IMPROVING ADHERENCE: USE OF RELAPSE PREVENTION
INSTRUCTIONS IN CLINICAL NUTRITION PROGRAMS

DISSERTATION

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By

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The possibility that faulty expectations about success and relapse recovery contributed to poor adherence was examined in this study. Support for such an expectancy model was sought through comparing an index of relative task magnitude to adherence rates. Instructions designed to improve adherence through changing expectations about relapse and relapse recovery were also administered to 46 clients in two clinical nutritional programs. Their adherence rates (in days) were compared to the rates obtained from the records of 64 other clients who did not receive the instructions.

To further understand the adherence phenomenon, several other measures were obtained from the treatment subjects. These data were compared to adherence rates in an attempt to identify potential co-variante relationships.

Statistical procedures including analysis of variance to determine comparability of subject groups, Pearson Product Moment correlations, t tests of the difference between means, and the Lawshe-Baker Nomograph comparing percent adherence rates were performed on the data.
Obtained results did not support the predicted relationship between relative task magnitude and adherence. This may have been due to differences between subjective assessments of task magnitude and the objective measure used in this study.

Although improvement in adherence was noted in both treatment groups, statistical significance was achieved only in the university based clinic. Differences in the settings, assisting nutritionists, and participating subjects could have produced these findings. However, because improvement did occur in both settings, and because the techniques may be easily and inexpensively utilized by clinical nutritionists, these instructions were recommended for inclusion as a routine component of nutritional clinic procedures.

No strong co-variate relationships were found between adherence and the additional measures included in the study. The only variables which correlated with adherence more than trivially, emotional response to a verbal food stimulus, and imaging ability, did lend support for this cognitively active method of improving adherence.
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CHAPTER I

IMPROVING ADHERENCE: USE OF RELAPSE PREVENTION INSTRUCTIONS IN CLINICAL NUTRITION PROGRAMS

People place a high value on health (being physically fit and vigorous) (Flanagan, 1978) and have invested significant resources in a medical care system which has worked extremely well in reducing the threat to health associated with acute, infectious disease (APA, 1976; Matarazzo, 1982). In fact, this model of health care, in which the recipient is essentially passive, has worked so well that such diseases are no longer major causes of disability and death in the United States. Rather, chronic diseases, more closely associated with characteristics of the host than with invading agents, currently dominate the lists of major causes of death in this country (Sexton, 1979).

Effective prevention or management of these chronic diseases, including heart disease, malignant neoplasms, central nervous system vascular disorders, and certain chronic pulmonary diseases, has required that the individual take responsibility for behaving in a manner which would reduce the likelihood of occurrence or the consequences of these chronic disorders and to maintain these behavior changes over time (Agras, 1982; APA, 1976; Belloc & Breslow, 1972).
Nutritional patterns have appeared to be one of the major factors associated with the etiology of several of these chronic diseases. That is, eating patterns which lead to obesity and/or which result in inappropriate intake of such substances as salt or dietary fats have been linked to these chronic diseases (Richmond, 1979). Changing unhealthy nutritional patterns and replacing them with eating patterns which promote health could contribute significantly to the health status of people (Richmond, 1979). However, adherence and compliance rates associated with nutritional and dietary patterns have been quite low (Glanz, 1980). Identifying contributors to this failure to adhere or comply and designing interventions which promote adherence/compliance could improve the health of many people.

Statement of the Problem

Health, in terms of physical fitness and vigor, has been highly prized by most people as important to their quality of life (Flanagan, 1978). A considerable amount of evidence has related behavioral practices, including nutritional patterns, to health and longevity (Belloc & Breslow, 1972). Yet, there has remained a significant problem of failure to comply with or adhere to positive nutritional practices, even among those who have sought the expert advice of nutritional professionals (Glanz, 1980).

It would seem likely that a person's mental expectations could influence health behavior patterns
Thus, expectations about outcomes may be important influencers of health behaviors, but it was suggested here that expectations about continuance of health behaviors over time (adherence) would be no less important a consideration when dealing with clients attempting to modify their lives in healthful ways. For example, the expectation that one slip from a nutritional regimen meant ultimate failure would likely have a highly negative effect upon adherence to such a program, whereas, expecting to slip occasionally, but also expecting to be able to recover from the occasional slip, would likely have a quite different effect (Marlatt, 1982).

The presumption was made that nutritional information was presented accurately and was received by the participants; this was not the concern of this study. Rather, the communication of the provider's expectations about the adherence of the participants was of concern. An experimental approach to counseling was studied with the hope that increased expectations of adherence would be communicated to participants, and that actual improvement in adherence would be the result.

**Literature Review**

*Health and Behavior.* Empirical evidence for the widely held belief that "good health" is highly valued by most Americans was provided by Flanagan in a 1978 study of the elements considered important by respondents of varying
demographic, economic, and cultural backgrounds. Flanagan's survey results suggested that 95-98 per cent of respondents, across categories, reported health status (defined as being physically fit and vigorous) as being important to their perceived "quality of life."

Further evidence of the high priority placed upon health status by Americans has been demonstrated through the extensive (and expensive) medical care industry so strongly supported by those in search of "health." This system has been costing ever increasing amounts, both in terms of personal expenditures and in terms of the percent of the Gross National Product (GNP) which goes toward health and health related care and services (APA, 1976, p. 236). Matarazzo, in a recent adaptation of data reported by Gibson (1979) and Vischi, Jones, Shank, and Lima (1980) pointed out that health expenditures in the U.S. have been growing at a rate faster than that of the GNP.

In 1978, 9.1 per cent of the GNP consisted of health and health related expenditures compared with 4.5 per cent in 1950 and 6.2 per cent in 1965. Matarazzo also reported projections which suggested that, if the present trend continued, health expenditures could reach a level as high as 14 per cent of GNP by 1990 (1982).

This continued rise in expenditures, elevenfold since 1950 according to the U.S. Surgeon General has, however, had
almost no effect upon overall morbidity and mortality rates in the United States (Richmond, 1979).

This unsettling fact must be understood in terms of the shifts in patterns of disease and death that have occurred in this country in the last 75 years. Table 1 presents frequently published data comparing 10 leading causes of death in the U.S. in 1900 with the 10 leading causes of death in 1973.

Table 1

Death Rates for 10 Leading causes of Death per 100,000, U.S., 1900-1973

<table>
<thead>
<tr>
<th></th>
<th>1900</th>
<th>1973</th>
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<tbody>
<tr>
<td>1</td>
<td>Flu/Pneumonia</td>
<td>202.2</td>
</tr>
<tr>
<td>2</td>
<td>T.B., All Forms</td>
<td>194.4</td>
</tr>
<tr>
<td>3</td>
<td>Gastroenteritis</td>
<td>142.7</td>
</tr>
<tr>
<td>4</td>
<td>Heart Disease</td>
<td>137.4</td>
</tr>
<tr>
<td>5</td>
<td>CNS Vas. Lesions</td>
<td>106.9</td>
</tr>
<tr>
<td>6</td>
<td>Chr. Nephritis</td>
<td>81.0</td>
</tr>
<tr>
<td>7</td>
<td>All Accidents</td>
<td>72.3</td>
</tr>
<tr>
<td>8</td>
<td>Mal. Neoplasms</td>
<td>64.0</td>
</tr>
<tr>
<td>9</td>
<td>Dis. of Infancy</td>
<td>62.6</td>
</tr>
<tr>
<td>10</td>
<td>Diphtheria</td>
<td>40.3</td>
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<tr>
<th></th>
<th>1900</th>
<th>1973</th>
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<tbody>
<tr>
<td>1</td>
<td>Heart Disease</td>
<td>360.3</td>
</tr>
<tr>
<td>2</td>
<td>Mal. Neoplasms</td>
<td>167.3</td>
</tr>
<tr>
<td>3</td>
<td>C'vasc. Dis.</td>
<td>102.1</td>
</tr>
<tr>
<td>4</td>
<td>Accidents</td>
<td>55.2</td>
</tr>
<tr>
<td>5</td>
<td>Flu/Pneumonia</td>
<td>29.8</td>
</tr>
<tr>
<td>6</td>
<td>Diabetes Mel.</td>
<td>18.2</td>
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<tr>
<td>7</td>
<td>Artersclerosis</td>
<td>15.9</td>
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<tr>
<td>8</td>
<td>Cirrhosis/Liver</td>
<td>15.5</td>
</tr>
<tr>
<td>9</td>
<td>Dis. of Infancy</td>
<td>14.5</td>
</tr>
<tr>
<td>10</td>
<td>Chr. Pul. Dis.</td>
<td>14.2</td>
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(Sexton, 1979, p. 4)
These epidemiologic data clearly indicated a shift in disease patterns over that period of time from acute infectious diseases to chronic, degenerative disorders. The dominant method of providing health care in the U.S. has also evolved during the same period.

When major diseases were infectious, the appropriate modes of treatment involved modifying environmental circumstances or attacking foreign agents which had invaded the body. Because public health and medical interventions were so successful in dealing with external conditions and disease agents, the person or host came to be viewed as essentially a passive recipient of the ministrations of physicians (Engel, 1977).

Precisely because of this dramatic success in reducing mortality from the major killers of the day, the so called "medical model" has continued to characterize the treatment approaches to the major illnesses which have replaced the infectious diseases. This traditional approach to treating illness, in essence, involved waiting for a person to present with a symptom set, diagnosing that symptom set as a disease entity, and then prescribing treatment for the presumed 'single cause' of that disease entity (often an infectious agent). Unfortunately, these chronic diseases arise, not as a result of infectious agents, but rather, seem to be related much more to characteristics, especially
behavioral characteristics, of the host, him or herself (Sexton, 1979).

To the extent that the disease target shifted from acute infections to chronic processes, the "medical model," in which the recipient is passive, has been much less effective, because it failed to involve the recipient as an active participant. Chronic diseases must be viewed in terms of management rather than in terms of cure (Blanchard, 1982). Essentially, disease management has come to mean addressing the behavior patterns or "lifestyle" of the individual in terms of whether the person's behavior promoted health or increased the likelihood of chronic disease. Thus, with regard to these chronic diseases, the role of the "patient" differed markedly from what was considered appropriate in the traditional approach. The patient would no longer be just a passive recipient whose internal and/or external environment was modified by a physician. Instead, the "patient" would accept responsibility for modifying his or her own behavior to reduce the risk of, or damage from, chronic diseases, as well as for maintaining these changes over time (Sexton, 1979).

The limited gains against chronic diseases in spite of a steady rise in health care expenditures has been one result of the continued application of a treatment model less appropriate to these diseases. From this, an evolving
but recently increasing challenge to certain "fundamental medical concepts relating to health and illness" has been recognized by the American Psychological Association (APA) Task Force on Health Research (1976, p. 264). The Task Force summarized this shift in thinking about disease in the following way:

In earlier times, illness was thought to result from the presence of a single pathogenic agent—germs, toxins, neoplasms, endocrine imbalance, vitamin or other nutritional deficiency, etc. New knowledge, however, has increased the recognition that the etiology of poor health is multifactorial. The virulence of infection interacts with the particular susceptibility of the host. Predisposition of the individual to succumb selectively to various assaults on physical integrity not only is related to particular early life experiences but also with economic and social status, especially as reflected in living and

The Task Force concluded that health care delivery must, therefore, include more than the treatment of illness in the narrow sense of the traditional "single cause-single disease" model. Rather, the Task Force called for "treatment of disease through positive and proactive programs of health maintenance" (p. 265).

Engel, a physician, called specifically for replacement of the biomedical model and its limited physical (somatic)
domain, with what he called the "biopsychosocial model."
This model, consistent with the Task Force view, took into account "the patient's characteristics and the social context in which he or she lives" (1977, p. 196).

Engel's proposed model, based upon general systems theory, did not necessarily call for the elimination from consideration of the molecular level of organization in the understanding of illness in humans. He did recognize the necessity of considering, as well, the molar level of organization, (i.e., behavior), if human disease and its treatment and prevention were to be understood.

Sexton, while not specifying an alternative as did Engel, nevertheless echoed his call for a new concept of disease and its treatment when she suggested that "the nature of these (current) diseases calls for an entirely new approach because their onset and progression are slow and insidious. By the time the individual experiences symptoms, the possibility of control is already diminished" (1979, p. 3). Sexton's view also carried the implication that prevention was an important notion when dealing with these chronic diseases. Michael makes the point explicit when he said "clearly the next health revolution must be aimed at these new killers and cripplers, and it clearly makes sense to emphasize strategies in that revolution for preventing these afflictions rather than to rely on treating them after they have already struck" (1982, p. 936).
Although as Pomerleau stated, "an awareness of the interactions between behavior and diseases is as old as the practice of medicine itself . . ." (1979, p. 654), scientifically acceptable evidence linking disease patterns with behavioral patterns has continued to mount. Much of the data came from epidemiological studies which Breslow described as "trying to identify the characteristics of individuals that are statistically associated with an increased frequency of disease and mortality from it; and then trying to deal with the characteristics so as to reduce the likelihood of the disease and its effects" (1978, p. 908).

It was this methodology that has been used to identify, through statistical relationships, the behavioral patterns or "lifestyles" associated with health status. Studies such as those conducted at the Human Population Laboratory in Alameda County California exemplify the approach. In studies there, Belloc and Breslow (1972) provided empirical support for the commonly held notion that personal habits including sufficient sleep, moderate alcohol use, no smoking, appropriate exercise and regular and moderate eating were positively associated with physical health and longevity and were negatively correlated with overall mortality rates. In one of many follow-up studies, Breslow and Enstrom reported results that "lend support to the hypothesis that good health practices and not the initial health status . . . are
largely responsible for the observed mortality relationships" (1980, p. 469).

Sexton, building upon this and other similar data, concluded that "a review of present knowledge suggests a behavioral component associated with at least nine of the leading causes of death" (1979, p. 3). She continued, "such evidence strongly suggested that the prevention and control of the major causes of death in the United States will involve management of the lifestyle or personal behavior of the individual" (p. 4).

This line of evidence also led Stachnik to the similar conclusion that "the most serious medical problems that plague the majority of Americans are not ultimately medical problems at all; they are behavioral problems requiring the alteration of characteristic response patterns . . . " (1980, p. 8).

Behavioral patterns which have been associated with chronic diseases include cigarette smoking (Bernstein & Glasgow, 1979; U.S. Public Health Service, 1975; Wynder & Graham, 1950), stressful, sedentary life with limited exercise (Dishman, 1981; Martin & Dubbert, 1982; Oldridge, 1984; Rosenman et al., 1975;), and undesirable nutritional practices—both in terms of eating patterns leading to obesity (Dawber, Moore & Mann, 1975; Glanz, 1980) and in terms of consuming inappropriate amounts of certain
substances, such as salt, fiber, or fats (Burkitt & Walker, 1974; Keys, 1970; Fries, 1976 and Moss & Mayer, 1977).

Therefore, people who wish to maintain physical fitness and vigor must look to their own behavior patterns and health practices. Recognizing this, the U.S. Surgeon General, in his 1979 report entitled Healthy People, recommended a major prevention program which included some 15 components, some of which emphasized nutritional practices. That report noted positive nutrition as one of the most important contributors to disease prevention (Richmond, 1979).

The public health approach has always sought etiological factors associated with diseases and then looked for ways to eliminate, reduce, or manage those factors so as to prevent disease (Lillienfeld & Lillienfeld, 1980). Identifying the association between behavioral patterns and chronic diseases suggested that prevention could be approached if target behaviors could be changed, as much as possible, before people became symptomatic and if those changes could be maintained over time.

Psychologists have increasingly been able to demonstrate empirically based and effective techniques for behavior change and have thus been increasingly asked to apply these techniques to health problems (Agras, 1982). It has been from this confluence of the changing patterns of disease and the availability of a technology of behavior
change that behavioral medicine has emerged as a powerful new approach to the treatment of these chronic disorders (Schwartz & Weiss, 1978), in terms of both disease prevention and health promotion (Matarazzo, 1980).

A major problem within behavioral medicine, however, has been that the power of the behavioral change techniques seemed limited to the short term (Agras, 1982; Pomerleau, 1979; Stachnik, 1980;). Because the disease targets were chronic in nature, the behavior changes needed also to be long term. Thus, the problem of adherence and compliance has remained an important one in behavioral medicine as it has long been in traditional medicine.

Adherence and Compliance. In spite of the widespread value placed upon health, Pomerleau and Brady (1979) pointed out the "growing awareness that the failure of patients to adhere to prescribed medical regimens is probably the single greatest problem in bringing effective medical care to the individual patient" (p. xix). Becker noted with disturbance the "extensive literature reporting generally low rates of compliance with health and medical care recommendations" (1979, p. 1).

Becker further concluded that "although specific definitions and measures of patient compliance vary greatly across investigations, reviewers agree that at least one-third of the subjects in most studies fail to follow
their physician's advice. Where the action is preventive, and/or the persons are without symptoms, and/or the regimen is long term, only about one-half the patients are usually compliant" (p. 1).

Becker's conclusions were consistent with data suggesting that many who initiated participation in health promoting activities such as exercise or nutritional programs also tended not to comply or adhere to those regimens, either (Haynes, 1984). Dishman (1981) reported that more than 50 per cent of those who began an exercise program had dropped out by the end of six months. Stunkard (1981) reported that adherence rates for persons with prescribed diets were no better and were considerably worse (as low as 20 per cent compliance in programs for the treatment of obesity and hypertension). Others have reported dietary non-compliance to be as high as 87 per cent (Glanz, 1980).

Obviously, failure to adhere to a therapeutic or preventive regimen would tend to weaken the potential benefit of the regimen. In the present context, therefore, poor adherence would tend to increase the likelihood of the occurrence of a chronic disease or to reduce the effectiveness of the treatment or preventive intervention applied to that chronic disease. In addition, poor compliance could result in additional medical and laboratory work-ups and diagnostic studies, as well as interference
with the provider/participant relationship, creating a negative perception of efficacy, and a reduced ability to evaluate health care (Becker 1979). These consequences of poor adherence, then, point to the importance of identifying intervention strategies which could improve adherence to health promoting/disease preventing regimens and the corresponding importance of that contribution to the health status of persons at risk for chronic diseases.

Although most of the researchers studying this phenomenon have used the words compliance and adherence interchangeably, more recent workers have favored the use of the term adherence over compliance. Stimson (1974) argued against the use of the word compliance because it was a value laden term and suggested a weakness or deficit in the patient. More recently, Stuart (1982) also argued against compliance, favoring adherence because "the former term implies adaptation of one's behavior to the wishes or demands of another, while the latter implies a willingness to give support or maintain loyalty to another's requests" (p. 5). Therefore, the term adherence was favored throughout this paper because it was more consistent with the notion of "deciding" to conform one's behavior to a health promoting regimen. However, because "compliance" has been widely used in the literature, instances of its use will also be found here.
The problem of definition goes beyond the choice of words and has been of central importance to the study of the adherence phenomenon. Sackett (1976) pointed out that the great variability in definition is one of the major impediments to understanding the phenomenon of adherence. He offered good advice, then, when he suggested that "any consideration of adherence must include a precise and unambiguous definition that is appropriate to both the research question and the research setting" (p. 179). Epstein and Cluss (1982) illustrated the definitional problem by pointing out that "some investigators choose to report actual compliance rates, or the number of treatment units taken by the number of units prescribed, whereas others report as their compliance rate the percentage of patients judged compliant according to some pre-determined standards" (p. 951). Haynes (1984) suggested the following definition of adherence: "the extent to which a person's behavior (in terms of taking medications, following diets or executing lifestyle changes) coincides with medical or health advice" (p. 2).

Most research on adherence has been directed at the problem of failing to follow physician's prescriptions for medications (Haynes, Taylor & Sackett, 1979). Haynes' definition, however, expands the scope of the problem of adherence to include health promoting/disease preventing behaviors as well. That is, this definition recognized that
the problems associated with failure to adhere existed not only in terms of treatment, but in terms of prevention and health promotion, as well.

Dunbar (1979) offered three basic approaches to defining adherence: (a) a quantitative assessment of the degree to which a treatment or preventive regimen was followed, usually reported as a percentage or ratio; (b) a categorical definition, such as "good, poor, or non-adhering," usually subjectively assigned; and (c) an index of adherence using multiple behavioral indicators, often including knowledge and attitude scores. She sums up the importance of definition by pointing out that "the way compliance is defined will suggest the type of assessment needed and the precision or complexity that is required" (p. 43). The reciprocal relationship between definition and assessment of adherence was thus suggested.

The importance of the assessment or measurement of adherence appeared obvious to Haynes (1984), who reminded his readers that "it is a truism in science that it is not possible to investigate something that cannot be measured. Consequently, if compliance is to be studied properly ... it must be measured in a reliable and valid manner" (p. 122). Gordis (1976) has reviewed the approaches to measurement of adherence and has categorized the methods as either direct or indirect. Direct measurements include assays of blood levels and urinary excretions (medications,
metabolites, markers). Indirect methods include outcomes, physician judgements, patient interviews, filling of prescriptions, pill counts and metabolic consequences. Epstein and Cluss added self-reports to Gordis's indirect methods (1982).

Dunbar (1979) classified adherence measures into three categories: (a) biological indices, (b) clinician ratings, and (c) patient self-reports. However classified, it is clear that each approach has its strengths and weaknesses, and there is no single or ideal method (Gordis, 1976). Dunbar stated that "the clinician-investigator must choose from a set of measures that vary in their reliability and the amount of information they yield. To complicate matters, those that yield the greater information, tend to be less reliable" (1979, p. 41). Adherence researchers must then "choose a method considering both the practicality and the data regarding validity of each method and must do so keeping in mind his or her goal for the assessment" (Epstein & Cluss, 1982, p. 954).

The ultimate reason for studying adherence has been to improve the benefit that should result from a prescribed treatment or a prevention/promotion regimen. It was this desire to eliminate a major barrier to both direct improvement in health status, and to the accurate assessment of other treatment and prevention/promotion strategies that prompted researchers to empirically test "virtually any
tactic that might overcome low compliance irrespective of the lack of a clear theoretical framework for such action" (Haynes, 1982, p. 56). Although there is as yet no widely accepted theoretical foundation for the phenomenon of adherence, most empirical studies could be classified as either seeking factors which describe the properties of adherence and/or adherers, or which predict adherence or adherers (Sackett, 1976).

Most studies have examined "easily measured characteristics of the patient, regimen, or illness, which, unfortunately, are usually neither predictive nor alterable" (Glanz, 1980, p. 794). Among the characteristics that have been studied are demographics (Haynes, 1976), health beliefs and attitudes (Becker, 1974), level of patient knowledge (Becker, 1979), and personality variables (Davis, 1968). According to Haynes's (1976) in-depth review, few of these studies have reported any consistent relationships between these characteristics and adherence.

Glanz suggested that possibly a more promising approach would involve attempts to find social-psychological and related variables that demonstrate consistency as descriptors and predictors of adherence and/or adherers. Her review of the literature concluded that "patient attitudes and motivation, social and family influences, modifiable aspects of the regimen, and features of the source of
nutritional care would yield more productive results" (180, p. 794).

Haynes, in his 1984 review, suggested that difficulty of the regimen, adherence to ancillary elements, smoking and occupational status, as well as percent body fat and measures of self-motivation had been identified as related to exercise adherence. He again concluded that no single set of characteristics seemed to have emerged.

Dishman and his colleagues, however, did report consistent results, suggesting that a psychobiological model might predict adherence, at least to exercise programs. The combination of biological and psychological predictors included percent body fat, body weight, and a measure of "self-motivation" developed by his research group (Dishman, 1981; Dishman & Gettman, 1980; Dishman & Ickes, 1981; and Dishman, Ickes, & Morgan, 1980).

Becker's consideration of "studies related to determinants of compliance indicated that a multifactorial approach to understanding and increasing patient cooperation with health and medical care advice is needed" (Becker, 1979, p. 19). Recognition of the need for such a multifactorial approach to understanding adherence suggested that a systematic arrangement of these many variables could be useful in understanding and improving adherence.

Although Haynes (1982) was correct in saying that most research had been empirical, theoretical explanations of the
adherence phenomenon have been offered. Having recognized that ultimately adherence was a behavioral phenomenon, theoretical offerings have been consistent with the dominant theories of human behavior in general. Both behavioral and cognitive models have been advanced. More recently, the synthesis of these two schools has resulted in a cognitive-behavioral model of "relapse prevention" (Marlatt, 1982).

The cognitive approach was best exemplified by the Health Belief Model (HBM) (Rosenstock, 1966; Rosenstock, 1974; Becker, 1979). This model, as expanded by Becker, contains five major elements: (a) health motivation—the extent to which a person is concerned about health matters, (b) susceptibility—the extent to which a person perceives him or herself to be vulnerable to health risk, (c) severity—the degree to which a person perceives the seriousness of the health risk, (d) benefits and costs—perception of the efficacy of a treatment or prevention/promotion regimen measured against the perceived effort to carry out the regimen, and, (e) a cue to action—an internal (i.e., symptom) or external (i.e., information) stimulus which activates the behavior. It should be noted that the Health Belief Model was based upon subjective perception rather than more objective evaluations of the health risk.
The HBM has generated considerable research aimed at determining its effectiveness as a predictor of health behavior, including adherence. A number of studies have demonstrated the power of the HBM as a predictor of adherence to both treatment and preventive/promotion regimens (Becker, 1979).

Taylor, Sackett and Haynes (1978) demonstrated a weak correlation between hypertension pill taking adherence and health beliefs during the initial six months period of their study. However, during the second six months, they found a much stronger correlation between adherence and health beliefs which suggested to Stunkard (1981) that health beliefs change with adherence and that, as a predictor of adherence, health beliefs may be more useful after a person has had experience with the treatment. (The reader should recall that the HBM was based upon subjective perceptions and these subjective perceptions would be expected to change with experience).

Hershey and his colleagues also found predictive value with the HBM. However, only three elements of the model (perceived control, perceived barriers to adherence, and duration of treatment) accounted for most of the variance (Hershey, Morton, Davis & Reichgott, 1980).

DiMatteo and DiNicola (1982), while generally sympathetic to the HBM, nevertheless recognized that a multi-dimensional approach was needed to understand health
behaviors, emphasizing that beliefs alone cannot suffice as
determinants of health behavior. Additionally, the Health
Belief Model was limited in that it predicted behavior based
upon beliefs about illness or the threat of illness and did
not speak to behaviors which promoted health.

DiMatteo and DiNicola also reminded that the HBM
contained an important basic assumption stemming from its
origins in Lewin's Field Theory. The model assumed that
"health is valued positively and that illness is valued
negatively by all individuals" (1982, p. 147). That this
assumption might not hold in every case has been suggested
by Mechanic (1972, 1979). Illness could be valued positively
if it provided secondary gain of some kind. A related
situation in which the HBM assumption of positive valence
for health would not pertain would be when the emotional
charge associated with certain deadly illnesses such as
cancer, resulted in massive denial by the victim.

In any event, it would be important to consider the
possibility that the assumption of positive value for health
might not be operating when adherence problems occur. Thus,
while the HBM was useful in the understanding of health
behaviors, including adherence, it did have limitations and
appeared insufficient in itself to explain health behaviors.

The second major theoretical approach to the
understanding of health behavior was that of the applied
analysis of behavior. Consistent with the behavioral
tradition, the antecedent environmental stimuli and the contingent consequences of health behavior were of central importance. Baer, Wolf and Risley have defined applied analysis of behavior as "the process of applying principles of behavior to the improvement of specific behaviors and simultaneously evaluating whether or not any changes are attributable to the process of application" (1968, p. 91).

Behavioral approaches have been used with success in various health contexts, including especially the treatment of obesity (Stuart, 1976; Stunkard, 1981). Three major types of behavioral approaches have been used to address the eating behavior of obese patients. One approach was stimulus control in which the goal was to remove or alter antecedent environmental stimuli which have become associated with overeating. A second approach was contingency management, in which the attempt was made to restructure the reinforcement conditions so that desired behaviors were more likely and undesired ones were less likely to occur. While this approach appeared to work in specific, (usually highly controlled), treatment situations, reinforcement resulting from health promoting/prevention behaviors occurred only in the long term. Indeed, the immediate consequences of modifying one's health habits were likely to be aversive (pain from exercise, loss of desirable foods), increasing the probability that one would not continue in that behavioral pattern (Lawlis & Lawlis, 1980). This, of course,
had direct implications for adherence, and a behavioral approach to improving adherence must somehow engineer situations in which the reverse probability would be the more likely case.

A third behavioral approach was the self-control model which used self-management techniques, including self-contracting, goal setting, self-reward, record-keeping, and self-monitoring procedures as means to the end of behavior change. Cline (1983) pointed out that these self-monitoring techniques were originally developed as methods of reporting behavioral patterns within the context of a contingency management protocol, but because they were found to have their own positive effect upon the target behavior, they have begun to be used as treatment techniques themselves.

Although there was research support for the efficacy of these behavioral approaches, particularly as they have been applied to the problems of obesity (Brownell, 1982), Kanfer (cited in Runck, 1982) pointed out two critical deficiencies in the operant model. The first deficiency was its failure to acknowledge that human beings respond to their own behavior, evaluate it, and even correct it. Secondly, people attend selectively to environmental stimuli. These two factors rendered insufficient any explanation of behavior that relied solely on the influence of present environmental stimuli.
Further, the behavioral model's success with behavior change seemed to be temporary (Martin & Dubbert, 1982). As mentioned above, this temporal phenomenon could be expected because external contingencies erode over time and because traditional behavioral approaches typically did not transfer contingency management from external to internal control. It must also be remembered that most behavioral strategies have been designed and applied as a means of initiating behavioral change and generally have not taken into account the possibility that longer term maintenance of such behavior change might operate differently (Cummings, Gordon & Marlatt, 1980). If it was true, as Marlatt and his colleagues suggested, that factors related to maintenance were different from those related to initiation of behavior, the temporal patterns found in most studies would be expected.

The increasing recognition of the inter-relatedness between cognitive (covert) and behavioral (overt) components of human behavior has resulted in the emergence of a synthesis of the cognitive and behavioral traditions. Rotter (1966), Bandura (1977), and Kanfer (1977) were among the major contributors to this social learning or cognitive-behavioral conceptualization.

It may be recalled that among the major criticisms of the behavioral model was a recognition of the ability of a person to define and respond selectively to the environment.
This allowed the person some degree of self-direction and personal responsibility, and did not limit the person to the role of simply responding to the environment.

The possibility that a person's cognitive state may play a role in governing the pattern of reinforcement contingencies, and thus, the behavior of individuals, led Bandura (1977) to the notion of "self-efficacy." Among other things, self-efficacy suggested that a person's expectations of success or failure in a specific effort would influence the person's actual performance toward that effort. Specifically, Bandura hypothesized that "expectations of personal efficacy determines whether coping behavior will be initiated, how much effort will be expended, and how long it will be sustained" (p. 191) [emphasis added].

Based in large part upon the cognitive-behavioral principles of social learning theory, especially the idea of self-efficacy, Marlatt and his colleagues (Cummings, Gordon, & Marlatt, 1980) developed a "self-control program designed to teach individuals who are trying to change their behavior how to anticipate and cope with the problem of relapse" (Marlatt, 1982, p. 329). Not only did this group approach the problem of adherence from a different theoretical perspective, they also looked at the problem in terms of a possible intervention strategy, rather than considering the problem only in terms of factors which might describe adherers and/or predict adherence.
Though their clinical interest was treatment of addictive behaviors, they focused upon relapse, or non-adherence, by recognizing that intervention strategies appropriate for the initiation of behavioral changes may not be appropriate for the on-going maintenance of desired behavioral changes over time.

By pointing out that maintenance of behavior change (and its opposite, relapse or non-adherence) might operate differently from factors which influenced initiation of behavior change, Marlatt and his co-workers have made a significant contribution to health psychology. This distinction between initiation and maintenance has not always been understood by those writing about adherence.

Dietary Adherence. As mentioned earlier, it has been increasingly recognized that positive dietary practices may be important to the prevention of disease as well as for the normal growth and development of human beings (Glanz, 1980). The initiation and maintenance of positive nutritional practices would typify the behavioral medicine approach to disease prevention and health promotion because: (a) nutritional patterns have been related to cardiovascular disease and other chronic diseases such as chronic renal failure, diabetes mellitus, and arthritis; (b) risk of these disorders can be reduced through modification of nutritional patterns; (c) the value of such nutritional changes must be maintained over time to be fully realized; and, (d) the
individual must assume responsibility, especially for the maintenance of the changed nutritional patterns (Glanz, 1980).

Kaplan recently called upon behavioral medicine specialists to be willing to question certain core assumptions, such as those mentioned above, about the relationship between health and behavior. However, Kaplan, did acknowledge that the assumption that behavior (including eating behavior) as a "risk factor for serious illness is most clearly supported by the evidence" (1984, p. 757).

Glanz, in her informative 1980 review of the current status of adherence to dietary regimens, accepted the assumption that dietary practices were related to health status in populations. She therefore concluded that the varying but frequently low levels of nutritional adherence found in studies of cardiovascular disease, weight reduction, chronic renal failure, diabetes mellitus and other chronic disorders did represent a significant barrier to disease prevention and health promotion.

Pointing out that little or no attention had been given to dietary adherence when compared to work done in the area of patient adherence in general, Glanz asserted that the probable reason was that "the organization of this body of literature is a cumbersome and complex task and requires an understanding of both (emphasis added) behavioral issues and nutritional management" (1980, p. 787). Almost no attempts
have been made to study nutritional adherence through combining the expertise of a psychologist and nutritionist, with the study by McReynolds, Lutz, Paulson and Kohrs (1976) being a notable exception.

Continuing with her review, Glanz concluded that "patient non-compliance with dietary regimens is at least as frequent as non-compliance with medication regimens" (1980, p. 787). Glanz believed that one reason for the possibly greater problem with dietary non-adherence was that dietary regimens differ in fundamental ways from medical treatment. She saw dietary regimens as restrictive, whereas medication adherence simply required adding new behaviors. Secondly, diets usually were aimed at controlling a condition as opposed to curing an acute problem. Thirdly, very often conditions addressed with dietary prescriptions were chronic, and thus, the nutritional programs must be maintained over lengthy periods of time, perhaps even lifetimes, as in the case of diabetes mellitus. Lastly, the person must take responsibility for his or her illness by changing behavior patterns which could result in the loss of formerly pleasurable eating patterns, yet the person often did not appear disabled and would often, therefore, not be accorded the privileges of acutely ill patients (1980).

Another factor which could have differentiated nutritional adherence from general medical adherence was the interesting, though not fully understood, phenomenon that
some observers have called "food addiction" (Bell, 1982). Bell reported that Rinkel was one of the first to notice that many persons with chronic symptoms frequently exhibited a "temporary flare in their illnesses in the first three to four days during which they avoid an offending food. He further noted that if a person again ate the food during the 'symptom flare,' symptom relief often followed" (1982, p. 22).

Randolph, who worked with Rinkel, first used the term "food addiction" to describe this phenomenon (1956). He apparently felt this term was appropriate because he noted the following addiction-like characteristics of the phenomenon: "(a) the withdrawal-like increase in symptoms, (b) the temporary relief of symptoms on re-exposure to the target food, and, (c) the reports of psychological craving for offending foods" (Bell, 1982, p. 22).

O'Banion (1981), writing about the treatment of health disorders using nutritional and ecological methods, stated that "when one begins to consider these factors in the treatment of behavior, it becomes readily apparent that the physiological influences directly due to poor nutrition and food and chemical sensitivities [emphasis added] may augment the psychological factors contributing to an individual's problems" (p. 9). Writing from a behavioral framework, O'Banion went on to suggest that "food addicts whose excessive food intake is under the control of physiological
factors also may experience psychologically related depression. Food addiction may result in increased eating behavior because of physiologically induced urges to eat" (p. 46).

Taken together, these ideas about food addiction suggested yet another synthesis of thought that could be helpful in understanding adherence—that of an interaction between the physiological and psychological levels of behavioral organization—or, what Achterberg and Lawlis have called "bridges of the bodymind" (1980).

To the extent that food addictions were operating, and to the extent that O'Banion (1981) was correct in his assertion that compulsive eating behavior was maintained by a variety of psychological and physiological factors, then this increased complexity would mean that the understanding and improvement of adherence to nutritional programs would be more difficult.

As was true in the case of adherence in general, variability and inconsistency in definition and measurement further clouded the picture of nutritional adherence. This has increased the difficulty of understanding the nature and extent of the problem of non-adherence to dietary regimens.

As described earlier (p. 19), much of the research on adherence has taken the form of empirical studies aimed at identifying factors related to adherence or its lack. Glanz's view acknowledged the importance of these empirical
relationships, but she concluded that the adherence phenomenon was multifactorial and probably operated on multiple levels. Specifically, she called for future research on dietary adherence to address the question from each of three perspectives: "(a) adequate methods for measurement of compliance, (b) investigations as to the determinants of compliance, and (c) evaluation of outcomes of various treatment modes or experimental interventions" (1980, p. 798). Because of Glanz's belief in the importance of good nutrition to the health status of people, she called for interventions (from the language used, one can presume that she meant behaviorally oriented strategies) "without waiting for the final proof of effectiveness" (1980, p. 798).

Though her review is well done and effectively focused attention on the problem of dietary non-adherence, Glanz appeared to have failed to distinguish between factors influencing initiation of behavior and factors influencing maintenance of behavior change (adherence), precisely the trap about which Marlatt had warned. The point of her review was clear, nonetheless, that in spite of the apparent magnitude of the problem of non-adherence in nutritional settings, very little work has been done to identify and assess the effectiveness of intervention strategies designed to improve adherence itself.
Finding ways to better understand and improve adherence to nutritional programs, then, has remained an important public health issue. If an adherence promoting intervention strategy could be shown to be both effective and directly usable by health promotion practitioners such as clinical nutritionists, then the health status benefits of these regimens could be more widely realized.

The present study, recognizing the urgency identified by Glanz, has attempted to address the problem of non-adherence to dietary regimens, as well as to further understand the phenomenon in light of the trend toward a social learning, or "cognitive-behavioral" conceptualization of behavior in general (Bandura, 1977; Kanfer, 1977; Rotter, 1954), and adherence in particular (Cline, 1983, Cummings et al., 1980). The study attempted to improve nutritional adherence utilizing clinical nutritionists as the behavioral change agents to improve adherence in their own clinical settings.

In approaching the problem of nutritional non-adherence from a cognitive-behavioral perspective, the phenomenon was characterized in terms of "expectancy." Bandura's theory of self-efficacy assumed that "psychological procedures, whatever their form, serve as a means of creating and strengthening expectations [emphasis added] of personal efficacy" (1977, p. 193). These expectations have been shown to take one of two forms, and
both usually operate together. First are outcome expectancies which have been defined as a "person's estimate that a given behavior will lead to certain outcomes" (p. 193). The second or, efficacy expectations, were defined as the "conviction that one can successfully execute the behavior required to produce the outcome" (p. 193).

For purposes of this study, registration by a person in a nutritional clinic program was taken to denote a positive outcome expectancy. The more critical variable in this context, then, was the efficacy expectancy. That is, how long one sustained participation in the nutrition program (adherence) may be thought to be directly related to the relative strength of the person's expectancy of success, or "self-efficacy." Improving adherence, then, would mean changing expectancies about adherence. An intervention strategy that would attack the problem at the cognitive level of expectancy, such as Marlatt's Relapse Prevention (RP) strategy would therefore, appear to be an appropriate means of changing expectancies.

RP was developed to help persons attempting to maintain positive behavioral changes related to addictive behaviors. It has been seen as quite flexible however, making it potentially useful both in terms of the types of problems which could be addressed, and in terms of the types and training of care-givers/change agents which could effectively use it (Marlatt, 1982). This flexibility, then,
made RP a good choice as a cognitive-behavioral intervention strategy for improving adherence to health promoting/prevention behaviors, using clinical nutritionists as the change agents.

The clinical nutritionists in this study used the RP model as a means of changing subject expectations about relapse in order to improve adherence to the prescribed nutritional regimens. This strategy involved helping subjects develop appropriate expectations about relapse and relapse recovery, especially that it was not necessary to view a lapse in an "all-or-none" fashion.

To the extent that this intervention strategy would be effective in such a situation, particularly if the effectiveness could be demonstrated using providers with health promotion expertise (i.e., clinical nutritionists), then the nutritionists' existing repertoire of clinical information and counseling techniques would be strengthened.

Research Question

Does the degree of relationship between the relative size of a weight loss goal and adherence rates support an expectancy model of adherence and does expectancy of recovery from relapse play a significant role in the rate of adherence to nutritional regimens prescribed by clinical nutritionists?

The first question suggested a relationship between adherence and the relative size of the weight loss goal
(McClelland, Atkinson, Clark & Lowell, 1953). The assumption was, of course, that the larger the goal, the more difficult it would be to achieve, thus, the less strong the person’s expectation of success, and correspondingly, the less likely a person would be to recover, if a relapse did occur. This question could be addressed by comparing the relative weight loss goal to the number of days of adherence.

The second question suggested a relationship between a relapse recovery expectancy, and adherence. As mentioned earlier, many people may interpret even one slip from the regimen as evidence of total failure (Cummings et al., 1980; Marlatt, 1982). This question could be addressed through use of relapse prevention instructions designed to modify the client’s expectations about adherence so as to include the possibility of recovery from relapse, and observing the effect of these instructions on adherence rates. Adherence was operationally defined as the number of days until the subject (a) dropped out of the program (failed to adhere), or (b) achieved the nutritional and/or weight loss goal, or (c) continued in the program for 60 days.

Because adherence has been shown to be a complex phenomenon (Becker, 1974; Becker, 1979; Davis, 1968; Haynes, 1976), several additional variables were also included in this study. These variables were compared to adherence rates in order to identify possible co-variate relationships. The importance of possible co-variate relationships lay both in
greater understanding of a complex and important factor in
health promotion and in the possibility of increased
specificity of efforts to improve adherence.

Demographic variables, including age, race, sex, height
and weight on entry, and the source of referral as well as
stated referral reason, would, of course, be important to
consider. The relative strength of relationships between
demographic variables, both individually and in combination,
and adherence, could have value in identifying persons who
might be at greater risk for adherence problems, and thus,
benefit from special attention to adherence.

The possible relationship between exercise, nutrition,
and health has been mentioned by Weinberg, Caldwell,
Cornelius, Jackson, and Smith (1984). Because exercise
participation may be similar to engaging in positive
nutritional practices, both in terms of probable
relationships to health status, and in terms of difficulty
of maintaining adherence (Dishman et al., 1980, 1981, 1982),
the relationship between exercise history and nutritional
adherence was considered important.

Social learning theories have suggested that persons
differ in their orientation toward control of reinforcement
(Rotter, 1966). That is, certain persons, internally
oriented toward locus of control of reinforcement, would
tend to perceive that what happens to them depends more on
what they do, than upon external circumstances. Other
persons, externally oriented, would tend to perceive themselves as more subject to external circumstances than their own behavior (Rotter, 1966).

Locus of control has been widely utilized in research on many aspects of human behavior (Rotter, 1975). Recently, this notion has been examined with specific regard to health behavior (Strickland, 1978; Wallston, Wallston, Kaplan, & Maides, 1976). Generally, researchers have suggested that internally oriented persons are more likely to engage in healthy behaviors, and thus, by extension, would be more likely to maintain such health promoting behaviors. However, Lawlis and Lawlis (1980), based upon their experience in trying to increase personal responsibility for health status have stated that:

while many have claimed to be in charge (or felt in control) of most factors in their lives (or were "internals" as opposed to "externals" in terms of locus of control jargon) many would nevertheless abdicate the responsibility for health to chance, or fate, the medical profession, genetics, or any outside source. The passivity, the depression, and the ultimate downhill course in health that appeared to be related to the failure to feel in control obviously has direct ramifications for both medical and psychological interventions. For if it is felt that one's behavior has nothing to do with health, then why bother eating
properly (when junk food tastes better), or exercising (when it hurts), or learning stress and pain management techniques (when pills are easier, faster, and may even produce euphoria) (1980, p. 2).

The importance of determining the relationship between general locus of control and nutritional adherence was clear. In light of the experience of Lawlis and Lawlis, examining health specific locus of control could further aid understanding of this interesting phenomenon.

In choosing an expectancy based intervention strategy, it became important to consider certain variables thought to affect expectancy. Beck (1976) and Foreyt and Goodrick (1981), among many others, have suggested that depression could be understood at the cognitive level. Essentially, their thinking suggested that a negative expectancy of success (learned helplessness) might be related to levels of depression. Thus, the nature and strength of any relationships between adherence and indicators of depression (Zung, 1965) would be helpful in supporting, or not, the major theoretical assumptions of this study.

Both the psychological and nutritional literature contained the suggestion that social support from significant others could be helpful in maintaining adherence to dietary regimens (O'Banion, 1981; Snetselaar, 1983). This relationship was demonstrated by O'Banion based upon the social support of others in a dietary group. The relative
importance of social support from significant persons not sharing a dietary group with the subject would be of interest because many persons, including those in this study, attempted to maintain dietary changes as individuals.

Eating behavior has been frequently associated with strong affect, and "when dietary modification is approached, the association of foods and these deep emotions leads to changes in old eating habits that can be achieved only with the greatest of difficulty" (Snetselaar, 1983, p. 155). Empirical support for this suggestion could have implications for special intervention strategies for those whose responses to food and eating contain significant affective components.

Evidence of the power of imagery in health and healing has continued to mount (Achterberg, 1985). In her new book, Achterberg asserted that due to the "pronounced effect the image has on the body, it yields power over life and death, and plays a key role in the less dramatic aspects of living as well" (1985, p. 3). She suggested that the active ingredient in imagery was the alteration of "the image or the expectancy that persons hold regarding their state of health" (p. 4) [emphasis added]. It seemed reasonable that the "image or expectancy" would be equally active in shaping a person's sense of their ability to influence their own state of health. A strong relationship between imaging ability and adherence would further support the theoretical
suggestion that expectancy modification could affect adherence. Skill in creating and reporting an image would provide a basis for assessing this relationship.

Specifically, it was hypothesized that there would be an inverse relationship between the relative magnitude of the weight loss goal of persons participating in a clinical nutrition program and their adherence rates to those programs. It was further hypothesized that participants in a clinical nutrition program who receive instructions about relapse and relapse prevention would tend to adhere to prescribed dietary regimens better than those who did not receive such instructions.
CHAPTER II

Method

Subjects

Subjects for this study were selected from among the clients of clinical nutrition programs, regardless of referral source. Although persons who were referred by physicians for general nutritional counseling were included in the study, those referred by physicians specifically because they were pregnant, diabetic, or for whom the referral was made in direct preparation for surgery or other significant medical procedure, such as gastroplasty, were excluded from participation. Two types of client data were obtained. The first type was gleaned from the records of clients who had attended the clinic prior to the start of the study. These data were limited to demographic information, certain dietary data, and length of participation (adherence). Active subjects, those who actually participated in the study, were over age 18 and were able to give informed consent for themselves (Appendix A). Data from the active subjects included scores on certain measurement devices in addition to the demographic, dietary, and adherence data gathered on both active and records subjects.
Subject groupings: The first group, identified as the Texas Woman’s University (TWU) Record Group (TWR), consisted of 32 persons who had participated in the TWU Nutritional Assessment and Counseling Center (NACC) program prior to the initiation of this study. These subjects did not receive Relapse Prevention (RP) instructions.

The second group, identified as the TWU Active Group (TWA), consisted of 16 persons, meeting eligibility requirements and who gave informed consent to participate. These subjects did receive RP instructions.

The third group, identified as the Plano General Hospital (PGH) Center For Lifestyle Enhancement (CLE) Record Group (PGR) included 30 persons who had participated in the CLE program prior to the initiation of this study. These subjects did not receive RP instructions.

The fourth group, identified as the PGH/CLE Active Group (PGA) contained 32 persons, who met eligibility requirements, and who gave informed consent to participate. These subjects did receive RP instructions.

Instruments and Measures

One hypothesis suggested a relationship between adherence and the relative size of the weight loss goal. In order to test this hypothesis, it was necessary to compare adherence, measured in days of participation, to the subject’s weight loss goal. In order to make the various weight loss goals more directly comparable in terms of
magnitude, a "goal index" (GI) was calculated by dividing the stated goal (SG) by the subject's weight on entry (WE), then multiplying that quotient by 100. The formula was expressed as GI = SG/WE x 100. The inverse of the goal index was then calculated so that the goal index increased in value as task magnitude increased. The inverse value was used to calculate the correlation coefficients.

The other hypothesis suggested a relationship between expectancy and adherence. The expectancy model postulated that many persons may fail to adhere to nutritional programs because they interpret even one slip from a prescribed regimen as evidence of total inability to maintain the positive behavior (Cummings et al. 1980; Marlatt, 1982). In order to test this hypothesis, clinical nutritionists presented relapse prevention instructions to all active subjects (Appendix B). Those instructions were designed to modify the client's expectation about adherence so as to include the possibility of recovery from relapse. Adherence rates for those subjects whose records were reviewed and who thus, did not receive instructions (Control groups) were compared to the rates for those active subjects who did receive instructions (Treatment groups). Adherence was operationally defined as the number of days until the person (a) dropped out of the program (failed to adhere), or (b) achieved the nutritional and/or weight loss goal, or (c) continued in the program for 60 days. In determining the
number of days of participation (adherence), the date of entry was not counted, but the last day of reported participation was counted.

Identification of possible co-variate relationships was accomplished through measurement of variables considered likely to co-vary with adherence. Demographic and referral characteristics for all subjects were captured on the Subject Data Sheet (Appendix C).

Data on active subjects' exercise history were obtained through a self-report form (Appendix D), which requested information on the type, intensity, frequency, and duration of each reported exercise activity. A composite exercise score (CES) was calculated from each self-report using a modification of the Cooper Point System (Cooper, 1966). Using this system, the intensity of each reported exercise was assigned a value. That value \( I \) was then multiplied by a frequency factor (number of days of exercise per week--\( F \)) and by a duration factor (the number of months that exercise activity had been maintained--\( D \)). This formula was expressed as \( CES = I \times F \times D \). Use of this formula enabled a person with low to moderate frequency and intensity, but with a higher duration (better adherence), to score higher than a person with possibly greater frequency and intensity of exercise, but less duration.

Generalized locus of control orientation was measured using the Rotter (1966) Internal/External Locus of Control
Scale. Scoring was based upon the number of "internal" responses given by each active subject.

The Lawlis and Lawlis (1980) Health Attribution Test (HAT), was also administered to determine the extent of the relationship between health specific locus of control orientation and adherence. Use of this device along with the Rotter Scale could also yield empirical evidence for, or against, the suggestion by Lawlis and Lawlis that health specific locus of control may not be necessarily related to generalized locus of control. Standard scoring methods were used. Percentage attribution scores were reported.

The Zung Self-Rating Depression Scale (SDS) was administered to active subjects to assess the mood states of subjects at the time of entry to the nutrition program (Zung, 1965). Standard scoring methods were used.

Assessment of the active subject's social support system was accomplished through self-report (Appendix E). Relative social support was determined through assigning a positive algebraic sign to persons reported as offering support (Supporters). A value of 2 was assigned to those in the immediate family, and a value of 1 was assigned to those not in the immediate family. A negative algebraic sign was assigned to those reported as not supporting participation in the nutritional program (Non-Supporters). The same numerical values were used for non-supporters as for
supporters. The Social Support Score (SSS) was determined by taking the algebraic sum of the assigned values.

The affective attachment to food and eating was assessed through use of a sentence completion device (R. Toledo, personal communication, May 2, 1985). The active subject responses to the sentence stems (Appendix F) were scored on a five point scale (Appendix G), with the higher numbers representing higher affective content of the responses. Seven judges sorted a sample of responses using the five point scale. As expected, there was greater agreement among judges at the extremes and mid-point of the scale. An index of agreement, calculated using split half correlation coefficients, may be found in Table 2. These results did support the use of this scaling method for assessing the affective content of responses.

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The imaging ability of active subjects was assessed by asking the subject to imagine eating a lemon, then having the person describe their image to the nutritionist. Scoring of imaging ability was based upon the categorization of the reported image in terms of the vividness and amount of detail reported, using the Imagery Scoring Key (Ransom, 1985) (Appendix H).

Procedure

Records data were obtained through review of clinic records by clinical nutritionists. The appropriate data were recorded on Subject Data Sheets exactly like those used for active subjects.

The investigator met individually with each of the clinical nutritionists who agreed to assist with the study to discuss the purposes and procedures. Each of the measurement devices was discussed. For those items that required the nutritionists to complete or score, careful instructions and practice were given. A written guide, describing the procedures and instructions, was also provided to each nutritionist. Following the training session and receipt of the written guide, the clinical nutritionists advised their clients who met the eligibility requirements described above, that a study to learn more about how to best help people who wanted to change their eating patterns was being done.
The nutritionists explained that the study would not affect the normal routine of the clinic except that the person would be asked to complete some questionnaires during the first visit and then listen to some short instructions. Clients were advised that no invasive or otherwise painful procedures would be used, and that following this first session, no other changes in clinic routine would occur.

Persons who indicated an interest in becoming subjects were asked to sign the informed Consent Form attached to their questionnaire packet. Potential subjects were told that there would be no negative consequences if they declined to participate in the study. Persons who did sign the consent forms to become subjects removed the form from the questionnaire packet and gave it to the nutritionist who filed the form separately from the completed questionnaires in order to protect confidentiality of respondents.

The nutritionist then assigned a number to the subject, placing this number on the Subject Data Sheet and asking the subject to place the number on all pages of the questionnaire set. The nutritionist then placed that same number along with the date of entry into the program on the Subject Log provided (Appendix I).

The nutritionist then completed the Subject Data Sheet through interviewing the client and adding the appropriate measurements and clinical assessment data. The subject was then asked to complete the set of questionnaires before
continuing with the clinic routines. Upon completion of the questionnaires, the nutritionist completed the imagery exercise and scored the subjects' response, according to the scoring criteria defined by the investigator, following instructions in its use provided by the investigator.

At this point, the nutritionist asked the subject to follow along while a set of Relapse Prevention Instructions was read. The instructions for both the nutritionist and the subject were typed on 8 1/2 x 11 inch white paper and enclosed in a plastic "page protector."

Following the reading of the Relapse Prevention Instructions, the nutritionist engaged the subject in the regular routine of the nutrition clinic. Although the salient point (if you slip, get right back into the program) was reinforced as appropriate during subsequent sessions, no further structured interventions occurred.

The nutritionist maintained the client log by recording, in addition to the "start date," the date at which the subject (a) dropped out of the program (failed to adhere), or (b) achieved the nutritional and/or weight loss goal, or (c) continued in the program for 60 days. Data sets and updated client logs were periodically mailed to the investigator by the nutritionists.

**Statistical Methods**

Once demographic and test data were collected and adherence rates were determined, standard statistical
techniques were applied to determine the nature and extent of the predicted relationships. To determine the comparability of the subject groups in the study, analysis of variance was used to test the significance of any differences between group means. The effect of RP instructions on adherence was assessed by comparing mean adherence rates using a standard t test formula, and by using the Lawshe-Baker Nomograph (Downie & Heath, 1965) to determine the significance of differences between per cent adherence rates. Pearson Product Moment correlations were used to determine the strength and direction of any relationship between task magnitude and adherence. Co-variate relationships were sought through use of Pearson Product Moment correlations, with each variable being compared to each other variable, including comparison with adherence.
CHAPTER III

Results

The Texas Woman's University (TWU) records group (TWR) was composed of 32 persons who sought nutritional services at the University's Nutritional Assessment and Counseling Center (NACC) prior to initiation of the active phase of the study. Data on these subjects were collected through review of NACC records. One person (3.1%) was male, and 31 (96.9%) were female. The racial breakdown indicated that 24 (75.0%) were Caucasian, 4 (12.5%) were Black, and 4 (12.5%) were from other racial backgrounds. The mean age for this group was 30.0 years, ranging from 18 to 57 years. The average height was 64.7 inches and the average weight on entry was 181.9 pounds, ranging from 116 to 265 pounds. These subjects ranged from -3 per cent below to +80 per cent above ideal body weight. Nearly three-fourths of these subjects (71.9%) reported a weight loss goal, averaging 45.4 pounds and ranging from 5 to 100 pounds. Most persons in this group (68.7%) were referred by a physician or friend. Five self-referrals (15.6%) were found in this group and five others (15.6%) were referred from other sources. Twenty-six (81.3%) indicated weight loss as their primary reason for seeking services at the clinic. Three (9.3%) reported health promotion as the primary reason for coming, and 3 (9.3%)
reported other reasons. No subjects in this group received Relapse Prevention (RP) instructions and the mean adherence rate for this group was 28.9 days.

The TWU treatment group (TWA) was composed of 16 persons who sought services from the NACC after initiation of the active phase of the study. All subjects in this group received RP instructions. All subjects in this group were female. Thirteen (81.2%) were Caucasian, 3 (18.8%) were from other racial backgrounds. The mean age for this group was 31.0 years, ranging from 17 to 53 years. Height averaged 64.4 inches and weight on entry averaged 162.1 pounds, ranging from 122 to 212 pounds. Thirteen (81.2%) subjects indicated a weight loss goal averaging 28.9 pounds and ranging from 3 to 55 pounds. Over 56 per cent were self-referred or came on advice of a physician. Friends (3) and other health professionals (4) referred the remaining 43.7 per cent. Fifteen (93.4%) listed weight loss as the primary reason for seeking services, and one reported health promotion as the reason for attending the clinic. Mean adherence rates for subjects in this group, following RP instructions, was 47.5 days.

The Plano General Hospital (PGH) Center for Lifestyle Enhancement (CLE) records Group (PGR) included 32 persons whose records were reviewed and who did not receive RP instructions. Fourteen (43.8%) were males and 18 (56.2%) were females. Almost all these subjects (96.9%) were
Caucasian and one (3.1%) was Asian. The mean age was 44.7 years, ranging from 22 to 73 years. The average height was 66.4 inches and the mean weight on entry was 179.1 pounds ranging from 88 pounds to 270 pounds. These subjects averaged 28.4 per cent body fat on entry and ranged from 12 per cent below to 69 per cent above ideal body weight. Twenty one (65.6%) reported a weight loss goal averaging 39.5 pounds, ranging from 12 to 100 pounds. All but one person in this group was referred by a physician. Twenty one (65.6%) indicated that weight loss was the primary reason for coming to the clinic, and eleven (34.4%) indicated a medically prescribed diet as a reason for coming. The mean adherence rate for this group, which did not receive RP instructions, was a remarkably high 45 days (75%).

The PGH treatment group (PGA) contained 30 subjects, eleven (36.7%) were males and 19 (63.7%) were females. One person (3.3%) was of Hispanic origin, and the remaining 29 (96.7%) were Caucasian. The average age for this group was 42.8 years, ranging from 22 to 64 years. Mean height on entry was 67.2 inches and weight on entry averaged 198.6 pounds, ranging from 109 to 305 pounds. Average percent body fat for this group was 35.3 per cent. These subjects ranged from 0.5 to 127 percent above ideal body weight. Twenty-two (73.3%) persons stated a weight loss goal averaging 56.2 pounds and ranging from 6 to 155 pounds. Twenty-six (86.7%) were referred by a physician and four persons reported other
referral sources. Twenty-three (76.7%) indicated weight loss as the primary reason for coming to the CLE, six (20.0%) reported a medical diet as their primary reason for coming to the clinic, and one person listed health promotion as the reason for coming. This group, which did receive RP instructions, achieved an average of 48.6 days of adherence to their nutritional programs.

Because the subjects in each group were self-selected, it was important to gain some indication of the degree of comparability of the groups. An analysis of variance procedure was performed on relevant demographic and co-variate measures to assess pre-treatment group comparability. Results of this analysis may be found in Table 3 (Appendix J). As can be seen from the Table, prior to administration of the RP instructions, the subject groups differed only with regard to age, entry height, and pounds to lose.

One hypothesis stated that there would be an inverse relationship between the magnitude of the weight loss goal of persons participating in a clinical nutrition program and their adherence rates to those programs. Pearson Product Moment correlation co-efficients between the "goal index" and days of adherence for each of the four groups are presented in Table 4 (Appendix J).

The predicted inverse relationship between task magnitude and adherence was not supported by the obtained
Pearson Product Moment correlations. There was essentially no correlation between the goal index and adherence when all subjects were considered together. However, when those who did not receive RP instructions (Control groups) were considered separately from those who did (Treatment groups), differences did appear. There was a slight positive correlation for the Treatment groups, suggesting that, in these groups, adherence was slightly better among those having higher weight loss goals. The correlations did not achieve significance. For the control groups (which did not receive RP instructions), the correlation coefficient did reflect a moderate negative relationship between task magnitude and adherence, as predicted, but again, obtained correlations did not attain statistical significance.

The other hypothesis stated that participants in a clinical nutrition program who received instructions about relapse and relapse prevention would tend to adhere to prescribed dietary regimens better than those who did not receive such instructions. Because adherence may be expressed either as a per cent or as a mean, the differences in adherence rates between records (control) groups and active (treatment) groups were statistically compared in two ways. First, per cent adherence rates were calculated for each group (actual days divided by expected days times 100). The differences in per cent adherence between control and treatment groups for each clinic location were tested for
significance using the Lawshe-Baker Nomograph (Downie & Heath, 1965). Results of this analysis are presented in Table 5 (Appendix J).

The significance of differences between mean adherence rates was determined using a standard t test formula (Spencer, Underwood, Duncan, & Cotton, 1968). Results of this analysis are presented in Table 6 (Appendix J).

Both methods of analysis yielded similar results. Obtained differences, both in terms of per cent adherence and in terms of mean adherence rates, were in the predicted direction. Although in the predicted direction, neither the per cent adherence nor mean adherence rate differences obtained from the PGH location (PGR & PGA) achieved statistical significance. Differences in adherence rates in both forms, between control and treatment groups at the TVU clinic (TWR & TWA), were found to be statistically significant at the .01 level using both analytical methods, thereby supporting the hypothesis that adherence could be improved through use of RP instructions.

A second aspect of this study was aimed at exploring possible co-variate relationships between selected variables and adherence rates. As has been generally true with research designed to demonstrate consistent empirical patterns associated with adherence, (Brownell, Marlatt, Lichtenstein & Wilson, 1986; Glanz, 1980), this attempt to identify possible predictive relationships between these
variables and adherence revealed no strong correlations. The obtained Pearson Product Moment Correlation coefficients comparing adherence and the co-variate measures included in this study, are presented in Table 7 (Appendix J).

As noted in the Table, only two variables correlated with adherence beyond +/- .3. The first suggested that there was an inverse relationship between emotional loading on the Sentence Completion stem "Food is..." and adherence. The other suggested that imaging ability was somewhat related to adherence. Both relationships were in the predicted direction, lending support, even if slight, to the cognitive model used here to improve adherence.
CHAPTER IV
Discussion

Data obtained in this study noted improved adherence in both treatment groups, although statistical significance was achieved only in the TWU clinic setting. Obtained results did not support the predicted relationship between relative task magnitude and adherence. No strong co-variante relationships were identified between adherence and the additional measures included in this study.

Fundamental to this study was the notion that adherence to a clinical nutrition program could be understood in terms of "expectancy." This relationship was characterized in terms of the subject's "expectancy of success," or, after Bandura, "self-efficacy." That is, one's actual adherence to a nutritional program was thought to be related to one's expectations that one could maintain adherence and/or could recover if relapse did occur. Using that model, this study attempted to improve nutritional adherence through modification of the subject's expectations about adherence, relapse, and relapse recovery.

In examining the hypothesized relationship between expectancy and adherence, the study was able to demonstrate that instructions given to change a person's expectations about adherence, relapse, and relapse recovery, did result
in improved nutritional adherence. The obtained data thus supported the contention that cognitive manipulation of expectancy could be used to improve adherence, quite well under certain conditions, and somewhat less well under other conditions.

Although obtained differences in adherence rates in both settings were in the predicted direction, only in the TWU clinic did the differences in adherence rates between Control and Treatment groups attain statistical significance. Factors which might account for this interesting finding are considered below.

An immediately obvious difference in the two settings was the adherence rate prior to initiation of the intervention (See Table 3, Appendix J). Although the clinicians at both TWU and Plano General Hospital (PGH) indicated strongly that their clinics were experiencing significant problems with adherence, the "before" adherence rate at PGH was considerably higher (better adherence) than that at TWU. In fact, both per cent and mean adherence rates at PGH, before intervention, were considerably higher than that generally reported in the literature, suggesting an outstanding program there. Consistent with the literature, TWU Control group adherence rates were relatively lower.

One reason why the improvement in adherence at PGH was not found to be statistically significant when compared to TWU, might well be that the rate of adherence at PGH was so
high initially that there was simply less "room" for detectable improvement at PGH, i.e., a statistical ceiling effect was operating. At TVU, on the other hand, with a lower base rate, there was more "room" for improvement to be detected. The operation of such a ceiling effect would not, however, diminish support for the conclusion that the manipulation of expectancy through RP instructions was a valid method of improving adherence rates, especially where a clinic had typically low adherence rates, but also even in clinical settings where the base adherence rates were higher. The fact that some improvement was noted even in the PGH clinic suggested that the instructions worked for some clients there who might not otherwise have maintained adherence as well as most others attending that clinic.

This intervention strategy, then, would appear to have value as a means of improving adherence to nutritional programs. Given its relative ease and economy of use, and because its effectiveness was demonstrated using clinical nutritionists as the change agents, the use of RP instructions to modify client expectancy about adherence, relapse and relapse recovery, should be encouraged as a routine part of the clinical procedure in nutritional clinics. The RP instructions would appear especially appropriate in clinics where baseline adherence rates are typically low, but also appeared to have value even in clinics where base adherence rates were relatively high.
Given the general pattern of low adherence to nutritional programs reported in the literature and given that both clinical nutritionists who assisted with this study reported that they considered failure to adhere to their respective programs to be a significant problem, it is of some interest to consider why the rates of adherence prior to the intervention differed so between the two clinic sites. That is, what other factors positively influencing adherence might have been operating at PGH?

Remaining consistent with the thesis of this study that expectancy affects adherence, the question might be more precisely stated in terms of what factors may have differentially shaped (influenced) expectancies in the two settings? This question may be approached by examining characteristics of the settings themselves, the nutritionists who assisted with the study, and participant subjects. The TVU clinic was associated with a University Department of Nutrition and Food Science. Clinical services were offered there as part of the training program for clinical nutritionists. The TWU program operated primarily as a student service, though services were available to persons in the general community for a nominal fee. As was appropriate for such a setting, service delivery existed in a training context, so that availability of a range of clinical experience for students was of high importance.
At PGH, on the other hand, the clinic was part of the Hospital’s health promotion effort, the Center for Lifestyle Enhancement (CLE). The nutritional program was an integral part of a medical setting, where the focus was much more on service delivery than on training, per se. All but one person in the PGH Control group was referred by a physician. In essence, the PGH clinic was part of a medical setting, whereas, TVU was part of an academic setting. The initial expectancy set for those approaching a university based clinic which provided clinical nutritional services as a part of an academic training program, could well have differed from the expectations of persons approaching a "medical" clinic.

Differences between the clinical nutritionists who executed the experimental protocol may also have accounted for part of the basal adherence rate differential. Clinical outcome studies have long shown a "clinician effect," and a similar "experimenter bias" has been described by Barber (1976). In this case, the most likely clinician/experimenter bias may have been in terms of what Barber called "personal attributes" of the nutritionists, or more specifically here, differences in the roles and role expectations of the nutritionists.

Although personal attributes of the nutritionists were not controlled beyond ensuring that both were Registered Dietitians, and that both were similarly trained in the
Department of Nutrition and Food Science at TWU, the somewhat differing roles of the two nutritionists could have produced differences in how the importance of adherence was communicated to their clients prior to the intervention phase of the study. That is, the nutritionist at TWU had returned to school for graduate study in nutrition and was thus, both a student in an academic setting and a practicing clinician. The role of the clinical nutritionist in that setting then, may have been viewed as temporary, and perhaps, as a means to the end of completing graduate study. Her student status was also no doubt perceived by the other students coming to the clinic, as well. Even the nominal fee charged by TWU gave immediate evidence to users that the program was for practicum experience, and may have been perceived as less than "professional" by those seeking nutritional services. This nutritionist was also somewhat more isolated from other health promotion programs at TWU than her counterpart at PGH, who was part of an integrated hospital-based wellness program.

At PGH, the nutritionist was always functioning in a professional clinical capacity, was considered a member of a medical team, including the charging of a professional fee, and was being asked by physicians to help people modify nutrition patterns which would literally save or prolong their lives. Such differences in the role and role expectations of the two nutritionists could clearly have
made subtle, or perhaps, not so subtle differences in how the relative importance of maintaining adherence was communicated to clients. Personality and "style" variability may also account for some differences in the two clinics, though these variables were not directly assessed in this study.

A third set of variables which could have influenced pre-intervention adherence were those related to subject (client) characteristics. Beyond ensuring that all subjects met certain criteria for participation and that they gave written consent to participate, subjects were not matched across clinics, since the literature reports of generally low levels of adherence found in many nutritional settings suggested that the problem generalized across a wide range of subject characteristics. Certain demographic differences did emerge, however. For example, those seeking services in the TWU clinic were younger, more likely to be female, were slightly shorter and less heavy, and reported somewhat fewer pounds to lose, than those served in the hospital based programs. Further, physicians referred almost all persons to the PGH clinic, many for potentially life threatening situations, whereas only about one-third (37.5%) of those at TWU were physician referrals, and most of those indicated weight loss as their reason for seeking services. Almost none mentioned any other health problem associated with their decision to participate in the clinic program. Thus,
the reasons for coming to the nutritional clinic could have been to lose weight primarily to improve their appearance, or perhaps even to "feel better," though probably not in the same sense as those facing a potentially life threatening condition.

By and large, these characteristics and data suggest that the higher rates of pre-treatment adherence at PGH may be attributed to its having been in a medical setting, the probable identification of its nutritionist as a part of a medical team, and the probably more serious health concerns perceived by its clients. The clinical nutritionist at PGH noted that Plano has an unusually high incidence of coronary heart disease (CHD), and apparently a quite low average age of acute onset of CHD (B. Verdery, RD, LD, Personal Communication, April 10, 1986). Many of those coming to the PGH clinic were diagnosed as being at risk for CHD.

Such a suggestion would appear to be a plausible explanation (or at least part of the explanation) for the higher baseline adherence rates in Plano. That is, younger, female students who sought clinic services in order to lose weight to improve their appearance may have had less commitment to adherence, or have perceived less serious negative consequences resulting from failure to adhere, than those whose primary concern was to avoid a potentially fatal health condition.
This does not mean, however, that the TWU group did not genuinely wish to achieve their goals, nor that their reasons for seeking services were trivial. When given expectancy modifying instructions, their adherence rates improved to a statistically significant degree.

In summary, the hypothesis that relapse prevention instructions would, through modifying expectancies, result in improved adherence to nutritional programs, was supported. Such cognitively active instructions did apparently work. Further, they can be economically and effectively administered by clinical nutritionists as part of the routines associated with developing and implementing a clinical nutrition plan for clients.

These instructions, did not, however, appear to be a panacea, and these data clearly suggest that other factors were also operating on adherence rates. For example, these data also support the conclusion that perceived higher health risks may lead to higher baseline rates of adherence to nutritional programs than would have been the case if the primary motivation for participation in the nutrition clinic was cosmetic. These higher pre-treatment rates of adherence further support the potential for RP instructions to improve adherence because even in a clinic with exceptional adherence, some improvement was noted.

It should also be remembered that provision of any clinical service—be it psychological counseling or, as in
In this case, nutritional counseling—where one person attempts to influence another, is a complex phenomenon and single factor, linear relationships are unlikely to provide complete answers. Thus, while providing useful information about one factor (expectancy) that might be modified to improve adherence, this study also pointed out the need to continue searching for multivariate relationships, both cognitive and environmental, which would more fully illuminate the fascinating and important phenomenon of adherence.

Because an expectancy model of adherence suggested a relationship between expectancy of success and relative magnitude of the task, this study also sought evidence in support of this relationship. Reasoning that if the task were large, there would be a greater likelihood that a person would perceive relatively less "success expectancy," and thus, would tend to adhere less well to a nutrition program, it was hypothesized that there would be an inverse relationship between task magnitude (amount of weight to lose, expressed as a 'goal index') and the number of days of adherence to the nutritional program.

If the relationship held as hypothesized, one would have expected the negative correlations to have been stronger in the Control groups (those without RP instructions) than in the Treatment groups since "success expectancy" was directly acted upon by the intervention
strategy. As noted in Table 4 (Appendix J), the obtained Pearson Product Moment correlations did indicate some support for this hypothesis since both Control groups did produce negative correlations, and both Treatment groups produced positive correlations. In neither case, however, did the obtained correlation coefficients suggest a strong relationship, nor was statistical significance achieved.

In considering why these results did not strongly fit the theoretical model, two possibilities must be examined—either the theoretical model was wrong, or, the method of assessing the proposed relationship was weak. Because obtained results did vary in the predicted direction, even if not significantly, and because intervention data did support the expectancy model, it was most likely the case that the theoretical model was not wrong. Rather, these findings most probably resulted from methodological weaknesses that diluted the obtained measures of relationship.

Although the relative size of the task was quantified from actual client data, and thus appeared objective, it must be remembered that task magnitude is in reality, a subjective judgement, especially in the case of something as personal as weight loss. It should also be noted that the relative magnitude of the task was assumed to be linear. That is, more weight to lose relative to body weight, was assumed to be of greater magnitude. Upon reflection however,
it seems reasonable that the linearity assumption made by the investigator, looking at groups of persons, would simply not be meaningful in the same way to individuals dealing only with their own weight loss task. That is, task magnitude, as perceived by an outsider, may not have affected subject expectancy as predicted, because the subjects might not have perceived the task necessarily as "big or little" in the same way the investigator did. Another way to say this is that "whatever trouble a person has is the worst trouble the person has." So one person wanting to lose 15 pounds and another wanting to lose 50 pounds may have perceived their respective tasks as equally formidable. The investigator's definition of relative magnitude, then, might not have been understood by the subjects in the same way, especially if all or most subjects viewed their weight loss task as difficult regardless of the computed "goal index." To the extent that this was true, there would be little or no statistical co-variability between task magnitude and adherence rates, because subject perceptions of task magnitude, in essence, did not vary.

The problem with demonstrating this relationship appeared to have been that "relative task magnitude" was perceived as a linear function by the investigator, not necessarily by the subjects in the study. The use of a "task difficulty rating scale," completed by each subject, and then correlated with days of adherence, would likely have
demonstrated this relationship more clearly, and quite possibly with statistical significance.

These results, although not as clear as might have been hoped, nevertheless may be instructive to clinical nutritionists. For example, it would appear important to remind nutritionists that the relative magnitude of the weight loss task of their clients is a subjective judgement, and that what may appear quite "do-able" to them, may be perceived as overwhelming to the client. Thus, they should take time to explore the client's perception of the size of the nutritional task, gearing their counseling approach to the client's perception, not their own.

The second part of the study, which attempted to identify co-variate relationships with adherence, produced no clear patterns. Only two variables correlated with adherence beyond +/- .3. Both variables, however, did suggest limited support for the cognitively active aspects of the model used here. That is, the negative correlation coefficient between adherence and the responses to the sentence completion stem "Food is . . . ," though not strong, indicated that as emotional loading to that stimulus increased, adherence tended to decrease. Such a finding was consistent with Snetselaar's (1982), discussion of the difficulty of overcoming emotional loading associated with food when trying to change dietary habits.
The other non-trivial correlation was that between adherence and imaging ability. This result suggested that as imaging ability, a cognitive skill important to expectancy, increased, so also did adherence.

This failure to find strong co-variate relationships with adherence more likely resulted from measurement artifacts or sample biases than any theoretical weakness. For example, necessary limits on the time frame for measuring adherence set an upper limit on the variability of the adherence measure. This limit on variability resulted in somewhat smaller correlation coefficients than might have otherwise have been the case. In light of this, and in view of the theoretical arguments in favor of these variables, they should be examined again, allowing a longer adherence interval.

It was recognized that the relatively short time interval for assessing adherence in this study would not allow any conclusions as to the impact of RP instructions on long term nutritional adherence (i.e., five years). Clearly, long term adherence would be necessary for positive nutritional practices to reduce the probability or the risks associated with chronic diseases. However, the value of examining the short term effect of the RP instructions used here was equally clear in that unless adherence could be promoted in the short term, it obviously could not be maintained over the long term. Future research should, of
course, examine long term adherence, but given the current state of understanding of nutritional adherence, important knowledge may be gained from short term studies such as this.

The obtained measurement ranges for the other co-variates would also appear to have been somewhat limited which could also have masked the actual strength of co-variante relationships. Possible reasons for these relatively narrow ranges of variability are briefly discussed below.

Although sustained participation in an appropriate exercise program should have correlated well with nutritional adherence, most subjects in this study (31 of 46, or 67.4%) reported no exercise activity at all, thereby reducing the range of variability of that measure, and correspondingly reducing the probability of a non-trivial correlation coefficient between exercise and adherence.

The subjects included in this study tended to be generally "internally" oriented as to locus of control of reinforcement. People with such an orientation have been described as more likely to assume responsibility for their own health and would therefore be more likely to seek services from a nutritional clinic. It would seem reasonable that a selection bias toward more internally oriented persons, among participants in this study, had reduced the
variability of obtained Rotter scores, again, very likely reducing the obtained correlation coefficient.

The corresponding HAT (or health specific locus of control) results were essentially the same as those of the more general Rotter scale, and most probably for the same reasons. It was interesting to note that the correlation coefficient between the Rotter Internal scores and the HAT Internal scores ($r = .491$), suggested moderate support for a relationship between general and health specific locus of control orientation, in some contrast to the suggestion of Lawlis & Lawlis (p. 39) that health specific locus of control often differed from a person’s general locus of control orientation.

The measure of depression was included in the study because of the possibility that depression might be related to negative expectancies of success. The failure to find a strong correlation between adherence and depression was probably more due to the probability that those coming to the nutritional clinics were not depressed to any significant degree (Zung SDS mean = 46.6, SD = 7.9) than that there was no relationship between depression and adherence expectancies.

The obtained social support indices were also somewhat skewed in that people who participated in the study appeared much more likely to report supportive relationships rather than non-supportive ones. As above, this reduced range of
variability was the more likely reason for the quite low correlation coefficients.

The failure to demonstrate strong relationships between adherence and the sentence completion items was less clearly understood, though the inverse relationship between emotional loading on the "Food is . . ." item and adherence would make further research into emotional factors worthy of continued serious study.

Conclusions

The following conclusions were derived from the results of this research into the relationship between expectancy and adherence and the use of a cognitive behavioral intervention strategy, designed to improve nutritional adherence. (a) Limited support was found for a cognitive-behavioral expectancy intervention strategy as a means of improving adherence in a clinical nutritional setting. (b) It was recommended, therefore, that the use of relapse prevention and recovery instructions be made a routine part of clinical nutritional practice. (c) Client perception of nutritional clinics and nutritionists as "professional" and medically oriented also appeared to positively influence adherence. (d) Client perception of serious medical consequences of non-adherence probably also had a beneficial influence on adherence rates. (e) Client perception of relative task magnitude was more salient than objective assessments of task size, making it very important
for nutritionists to understand task difficulty from the client's perspective. Future behavioral medicine research should continue to search for empirical patterns associated with adherence, especially in terms of variables related to an expectancy model, and that such research should extend the time interval for measuring adherence.
This is my request to participate in a research study.

I am agreeing, by this statement, to provide certain personal data for use in this research study. Further, I understand THAT ALL DATA WILL BE HELD IN STRICTEST CONFIDENCE, AS WELL AS NOT BEING IDENTIFIED AS COMING FROM ME. Should I decide to withdraw my participation in this study, I understand that all services will continue to be available to me without negative consequences.

I have read this release and fully understand the consequences for executing this document. Questions about this release and my treatment here have been answered to my satisfaction. This release is therefore fully and voluntarily executed by me.

Name (Please Print)

Signature

Date
Appendix B

RELAPSE PREVENTION MODULE

It is very important to recognize that what you are attempting to do represents a major change in your behavior and lifestyle. The possibility of "slipping", that is, failing to stay with these dietary recommendations, is always present. In fact, a slip is not at all that unusual. What is extremely important to remember, however, is that a slip DOES NOT MEAN THAT YOU HAVE LOST CONTROL OF YOUR BEHAVIOR. It means simply that you have not, in this instance, adhered to your diet plan.

When this happens, many people feel guilty and even think of themselves as weak or bad, or in some other way seek to blame themselves for the slip. While this is a predictable feeling whenever you do not achieve your diet plan, there are other ways that you could think about your slip that would be actually helpful in avoiding such a slip in the future. If, for example, you choose to think about the slip as a learning experience, the result of this kind of thinking can be quite helpful in helping you improve your ability to stay within your diet plan.

Let me show you what I mean. You might, instead of berating yourself or giving up because of a slip, ask these kinds of questions: What was the situation I was in when the slip
occurred? What was it about that situation (or my feelings about the situation at the time) that makes that situation one of high risk for me? Could I do something different next time I am in that situation or a similar one in order to reduce the possibility of another slip? By this, attempts to learn from the slip, you have turned what at first seemed like a very bad thing into a very useful occurrence.

Another thing to remember is the old saying "One robin doesn't make a summer." Well, in exactly the same sense, one slip does not make a full relapse, either. Just because you have slipped once, does not mean that you are a failure, that you have no strength or that your attempts to change your eating habits are hopeless. It will help you stay on this program if you can look upon any slip as a single independent event, something which can be avoided in the future if you can learn to recognize potential high risk situations, and develop some alternative responses to those situations.
Appendix C

SUBJECT DATA SHEET

GROUP NO. __________

DATE OF ENTRY __________

CLIENT NO. __________

CLIENT AGE _____ YEARS, OR

CLIENT BIRTHDATE __________

CLIENT RACE: ( ) HISPANIC
( ) ASIAN
( ) BLACK
( ) CAUCASIAN
( ) AMERICAN INDIAN
( ) OTHER

CLIENT SEX: ( ) MALE
( ) FEMALE

CLIENT WEIGHT ON ENTRY: __________ LBS.

CLIENT HEIGHT ON ENTRY: __________ INS.

CLIENT PER CENT BODY FAT ON ENTRY: __________ %

CLIENT COMPARISON TO "IDEAL BODY WEIGHT": + OR - __________ %

CLIENT VARIANCE FROM DIETARY STANDARD ON ENTRY:

CLIENT REFERRAL SOURCE:

( ) SELF
( ) FRIEND
( ) PHYSICIAN
( ) PSYCHOLOGIST
( ) OTHER HEALTH PROF.
( ) OTHER __________

GROUP IDENTIFIERS:

( ) TWU
( ) TWU RECORD
( ) PRIVATE GROUP 1
( ) PRIVATE GROUP 2

CLIENT REASON FOR ENTRY:

( ) WEIGHT LOSS (GOAL IN LBS __________)
( ) MEDICAL DIET (DX __________)
( ) HEALTH PROMOTION
( ) OTHER __________

RELAPSE PREVENTION MODULE:

( ) YES
( ) NO
Appendix D

CLIENT NO.  

GROUP NO.  

EXERCISE HISTORY

Please check the following box which best describes your involvement in exercise. (If you are engaged in physically active work, you may list that also.)

I engage in physical exercise activity on a regular basis.  
( )Yes  ( )No

If you checked "Yes", please answer the questions below. If you checked "No", please go directly to the next page.

My three most frequent current exercise activities are (in order): (If you regularly use only one or two forms of exercise, report only on those):

1. __________________________ for an average of __________ minutes, _______ days per week. I have generally maintained this level of activity for the past _______ months or _______ years.

2. __________________________ for an average of __________ minutes, _______ days per week. I have generally maintained this level of activity for the past _______ months or _______ years.

3. __________________________ for an average of __________ minutes, _______ days per week. I have generally maintained this level of activity for the past _______ months or _______ years.
Appendix E

CLIENT NO. ____________

GROUP NO. ____________

PLEASE MAKE A LIST, USING FIRST NAMES ONLY, OF THOSE PERSONS WHOM YOU BELIEVE WOULD OFFER YOU ENCOURAGEMENT IN YOUR EFFORT TO CHANGE YOUR DIET:

FIRST NAME: ___________________________  RELATIONSHIP: ___________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

PLEASE MAKE A LIST, USING FIRST NAMES ONLY, OF THOSE PERSONS WHOM YOU BELIEVE WOULD NOT ENCOURAGE YOU IN YOUR EFFORT TO CHANGE YOUR DIET:

FIRST NAME: ___________________________  RELATIONSHIP: ___________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________
PLEASE COMPLETE THE FOLLOWING SENTENCES:

1. FOOD IS

2. DESSERT IS

3. A FAT PERSON IS

4. A THIN PERSON IS
Appendix G

SENTENCE COMPLETION SCORING GUIDE

FACTUAL = Refers to statements of fact, or objective definitions of statements.

SUBJECTIVE = Refers to statements of feeling, or value based definitions of statements.

ENTIRELY FACTUAL

MOSTLY FACTUAL; SOMEWHAT SUBJECTIVE

PARTLY FACTUAL; PARTLY SUBJECTIVE

MOSTLY SUBJECTIVE; SOMEWHAT FACTUAL

ENTIRELY SUBJECTIVE

SCORES:

FOOD IS...

DESSERT IS...

A FAT PERSON IS...

A THIN PERSON IS...

COMPOSITE SCORE

----------------------------------------------
Appendix H

IMAGERY INSTRUCTIONS

I would like for you to imagine yourself eating a lemon slice. Please take a moment to imagine doing this (you may close your eyes, if you wish), then describe for me, your imaginary experience.

SCORING INSTRUCTIONS

Look for the following points in determining how well the person is able to create an image:

Mechanical detail: movement about a room; use of devices; cutting, etc.

Sensory detail: taste; texture; appearance; sounds, etc.

Emotional detail: pleasant vs unpleasant; like vs dislike, etc.

SCORING KEY

0 NO images produced even after encouragement from nutritionist

1 VAGUE images produced, minimal details provided, required frequent questioning/encouragement from the therapist

2 AVERAGE images produced, questions answered directly without providing additional detail

3 BETTER THAN AVERAGE images produced; some details added beyond those called for by questions

4 VERY VIVID images produced; many details given spontaneously beyond those called for by questions
## CLIENT ROSTER

<table>
<thead>
<tr>
<th>Group Number</th>
<th>Client Number</th>
<th>Entry Date</th>
<th>Expected Date</th>
<th>Terminal Date (Act)</th>
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Appendix J

Statistical Tables
### Table 3
Summary of Analysis of Variance to Assess Comparability of Subject Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>df</th>
<th>Sums of Squares</th>
<th>Mean Squares</th>
<th>F</th>
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<tbody>
<tr>
<td>Age</td>
<td>3</td>
<td>4973.1</td>
<td>1657.7</td>
<td>12.38**</td>
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<td>Entry Weight</td>
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<td>14768.3</td>
<td>4922.8</td>
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<tr>
<td>Entry Height</td>
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<td>140.9</td>
<td>47.0</td>
<td>3.57**</td>
</tr>
<tr>
<td>% Body Fat</td>
<td>2</td>
<td>541.8</td>
<td>270.8</td>
<td>1.69</td>
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<tr>
<td>+/- Ideal</td>
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<td>3509.0</td>
<td>1169.7</td>
<td>1.98</td>
</tr>
<tr>
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<td>6546.8</td>
<td>2182.3</td>
<td>2.73*</td>
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<td>499.0</td>
<td>166.3</td>
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<td>203.2</td>
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<td>Zung SDS</td>
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<td>65.0</td>
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<td>Social Support</td>
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<td>&quot;Food is...&quot;</td>
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<td>0.1</td>
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<td>1.5</td>
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<td>Sentence Composite</td>
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<td>8141.3</td>
<td>8141.3</td>
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*p < .05.  **p < .01.
Table 4

Correlation Co-efficients between Goal Index and Adherence Rates

<table>
<thead>
<tr>
<th>Pearson r</th>
<th>Group PGR</th>
<th>TWR</th>
<th>PGA</th>
<th>TWA</th>
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<td>-0.31</td>
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<td>0.27</td>
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<table>
<thead>
<tr>
<th>Pearson r</th>
<th>Group Control 3.</th>
<th>Treatment</th>
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<tr>
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<td>-0.09</td>
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<table>
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<tr>
<th>Pearson r</th>
<th>Group All Groups</th>
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### Table 5
Comparison of Per Cent Adherence Rates

<table>
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<th>Group</th>
<th>Expected Days</th>
<th>Actual Days</th>
<th>% Adherence</th>
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<tbody>
<tr>
<td>PGR (Control)</td>
<td>1920</td>
<td>1440</td>
<td>75.0%</td>
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<td>PGA (Treatment)</td>
<td>1800</td>
<td>1457</td>
<td>80.9%</td>
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<td>TWR (Control)</td>
<td>1905</td>
<td>927</td>
<td>48.7%</td>
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<td>TWA (Treatment)</td>
<td>905</td>
<td>760</td>
<td>84.0%*</td>
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*p < .05"
Table 6
Mean Differences in Adherence Rates

<table>
<thead>
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<th>Group</th>
<th>N</th>
<th>Mean Days</th>
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<tbody>
<tr>
<td>PGR (Control)</td>
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<td>45.0</td>
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<td>PGA (Treatment)</td>
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<tr>
<td>TVR (Control)</td>
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<td>TWA (Treatment)</td>
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<td>47.5</td>
<td>3.18</td>
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**p < .01**
Table 7

Pearson Product Moment Correlation Coefficients Between Adherence and Selected Co-variate Measures

<table>
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<th>Co-variate</th>
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<td>Age</td>
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<tr>
<td>Race</td>
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<td>.062</td>
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<td>Entry Height</td>
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<td>.113</td>
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<tr>
<td>% Body Fat</td>
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<td>+/- Ideal Weight</td>
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<td>Lbs to Lose</td>
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<td>.060</td>
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<td>Goal Index</td>
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<td>.271</td>
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<td>Exercise Index</td>
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<td>&quot;A Thin Person is . . . &quot;</td>
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<td>Imagery Rating</td>
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References


Cline, M. H. (1983). *The role of self-efficacy in predicting adherence/compliance to health behavior regimens.* Unpublished manuscript. North Texas State University, Department of Psychology, Denton, TX.


Ransom, K. J. (1985) *Imagery Scoring Key.* Unpublished manuscript. North Texas State University, Department of Psychology, Denton, TX


