs to be tested with physicians and patients. By participating in my study, you and your physician would be partners, and pioneers, in testing the manual.

Now, let me tell you what your time commitment will be, as well as what would be involved if you agree to participate.

First, you and your doctor will work on one or two practice problems together. Next, you will respond to some questionnaires about the impact diabetes has on you, as well as some general questionnaires about your health. If your scores on any of the questionnaires identify a health problem of which you may not be aware, I will notify you immediately and provide you with information on professional resources available to you so that you can choose to get some immediate help for the health problem.

Following completion of the questionnaires, you would proceed to work through the manual. Working through the manual also involves you selecting a "Buddy" (e.g. family member, friend) who is living with you to help you work through the manual. After you have completed the manual, I will collect it and review it with a view to any changes that may be required in it, or to determine if further testing of it is necessary prior to its use with other physicians and patients. Finally, you will be asked to respond to some questionnaires just after you completed the manual, and again at two and four months following its completion. Your feedback continues to be important over that period of time because you may have different viewpoints on the usefulness of the manual as time passes.

While you are completing the manual, you will continue to visit your doctor as usual, and as directed in the manual. The visits, when you are using the manual, will be audiotape recorded. The audiotapes will provide me with information about how you and your doctor work together, generally. I will also be

reviewing the progress notes that your doctor usually writes on your medical record, in order to keep a record of your treatment plan and any changes to it prior to, during, and after the use of the manual.

Working through the manual will take between two and three weeks of your time, depending on the specific focus you will take. Five other patients and their physicians will be participating in my study. Your participation would be very much appreciated so that your unique perspective can be obtained.

If you agree to participate in my study, you may, of course, withdraw at any time after you begin. If you need to withdraw, I again emphasize that your regular care with your physician will continue as before.

Also, if you agree to participate in my study, you will not be identified in written or verbal summaries of the research to the public, since the research process includes confidential treatment of all data obtained. During the course of the study, all of your data will be stored in a locked filing drawer that is accessible only to myself and to Dr. Holborn. Your data will only be reviewed by myself and my research supervisor, and it will not be released to anyone else, except in a summarized form where you will not be identifiable by name. You will receive a summary of the research findings, so that you will know how your efforts and the efforts of the other participants assisted in the development of the final product. Also, when I have completed my review of the manuals, I will return your manual to you so that you can use

it in future should you wish. If you and your doctor wish, I will also return the audiotapes to you, or alternatively, I will erase them following the completion of the study.

If you are willing to participate, I will set a time to get the research materials to you and to discuss any questions or concerns that you might have. I will also be leaving my telephone number and the telephone number of my research supervisor with you so that you can call either of us at any time during the research should you have any questions or concerns. Are there any questions you have now that will enable you to decide whether you will participate?

If you agree to participate, I will ask you to sign the following Consent to Participate Form.

Consent to Participate

I _____ (Patient's name) have read the above, and have reviewed the manual entitled "Managing Diabetes: Patient and Doctor...Partners in Care: A Brief Manual to Increase Joint Problem Solving Behaviors in the Management of Diabetes", as well as the Patient and Buddy Guidelines for the Use of the Manual. I agree to participate in the study and understand that I will not be identified by name, or by any other means that will reveal my identity, in the research report. I understand that, at any time during the course of the study, I may withdraw my participation and my usual care with my physician will continue as before. I

further understand that I will have access to the results of this study in the form of its final report that is approved by the dissertation committee of the principal investigator.

Date _____

Signatures _____ (Patient)

_____ (Principal Investigator)

Appendix C

Research Instruments

Following a description of psychometrics, research instruments appear in the following order:

1. The Illness Behavior Instrument (Turkat & Pettegrew, 1983).
2. Diabetes Related Problems Scale (Nerenz, Repasky, Whitehouse, & Kahkonen, 1992).
3. Barriers to Adherence Questionnaire (Glasgow, McCaul, & Schafer, 1986).
4. The Health Promoting Lifestyle Profile (Walker, Sechrist, & Pender, 1985).
5. The Psychosocial Adjustment to Illness Scale-Self Report (Derogatis, 1977).
6. The Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).
7. The Hopelessness Scale (Beck & Weissman, 1974).
8. Multidimensional Health Locus of Control (Wallston, Wallston, & DeVellis, 1978).
9. The Problem Solving Inventory (Heppner & Petersen, 1982).
10. A modification of the General Satisfaction Scale (Bornstein & Rychtarik, 1983), modified by Farrell for this study.
11. Patient-physician Pairs Pretreatment Problem Analogues.

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
Illness Behavior Inventory (Turkat & Pettegrew, 1983)	40 graduate students in nursing generated items.	Elementary linkage analysis, alternative to factor analysis, resulted in two domains: work-related and social-related illness behavior.	a) concurrent: i) with 11 diabetic neuropathy patients. Correlated with McGill Melzack Pain Questionnaire ($r= 0.48$, $p<0.01$); Diabetes Symptoms Questionnaire ($r= 0.38$, $p<0.05$); reduction in usual activities ($r=0.41$, $p<0.03$); number of days in bed due to illness ($r=0.32$, $p<0.07$); medical utilization index ($r=0.32$, $p<0.07$; disability and utilization index ($r=0.44$, $p<0.02$). ii) with 50 lower back pain patients. Correlated with: amount of medical expenditures ($r=0.03$, $p< 0.03$); freq of physician visits ($r=0.04$, $p<0.005$); days in hospital ($r=0.29$, $p<0.04$); work days lost ($r=0.32$, $p<0.03$);

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
(Illness Behavior Inventory continued)			% reduction in daily work activities (r=0.39, p<0.005). iii) with 152 healthy college students correlated with freq. of out-patient medical use (r=0.25, p<0.001); Mechanic & Volkart's 1962 Sick Role Inventory (r=0.44, p<0.001); Pilowsky's 1967 Hypochondriac (r=0.43,001). b) predictive: with 63 health female undergrads. Predicted: freq. of ambulatory medical use (r=0.38, r2=0.15, F=21.66, p<0.05);bed disability days (r=0.37, r2=0.14, F=11.4, p<0.05); SRT r=0.34, r2=0.12, F=12.15, p<0.05); Wolinsky & Wolinsky 1981 scale for tendency to seek and receive meds from physicians (r=0.30, r2=0.09, F=6.17, p<0.05).

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
(Illness Behavior Inventory continued)			c) discriminant: 11 diabetic neuropathy patients. Patients in high illness behavior group had sig. higher IBI scores than patients in low illness behavior group ($p<0.01$).
Barriers to Adherence Questionnaire (Glasgow, McCaul, & Schafer, 1986).	Items generated by 6 IDD patients and 2 nurse educators, and from Behavior Analytic Model (Goldfried & D'Zurilla, 1969).	NR	a) concurrent: with 65 IDD outpatients correlated with glucose testing ($r=0.44$, $p<0.001$); exercise ($r=-0.30$, $p<0.05$); diet ($r=-0.39$, $p<0.005$);insulin injection ($r=-0.44$, $p<0.001$).

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
Diabetes Related Problem Scale (Nerenz, Repasky, Whitehouse, & Kahkonen, 1992).	Items developed from those used in RAND Medical Outcomes Study (Stewart, Hayes, & Ware, 1988), MOS Short Form Health Survey.	NR	a) concurrent: with 235 IDD and non-IDD patients correlated with physicians' ratings ($r = 0.58$, $p < 0.01$). b) discriminant: NS correlations with high, med., and low glucose control patients.

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
Health Promoting Lifestyle Profile (Walker, Sechrist, & Pender, 1985).	Items developed from Pender's (1982) Health Promotion Model. Item analysis reduced 100 items to 70. Administered to 1083 healthy adults in USA.	Principal axis factor analysis and oblique rotation of responses to 70 items yielded 16 factors combined into 6 conceptually valid subscales. Sixteen factors explained 56.6% of variance in instruments. Further analysis reduced items to 48.	NR

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
Psychosocial Adjustment to Illness Scale Self Report (PAIS-SR) (Derogatis, 1977; 1986).	NR	With lung cancer cohort, principal components analysis and orthogonal rotation yielded 7 substantive dimensions accounting for 63% of vararation in inststruments.	a) concurrent: with 27 breast cancer patients correlated with Global Adjustment to Illness Scale (r=0.81); SCL-90-R General Sensitivity Index(r = 0.60); Affect Behavior Scale (r = 0.69): Patients' Attitudes, Information, and Expectancies Scale (r=0.64). b) discriminant: with 120 lung cancer patients and 86 controls (t = 2.93, p < 0.005).

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
Problem Solving Inventory (Heppner & Petersen, 1982; Heppner, 1988).	Researcher generated items using five stages of the problem solving process; general orientation, problem definition, generation of alternatives, decision making, and evaluation.	Principal components factor analysis yielded 10 factors with eigen values > 1.00 which accounted for 65% variance. A second factor analysis, followed by a screen test yielded 3 factors; problem solving confidence, approach-avoidance, and personal control.	a) concurrent: i) with Rotter I-E Scale (n = 33), (p=< 0.02). ii) with 73 couples. Correlated with Potential Problem Checklist (Patterson, 1986) (r=-.31, p<0.005). b) predictive: with university students, predicted high and low assertiveness scores, social anxiety, depression, and health and physical symptoms.

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
Multidimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978).	Items were selected from pools of IHLC, PHLC, and CHLC originally generated from persons over 16 years of age who were waiting in a metropolitan airport (n = 125 returned booklets of items).	Construct derived from Rotter's Social Learning Theory.	a) Predictive of some health and sick role behavior, specifically, weight loss; participation in self-treatment; and information seeking. Health status correlated positively with IHLC ($r = 0.403$, $p < .001$), negatively with CHLC ($r = -0.275$, $p < 0.01$), and no correlation with PHLC.

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
The Hopelessness Scale (Beck, Weissman, Lester & Trexler, 1974).	Nine items were selected from a test of attitudes about the future (Heimberg, 1961). Eleven items were drawn from a pool of pessimistic statements made by psychiatric patients who were judged by clinicians to be hopeless.	Principal components factor analysis with varimax rotation yielded 3 factors with eigan values > 1.00. These were; 1) Feelings about the future, 2) Loss of motivation, and 3) Future expectations.	a) concurrent I) with 23 outpatients in general medical practice. Correlated with clinician's ratings of hopelessness ($r = 0.74$, $p < 0.001$). ii) with 62 hospitalized patients who attempted suicide. Correlated with clinician's ratings ($r= 0.62$, $p< 0.001$). iii) with 59 depressed patients concurrent with Depression Inventory ($r= 0.63$, $p< 0.001$); Stuart Future Test ($r = 0.60$, $p < 0.001$).

Validity Summary of Psychometrics

Instrument	Content	Construct	Criterion-Related & Referenced
An Inventory for Measuring Depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).	Items were clinically derived from therapy practices with depressed patients and use of descriptions in the psychiatric literature.	NR	a) concurrent i) with four psychiatrists using DSM-3R and 40 patients. b) predicative of depth of depression, significant at $p < 0.0004$.

Reliability Summary of Psychometrics

Instrument	Interrater Agreement	Interrater Accuracy	Test Retest	Internal Consistency
Illness Behavior Inventory (Turkat & Pettegrew, 1983).	NR	NR	32 undergrad. linguistic students over two weeks (r=0.82 - 1.0).	Social illness behavior (α = 0.88); Work illness behavior (α = 0.89).
Barriers to Adherence Questionnaire (Glasgow, McCaul, & Schafer, 1984).	NR	NR	65 IDD outpatients over two months. (r=0.36 - 0.71, p<0.01 for all).	NR
Diabetes Related Problems Scale (Nerenz, Repasky, Whitehouse, & Kahkonen, 1992).	NR	85 research assistants against physician ratings.	235 diabetic patients over six months (r= 0.82 - 0.83).	NR

Reliability Summary of Psychometrics

Instrument	Interrater Agreement	Interrater Accuracy	Test Retest	Internal Consistency
Health Promoting Lifestyle Profile (Walker, Sechrist, & Pender, 1985).	NR	NR	63 healthy adults over two weeks (r= 0.925 overall, subscales r= 0.808 - 0.905).	α = 0.922 overall, subscales α from 0.702 - 0.904.
Psychosocial Adjustment to Illness Scale - Self Report (PAIS-SR) (Derogatis, 1977; 1986).	i) breast cancer sample (n=17) using clinical psychologist and nurse (r = 0.56 - 0.86). ii) Hodgkins sample (n=37) using physicians, and social workers, and psychologists (r=.33-.83)	NR	NR	i) with 269 renal dialysis patients (α= 0.63 - 0.87). ii) with 89 lung cancer patients (α= 0.12 - 0.93). iii) with cardiac patients (α= 0.47 - 0.85). Note, α above 0.80 were; sexual relationship; psychological distress; for all groups; social environment for lung cancer and cardiac, vocational environment for renal and lung and cancer group.

Reliability Summary of Psychometrics

Instrument	Interrater Agreement	Interrater Accuracy	Test Retest	Internal Consistency
Problem Solving Inventory (Heppner Petersen, 1982; Heppner, 1988).	NR	NR	31 undergraduate students over two weeks (r = 0.83 - 0.89) and over three weeks (r = 0.77 - 0.81). 29 undergraduate students over two years (r = 0.44 - 0.65).	Problem Solving Confidence α = 0.78 - 0.85 Approach-Avoidance α = 0.84 - 0.90 Personal Control α = 0.72 - 0.91 Total PSI α = 0.90 - 0.91
Multidimensional Health Locus of Control (Wallston, Wallston, & DeVellis, 1978).	NR	NR	NR	IHLC α = 0.839 PHLC α = 0.830 CHLC α = 0.841

Reliability Summary of Psychometrics

Instrument	Interrater Agreement	Interrater Accuracy	Test Retest	Internal Consistency
The Hopelessness Scale (Beck, Weissman, Lester, & Trexler).	NR	NR	NR	α = 0.93
An Inventory for Measuring Depression (Beck, Ward, Mendelson, Mock, and Erbaugh, 1961).	Among four psychiatrists using 40 patients = 73%	Scores obtained by 3 interviewers plotted against the clinical ratings = high degree of correspondence	Split-half reliability using 97 cases = reliability coefficient of 0.86 - 0.93. Test-Retest: with 38 patients at two times.	NR

The Illness Behavior Instrument

Circle the items that currently apply to you.

1. I see doctors often.
2. When ill, I have to stop work completely.
3. I stay in bed when I feel ill.
4. I work fewer hours when I'm ill.
5. I do fewer chores around the house when I'm ill.
6. I seek help from others when I'm ill.
7. When ill, I work slower.
8. I leave work early when I'm ill.
9. I complain about being ill when I feel ill.
10. I avoid certain aspects of my job when I'm ill.
11. I take rest periods when I'm ill.
12. Most people who know me are aware that I take medication.
13. Even if I don't feel ill at certain times, I find that I talk about my illness anyway.
14. Others often behave towards me as if I'm ill.
15. Although I very seldom bring up the topic of my illness, I frequently find myself involved in conversation about my illness with others.
16. Others seem to act as if I am more ill than I really am.
17. My illness or aspects of it is a frequent topic of conversation.
18. When I'm ill people can tell by the way I act.
19. Often I act more ill than I really am.
20. I have large medical bills.

Diabetes Related Problems

Circle the number on the 1 to 5 scale that corresponds to the frequency with which you have experienced the following symptoms in the past week.

SYMPTOM	FREQUENCY				
	Never	Once or twice	A few times	Fairly often	Very often
• Blurred vision (not correctable with glasses)	1	2	3	4	5
• Nausea	1	2	3	4	5
• Headaches or head pains	1	2	3	4	5
• Feeling drowsy or sedated	1	2	3	4	5
• Feeling dizzy when standing up	1	2	3	4	5
• Feeling lightheaded or unsteady when on your feet	1	2	3	4	5
• Sudden weakness, dizziness, heart pounding, or tremors that are relieved by eating	1	2	3	4	5
• Shortness of breath with light exercise or work	1	2	3	4	5
• Shortness of breath when lying down flat	1	2	3	4	5
• Chest discomfort / pain brought on by acitvity	1	2	3	4	5
• Chest discomfort / pain relieved by rest or nitroglycerin	1	2	3	4	5
• Problems falling asleep	1	2	3	4	5
• Pins and needles, numbness or burning in your feet	1	2	3	4	5
• Urinating more than usual	1	2	3	4	5
• Getting up at night several times to urinate	1	2	3	4	5
• Heart pounding or palpitation	1	2	3	4	5
• Skin irritations	1	2	3	4	5
• Feeling unusually hungry before lunch	1	2	3	4	5
• Feeling unusually hungry before dinner	1	2	3	4	5

Barriers to Adherence Questionnaire

Read through the following situations and, using the scale below, indicate how often each problem situation occurs for you. It is important that you rate every situation.

How frequently is this situation a problem for you? (Choose one number and write it in the space beside the corresponding item).

(1) Very rarely	(2) Once per month	(3) Twice per month	(4) Once per week	(5) Twice per week	(6) More than twice per week	(7) Daily

____ 1. It is embarrassing to eat when the people around me are not eating.

____ 2. It is inconvenient to inject my insulin when I am not at home.

____ 3. Bad weather interferes with my regular exercise routine.

____ 4. When my (urine or blood) glucose tests are high my family wants to know why.

____ 5. I am in the middle of an activity with friends when I realize it is time to have my afternoon snack.

____ 6. On a weekend, it is difficult to get up at the regular time to take my shot.

____ 7. It is too much trouble to write down the results of my urine (or blood) tests.

____ 8. I don't have my urine (or blood) testing materials when it is time to do the testing.

____ 9. I just don't like to exercise.

____ 10. It is easy to make a mistake on the number of food exchanges in a meal.

____ 11. Sometimes I don't draw the proper amount of insulin into the syringe.

____ 12. I feel out of place testing my urine (or blood) at work during the day.

____ 13. After eating what I am allowed at a meal, I still feel hungry.

____ 14. It is hard for me to regulate my exercise because I work all week long and then I exercise a lot on the weekend.

____ 15. A watch or a clock with a second hand is not available to time my urine (blood) test.

The Depression Inventory

Instructions: In each of the categories below, A through U, circle the number that best describes you at the present time.

A.
1. I do not feel sad.
2. I feel blue or sad.
3. I am blue or sad all the time and I can't snap out of it.
4. I am so sad or unhappy that it is very painful.
5. I am so sad or unhappy that I can't stand it.

B.
1. I am not particularly pessimistic or discouraged about the future.
2. I feel discouraged about the future.
3. I feel I have nothing to look forward to.
4. I feel that I won't ever get over my troubles.
5. I feel that the future is hopeless and that things cannot improve.

C.
1. I do not feel like a failure.
2. I feel I have failed more than the average person.
3. I feel I have accomplished very little that is worthwhile or that means anything.
4. As I look back on my life, all I can see is a lot of failures.
5. I feel I am a complete failure as a person (parent, husband, wife).

D.
1. I am not particularly dissatisfied.
2. I feel bored most of the time.
3. I don't enjoy things the way I used to.
4. I don't get satisfaction out of anything any more.
5. I am dissatisfied with everything.

E.
1. I don't feel particularly guilty.
2. I feel bad or unworthy a good part of the time.
3. I feel quite guilty.
4. I feel bad or unworthy practically all of the time now.
5. I feel as though I am very bad or worthless.

F.
1. I don't feel I am being punished.
2. I have a feeling that something bad may happen to me.
3. I feel I am being punished or will be punished.
4. I feel I deserve to be punished.
5. I want to be punished.

G.
1. I don't feel disappointed in myself.
2. I am disappointed in myself.
3. I don't like myself.
4. I am disgusted with myself.
5. I hate myself.

H.
1. I don't feel I am any worse than anybody else.
2. I am very critical of myself for my weaknesses or mistakes.
3. I blame myself for everything that goes wrong.
4. I feel I have many bad thoughts.

I.
1. I don't have any thoughts of harming myself.
2. I have thoughts of harming myself but I would not carry them out.
3. I feel I would be better off dead.
4. I have definite plans about committing suicide.
5. I feel my family would be better off if I were dead.
6. I would kill myself if I could.

J.
1. I don't cry any more than usual.
2. I cry more now than I used to.
3. I cry all the time now and I can't stop it.
4. I used to be able to cry but now I can't cry even though I want to.

K.
1. I am no more irritated now than I ever am.
2. I get annoyed or irritated more easily than I used to.
3. I feel irritated all the time.
4. I don't get irritated at all the things that used to irritate me.

L.
1. I have not lost interest in other people.
2. I am less interested in other people now than I used to be.
3. I have lost most of my interest in other people and have little feeling for them.
4. I have lost all my interest in other people and don't care about them at all.

M.
1. I make decisions about as well as ever.
2. I am less sure of myself now and try to put off making decisions.
3. I can't make decisions any more without help.
4. I can't make decisions at all any more.

N.
1. I don't feel I look any worse than I used to.
2. I am worried that I am looking old or unattractive.

3. I feel that there are permanent changes in my appearance and they make me look unattractive.
4. I feel that I am ugly or repulsive looking.

O.
1. I can work about as well as before.
2. It takes extra effort to get started at doing something.
3. I don't work as well as I used to.
4. I have to push myself very hard to do anything.
5. I can't do any work at all.

P.
1. I can sleep as well as usual.
2. I wake up more tired in the morning than I used to.
3. I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
4. I wake up early every day and can't get more than 5 hours of sleep.

Q.
1. I don't get any more tired than usual.
2. I get tired more easily than I used to.
3. I get tired from doing anything.
4. I get too tired to do anything.

R.
1. My appetite is no worse than usual.
2. My appetite is not as good as it used to be.
3. My appetite is much worse now.
4. I have no appetite at all any more.

S.
1. I haven't loss much weight, if any, lately.
2. I have lost more than 5 pounds.
3. I have lost more than 10 pounds.
4. I have lost more than 15 pounds.

T.
1. I am no more concerned about my health than usual.
2. I am concerned about aches and pains or upset stomach or constipation or other unpleasant feelings in my body.
3. I am so concerned with how I feel or what I feel that it's hard to think of much else.
4. I am completely absorbed in what I feel.

U.
1. I have not noticed any recent change in my interest in sex.
2. I am less interested in sex than I used to be.
3. I am much less interested in sex now.
4. I have lost interest in sex completely.

Hopelessness Scale

Please answer true, or false, to each of the following items. Consider each item as it applies to you now.

ITEM	RATING
1. I look forward to the future with hope and enthusiasm.	True False
2. I might as well give up because I can't make things better for myself.	True False
3. When things are going badly, I am helped because I know that they can't stay that way forever.	True False
4. I can't imagine what my life would be like in 10 years.	True False
5. I have enough time to accomplish the things I most want to do.	True False
6. In the future, I expect to succeed in what concerns me most.	True False
7. My future seems dark to me.	True False
8. I expect to get more of the good things in life than the average person.	True False
9. I just don't get the breaks, and there's no reason to believe I will in the future.	True False
10. My past experiences have prepared me really well for the future.	True False
11. All I can see ahead of me is unpleasantness rather than pleasantness.	True False
12. I don't expect to get what I really want.	True False
13. When I look ahead to the future, I expect I will be happier than I am now.	True False
14. Things just won't work out the way I want them to.	True False

15. I have great faith in the future. True False

16. I never get what I want so it's foolish to want anything. True False

17. It is very unlikely that I will get any real satisfaction in the future. True False

18. The future seems vague and uncertain to me. True False

19. I can look forward to more good times than bad times. True False

20. There's no use in really trying to get something I want because I probably won't get it. True False

Multidimensional Health Locus of Control Scale

Directions: Consider **each** item below, and using the scale provided, circle the number that **best** describes your position at the present time.

Item	Scale					
	Strongly Disagree 1	2	3	4	5	Strongly Agree 6
1. If I become sick, I have the power to make myself well again.	1	2	3	4	5	6
2. Often, I feel that no matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3. If I see an excellent doctor regularly, I am less likely to have health problems.	1	2	3	4	5	6
4. It seems that my health is greatly influenced by accidental happenings.	1	2	3	4	5	6
5. I can only maintain my health by consulting health professionals.	1	2	3	4	5	6
6. I am directly responsible for my health.	1	2	3	4	5	6
7. Other people play a big part in whether I stay healthy or become sick.	1	2	3	4	5	6
8. Whatever goes wrong with my health is my own fault.	1	2	3	4	5	6
9. When I am sick, I just have to let nature run its course.	1	2	3	4	5	6
10. Health professionals keep me healthy.	1	2	3	4	5	6

11. When I stay healthy, I'm just plain lucky.	1	2	3	4	5	6
12. My physical well-being depends on how well I take care of myself.	1	2	3	4	5	6
13. When I feel ill, I know it is because I have not been taking care of myself properly.	1	2	3	4	5	6
14. The type of care I receive from other people is what is responsible for how well I recover from an illness.	1	2	3	4	5	6
15. Even when I take care of myself, it's easy to get sick.	1	2	3	4	5	6
16. When I become ill, its a matter of fate.	1	2	3	4	5	6
17. I can pretty much stay healthy by taking good care of myself.	1	2	3	4	5	6
18. Following doctor's orders to the letter is the best way for me to stay healthy.	1	2	3	4	5	6

Problem Solving Inventory

Rate yourself on each of the items below using the following six point rating scale where (1) represents ALWAYS, and (6) represents NEVER. Circle the number that best describes you in response to each item.

ITEM	(1) always	(2)	(3)	(4)	(5)	(6) never
1. When a solution to a problem was unsuccessful, I do not examine why it didn't work.	1	2	3	4	5	6
2. When I am confronted with a complex problem, I do not bother to develop a strategy to collect information so I can define exactly what the problem is.	1	2	3	4	5	6
3. When my first efforts to solve a problem fail, I become uneasy about my ability to handle the situation.	1	2	3	4	5	6
4. After I have solved a problem, I do not analyze what went right or what went wrong.	1	2	3	4	5	6
5. I am usually able to think up creative and effective alternatives to solve a problem.	1	2	3	4	5	6
6. After I have tried to solve a problem with a certain course of action, I take time and compare the actual outcome to what I thought should have happened.	1	2	3	4	5	6
7. When I have a problem, I think up as many possible ways to handle it as I can until I can't come up with any more ideas.	1	2	3	4	5	6
8. When confronted with a problem, I consistently examine my feelings to find out what is going on in a problem situation.	1	2	3	4	5	6
9. I have the ability to solve most problems even though initially no solution is immediately apparent.	1	2	3	4	5	6
10. Many problems I face are too complex for me to solve.	1	2	3	4	5	6

ITEM	(1) always	(2)	(3)	(4)	(5)	(6) never
11 I make decisions and am happy with them later.	1	2	3	4	5	6
12 When confronted with a problem, I tend to do the first thing that I can think of to solve it	1	2	3	4	5	6
13 Sometimes I do not stop and take time to deal with my problems, but just kind of muddle ahead.	1	2	3	4	5	6
14. When deciding on an idea or possible solution to a problem, I do not take the time to consider the chances of each alternative being successful.	1	2	3	4	5	6
15. When confronted with a problem, I stop and think about it before deciding on a next step.	1	2	3	4	5	6
16. I generally go with the first good idea that comes to my mind.	1	2	3	4	5	6
17. When making a decision, I weigh the consequences of each alternative and compare them against each other.	1	2	3	4	5	6
18. When I make plans to solve a problem, I am almost certain I can make them work.	1	2	3	4	5	6
19. I try to predict the overall result of carrying out a particular course of action.	1	2	3	4	5	6
20. When I try to think up possible solutions to a problem, I do not come up with very many alternatives	1	2	3	4	5	6
21. Given enough time and effort, I believe I can solve most problems that confront me.	1	2	3	4	5	6
22 When faced with a novel situation I have confidence that I can handle problems that may arise.	1	2	3	4	5	6
23 Even though I work on a problem, sometimes I feel like I am groping or wandering, and am not getting down to the real issue	1	2	3	4	5	6

ITEM	(1) always	(2)	(3)	(4)	(5)	(6) never
24. I make snap judgments and I later regret them.	1	2	3	4	5	6
25. I trust my ability to solve new and difficult problems.	1	2	3	4	5	6
26. I have a systematic method for comparing alternatives and making decisions.	1	2	3	4	5	6
27. When confronted with a problem, I do not usually examine what sort of things my external environment may be contributing to my problem.	1	2	3	4	5	6
28. When I am confused by a problem, one of the first things I do is survey the situation and consider all the relevant pieces of information	1	2	3	4	5	6
29. Sometimes I get so charged up emotionally that I am unable to consider many ways of dealing with my problems.	1	2	3	4	5	6
30. After making a decision, the outcome I expected usually matches the actual outcome.	1	2	3	4	5	6
31. When confronted with a problem, I am usure of whether I can handle the situation.	1	2	3	4	5	6
32. When I become aware of a problem, one of the first things I do is to try to find out exactly what the problem is.	1	2	3	4	5	6

Client Satisfaction Scale: General Satisfaction

I would like to know, generally, how satisfied you were with the use of the manual ***Managing Diabetes: Patient and Doctor...Partners in Care.*** Please circle your response to each of the following questions.

---

1. How would you rate the quality of the manual?

4	3	2	1
excellent	good	fair	poor

2. To what extent has the manual met your needs in helping you (your patient) to look at the challenges of managing diabetes?

4	3	2	1
almost all of my needs have been met	most of my needs have been met	only a few of my needs have been met	none of my needs have been met

3. If a friend (another patient) were in need of similar help, would you recommend the manual to him or her?

1	2	3	4
no, definitely not	no, I don't think so	yes, I think so	yes, definitely

4. How satisfied were you with the amount of help you received from the researchers as you (your patient) worked through the manual?

1	2	3	4
quite dissatisfied	indifferent or mildly dissatisfied	mostly satisfied	very satisfied

5. Has working through the manual helped you manage other problems more effectively?

4	3	2	1
yes, it helped a great deal	yes, it helped somewhat	no, it really didn't help	no, it seemed to make things worse

6. In an overall, general sense, how satisfied were you with both the manual and the help you received from the researchers in working through it?

4	3	2	1
very satisfied	mostly satisfied	indifferent or mildly satisfied	quite satisfied

Patient-physician Analogues

The audiotape will record your discussion, as together, you work through the following two problems. Please allow no more than five minutes or less discussion for each problem.

As you consider each problem, ask yourselves **how you would resolve it.**

PROBLEM ONE

A close, elderly, friend of yours is about to be released from the hospital after a lengthy stay for treatment of pneumonia. While he is now able to go home, he is quite weakened and needs some help for the next month. Previously, you and he had reassured his doctor that your friend could stay with you when he got out of the hospital. Now this has become impossible because you sister has just informed you that she has lost her job and needs to move in with you to help conserve her money until she finds a new job. What will you do? What will you tell your friend?

Patient-physician Analogues continued

PROBLEM TWO

Your friend has diabetes and has been referred, by her doctor, to a nutrition counsellor to help her find a way to stick to her diabetic diet. Your friend has told you in the past that she has a lot of difficulty staying on her diet. She said she enjoyed the visit with the nutrition counsellor, but she didn't get the help she expected. You remember that she has said this, in the past, about other sources of help for nutrition advise that her doctor recommended. you note that she still reports difficulty staying on her diet after the visit to the counsellor. Recently, she told you that she is afraid to see her doctor because she hasn't been sticking to her diet. She wants your advise. How will you help her?

Appendix D

Chart Audit Criteria

Diabetic Treatment Protocol[1]

Charts, in their entirety, were reviewed for the presence or absence of the following criteria:

1. Q. 6 months comment on: polyuria, polydypsia, or weight loss.
2. Fundi checked yearly, or seen by ophthalmologist.
3. Complete physical or followed by a specialist.
4. Home monitoring used or absence justified.
5. HbAcc q.3 months.
6. Renal function q. 3 years.
7. EKG if older than 30 years.
8. 2 FBS greater than 8.8.
9. Insulin dosage documented yearly.
10. Dietary counselling.
11. Smoking and alcohol intake noted.
12. Two follow-up visits per year, or, follow-up by specialist.
13. Effects of diabetes on normal life discussed yearly.
14. Indication of family history of diabetes.

The above criteria are those of the College of Family Physicians of Canada. The criteria were tested as part of a quality of care assessment project, and are now widely used in Canada. The project is reported in:

Borgiel, A., Williams, J., Anderson, G., Bass, M., Dunn, E., Lamont, C., Spansoff, R., & Rice, D. (1985). Assessing the quality care in family physicians' practices. Canadian Family Physician, 31, 853-862.

15. Duration of diabetes, or starting date.
16. Blood sugar, dietary management, patient well or ill.
17. Weight documented in at least 75% of office visits.
18. Cardiovascular system and blood pressure.
19. Yearly urinalysis.
20. Diagnosis of diabetes was based on a glucose tolerance test.
21. Diabetic diet and reduced intake of calories.
22. If BUN greater than 9 or Creatinin greater than 140, were appropriate drugs prescribed?
23. Exercise.
24. Follow-up in one month for newly diagnosed; every 6 months thereafter.
25. At least one ophthalmology visit.
26. Sexual dysfunction.

Appendix E

Definitions and Directives for Content Analysis of Verbal Behavior During Office Visits

DIRECTIONS Read all of the instructions before proceeding.

STEP ONE

Read the entire transcript. Then go back, and from the beginning, label all instances of concordance statements. These statements are bracketed.

STEP TWO

Read the entire transcript. Then go back from the beginning label all instances of directive, open-ended, and emotion-handling statements (statements of respect and understandability). These statements are also bracketed.

Statements are single sentences.

Doctor - There has been some deterioration to your eyes according to this report.
Patient - That may be the case, but I'm not experiencing anything different with regards to vision.
Doctor - even so, I think it best that we have you see the eye doctor a little more frequently.

Patient - I'm not sure that will be helpful, since I don't get much information from him. [But if you need the information I'll do it.] -- Concordance.

Make certain that an independent observer can clearly identify exactly what you are labelling, and the label itself.

If you have any qualifiers about any of your labelling decisions, make a note of this in the margin and expand on this on a separate page - identifying the sentence to which you are referring.

STEP THREE

Look over the transcript once again to ensure that all your labels clearly correspond to the bracketed sentence you are labelling.

DEFINITIONS OF CATEGORIES

Concordance Statements. Statements such as "If you will do...then I will do...", and "Let's see how we can achieve...". The implication is that the physician and patient will together assume some responsibility for working on achieving goals. The patient and physician need not always agree on what they are trying to achieve, but they are willing to negotiate, or give and

take, as in the example previously given.

DEFINITIONS OF CATEGORIES

STEP TWO

(A) Directive Questions.

Directive occurs when details of specific events are specifically probed ("How frequently...", "What specifically, or who specifically was involved in...", "How long...", "How much...").

(B) Open-Ended Questions.

Open-ended questions or requests ("Tell me more...", "Go on..."). These differ from directive probes in that they do not probe specifics, rather they are open-ended. Any response can occur in whatever direction the responder wishes to go.

(C) Emotion-handling Statements.

Included are, (a) understandability or legitimation ("I can imagine what that must have been like for you"), ("I can understand what you are trying to say"); (b) respect ("You've really done well"), ("I want to congratulate you"), ("You've managed to accomplish some good things").

Table E1

Mean Point-By-Point Agreement: Verbal Behavior of Patient-physician Pairs

Pair	Mean Point-By-Point
Rachel & Dr. Lynn	96%
David & Dr. Susan	94%
Gordon & Dr. Brian	94%
Ronald & Dr. Grace	92%
Louise & Dr. Karen	95%

Note. Overall Mean Point-By-Point Agreement = 94%

Appendix F

Criteria for Classification of Glucose Tolerance[a]

Plasma Glucose mg/dl (mmol/l)

Class	Fasting	Two Hour
Normal	Less then 140 (7.8)	Less than 140 (7.8)
Intermediate	Less than 140 (7.8)	140 - 199 (7.8-11.0)
Diabetes	Greater or = to 140 (7.8)	Greater or + to 20(11.1)

Test Values for Control of Diabetes[b]

Degree of Control	% Negative Urine[c]	% HbA_{1C} Level[d]
Excellent	>90	<8.5
Good	75-79	8.5-9.5
Fair	60-74	9.5-10.5
Fair to Poor	50-59	10.5-12
Poor	<50	>12

Note. [a]From Knowler, Everhart, & Bennett (1985). [b]From Guthrie & Guthrie (1983). [c]Test urine with two drops Clinitest on first voided specimen obtained pre-meal and bedtime (4 times per day). [d]HbA + total glycoslylated hemoglobin A_{1a+b+c} by microcolumn.

Appendix G

Results: Indirect Measures

Impact of Training on Other Health Behaviors.

Various self-report measures of health behaviors were used, specifically: psycho-social adjustment to illness, general illness behaviors, diabetes illness behaviors, barriers to diabetes treatment plan adherence, depression, hopelessness, health locus of control, and health promotion behaviors. Patients completed the questionnaires prior to the onset of treatment, immediately following treatment, and at three month follow-up.

The Problem Solving Inventory (Heppner & Petersen, 1988) was used to determine if the data derived from the manuals, that is the actual development of problem identification and goal setting behaviors, would also be reflected in the patients' self-assessments of their problem solving ability. All patients, via the manual, were able to specify clear and complete statements of a health behavior, and were able to write measurable long and short term objectives to reduce, or better manage, the problem. They then went on to implement their goals and achieved positive health outcomes: they achieved solutions to their problems. Did the self-measure reflect their success? Two patients, Rachel and David, assessed themselves more positively on problem solving behaviors at pretreatment, post treatment, and follow-up, than did the "normal" male and female adults cited in the Heppner and Petersen research. The mean for "normal" female adults was

reported as 86.2. Rachel's scores were 65, 62, and 62. The mean for "normal" male adults was reported as 76.9. David's scores were 38, 37, and 38. Three patients, Ronald (means 85, 107, 84), Gordon (means 82, 100, 102), and Louise (means 111, 121, 111), assessed themselves less positively than normal adults at each of the three research phases.

The Psychosocial Adjustment to Illness Scale Self Report (PAIS) (Derogatis, 1977; Derogatis & Derogatis, 1983) is designed for use with patients who are experiencing chronic illness. It measures the extent to which patients self-report chronic illness as interfering with their ability to function in a variety of roles; work at home, self-health care and use of the health care system, interpersonal and family relationships, sexual relationships and occupational work. Normative scores are provided for Diabetic Patients (Derogatis, 1986). Patients whose total scores, across domains, are above 62 are deemed to be poorly adjusted to their illness in relation to ability to perform their roles in the various domains. The patients' scores at pretreatment, post treatment, and follow-up were; Rachel (30, 30, 30); David (58, 63, 60); Ronald(45, 50, 48); Gordon (70, 69, 80), and Louise (65, 65, 63). Of the five patients, David, Gordon, and Louise were experiencing more of the complications of diabetes than were Rachel and Ronald. David was currently on disability leave from his work due to diabetic retinopathy and neuropathy. He also was hypertensive. Gordon had to retire early from his work and had just been categorized as legally blind. He

was no longer able to drive or read without vision aids. His neuropathy was also affecting his balance, thus limiting his mobility. He also had renal and cardiac failure, and during the course of the study had a permanent indwelling urinary catheter, attached to a leg bag, inserted due to his inability to voluntarily empty his bladder. Louise was still working but was finding the work physically challenging. She had cardiac complications of her diabetes.

The Illness Behavior Instrument (Turkat & Pettegrew, 1983) was used to measure change in a patient's self-reported illness behavior following completion of the manual. Illness behaviors are those behaviors employed by the patient to indicate experience of illness, for example, talking to others about the illness, staying home from work, doing housework more slowly, staying in bed, and so forth. Rachel, Ronald, and Gordon reported a decrease in their illness behaviors following use of the manual; David and Louise reported an increase. This self-reporting of illness behaviors was not congruent with self-reporting of symptoms of diabetes, as measured by the Diabetes Related Problems Scale (Nerenz, Repasky, Whitehouse, & Kahkonen, 1992). With the exception of Gordon, patients who reported an increase in illness behaviors also reported a decrease in symptoms: patients who reported a decrease in illness behaviors also reported an increase in symptoms. Gordon reported a decrease in illness behaviors and a decrease in symptoms, even though the complications of his diabetes were increasingly limiting his

ability to function.

The Barriers to Adherence Questionnaire (Glasgow, McCaul, & Schafer, 1986) was used as an adjunct to the completed manuals to determine whether the patients' responses on the questionnaires were congruent with the behaviors targeted for modification by patients in the manuals. The patients' responses on this instrument did correspond with the findings in the manuals. However, whether the patients reported the behaviors as barriers or not as barriers varied. For example, achieving success with the modification of a behavior was reported as an increased barrier by some patients, and a decreased barrier by others.

The Health-Promoting Lifestyle Profile (Walker, Sechrist, & Pender, 1985) was a self-report measure used to determine the extent to which patients, although experiencing complications of diabetes, were nevertheless engaging in health promotion and illness prevention behaviors. Rachel and David reported an increase in these behaviors at post treatment and follow-up. Ronald reported a decrease at post treatment and an increase at follow-up. Gordon reported the same amount of these behaviors across the three phases. Louise reported a decrease in these behaviors at post treatment and follow-up. Actual success in defining and implementing target behaviors for positive health outcomes did not necessarily correspond with reports of the use of health promoting behaviors as measured by the Health-Promoting Lifestyle Profile.

The Multidimensional Health Locus of Control Scale

(Wallston, Wallston, & DeVellis, 1978) was used because some early work with patients who have diabetes indicated that long-term experience with diabetes in patients who report an internal locus of control preference over powerful others or chance (external), are less compliant with treatment protocols (Lowery, 1974; Lowery & DuCette, 1976). All of the patients in my research had been identified by their physicians as having difficulty adhering to their treatment protocols. Although all of the patients in my study reported themselves as having an internal behavioral orientation, this orientation changed somewhat during the course of the study, although all patients maintained their internal behavioral preference. Rachel and David reported a strengthening of their internal preference following the completion of the manual. For Ronald and Louise, the chance behavioral preference increased: for Gordon, the powerful others behavioral preference increased. However, on completion of the manual, all patients were more adherent, rather than less, to their treatment protocols despite self-reporting on internal behavioral preferences.

Finally, patients completed the Inventory for Measuring Depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974). None of the patients reported depression at pretest. Gordon reported mild depression at follow-up. This corresponded to the impact which having to wear a urinary drainage bag had on his daily functioning, as well as facing the prospects of possible

surgery and of needing a blood transfusion for anemia. Rachel, David, and Ronald did not report themselves as experiencing hopelessness behaviors. Gordon and Louise reported increasing experience of hopelessness behaviors at post treatment and follow-up.

Appendix H

Defining Procedures and Outcomes Regarding Treatment Integrity

Audiotapes of verbal behavior were analyzed to ensure that the manual was being used as intended. A checklist to assess the presence of the following key elements was used:

First office encounter. The following must be present: (a) the patient completes the first two exercises before meeting with the physician, (b) the patient and physician meet and together review, and if necessary revise, the first two exercises, (c) the patient and physician sign a contract to continue working in the manual until its completion.

Second office encounter. The following must be present: (a) the patient brings the completed manual to the encounter, (b) the patient and physician together discuss the health problem and goals that were identified by the patient as instructed by the manual, (c) the patient and physician agree on the health problem and the goals as an essential focus for subsequent treatment planning.

Third office encounter. The following must be present: (a) the patient and physician discuss the progress on the treatment plan that was agreed to in the second office encounter.

All of the above elements were achieved by each pair in the sequence identified. The presence of each element was assessed by two independent raters using a simple checklist that instructed

the rater to check yes the element was present, or no it was not present, and to give an example of each element. Data sources were the manual and the audiotapes of the office encounters. Interobserver agreement on the presence of the required elements was 100%.

Appendix I

Patient-Buddy Guidelines for Use of the Manual

The Manual contains 10 exercises. Each exercise builds on the work of the previous exercise. Now that your Buddy has agreed to help you, it is important that you both identify ways of rewarding yourselves as you complete the exercises in the manual. Perhaps there is something you like to do together that you could agree to do only when you have completed an exercise. Alternatively, perhaps there is a reward that you can give your Buddy for ensuring that you have completed an exercise and that your Buddy can give to you for its completion.

For best results, the reward or rewards that you select should not be available to either of you until you have completed what you have agreed to complete. For example, if you have selected going to your favorite restaurant as your reward, and your Buddy has selected buying a new tape of favorite music, then, you must restrict yourself from going to your favorite restaurant, and your Buddy refrain from buying new music until you have completed the work that you have agreed to complete. When you have completed the work, your Buddy can deliver the restaurant gift certificate (which your Buddy has been holding for the reward day) to you. In turn, you can deliver the new music tape (which you have been holding) to your Buddy.

The two of you may also select a joint reward for work that you have completed. For example, you may select going to a movie

together as a reward. If this is the case, you both should refrain from going to movies until you have completed the work that you have agreed to do, and then you can go the movie as your reward. The reward system will work best if your reward is something that is very attractive and desirable to each of you (together if it is a joint reward, and to each of you uniquely if it is not a joint reward), and if the reward is something that you each can deliver or dispense to one another. It is also very important that the rewards you select are achievable. You want to select a reward that you can actually, and easily obtain.

Now how exactly will you earn you rewards? Look at the rewards you have selected, and each of you rank your own rewards in order of personal desirability. Even though all of your rewards are desirable to you (or they wouldn't be good rewards), some will be more desirable than others. Select two rewards, both of which are desirable to you, but one of which is more desirable than the other. You will use the smaller reward when you are half way through the exercises. The very best reward must be reserved until you have completed all of the exercises in the manual.

You and your Buddy will know how many stickers for completion of each exercise you have earned when you look at the **Completed Exercises Form** that you have posted in a visible place. If you have five stickers visible, then you can receive you first reward. When ten stickers are visible, you can receive your very best reward.

If you have difficulty sorting out your rewards, go to

exercise 10 in the manual for some assistance. You may also call the researcher, Pat Farrell (474-6816 or 256-9778) for some assistance.

Now, one more thing before you begin. We have included agreements for you and your Buddy to complete and sign. The agreements indicate exactly what you have agreed to do together as you work through the manual.

Buddy Agreement

I, _____ (name of Buddy) agree to help _____ (Patient's name) to work through the manual Managing Diabetes: Patient and Doctor...Partners in Care. I also agree to review each completed exercise, and if necessary, to help change or modify it as instructed in the manual.

Date _____ Buddy's Signature_____

Patient's Agreement

I, _____ (Patient's name) agree to show _____ (Buddy's name) my completed work at the end of each exercise and as instructed in the manual. I also agree to discuss my work with my buddy and to change or modify it as instructed in the manual.

Date _____ Patient's Signature _____

Buddy Reward Agreement

(if using individual reward)

I, _____ (Buddy's name) agree to reward myself, after we have completed the first 5 exercises in the manual, with the following reward _____. I further agree to reward myself, after we have completed all 10 of the exercises in the manual with the following reward _____ _____. I further agree to use the rewards only after collecting the number of stickers necessary to gain the rewards.

Date _____ Buddy's Signature _____

Patient Reward Agreement

(if using individual reward)

I, _____ (Patient's name) agree to reward myself, after we have completed the first 5 exercises in the manual, with the following reward _____. I further agree to reward myself, after we have completed all 10 of the exercises in the manual with the following reward _____ _____. I further agree to use the rewards only after collecting the number of stickers necessary to gain the rewards.

Date _____ Patient's Signature _____

Joint Reward Agreement

(if using joint rewards)

We, _____ (Buddy's name) and _____ (Patient's name) agree to reward ourselves, after we have completed the first 5 exercises in the manual, with the following reward _____. We further agree to reward ourselves, after we have completed all 10 exercises in the manual with the following reward _____ _____. We further agree to dispense and use the rewards only after collecting the number of stickers necessary to gain the rewards.

Date_____ Signed _____(Buddy's Signature)

Signed _____(Patient's Signature)

Physician's Guide to Use of the Patient Training Manual

Managing Diabetes:

Patient and Doctor...

Partners in Care

Patients and Physicians as Partners

Once you have diagnosed your patient as having insulin-dependent diabetes, his or her day-to-day management of its effects will depend not only on your prescribed treatment plan, but also will depend on your patient's commitment to the plan, and particularly on implementation of the plan on a daily basis. Because each patient will have very unique circumstances, at home, at work, or at play, it can become very challenging to sort out all of the factors in managing the effects of insulin-dependent diabetes.

Who Will Benefit From Using The Manual?

When your patients do not adhere to your treatment plan for them, you can expend a great deal of time and effort gaining their adherence. The use of the manual will save time, in these cases, in both the short and long-term. In the short-term, most of the work required in using the manual is done by the patient away from your office. In the long-term, once the patient gains skills in using problem solving behaviors, these skills may generalize to treatment of health problems other than diabetes and assist you in treating these problems as well.

Some of your patients may report difficulty in adhering to

the treatment plan. Others may report no difficulty in adherence but, for various reasons, you suspect that they are in fact having difficulty. Part of the difficulty in adhering to the treatment plan may be because your patient has difficulty in clarifying, and clearly specifying, what the problems of adherence really are. Part of the difficulty also may be because your patient may not be able to clearly specify and achieve goals. Patients may believe that they are clear about problems and goals, but may instead have focused on the wrong problem. Or, they may be focusing on the right problem, but on the wrong goals related to it, and so forth. If you suspect that your patient is having difficulty with clear problem specification or with goal setting, then it definitely will be helpful to have them work through the manual.

Because you use of the manual is part of a research project to test its effectiveness, we ask that you select your participating patient using one or more of the following criteria:

1. A patient who has self-reported, or whose relatives or friends have reported to you that he or she is having difficulty adhering to any aspect of your treatment plan.
2. A patient whom you suspect is not adhering to your treatment plan because he or she has a known history of non-adherence to treatment plans in other illness contexts.
3. A patient whom you suspect is not adhering to the treatment plan because physiologic measures of glucose control are not

within what you consider to be an acceptable range for that patient.

We also ask that you consider only those patients who have been insulin-dependent for at least five years; are using blood glucose monitoring procedures at home; and have a spouse, friend, or relative living with them.

How Long Will It Take? What is Our Commitment?

Working though the manual will take your patient from one to two weeks, depending on the health behavior targeted for change. After a baseline period where the patient will need to meet with you briefly; the manual requires that the patient check in with you at its completion to determine the next steps you will take to plan for the achievement of the patient's goals (two office visits altogether). Checking in with you is an essential part of the process if the behavior change is to occur. The manual also requires that the patient enlist the support of a "buddy" to help throughout the process. Use of a "buddy" will also increase the likelihood of success in completing all of the exercises in the manual.

What Behavioral Outcomes Can I Expect To See?

When your patient has completed all of the exercises in the manual, he or she will have;

1. Clearly defined a behavior targeted for change.
2. Identified, in clear achievable and measurable terms, short and long term goals to achieve the target behavior change.
3. Identified rewards for use in achieving the plan of action

that will be developed with you to achieve the goals.

Once your patient has worked through the manual, you should be able to decide together just what the next steps are to achieve the goals. This is because you will have a clearly described, observable behavior with which to work that is unique to your patient's circumstances.

With this in mind, you may choose to use the contract attached to these guidelines to facilitate continuation of the problem solving process when your patient has completed the manual. You will note that a contract is also included in the manual at the beginning of the process, in order to make the commitment to the process visible.

What is The Process?

Once you have identified the patient who you believe should work with the manual, contact the researcher, Pat Farrell (contact information blow). She will telephone the patient, arrange a meeting time, discuss the research process, and collect the patient's written agreement to participate. She will also liase with your nurse to ensure that the requirements for the patient's appointments with you are in place and that all materials are available in your office.

Because, at this stage, we are testing the usefulness of the manual, it is important to adhere to a research protocol. The protocol includes:

1. Researcher access to patient record data, prior to, concurrently with, and at 2, and 4 months from the initial

use of the manual.

2. Audio-recording of the office visits with your patient during the course of the study. In this type of research that is concerned with testing the effect of the use of a manual on patient behavior, it is essential to ensure that correct use of the manual throughout the testing period. Analysis of audiotapes of discussion of the manual during your patient's office visit will enable the researcher to determine you and your patient's usual patterns of interaction. This procedure is critical to ensure an adequate test of the manual. The recording apparatus will be provided by the researcher.
3. The administration of several questionnaires to your patient before and following the study. These instruments are designed to measure adherence to treatment behaviors, self-reported health promoting behaviors and depression. If your patient is screened as seriously depressed, as measured by the Beck Inventory, you and your patient will be informed and, if necessary, provided with a list of resources for help.
4. Access to the manual, upon its completion, for analysis of the completed exercises.

Researcher Contact Information on following page.

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COMPLETED EXERCISES

(Post this sheet in a visible place in your home or at work. After you complete each exercise, fill in the date you completed it in the space provided. A space is also provided for you and your partner to sign, indicating that you have completed the exercise. Then, select a sticker of your choice to put in the space provided. The sticker will give you a bright, visible reminder of your progress).

EXERCISE	DATE COMPLETED	SIGNATURES	STICKER
1. Your Health Concern.			
2. Your Treatment Plan.			
3. Your Health Behaviors.			
4. Ranking Your Health Behaviors.			
5. Defining the Problem.			
6. A Closer Look.			
7. Searching for Clues.			
8. Setting Goals.			
9. Short-Term Goals.			
10. Finding My Rewards.			

Appendix J

Individual Pair's Use of Questions and Statements, and Duration of Office Encounters

Table J1

Number of Direct Questions and Open-ended and Emotion-handling and Concordance Statements Spoken by Patients and Physicians During Office Visits at Pretreatment

	Direct Question		Open-ended		Emotion-handling		Concordance	
	Patient	Doctor	Patient	Doctor	Patient	Doctor	Patient	Doctor
Rachel & Dr. Lynn	0	16	0	5	0	1	0	4
David & Dr. Susan	1	8	1	6	0	3	3	3
Ronald & Dr. Grace	1	11	0	5	0	0	0	0
Gordon & Dr. Brian	1	4	0	0	0	1	0	0
Louise & Dr. Karen	1	5	0	1	1	1	0	1

Table J2

Number of Direct Questions and Open-ended and Emotion-handling and Concordance Statements Spoken by Patients and Physicians During Office Visits at Post Treatment

	Direct Question		Open-ended		Emotion-handling		Concordance	
	Patient	Doctor	Patient	Doctor	Patient	Doctor	Patient	Doctor
Rachel & Dr. Lynn	3	22	0	10	0	11	2	6
David & Dr. Susan	2	9	0	8	0	6	12	11
Ronald & Dr. Grace	1	18	0	11	0	3	2	2
Gordon & Dr. Brian	7	8	2	4	2	11	9	11
Louise & Dr. Karen	3	5	0	1	0	5	3	3

Table J3

Number of Direct Questions and Open-ended and Emotion-handling and Concordance Statements Spoken by Patients and Physicians During Office Visits at Follow-up

	Direct Question		Open-ended		Emotion-handling		Concordance	
	Patient	Doctor	Patient	Doctor	Patient	Doctor	Patient	Doctor
Rachel & Dr. Lynn	3	13	1	2	6	5	7	7
David & Dr. Susan	2	20	4	7	0	5	5	6
Ronald & Dr. Grace	0	12	0	10	0	5	0	1
Gordon & Dr. Brian	6	6	0	1	1	4	6	8
Louise & Dr. Karen	1	8	0	3	0	2	4	5

Table J4

Number and Percentages of Directive and Open-ended Questions, and Emotion-handling and Concordance Statements, Spoken by Patients and Physicians During Office Encounters

	Pretreatment		Post Treatment		Follow-up		Total
Statement	Patients	Physicians	Patients	Physicians	Patients	Physicians	
Directive	4 44%	44 59%	16 33%	62 38%	12 26%	59 45%	197
Open-ended	1 11%	17 23%	2 4%	34 21%	5 11%	23 18%	82
Emotion-handling	1 11%	6 8%	2 4%	36 22%	7 15%	21 16%	73
Concordance	3 33%	8 11%	28 58%	33 20%	22 48%	27 21%	121
Total	9	75	48	165	46	130	473

Table J5

Rate, per Minute, of Direct Questions Spoken by Patient-physician Pairs During Office Visits

Pair	Pretreatment	Post Treatment	Follow-up
Rachel & Dr. Lynn	2.67	0.96	2.00
David & Dr. Susan	1.00	0.73	2.20
Ronald & Dr. Grace	2.00	3.80	2.40
Gordon & Dr. Brian	1.00	1.15	2.00
Louise & Dr. Karen	1.50	1.60	1.80

Note. Rate = Number of Direct statements divided by length of verbal behavior time, in minutes, during office visits.

Table J6

Rate, per Minute, of Open-ended Questions Spoken by Patient-physician Pairs During Office Visits

Pair	Pretreatment	Post Treatment	Follow-up
Rachel & Dr. Lynn	0.83	0.38	0.38
David & Dr. Susan	0.78	0.53	1.10
Ronald & Dr. Grace	0.83	2.20	2.00
Gordon & Dr. Brian	0	0.46	0.16
Louise & Dr. Karen	0.25	0.20	0.60

Note. Rate = Number of Open-ended statements divided by length of verbal behavior time, in minutes, during office visits.

Table J7

Rate, per Minute, of Emotion-handling Questions Spoken by Patient-physician Pairs During Office Visits

Pair	Pretreatment	Post Treatment	Follow-up
Rachel & Dr. Lynn	0.17	0.42	1.38
David & Dr. Susan	0.33	0.40	0.50
Ronald & Dr. Grace	0	0.60	1.00
Gordon & Dr. Brian	0.20	1.00	0.83
Louise & Dr. Karen	0.50	1.00	0.40

Note. Rate = Number of Emotion-handling statements divided by length of verbal behavior time, in minutes, during office visits.

Table J8

Rate, per Minute, of Concordance Statements Spoken by Patient-physician Pairs During Office Visits

Pair	Pretreatment	Post Treatment	Follow-up
Rachel & Dr. Lynn	0.67	0.31	1.75
David & Dr. Susan	0.67	1.53	1.10
Ronald & Dr. Grace	0	0.80	0.20
Gordon & Dr. Brian	0	1.54	2.33
Louise & Dr. Karen	0.25	1.20	1.80

Note. Rate = Number of concordance statements divided by length of verbal behavior time, in minutes, during office visits.

Table J9

Length of Time, in Minutes, of the Patient-physician Verbal Behavior During Office Visits

	Duration in Minutes			
Pair	Pretreatment	Post Treatment	Follow-up	Total
Rachel & Dr. Lynn	6	26	8	40
David & Dr. Susan	9	15	10	34
Ronald & Dr. Grace	6	5	5	16
Gordon & Dr. Brian	5	13	6	24
Louise & Dr. Karen	4	5	5	14
Total	30	64	34	128

Appendix K

Social Validity Data

Item	Scale Used and Findings			
Quality of manual?	Excellent = 4 - Patient=2 - Doctor=2	Good = 6 - Patient=3 - Doctor=3	Fair = 0	Poor = 0
Did manual meet needs?	Almost all needs meet = 1 - Patient=1 - Doctor=0	Most needs meet = 9 - Patient=4 - Doctor=5	Few needs meet = 0	None = 0
Recommend manual to others?	No = 0	No, probably = 0	Yes, probably = 2 - Patient=2 - Doctor=0	Yes, definitely = 8 - Patient=3 - Doctor=5
Satisfaction with help from researchers?	No = 0	Indifferent or Mildly = 0	Mostly = 0	Very = 10 - Patient=5 - Doctor=5
Generalization to other problems?	Helped a great deal = 5 - Patient=3 - Doctor=2	Helped somewhat = 5 - Patient=2 - Doctor=3	Didn't really help = 0	Made things worse = 0
Satisfaction with whole process?	Very = 9 - Patient=5 - Doctor=5	Mostly = 8 - Patient=7 - Doctor=1	Indifferent or Mildly = 0	Not quite = 0