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Interactional Effects Between Levels of Biofeedback Confidence and Measures of Assertiveness on Biofeedback Treatment Outcome

Dora D. Clarke-Pine
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Andrews University
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INTERACTIONAL EFFECTS BETWEEN LEVELS OF BIOFEEDBACK CONFIDENCE AND MEASURES OF ASSERTIVENESS ON BIOFEEDBACK TREATMENT OUTCOME

A Dissertation
Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy

by
Dora D. Clarke-Pine
August 1995
INTERACTIONAL EFFECTS BETWEEN LEVELS OF BIOFEEDBACK CONFIDENCE AND MEASURES OF ASSERTIVENESS ON BIOFEEDBACK TREATMENT OUTCOME

A dissertation presented in partial fulfillment of the requirements for the degree Doctor of Philosophy

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Dora D. Clarke-Pine

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06-30-1995 Date Approved

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ABSTRACT

THE INTERACTIONAL EFFECTS BETWEEN LEVELS OF BIOFEEDBACK CONFIDENCE AND MEASURES OF ASSERTIVENESS ON BIOFEEDBACK TREATMENT OUTCOME

by

Dora D. Clarke-Pine

Chair: Marion Merchant
ABSTRACT OF GRADUATE STUDENT RESEARCH
Dissertation
Andrews University
School of Education

Title: INTERACTIONAL EFFECTS BETWEEN LEVELS OF BIOFEEDBACK
CONFIDENCE AND MEASURES OF ASSERTIVENESS ON
BIOFEEDBACK TREATMENT OUTCOME

Name of researcher: Dora Dean Clarke-Pine
Name and degree of faculty chair: Marion Merchant, Ph.D.
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Problem
Not all individuals who enter a biofeedback program
obtain the relief that they are seeking from their various
pain-related or anxiety-related complaints. Some
individuals obtain little or no relief, whereas others may
eliminate their pain-related or anxiety-related complaints
completely. Understanding more clearly the reasons for such
variance is considered important in that such understanding
may encourage the development of techniques that elicit
greater biofeedback efficacy rates.

This research study was an attempt to determine some
of the factors that may help contribute to a successful
biofeedback program. Specifically examined were
interactional effects between levels of biofeedback confidence and measures of assertiveness on biofeedback treatment outcome.

Method

The population included 40 patients who were referred to the biofeedback program at a military hospital in south-central Missouri. These were subjects who presented with either an anxiety-related or pain-related complaint.

Subjects were administered the Gambrill Assertion Inventory, the Biofeedback Intervention Confidence Scale, and the Biofeedback Survey (pre-test/post-test). The pre-test, along with the first two instruments, were administered before treatment intervention and the post-test was administered after a standardized biofeedback treatment intervention ensued.

A two-way ANCOVA design, using a fixed effects model, was utilized in the analysis of the resulting data.

Results

No interactional effects between measures of assertiveness and biofeedback confidence on biofeedback treatment outcome were found. In addition, assertiveness levels did not appear to have a significant impact on biofeedback treatment outcome in terms of frequency or intensity of the presenting complaint. The only significant finding of the study, at the .05 level, was than an
individual’s confidence level in a biofeedback treatment program did have a significant impact upon treatment outcome in terms of "frequency" of presenting complaint. That is, a high level of biofeedback confidence had a significant impact on reducing the frequency of a presenting complaint.

Conclusion

It was concluded that if a high level of confidence in a biofeedback program can have a positive and significant impact on biofeedback outcome in terms of "frequency" of presenting complaint, then increasing an individual's level of confidence in such an intervention would be viewed as cost-effective in terms of treatment.
CHAPTER I

INTRODUCTION AND BACKGROUND TO THE PROBLEM

This research study was an attempt to determine some of the factors that may contribute to a successful biofeedback program.

In biofeedback, an individual learns how to use special equipment designed to measure specific physiological responses such as heart rate, muscle tension, blood pressure, and body temperature. Once individuals understand how their bodies are actually physiologically performing at any given moment, then they can use the techniques that they have learned in a biofeedback setting to change negative physiological responses into more appropriate physiological responses.

"Bio" can refer to imperceptible physiological responses such as blood pressure (Miller, 1989). Biofeedback is a source of immediate physiological feedback that is often invaluable to patients attempting to cope with various pain-related and/or anxiety-related complaints. The "feedback" given to an individual concerning current physiological functioning may be visual or auditory in nature, or a combination of both mediums (O'Sullivan, 1988).
Biofeedback has been used extensively to treat the following conditions: asthma, headaches (tension and migraine/vascular headaches), Raynaud's disease, hypertension, and irritable bowel syndrome (Basmajian, 1989; Blanchard, Greene, Scharff, & Schwarz-McMorris, 1994; Freedman, 1990; Freedman et al., 1988; Freedman, Ianni, & Wenig, 1983, 1985; Hatch, 1987; Marion & Cevette, 1991; Peper, Ancoli, & Quinn, 1979; Ray, Raczenski, Rogers, & Kimball, 1979; Schwartz, 1987; Sedlacek, 1985).

Fecal and urinary incontinence has been addressed rather successfully through biofeedback techniques (Baigis-Smith, Smith, Rose, & Newman, 1989; Cox, Sutphen, Borowitz, Dickens, & Singles, 1994; Loening-Baucke, 1990; Sedlacek, 1985; Weiss, 1991) as well as other physical conditions such as symptoms of Parkinson's disease, symptoms of diabetes, tinnitus, and spasmodic torticollis (Saunders, Cox, Teates, & Pohl, 1994; Sedlacek, 1985).

Biofeedback techniques have assisted in reducing chronic pain-related complaints such as low back pain (Sedlacek, 1985) or injury-related, post-traumatic headaches (Peper et al., 1979). Biofeedback training has even been used to successfully reduce pain levels during childbirth and labor (Duchene, 1989).

Biofeedback has also been found to be helpful in controlling anxiety-related complaints such as heart palpitations and hyperventilation, generalized anxiety disorder, ulcers, other gastrointestinal complaints, bruxism, and sleep-onset insomnia (Leung & Robson, 1991;
Miller, 1989; Peper & MacHose, 1994; Rice, Blanchard, & Purcell, 1994; Sedlacek, 1985).

Some somatization disorders such as functional laryngeal obstruction have also been shown to respond positively to biofeedback training (Sim, McClean, Lee, Naranjo, & Grant, 1990).

Biofeedback training is also in the beginning stages of producing a viable alcohol treatment option (Peniston & Kulkosky, 1989).

Finally, biofeedback techniques have been helpful with posture-related complaints (Miller, 1985), stroke rehabilitation (Basmajian, 1989; Cozean, Pease, & Hubbell, 1988; Logemann & Kahrilas, 1990; Mandel, Nymark, Balmer, Grinnell, & O'Riain, 1990; Miller, 1985; Wolf, LeCraw, & Barton, 1989; Wissel, Ebersbach, Gutjahr, & Dahlke, 1989), head-trauma complications (Shutty, Dawdy, McMahon, & Buckelew, 1991), reconstructive surgery (Draper & Ballard, 1991), as well as in regaining muscle use after severe, and what was once thought to be permanent, spinal damage (Basmajian, 1989; Morrow & Wolff, 1991).

Some individuals, with various pain-related or anxiety-related complaints, benefit significantly from only a biofeedback intervention (Highland, 1983; Sedlacek, 1985), while others seem to benefit from more of a multi-dimensional treatment approach that "includes" biofeedback training (Findley, Podolsky, & Silberner, 1991; Hanson & Gerber, 1990).
Treatments often used in conjunction with biofeedback interventions for anxiety-related and/or pain-related complaints include the following: behavior modification, medication management, family therapy, group therapy, supportive therapy, visual imagery, relaxation training, and stress-coping training (Dossey, 1991; Fordyce, 1978; Sorbi, Tellegen, & DuLong, 1989; Swanson, Swenson, Maruta, & McPhee, 1976).

I was especially interested in how the following areas impacted upon biofeedback success: assertive vs. unassertive personality orientations and an individual's level of "confidence" in a biofeedback treatment intervention.

**Statement of the Problem**

Not all who enter a biofeedback program obtain the relief they are seeking from their various pain-related or anxiety-related complaints. Some individuals obtain little or no relief, whereas others may eliminate their pain-related or anxiety-related complaints completely. At this time, reasons for the variance described above are not clearly understood. Understanding more fully the reasons for such variance is considered important in that such understanding may encourage the development of techniques that elicit greater success for a wider number of individuals who are engaged in this particular modality of treatment.
Purpose of the Study

There is a body of research to suggest an individual's set of expectations regarding a biofeedback intervention has a significant impact upon the biofeedback outcome (Hanson & Gerber, 1990; Peper et al., 1979).

Stroebel concluded in his research that biofeedback success was optimized when congruence between "treatment expectations" and "session results" was maintained (Peper et al., 1979).

Gibb, Stephan, and Rohm demonstrated in their research that a belief system did indeed have a significant impact upon biofeedback success (cited in Peper et al., 1979). Subjects in their study achieved "lower" muscle tension readings when they "believed" readings on the biofeedback monitors reflected previous gains. The readings on the monitors, however, had been manipulated; that is, muscle tension readings reflected higher readings than what subjects were actually producing through muscle relaxation exercises. In these conditions it was found that subjects, believing they had not yet obtained previous gains, continued to work until those previous "gains" were once again achieved. This in reality meant that new "gains" had been achieved (cited in Peper et al., 1979).

Some researchers also believe that individuals who possess "passive" or "unassertive" personality styles may have a tendency to use their pain-related or anxiety-related complaints, either consciously or
unconsciously, as a shelter from environmental demands (Butcher, Dahlstrom, Gynther, & Schofield, 1979).

The purpose of the study was to discover how the interaction between an individual's level of assertiveness, on the one hand, and his or her level of "confidence" in a biofeedback intervention, on the other hand, affects biofeedback outcomes in pain-related or anxiety-related complaints. That is, the synergistic effect between these two variables was the primary focus of this particular study.

Hypotheses

The hypotheses outlined at the end of this section were based upon one standardized biofeedback treatment intervention administered to four different categories of subjects:

1. Those individuals who were judged by an assertiveness inventory as generally "unassertive" in orientation but who possessed a high level of "confidence" in a biofeedback program, as measured by an inventory developed by myself for use in this study

2. Those individuals who were judged as generally "unassertive" in orientation but who possessed a low level of "confidence" in a biofeedback program

3. Those individuals who were judged as generally "assertive" in orientation but who possessed a high level of "confidence" in a biofeedback program
4. Those individuals who were judged "assertive" in orientation but who possessed a low level of "confidence" in a biofeedback program.

General definitions of assertiveness and unassertiveness are outlined later in this chapter under the section entitled "Definition of Terms." Specific operational definitions of unassertiveness vs. assertiveness as well as specific operational definitions of low vs. high levels of confidence in a biofeedback intervention are outlined in chapter 3 under the sections entitled, "Variables Under Study" and "Instrumentation."

In condition 1, individuals who were judged "unassertive" or "unassertive/doesn't care" in orientation, and who possessed a low level of biofeedback confidence, participated in a standardized biofeedback treatment program. The training provided in the treatment program, and the training that followed in all other treatment situations, included the standardized use of a paradoxical biofeedback intervention. The section entitled "Definition of Terms" has more information on paradoxical interventions. The section entitled "Delimitations of Study" has more information on the specific paradoxical intervention used in this particular study.

In condition 2, individuals who were judged "unassertive" or "unassertive/doesn't care" in orientation, and who possessed a high level of biofeedback confidence, underwent biofeedback training.
In condition 3, individuals who were judged "assertive/anxious performer" or "assertive" in orientation, and who possessed a low level of biofeedback confidence, underwent biofeedback training.

In condition 4, individuals who were judged "assertive/anxious-performer" or "assertive" in orientation, and who possessed a high level of biofeedback confidence, underwent biofeedback training.

The research question under consideration in this particular study was: Will the different categories of subjects produce significantly different results in terms of biofeedback success?

The following general research hypotheses were derived from the research question:

**Hypothesis 1.** There is a significant difference between the adjusted intensity post-test means of the group with high biofeedback confidence levels and the group with low biofeedback confidence levels, when the pre-test is used as a covariate.

**Hypothesis 2.** There is a significant difference between the adjusted intensity post-test means of the group with high assertiveness levels and the group with low assertiveness levels, when the pre-test is used as the covariate.

**Hypothesis 3.** There is a significant interaction between biofeedback confidence levels and measures of assertiveness with respect to intensity of the presenting complaint.
Hypothesis 4. There is a significant difference between the adjusted frequency post-test means of the group with high biofeedback confidence levels and the group with low biofeedback confidence levels, when the pre-test is used as the covariate.

Hypothesis 5. There is a significant difference between the adjusted frequency post-test means of the group with high assertiveness levels and the group with low assertiveness levels, when the pre-test is used as the covariate.

Hypothesis 6. There is a significant interaction between biofeedback confidence levels and measures of assertiveness with respect to frequency of the presenting complaint.

Assumptions

The assumptions made in this study were:

1. Individuals would respond both objectively and honestly to the self-administered inventories.

2. The inventory that I developed, that is, the Biofeedback Intervention Confidence Scale (BICS), does measure accurately and successfully, a subject's level of confidence in a biofeedback intervention.

3. Individuals would not be indirectly influenced by personal biases (unconscious or realized) to perform in a particular manner in the different treatment situations. This would be made possible by the concealment of the real purpose of the study from the
subjects who were chosen to participate in the study until the study's conclusion.

4. The biofeedback technician would provide objective and unbiased treatment to patients participating in the study, regardless of the treatment group to which the subjects belonged. It was felt that this effect was achieved by withholding information regarding the subject's assertiveness level and level of biofeedback confidence from the biofeedback technician providing treatment to each participant in the study.

**Importance of the Study**

In the area of various pain-related complaints such as chronic back pain, certain factors appear to serve a vital role in predicting the likelihood of success with numerous types of "surgical" treatment. For example, one set of authors, noting reviews of failed spinal surgery, state that psychological factors and appropriate patient selection appear to play a key role in determining successful surgery-related outcomes (Waddell, Main, Morris, DiPaola, & Gray, 1984). Other researchers appear to confirm that finding (Gottlieb et al., 1977; Maruta, Swanson, & Swenson, 1976; Wilfling, Klonoff, & Kokan, 1973; Wiltse & Rocchio, 1975). For low back-pain patients who have been resistant to both medical and surgical treatment, successful treatment appears to revolve around a combined psychological, pharmacological, and physical approach (Maruta et al., 1976).
In the area of pain-related and/or anxiety-related complaints, it is hypothesized that certain psychological factors may play an active and important role in terms of contributing to "biofeedback success." If, through the use of certain psychological instruments, one could predict with some assurance the likelihood of biofeedback success, then that individual would have a set of valuable assessment tools to assist him or her with the treatment process.

Several instruments have been studied in terms of predicting "surgical treatment outcomes" for various pain-related complaints: The Minnesota Multiphasic Personality Inventory (MMPI), the MMPI-168 (a condensed version of the MMPI), the Health Index, the Wechsler Adult Intelligence Scale (WAIS), the Mooney Checklist, the Cornell Medical Index (CMI), and the Quick Test, just to name a few (Calysyn, Spengler, & Freeman, 1977; Sternbach & Timmermans, 1975; Towne & Tsushima, 1978; Wifling et al., 1973; Wiltse & Rocchio, 1975). By contrast, little research has focused on predicting "biofeedback treatment outcomes" for various pain-related and/or anxiety-related complaints.

I was interested in studying the following variables as they relate specifically to biofeedback treatment success: measures of assertiveness i.e., unassertiveness vs. assertiveness, and an individual's level of "confidence" in a biofeedback intervention.
Rationale for the Study

This study was chosen because of: (1) my personal desire to better understand factors that contribute to successful biofeedback interventions in the area of both anxiety and chronic pain; (2) the implications for therapists and counselors in developing appropriate biofeedback treatment interventions; and (3) the desire to stimulate further research in the area of viable anxiety-related and chronic pain-related treatment programs.

Definition of Terms

Assertiveness: The ability to maintain or defend; ability to insist on one's rights, or on being recognized; to declare one's position openly or formally, often in the face of opposition; positive or confident in a persistent way (Guralnik, 1978).

Biofeedback: A technique of seeking to control certain emotional or physical states by training oneself, with the aid of electronic devices, to modify more effectively what are typically thought to be involuntary body functions (Schwartz, 1987).

Electrodermal Skin Activity (EDA): Also known as Electrodermal Skin Response (EDR), Skin Potential (SP), or Galvanic Skin Response (GSR) Biofeedback. This biofeedback process attempts to measure electrical skin conductivity or skin resistance (Stens, Part I, 1993).
Electromyographic (EMG) Biofeedback: Biofeedback that attempts to measure the electrical impulses that exist between various nerve endings and muscle fibers. EMG helps to identify the state of contraction vs. relaxation within a particular muscle group (Stens, Part I, 1993).

Temperature Biofeedback: Makes use of a thermal probe that, when placed on an affected body part, reflects the skin temperature (Stens, Part I, 1993).

Paradoxical Interventions: Paradox generally refers to a statement that seems contradictory, unbelievable, or absurd but that may actually be true in fact (Guralnik, 1978). Thus, a paradoxical intervention refers to verbalizing a situation in such a way that a patient feels driven to contest or challenge. Such interventions are typically used with patients who seem to be "stuck" in unhealthy, pathological positions and generally encourages them to move forward in terms of positive change. For example, such interventions are used to draw attention to unconscious secondary gains surrounding a condition or behavior, or used to directly confront an individual's need to consciously maintain a presenting complaint.

Secondary Gains: A "gain" that is derived or results from something considered primary or original; dependent; second-hand; not original; not primary (Guralnik, 1978). In psychology this is often thought to be related to a hidden agenda, a covert goal, or an unconscious need.
Unassertiveness: Offering no opposition or resistance; submissive, yielding; patient; taking no active part; inactive (Guralnik, 1978).

Delimitations of Study

The study was delimited to:

1. A sample restricted to the south-central region of Missouri

2. Individuals who were referred to the biofeedback program at General Leonard Wood Army Community Hospital in one of the following ways: physician referral, social work service referral, psychiatry and neurology referral, or self-referral

3. Pain-related complaints that included tension headaches, migraines, and vascular headaches, TMJ, lower back pain, and gastrointestinal distress; anxiety-related complaints that included panic disorder, generalized anxiety, social phobia, post-traumatic stress disorder, and sleep-onset insomnia

4. A standardized 6-week format to be conducted by the same individual. The program was comprised of the following: a paradoxical biofeedback intervention, visual imagery, relaxation techniques, and recognition of body cues through the use of biofeedback equipment

5. Paradoxical interventions that followed a standardized procedure. A discussion of "secondary gains" was

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followed by the following statement: "If significant secondary gains are not at play . . . you will probably do very well with the program. If you do not achieve what you wish to achieve in the program, then perhaps we need to engage in some brief individual therapy to discuss the possibility that strong secondary gains revolving around current complaints actually do exist."

Limitations of Study

This study was limited by:

1. Focusing on a military-related population that includes active-duty service members, retired military personnel, dependents of active-duty service members, and dependents of retired military personnel

2. Unintentional and unconscious movement from a standardized format. The discussion of secondary gains and corresponding use of paradoxical interventions, as well as the biofeedback training program in and of itself, were standardized in terms of format. However, it is possible that delivery of the standardized format varied slightly in its presentation due to intervening variables such as fatigue or low energy levels when discussing and processing interventions with each participant in the study.
Organization of Paper

This dissertation is organized in the following manner:

Chapter 1 deals with the introduction and background of the problem. Specific areas include the statement of the problem, the purpose of the study, the hypotheses, the basic assumptions, the importance of the study, the rationale of the study, the definition of terms, the delimitations of the study, the limitations of the study, and the organization of the paper. Chapter 2 presents the review of the literature concerning the topic of this study. Chapter 3 discusses the methodology of the study. Chapter 4 presents the results of the data analysis, and chapter 5 includes a summary of the previous chapters, followed by the findings, discussion, implications, and recommendations of this study.
CHAPTER II

REVIEW OF THE LITERATURE

What effect, if any, does a person's level of confidence in a particular treatment intervention, such as a biofeedback intervention, have on the treatment outcome? Do high levels of confidence in a biofeedback intervention lead to greater results in terms of biofeedback success as compared to low levels of confidence in a biofeedback intervention? Do measures of assertiveness also impact significantly upon biofeedback success? That is, if a person possesses a passive personality style, will he or she benefit differently from a biofeedback program as compared to an individual who possesses an assertive personality style?

This chapter looks at the multidimensional effects obtained from measures of assertiveness (i.e., passiveness vs. assertiveness) and biofeedback confidence levels on biofeedback success. The five specific sections covered in this chapter are: (1) types of biofeedback treatment interventions, (2) factors that affect or have the potential of affecting biofeedback treatment outcomes, (3) confidence levels and biofeedback success, and (4) measures of assertiveness and possible effects on
biofeedback success. Summaries are given at the end of each specific section. In addition, a chapter summary is also provided.

Types of Biofeedback Treatment Interventions

The most common types of biofeedback are electromyographic or EMG biofeedback, electrodermal skin activity or EDA/EDR biofeedback (also known as electrodermal skin response, skin potential, or galvanic skin response), temperature biofeedback, and electroencephalographic or EEG biofeedback (Everly & Rosenfeld, 1981).

Electromyographic (EMG) biofeedback attempts to measure the electrical impulses that exist between various nerve endings and muscle fibers. EMG helps to identify the state of contraction vs. relaxation within a particular muscle group. Muscle tension can be reduced by focusing on techniques that help relax the particular muscle group affected, which is usually reflected through auditory or visual responses. For example, lower tones signal reduced muscle tension. The EMG equipment used can signal the user whether or not the techniques being used are working successfully to decrease muscle tension (Miller, 1989). Excessive tension in the muscle often causes unpleasant symptoms such as headaches and/or muscle spasms (Highland, 1983).

Electrodermal skin activity (EDA), electrodermal skin response (EDR), galvanic skin response (GSR), or skin
potential (SP) biofeedback measures skin conductance, skin resistance, or skin potential (Fowles et al., 1981). Measurements today are typically in the area of skin conductance or skin potential. Standardized placement of electrodes for skin conductance is bipolar, whereas standardized placement for skin potential is unipolar (Fowles et al., 1981). Skin conductance measurements are generally preferred over skin potential measurements in that skin potential measurements are typically more difficult to interpret and tend to be more easily influenced by hydration effects (Fowles et al., 1981).

Regardless of which measurements are chosen, one theory holds that electrical changes in the skin are thought to be related to blood flow changes (Stens, Part I, 1993). Theoretically, increased sympathetic activity is reflected by increased sweat gland activity (Stens, Part II, 1993). Thus, when an individual is under stress or under a state of arousal, more sweat is produced by the sweat glands, and conductivity increases or resistance decreases (Stens, Part I, 1993). Relaxation techniques assist in reducing the amount of sweat or the amount of sweat gland activity produced by an individual, which is also typically reflected by lower auditory signals (Miller, 1989). Electrodermal biofeedback has been especially helpful with anxiety-related complaints, as well as chronic pain-related complaints (Miller, 1989).

Temperature biofeedback makes use of a thermal probe that, when placed on an affected body part, reflects
the skin temperature. Techniques can be learned to increase skin temperature. Higher temperatures generally reflect more appropriate blood circulation states and thus improve such conditions as migraine headaches and Raynaud's disease (Miller, 1989).

Other instruments often used in biofeedback training measure such activities as brain-wave activity (EEG), heart rate, and blood pressure (Highland, 1983).

As mentioned in chapter 1, biofeedback has been used in treating the following conditions: headaches (tension, migraine, and vascular), Raynaud's disease, hypertension, low back pain, irritable bowel syndrome, torticollis, urinary and fecal incontinence, anxiety-related complaints, ulcers, other gastrointestinal complaints, symptoms of diabetes, tinnitus, bruxism, sleep-onset insomnia, childbirth and labor pain, somatization disorders, alcohol addictions, posture-related complaints, head-trauma complications, and stroke or spinal injury rehabilitation.

Factors That Affect or Have the Potential of Affecting Biofeedback Treatment Outcomes

Researchers have identified some factors that seem to contribute to biofeedback success: presentation of conditions with known biofeedback protocols, immediate access to treatment, an absence of major psychopathology and/or major personality disorders, and an absence of litigation surrounding the presenting complaint.
Individuals who possess physical conditions that have a positive history with biofeedback interventions, that is, conditions with known biofeedback protocols, generally do well in such programs. Several researchers note satisfying levels of biofeedback success in the treatment of migraine, tension, and other vascular headaches (Blanchard et al., 1990; Blanchard, Andrasik, Guarnieri, Neff, & Rodichok, 1987; Blanchard et al., 1988; Sedlacek, 1985).

Researchers also note that certain conditions tend to respond better to specific biofeedback approaches, and choosing a particular intervention should be an educated and intentional process (Lehrer, Carr, Sargunaraj, & Woolfolk, 1994).

It has also been found that individuals who have more immediate access to biofeedback treatment, once symptoms have developed, tend to do better than those who do not have such timely access to treatment (Sedlacek, 1985). This finding is similar to findings that, in general, individuals who have to wait for treatment, regardless of the type of treatment, tend not to do as well as those individuals who have access to immediate treatment (Beals & Hickman, 1972; Krusen & Ford, 1958; Phillips, 1964).

Also, those individuals who possess psychotic disorders and/or severe personality disorders such as borderline personality disorders, tend not to do well with biofeedback interventions (Sedlacek, 1985). This may be
related to the idea that such persons have tremendous difficulty with trust-related issues and may, therefore, be guarded in their responses to any treatment intervention. In addition, such persons often have tremendous difficulty coping with life in general, in that poor problem solving skills and difficulties sustaining attention on one presenting issue may be evident. These skills are normally judged important in any biofeedback treatment intervention.

Finally, in general, individuals who are engaged in litigation over their various pain-related complaints tend not to do as well with treatments that attempt to alleviate their particular complaint as those individuals who are not engaged in any litigation activity (Beals & Hickman, 1972; Krusen & Ford, 1958; Sternbach, Wolf, Murphy, & Akeson, 1973b; Swanson et al., 1976). This is no doubt related to potential secondary gain-related issues, unconscious or conscious in nature.

Thus, it would appear that biofeedback efficacy can be improved if treatment focuses on conditions that have a positive history with biofeedback interventions and treatment is provided in as much of a timely manner as possible. In addition, biofeedback treatment is often contraindicated with the following populations: (1) patients presenting with major psychopathology and/or severe personality disorder, and (2) patients involved in litigation surrounding their presenting complaint.
There is some research to suggest that other variables may have a significant impact on treatment intervention outcomes in general. Recent research has focused on areas such as: personality, depression, illness behavior, secondary gain, lifestyle, and motivation.

Variables such as attitude and personality, according to some researchers, can affect an individual's overall health status (Thomas & Lyttle, 1976). It can be argued that personality variables can play a valuable role in successful "biofeedback interventions" as well (Witt, 1981). However, the significance of these relationships, if such relationships indeed exist, is not clearly understood at this time.

Biofeedback interventions are commonly used in the treatment of "chronic pain," and personality variables do seem to emerge in the area of "chronic pain." For example, individuals suffering from "chronic" pain-related complaints, that is, pain-related complaints that remain resistant to treatment over an extended period of time, appear to possess a sense of interpersonal alienation, a need to project blame, and a need to manipulate and control others (Timmermans & Sternbach, 1974).

Researchers also describe a phenomenon known as the "chronic-pain syndrome." Individuals who seem to fit within the boundaries of this particular syndrome often experience the following: a tendency to ruminate on pain-related complaints ("pain preoccupation"),
multiple attempts to obtain medical relief, pursuit of disability compensation, attempts to convince others of their disabled status, dependency on narcotics, depressive symptomology, noted disturbances in sleep, social withdrawal/feelings of alienation, an increase in interpersonal conflict, and general inactivity (Beals & Hickman, 1972; Hanson & Gerber, 1990; Pilling, Brannick, & Swenson, 1967). It is interesting to note that these individuals do not typically respond to conventional treatment interventions and are often referred to specialty pain clinics as a result (Hanson & Gerber, 1990).

There is a growing body of evidence to suggest that individuals with chronic pain-related complaints generally produce "neurotic triad" or "conversion-V" profiles on the MMPI (Phillips, 1964; Swanson et al., 1976). Some researchers, noting these findings on the MMPI, have discovered that a strong proportion of disability insurance claimants possess personality characteristics that would classify them with moderate to severe personality disorders (Shaffer, Nussbaum, & Little, 1972).

There is even some evidence to suggest higher incidences of psychopathology or neuroticism in individuals experiencing "functional pain" or "mixed pain" as compared to those individuals experiencing "organic pain" (Calsyn, Louks, & Freeman, 1976; Calsyn, Spengler, & Freeman, 1977; Freeman, Calsyn, & Louks, 1976; Hanvik,
1951; McCreary, Turner, & Dawson, 1977). "Functional" pain refers to pain that does not have an organic basis, "mixed" pain refers to pain that has an organic basis but the pain "experience" appears to be out of proportion with the presenting problem, whereas "organic" pain refers to pain that has a documented organic basis (Freeman et al., 1976).

However, research is still conflicted regarding cause and effect factors. Some research has suggested that the neurotic behaviors noted in individuals with a chronic pain-related complaint, may be the result of the chronic pain-related complaint rather than a precursor to it (Sternbach & Timmermans, 1975). Sternbach and Timmermans found that neuroticism indicators on two assessment instruments dropped significantly after successful surgery, that is, pre-test vs. post-test neurotic indicators were compared and a significant difference between the two results was noted (Sternbach & Timmermans, 1975).

Other researchers doubt the existence of a "homogeneous pain personality," although the same researchers concede that personality trends in chronic pain may exist (Louks, Freeman, & Calsyn, 1978).

Thus, it is generally unclear at this time as to whether a relationship between certain personality variables and chronic pain exists. It is equally unclear as to whether certain personality variables impact upon biofeedback treatment outcomes. What remains clear at
this time, however, is that further research in this area is needed before personality variables can be considered a significant contributing factor to biofeedback success.

The presence of depressive symptomology in individuals with chronic pain-related complaints has been well noted by researchers over the years (Fields, 1991; Fordyce, 1978; Fordyce, Brena, Holcomb, DeLateur, & Loeser, 1978; Hanson & Gerber, 1990; Pilling et al., 1967; Sternbach, Wolf, Murphy, & Akeson, 1973a).

Considerable debate still exists as to whether chronic pain is responsible for the depressive symptomology or whether the depressive symptomology is responsible for the presence of chronic pain (Hahn, Jones, & Carron, 1989). Regardless of cause and effect features, it is interesting to note that anti-depressant medications are considered to be one of the more effective treatment interventions in the management of chronic pain (Hahn et al., 1989; Sternbach, Murphy, Akeson, & Wolf, 1973; Sternbach, Wolf, Murphy, & Akeson, 1973a).

Thus, using only a biofeedback intervention to treat a pain-related complaint when depressive symptomology is quite evident, would not only be contraindicated but unwise. Many authors suggest that successful management of certain chronic pain-related complaints should be multidimensional in focus and may need to include, in conjunction with biofeedback training, the following: narcotic and benzodiazepine detoxification, anti-depressant therapy, psychological
counseling, behavior modification, and physical therapy (Hahn et al., 1989; Maruta et al., 1976; Thompson, 1990).

Illness behavior, that is, behavioral patterns resulting from a chronic pain-related complaint, can, at times, become the major management problem in treatment for some individuals (Waddell et al., 1984).

A low locus of control and learned helplessness are common symptoms of illness behavior, which, in the end, can contribute to the perception of reactive pain (Gottlieb et al., 1977). Such persons often do not feel that they have the resources to help themselves and often unconsciously magnify the presenting problem's severity as a "cry for help" (Waddell et al., 1984).

Thus, teaching individuals how to help themselves, that is, assisting them in developing more of an internal locus of control may assist in diminishing reactive pain levels. Biofeedback treatment interventions tend to emphasize self-management goals and often place the emphasis of success on the patient's shoulders (Hanson & Gerber, 1990).

Research also seems to suggest that secondary gains that have resulted from operant conditioning may play an active role in some pain-related situations. In other words, pain-related behavior that is significantly "rewarded" may be maintained by such "rewards" or "secondary gains" (Butcher et al., 1979; Fordyce, 1978; Krusen & Ford, 1958).
Operant conditioning may establish behaviors that are resistant to change. For example, if the only time a patient receives support and attention from his or her spouse is when he or she is experiencing a severe headache, and that "support and attention" is considered valuable to the patient, then taking away the headache is also viewed by the individual, on an unconscious level, as a loss in terms of "attention and support." The "unconscious" may consider the "attention and support" more valuable, and worth the trade-off, as compared to "eliminating the pain." Thus, patient education and appropriate counseling to develop more effective coping skills may be necessary before engaging in a biofeedback intervention.

Moreover, regarding biofeedback treatment, some research suggests that motivation levels play a healthy role in achieving biofeedback success. For example, researchers at the University of Utah noted that volunteers who were paid up to $18 an hour to increase their heart rate (the amount they earned was dependent upon the success they achieved in the program) did significantly better than those who were paid nothing or who were paid a nominal flat fee of $2 an hour regardless of the outcome ("Mind Over Matter," 1980). Thus, it would appear that a strong investment in achieving biofeedback results, that is, high motivation, impacts favorably upon biofeedback success.
Finally, some researchers feel that a set of rewarding life activities may actually diffuse pain-related complaints on some level (Fordyce, 1978). Perhaps having a "good day" may take the "edge" off of a pain-related complaint. For example, if a person has a day filled with rewarding activities and, in general, events have gone relatively well (i.e., work was fulfilling, fellow workers were kind, a substantial "winning" lottery ticket was purchased, etc.), such a person, if he or she somehow stubbed a toe on the way home from work, would perceive that pain differently than a person who experiences the same injury after a day filled with non-rewarding tasks, depressing work, unkind remarks from fellow workers, an I.R.S. notification of an impending audit, etc. Thus, biofeedback interventions that focus on helping patients have a greater number of "good days," that is, interventions that assist patients in improving the quality of their lives or interventions that focus on positively reframing life circumstances, may be more successful than biofeedback interventions that do not.

Thus, in summary, the following variables may interfere with a successful biofeedback treatment outcome: an absence of rewarding life activities, low motivation levels, "significant" secondary gains surrounding presenting complaint, illness behavior such as a low locus of control and/or learned helplessness, depressive symptomology, unresolved litigation, psychotic and/or
severe personality disorders, lack of immediate treatment, and treatment of conditions with no known biofeedback protocol.

Confidence Levels and Biofeedback Success

One set of authors state that the usefulness of any treatment is very much dependent upon an individual's set of expectations regarding the successful outcome of the treatment (Hanson & Gerber, 1990). Other researchers agree, stating that beliefs and attitudes do impact upon the therapeutic outcome (Peper et al., 1979; Ray et al., 1979).

If biofeedback training is composed of both objective components and subjective components as some researchers propose (i.e., physiological "feedback" as well as beliefs and attitudes [Peper et al., 1979]), then how do these variables relate to each other? The relationship between these two variables is not clearly understood at this time. However, research has recently attempted to address this particular question.

One set of authors, citing earlier research conducted by Stroebel, note that individuals who possessed low expectations concerning biofeedback success and who produced higher than expected degrees of control, and individuals who possessed extremely high expectations concerning biofeedback success and who produced lower than expected degrees of control, performed more poorly in biofeedback interventions as compared to individuals who
possessed a better match between biofeedback expectations and biofeedback success (Peper et al., 1979). Stroebel suggests that biofeedback results can be optimized if a better match between "treatment expectations" and "session results" take place (Peper et al., 1979).

Other researchers emphasize the contributing role a belief system, in general, has on biofeedback success. In a study conducted by Gibb, Stephan, and Rohm on a total of 165 subjects, it was discovered that an individual's belief system played a significant role in biofeedback success (cited in Peper et al., 1979). In this study, subjects were taught general muscle relaxation exercises. Resulting biofeedback readings were recorded with the lowest muscle-tension readings especially noted. At a particular point in the experiment, without the subject's awareness, the sensitivity setting on the biofeedback equipment was changed from low sensitivity to medium sensitivity. Thus, a muscle-tension reading of 18 microamperes was suddenly changed to 26 microamperes. In general, it was discovered that individuals who "perceived" they had not yet achieved their maximum potential in terms of muscle-tension readings, that is, maximum potential based on previous within-session successes, continued to work until they "perceived" they had reached their maximum potential. They were now able to reduce the "medium" sensitivity readings to numbers comparable to what they had received on the "low" sensitivity readings. That is, a person who previously
could lower muscle-tension readings on the low sensitivity setting to only 18, could now lower muscle tension readings on the medium sensitivity setting to 18. These new recordings reflected a lower muscle-tension reading than originally obtained by the subjects (Peper et al., 1979). The researchers concluded that, in this particular study, a person's belief system did play a major role in achieving biofeedback success.

Thus, in summary, it appears that a person's belief system can indeed be a major component in biofeedback treatment interventions. In a study conducted by Stroebel, a significant relationship between biofeedback expectations and biofeedback success was noted. Stroebel found that biofeedback success was optimized when biofeedback expectations and biofeedback session results remained congruent. Finally, in a study conducted by Gibb, Stephan, and Rohm, it was discovered that subjects were able to manipulate muscle-tension readings to significantly lower levels than previously obtained if deceptive feedback mechanisms were used.

**Measures of Assertiveness and Possible Effects on Biofeedback Success**

There is a body of evidence to suggest that individuals with low levels of assertiveness may have a tendency to use their pain-related complaints, on a conscious or unconscious level, as a means to avoid the responsibilities placed upon them by their environment (Butcher et al., 1979). In other words, these authors
comment that "pain behaviors" actually provide support and shelter from environmental demands for those individuals with passive-dependent personalities (Butcher et al., 1979). Thus, individuals who possess "passive" orientations may need to first address the role that the "pain behavior" actually plays in their life before participating in a biofeedback intervention.

The above concept can be illustrated in the following way: Let us say that I am a passive individual who has difficulty saying "no" to environmental demands. When my system becomes overwhelmed by environmental demands, which is likely to happen because of my passive personality style, my system will have to find a way to avoid additional environmental demands. If I do not possess the skills to say "no" to additional environmental demands, then my system, which is in reality a very creative system, may come up with a way to say "no" indirectly to additional environmental demands. The body can devise a number of ways to indirectly say "no" to environmental demands (i.e., panic attacks, depression, headaches, stroke, heart attack, etc.).

Assertiveness training programs can teach individuals more appropriate coping skills, reducing the need to obtain support and shelter from environmental demands through "pain behaviors." Thus, individuals who possess "passive" orientations may need to first engage in assertiveness training before entering a biofeedback program, or, at the very least, such persons may need to
engage in assertiveness training while simultaneously participating in a biofeedback treatment intervention.

If the above hypothesis is correct, that is, if measures of assertiveness do impact significantly upon biofeedback treatment outcomes, then finding appropriate ways to measure assertiveness levels would be considered crucial in terms of biofeedback success.

Currently several assertiveness scales exist: the Adult Self-Expression Scale (Gay, Hollandsworth, & Galassi, 1975), the Bakker Assertiveness Inventory (Bakker, Bakker-Rabdaau, & Breit, 1978), the College Self-Expression Scale (Galassi, Delo, Galassi, & Bastien, 1974), the Constriction Scale (Bates & Zimmerman, 1971), the Gambrill Assertion Inventory (Gambrill & Richey, 1975), the Interpersonal Behavior Survey (Mauger & Adkinson, 1987), the Rathus Assertiveness Schedule (Rathus, 1973), and the Wolpe-Lazarus Assertion Inventory (Wolpe & Lazarus, 1966).

The Adult Self-Expression Scale is a 48-item, self-report scale, designed to measure assertiveness in an adult population (Gay et al., 1975). The Bakker Assertiveness Inventory is a 36-item, self-report inventory, designed to differentiate between measures of assertiveness and measures of aggressiveness in an adult population (Bakker et al., 1978). The College Self-Expression Scale is a 50-item, self-report inventory, designed to measure three dimensions of assertiveness (i.e., positive assertiveness, negative assertiveness, and
self-denial in a college population [Galassi et al., 1974]). The Constriction Scale is a self-report scale designed to screen candidates for assertiveness training in college populations (Bates & Zimmerman, 1971). The Gambrill Assertion Inventory is a 40-item, self-report inventory, designed to measure assertiveness in an adult population (Gambrill & Richey, 1975). The Interpersonal Behavior Survey is a 272-item, self-report survey, designed to differentiate between assertive and aggressive behaviors in an adult population (Mauger & Adkinson, 1987). Finally, the Wolpe-Lazarus Assertion Inventory, one of the earliest known assertiveness inventories, is a 30-item, self-report inventory, designed to measure assertiveness (Furnham & Henderson, 1981).

If varying degrees of assertiveness result in varying degrees of biofeedback success, it would be interesting to note if cultural differences in regard to biofeedback success also exist. The literature suggests that cultural differences with self-reported measures of assertiveness appear to indeed exist (Fukuyama & Greenfield, 1983; Furnham, 1979; Lineberger & Calhoun, 1983). Although this particular area was not addressed in this particular study, this may be an appropriate area of research in future studies.

Thus, in summary, it was hypothesized that varying degrees of assertiveness may produce varying degrees of biofeedback success. Research suggests that some passive-dependent personalities may harbor an unconscious
need to use their pain-related complaints as some form of "shelter" from environmental demands. That is, the pain-related complaint, for some individuals, can actually be viewed as a means to cope with stress or a means to reduce stress. If this hypothesis is true, then attempting to remove the pain-related complaint, without first replacing it with more effective coping mechanisms, would most likely lead to unsuccessful results.

Assertiveness training was one possible intervention offered to assist in developing more successful coping mechanisms. In addition, it was felt that if varying degrees of assertiveness result in varying degrees of biofeedback success, then finding ways to measure assertiveness levels appropriately were needed. Finally, several assertiveness inventories that currently exist were briefly discussed.
CHAPTER III

METHODOLOGY

Successful biofeedback interventions are no doubt influenced by many contributing variables to include the competence and expertise of the biofeedback clinician as well as patient selection variables.

From the review of the literature, evidence suggests that individuals who are interpersonally unassertive in nature typically seek nurturance and support from others as well as shelter from environmental demands. Unconsciously, the body may seek shelter from environmental demands through an anxiety-related and/or pain-related complaint. Thus, individuals who are unassertive in nature may have more difficulty benefiting from treatment interventions, such as biofeedback interventions, if shelter from environmental demands is maintained more successfully by a particular presenting complaint.

The literature also suggests that expectations regarding biofeedback treatment do have a significant impact upon the treatment outcome. Thus, it was hypothesized that interactional effects between assertiveness and biofeedback confidence would be found.
This study, therefore, was undertaken to discover the interactional effects between measures of assertiveness and biofeedback intervention confidence levels on biofeedback treatment success.

This chapter discusses the research approach, the variables in the study, the research design, the population and sample, instrumentation, data collection procedures, null hypotheses, and method of analysis.

**Research Approach**

As indicated above, the three areas researched in this study were measures of assertiveness, biofeedback intervention confidence levels, and interactive effects on biofeedback treatment outcome.

The Gambrill Assertiveness Inventory was used to determine level of assertiveness. This inventory places an individual in one of four categories: unassertive/high discomfort performing assertive behaviors, unassertive/low discomfort performing assertive behaviors ("doesn’t care"), assertive/high discomfort performing assertive behaviors ("anxious-performer"), and assertive/low discomfort performing assertive behaviors.

The four assertiveness categories were collapsed into two broad categories: unassertive vs. assertive regardless of defined comfort levels, for the purposes of this study.

The Biofeedback Intervention Confidence Scale was used to determine level of biofeedback confidence.
This inventory places an individual in one of two categories: low vs. high biofeedback confidence.

Thus, four groups of subjects were examined in the analysis of this study: (1) individuals who were judged "unassertive" in orientation and who possessed a low level of confidence in the biofeedback program, (2) individuals who were judged "unassertive" in orientation and who possessed a high level of confidence in the biofeedback program, (3) individuals who were judged "assertive" in orientation and who possessed a low level of confidence in the biofeedback program, and (4) individuals who were judged "assertive" in orientation and who possessed a high level of confidence in the biofeedback program.

A two-way analysis of covariance design was used on these four groups of subjects to test the null hypotheses described later in this chapter.

**Variables in Study**

**Independent Variables:** The independent variables are assertiveness and biofeedback intervention confidence.

Specific measures of assertiveness were defined by the measures outlined in the Gambrill Assertion Inventory. The section entitled "Instrumentation" has more information on the Gambrill Assertion Inventory and the measures of assertiveness utilized in this study.

Biofeedback intervention confidence levels were measured by a Likert attitude scale developed by me for this particular study. The scale, called the Biofeedback
Intervention Confidence Scale (BICS), is described in detail later in this chapter.

**Dependent Variable:** The dependent variable was defined as an individual's ability to modify presenting pain-related or anxiety-related complaints in terms of frequency or intensity.

A pre-test and post-test were used to measure an individual's altered ability to modify presenting pain-related or anxiety-related complaints utilizing techniques learned in the biofeedback program. The pre-test and post-test are further described in the section entitled "Method of Analysis" at the end of this chapter.

**Intervening Variables:** The intervening variables, that is, those variables that could not be controlled in the study, may have included variables such as fatigue, barometric pressure changes, secondary gains surrounding presenting complaint, and other unidentified intense emotional/personal preoccupations that may have occurred during the period of treatment.

**Research Design**

A two-way ANCOVA, utilizing a fixed model design, was used. This study included R = two experimental levels of one variable and C = two experimental levels of another variable. The number of treatment combinations was RC.

R (row) experimental treatments represented measures of assertiveness (1 = unassertive, 2 = assertive)
and C (column) experimental treatments represented intervention confidence levels (1 = low biofeedback confidence, 2 = high biofeedback confidence). This research design is shown in Table 1.

TABLE 1
TREATMENT DESIGN VARIABLES IDENTIFIED

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Low Biofeedback Confidence</th>
<th>High Biofeedback Confidence</th>
<th>Row Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unassertive</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>12</td>
<td>1.</td>
</tr>
<tr>
<td>Assertive</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>22</td>
<td>2.</td>
</tr>
<tr>
<td>Column Mean</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>.1</td>
<td>.2</td>
<td>. .</td>
</tr>
</tbody>
</table>

Thus, group 1 (x₁₁) included individuals who fell into "unassertive" and "low biofeedback confidence" categories. Group 2 (x₁₂) included individuals who fell into "unassertive" and "high biofeedback confidence" categories. Group 3 (x₂₁) included individuals who fell into "assertive" and "low biofeedback confidence" categories. Group 4 (x₂₂) included individuals who fell into "assertive" and "high biofeedback confidence" categories.
Population and Sample

The population was restricted to a military hospital outpatient setting in south-central Missouri. Participants in the study included active-duty personnel and their dependents, as well as retirees and their dependents.

Since the number of individuals applying to the biofeedback program at the hospital where the study was conducted was relatively small, all individuals screened for the biofeedback program, who were also 18 years of age or older, were entered into the analysis of the study. This was considered to be the sample population, that is, the subaggregate that was drawn from the population. This sample population included individuals seeking biofeedback treatment for a number of anxiety-related or pain-related complaints at General Leonard Wood Army Community Hospital.

It was determined that by setting alpha at .05 and power at .90, a large effect size would require a minimum of 10 entries per cell while a moderate effect size would require a minimum of 21 entries per cell.

Thus, power analysis indicated that a sample of 10 subjects per cell, that is, a sample of 10 subjects per category of subjects, was adequate. Four cells required a total of 40 individuals. However, the sample size was, in the end, very much dependent upon the number of individuals applying to the biofeedback intervention program. It was earlier judged possible that certain
categories of subjects may not choose to pursue biofeedback interventions even if such interventions were available. For example, it was thought that individuals who possessed unassertive orientations and low confidence levels in biofeedback interventions might be reluctant to pursue entry into a biofeedback program.

Instrumentation

Under this section, two major types of instruments are discussed, namely, measures of social assertion and measures of "confidence" in a biofeedback intervention.

Assertion Inventories

Several assertion inventories were considered for use in this study: the Adult Self-Expression Scale (Gay et al., 1975), the Bakker Assertiveness Inventory (Bakker et al., 1978), the College Self-Expression Scale (Galassi et al., 1974), the Constriction Scale (Bates & Zimmerman, 1971), the Gambrill Assertion Inventory (Gambrill & Richey, 1975), the Interpersonal Behavior Survey (Mauger & Adkinson, 1987), the Personal Relations Inventory, the Rathus Assertiveness Schedule (Rathus, 1973), and the Wolpe-Lazarus Assertion Inventory (Wolpe & Lazarus, 1966).

After much consideration, the Gambrill Assertion Inventory became the instrument of choice. This particular instrument was preferred over the other assertion inventories for the following reasons: (1) brief administration time, (2) unique focus, that is, a focus combining both social discomfort with a particular
behavior and the probability of actually performing the behavior, (3) global cut-off scores for assertive and non-assertive personality styles, (4) relative ease in administration, scoring, and interpretation, (5) high test-retest reliabilities, and (6) usability with a variety of individuals.

In addition, it was noted that many of the other inventories that were listed above possessed some shortcomings. For example, one of the inventories, the Wolpe-Lazarus Assertion Inventory, was unstandardized. A few inventories were standardized on homogenous college populations such as the College Self-Expression Scale, the Constriction Scale, and the Rathus Assertiveness Schedule. Other inventories were considered time-consuming in terms of administration as well as scoring such as the Interpersonal Behavior Survey and the Personal Relations Inventory. Finally, some of the inventories focused primarily on differences between assertiveness and aggressiveness rather than on assertiveness and unassertiveness, such as the Bakker Assertiveness Inventory and the Interpersonal Behavior Survey.

Gambrill Assertion Inventory

Factor analysis reveals that the Gambrill Assertion Inventory is a multi-dimensional scale. The scale is composed of 11 factors that apparently account for 61% of the variance (Mansour, Zernitsky-Shurka, & Florian, 1987). The 11 factors are: initiating
interaction, confronting others, giving negative feedback, responding to criticism, turning down requests, handling service situations, resisting pressure to alter one's consciousness, engaging in "happy talk," complimenting others, admitting personal deficiencies, and handling a bothersome situation (Mansour et al., 1987).

On the Gambrill Assertion Inventory, subjects rate degree of discomfort with a particular behavior as well as the likelihood of displaying the behavior (Gambrill & Richey, 1975). A distinction was made between discomfort and actual behavior in that varying degrees of incongruence between these two areas are sometimes noted (Gambrill & Richey, 1975). Looking at the interaction between these two variables was considered a unique contribution by some researchers who labelled the inventory as "promising" (Furnham & Henderson, 1983). Test-retest reliabilities were .87 for the discomfort scale and .81 for the response probability scale (Gambrill & Richey, 1975). Appendix A contains a copy of the instrument.

The Gambrill Assertion Inventory generates one of four possible profiles (Gambrill & Richey, 1975). That is, as mentioned earlier in this chapter, respondents will fall into one of the four following categories: (1) unassertive with high discomfort levels, (2) unassertive with low discomfort levels ("doesn't care"), (3) assertive with high discomfort levels ("anxious-performer"), and (4) assertive with low discomfort levels. The instrument was
designed for both normal and clinical populations (Gambrill & Richey, 1975; Weinstein, 1985) and no sizeable sex differences were noted on the instrument (Gambrill & Richey, 1975). For the purpose of this particular study, the above four categories were collapsed into two general categories, unassertive or assertive, and cut-off scores developed by the authors of this instrument were used.

Biofeedback Confidence Scales

An absence of biofeedback confidence measurement scales was clearly noted in the research literature. After a thorough literature review, only one instrument that attempted to measure expectancy, enthusiasm, and confidence in biofeedback interventions was located. The instrument was called the Placebo-Active Therapy Index or PATI (Peper et al., 1979).

The PATI was designed to rate current effectiveness of biofeedback training during treatment. It was also designed to predict long-term effectiveness of such training after treatment cessation (Peper et al., 1979). The support for the model was based upon a sample of 50 normals and 25 psychiatric inpatient subjects (Peper et al., 1979).

Although the PATI can be used to predict long-term effectiveness of biofeedback training after such training has been received, it was never designed to predict biofeedback success before onset of treatment.

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The preliminary research with this instrument revealed that optimal biofeedback success was obtained when treatment expectations were congruent with actual session results. That is, extremely high or extremely low expectations regarding biofeedback treatment outcome typically produced poorer results than individuals whose expectations were more in line with the actual biofeedback results of each treatment session.

The PATI, therefore, attempts to measure current levels of biofeedback success "during" treatment and/or predict long-term success "after" treatment termination.

The PATI eventually assisted researchers in understanding that more "moderate" and perhaps more "realistic" attitudes regarding possible biofeedback treatment outcomes often resulted in the most visible biofeedback gains.

In this particular study it was hoped that an instrument could be developed that would attempt to predict biofeedback treatment outcome before treatment onset. It was thought that such an instrument would ultimately prove useful as a screening instrument, eliminating unnecessary treatment for patients deemed highly unlikely to benefit from such treatment modalities. Thus, the Biofeedback Intervention Confidence Scale (BICS) was conceptualized and developed with this particular purpose in mind.
The Biofeedback Intervention Confidence Scale

The Biofeedback Intervention Confidence Scale (BICS), using a Likert attitude scale format, was designed to measure an individual's level of confidence in a biofeedback intervention and, unlike the PATI, could be administered to individuals not currently involved in such interventions.

Validity

Validity refers to the extent an instrument accurately measures the construct or constructs it is designed to measure. Measuring constructs accurately is difficult since constructs can never be measured perfectly by any means. Since validity cannot be assessed directly, it must be inferred.

In this particular study, face and construct validity were the validity measures chosen.

Face validity focuses on a test-taker's impression that a test measures what it is supposed to measure, that is, the content of the test appears relevant to the purpose at hand.

Construct validity focuses on comparing a presumed measure of a construct to some theoretical expectation, that is, some behavior or manifestation that supposedly underlies such a construct. In this case, an individual who "expresses an expectation" that a biofeedback intervention can assist with a pain-related and/or an anxiety-related complaint was judged on some
level to possess a "measure of confidence" in such an intervention.

Internal consistency was one measure selected to assist with establishing construct validity. An instrument with high internal consistency, that is, an instrument that demonstrates that items are substantially intercorrelated, would more likely be measuring one underlying variable or one "construct." This process, however, does not guarantee that the right construct is being measured. Thus, another measure, the opinion of expert judges, was also used to assist in establishing construct validity. The judges were asked to assess whether the items on the new scale measured the delineated construct in some appropriate way and whether the items, as a whole, measured the construct comprehensively.

In summary, high internal consistency coefficients, as are demonstrated in the item analysis later in this chapter, support the idea that one major construct was being measured by the instrument. Construct validity was also supported by the solicitation of expert judge opinions in the development of the scale. It was believed that the use of such judges increased the probability that the desired construct was the construct actually being measured.

Instrument construction

Several mental-health professionals with varying belief sets concerning biofeedback efficacy were contacted
for participation in the development of this scale. These individuals were asked to contribute to a pool of statements reflecting confidence or the lack of confidence in biofeedback interventions to assist with various presenting complaints. The sample consisted of a total of 13 mental-health professionals: four psychiatrists, four social workers, two psychologists, two psychiatric nurses, and one psychology technician. A pool of 50 statements, that is, a pool of twice as many statements as thought needed, was thus generated for the new attitude scale through this process.

The resulting statements were modified to fit the criteria outlined by Daniel J. Mueller in *Measuring Social Attitudes: A Handbook for Researchers and Practitioners*, 1986. The modified statements were then sent to a sample of 39 mental-health-care professionals in 36 states for critique and evaluation. These individuals, "chapter representatives" of the Association for Applied Psychophysiology and Biofeedback, were judged to have some expert knowledge about biofeedback treatment interventions.

The respondent judges were asked to critique the statements and evaluate their appropriateness for inclusion in the newly developed scale. They evaluated poorly worded or ambiguous statements as well as construct validity, i.e., "Does the statement measure confidence in a biofeedback intervention or biofeedback techniques to assist with a presenting complaint, or the lack of
confidence in a biofeedback intervention or biofeedback techniques to assist with a presenting complaint?"

Finally, the judges were asked to rate the statements as either positive or negative in focus.

In the first few weeks of the mailing, a total of 13 surveys was returned for analysis. A follow-up letter was then sent to the biofeedback judges, inviting those individuals who had not yet responded to the survey to participate in the analysis of the scale. Out of the 39 surveys sent to the biofeedback judges, a total of 20 surveys were eventually returned, with 17 of those surveys qualifying for analysis. These results represented a 51% return rate while the "usable" return rate for the instrument was calculated to be 44%.

Only those statements that achieved 80% agreement from the judges in terms of construct validity as well as those items that achieved an 80% agreement in terms of keyed response (negative vs. positive statement) were retained for possible inclusion into the new attitude scale. Through this process 10 items were eliminated from the original survey, reducing the survey to a 40-item instrument.

Pilot study

The newly developed 40-item instrument was administered to a sample of 246, with 241 of the completed surveys qualifying for analysis. All individuals who responded to the survey were individuals who were, in
some respect, affiliated with the military installation at Ft. Leonard Wood, Missouri. The sample is outlined in Table 2.

### TABLE 2
ITEM ANALYSIS SAMPLE

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Duty Army Basic Trainees</td>
<td>120</td>
</tr>
<tr>
<td>College Students</td>
<td>67</td>
</tr>
<tr>
<td>Physical Therapy Patients</td>
<td>26</td>
</tr>
<tr>
<td>Eligible Biofeedback Patients</td>
<td>21</td>
</tr>
<tr>
<td>Former Biofeedback Patients</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>241</strong></td>
</tr>
</tbody>
</table>

The active-duty personnel were basic trainees attending the engineer basic-training course and represented a single academic class of basic trainees.

The students chosen for participation in the study attended a small community college located on the installation grounds and were enrolled in one of the following classes: (1) Introduction to Psychology, (2) Personality Theories, (3) Abnormal Psychology, and (4) Introduction to Sociology.

The physical therapy patients were individuals who were seeking treatment at the post military hospital for a number of presenting physical complaints.

The eligible biofeedback patients were individuals who had been screened for various pain-related and
anxiety-related complaints, and who were judged eligible to enter the biofeedback program at the military hospital on post, while the former biofeedback patients were individuals who had already completed the biofeedback program at the hospital.

It was strongly believed that the samples chosen would represent varying belief sets concerning biofeedback efficacy ranging from low confidence to high confidence in such interventions.

Unfortunately, for a number of known and unknown reasons, 13% of the sample did not fill out the demographic survey. Due to a photocopying error, former and eligible biofeedback patients did not receive a demographic survey form along with the biofeedback survey. In addition, a few surveys that did have attached demographic surveys were not completed. Possible reasons for this outcome include: (1) subjects did not wish to take the time to fill out this portion of the survey, (2) subjects did not notice the attached demographic section, or (3) subjects felt that their response on this portion of the survey could somehow compromise privacy, that is, identify them in some way. A varying number of unknown reasons may also have been responsible for this particular outcome. Regardless of the individual reasons for failing to fill out the demographic portion of the survey, responses on the biofeedback portion of the surveys were then subjected to item analysis.
Item analysis

Item analysis was conducted on each of the 40 items in the survey for the sample of 241 individuals. Point-biserials were calculated and it was decided that only those items that provided the greatest discrimination indexes would be retained. In this particular situation, it should be noted that all items met the criteria for inclusion. Appendix B shows the item number, point-biserials, proportion of individuals endorsing each alternative, and the response indicating whether the statement contributes positively or negatively to a total score of confidence.

Point-biserials indicate the similarity, over a group of subjects, between item performance and total test or subtest performance. High item to total test performance provides a measure of instrument reliability (Lemke & Wiersma, 1976).

In addition, moderate difficulty levels, that is, difficulty levels approximating .5, would assist in eliminating items that are too difficult or too easy, and thus, would contribute to "maximum dispersion." Traditionally, reliability and validity concepts are dispersion-based, and moderate difficulty levels are judged most desirable (Lemke & Wiersma, 1976). Moderate difficulty levels and high item intercorrelations are likely to result in maximum internal consistency reliability (Lemke & Wiersma, 1976). Thus, point-biserials between .3 and .8 would be judged
acceptable. As noted earlier, all items met this particular standard. The obtained point-biserials ranged from .32 to .71, with 90% of the values falling between .37 and .64.

Based upon the point-biserials obtained, it was determined that the instrument could be easily reduced to a 20 to 25-item instrument as earlier intended. However, in that all of the point-biserials were considered good point-biserials, it was difficult to decide which items should be discarded and which items should be retained without negatively affecting the validity of the instrument. Thus, in order to preserve maximum validity in terms of measured content, and reliability in terms of test length, it was decided that the new instrument should be composed of all 40 items.

The new instrument also attempts to achieve a balance between positive and negative statements with 23 positive and 17 negative statements. The test items are listed in Appendix C.

Internal consistence reliability

The Cronbach Alpha reliability coefficient was found to be .93. Reliability coefficients above .70 are judged acceptable. The obtained reliability coefficient suggests that the internal consistency of the instrument was very high.

The Cronbach Alpha is a measure that attempts to compute the mean of all conceivable item split-half
estimates (Lemke & Wiersma, 1976). It is a special case of the Kuder-Richardson 20 formula (Shertzer & Linden, 1979). This average reliability estimate is, as mentioned above, a measure of internal consistency.

As noted earlier, for a number of known and unknown reasons, 13% of the 241 individuals participating in the item analysis did not fill out the demographic portion of the biofeedback survey. The absence of demographic information on biofeedback candidates and biofeedback graduates prompted the researcher to administer the survey to an additional 37 biofeedback candidates. The Cronbach Alpha reliability coefficient was then estimated on a composite of individuals who had originally completed the “entire” survey, including the demographic portion. Thus, 76 individuals from the original sample of 241 were chosen, as is subsequently detailed in the section entitled “Population and Sample,” as well as an additional sample of 37 biofeedback candidates who had also filled out the entire survey, including the demographic portion, bringing the total number in this particular sample to 113. Manipulating the data in this way allowed the computation of complete demographics for the sample.

In addition, the sample of 113 individuals selected represented a more proportionate sample in terms of individuals seeking assistance for anxiety or pain-related complaints vs. individuals not seeking such assistance, as compared to the original sample of 241...
individuals. That is, 56% of this new sample were currently involved in physical therapy, had been screened for a biofeedback program, or were actually enrolled in a biofeedback program, whereas 44% of the sample were not involved in any of these processes. Table 3 outlines more fully the composition of individuals in this sample. In the original sample, 22% of the sample were currently involved in physical therapy, had been screened for a biofeedback program, or had already completed a biofeedback program, whereas 78% of the sample had not been involved in any of these processes.

The Alpha Cronbach reliability was recalculated. The reliability coefficient was found to be .95. This internal reliability coefficient was relatively consistent with the results obtained with the original sample of 241 individuals and suggests that the internal consistency of the instrument is very high.

Population and sample:
Adjusted sample

The 40-item instrument, as mentioned above, eventually focused on a sample of 113 individuals. All individuals were, once again, in some respect affiliated with the military installation at Ft. Leonard Wood, Missouri. The sample is outlined in Table 3.
TABLE 3
ALPHA CRONBACH SAMPLE

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Duty Army Basic Trainees</td>
<td>25</td>
</tr>
<tr>
<td>College Students</td>
<td>25</td>
</tr>
<tr>
<td>Physical Therapy Patients</td>
<td>26</td>
</tr>
<tr>
<td>Eligible Biofeedback Patients</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
</tr>
</tbody>
</table>

The active-duty personnel were, once again, basic trainees attending a basic-training course. Out of the original 120 basic trainees participating in the item analysis, 25 of these surveys were randomly selected and used in the new Cronbach Alpha reliability coefficient analysis.

The participating students attended a small community college located on the installation grounds. The item analysis conducted on the original sample involved students from four classes: Introduction to Psychology, Introduction to Sociology, Abnormal Psychology, and Personality Theories. The students selected for the Cronbach Alpha analysis were enrolled in two of the above classes: Introduction to Psychology and Abnormal Psychology.

The physical therapy patients were individuals seeking treatment for a number of physical complaints at the post military hospital. The surveys from all 26
individuals who participated in the original item analysis were used for the Cronbach Alpha analysis.

The eligible biofeedback patients were individuals who had been screened for various pain-related and anxiety-related complaints, and who were judged eligible to enter the biofeedback program at the military hospital on post. None of the completed surveys in the original sample were used in the new Cronbach Alpha analysis. Due to a copying error, as mentioned earlier in the study, the demographic section was not available to this particular sample; thus the survey was administered to a new sample of 37 individuals and used in this analysis.

Further demographics were collected on this particular sample. See Tables 4 through 9 for more information on the representation of the sample.

TABLE 4
SEX OF BICS ADJUSTED SAMPLE

<table>
<thead>
<tr>
<th>Sex</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>61</td>
</tr>
<tr>
<td>Females</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
</tr>
</tbody>
</table>
### TABLE 5  
**AGE OF BICS ADJUSTED SAMPLE**

<table>
<thead>
<tr>
<th>Age</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 to 19 year olds</td>
<td>18</td>
</tr>
<tr>
<td>20 to 29 year olds</td>
<td>28</td>
</tr>
<tr>
<td>30 to 39 year olds</td>
<td>31</td>
</tr>
<tr>
<td>40 to 49 year olds</td>
<td>22</td>
</tr>
<tr>
<td>50 to 59 year olds</td>
<td>9</td>
</tr>
<tr>
<td>60 to 69 year olds</td>
<td>3</td>
</tr>
<tr>
<td>70 to 79 year olds</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>113</strong></td>
</tr>
</tbody>
</table>

### TABLE 6  
**MARITAL STATUS OF BICS ADJUSTED SAMPLE**

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>32</td>
</tr>
<tr>
<td>Married</td>
<td>73</td>
</tr>
<tr>
<td>Divorced</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>113</strong></td>
</tr>
</tbody>
</table>
### TABLE 7
**RACIAL/ETHNIC BACKGROUND OF BICS ADJUSTED SAMPLE**

<table>
<thead>
<tr>
<th>Racial/Ethnic Background</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>White/Caucasian</td>
<td>91</td>
</tr>
<tr>
<td>Black/African-American</td>
<td>13</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>2</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>1</td>
</tr>
<tr>
<td>Native American</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>113</td>
</tr>
</tbody>
</table>

### TABLE 8
**EDUCATIONAL BACKGROUND OF BICS ADJUSTED SAMPLE**

<table>
<thead>
<tr>
<th>Educational Background</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not Complete High School</td>
<td>5</td>
</tr>
<tr>
<td>High School Diploma or its Equivalent</td>
<td>62</td>
</tr>
<tr>
<td>Associate’s Degree</td>
<td>27</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>12</td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>4</td>
</tr>
<tr>
<td>Doctoral Degree</td>
<td>0</td>
</tr>
<tr>
<td>Post-Doctoral Experience</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>113</td>
</tr>
</tbody>
</table>
TABLE 9
ANNUAL INCOME OF BICS ADJUSTED SAMPLE

<table>
<thead>
<tr>
<th>Annual Income No.</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Response</td>
<td>3</td>
</tr>
<tr>
<td>Under $10,000</td>
<td>20</td>
</tr>
<tr>
<td>$10,000 - $19,000</td>
<td>34</td>
</tr>
<tr>
<td>$20,000 - $29,000</td>
<td>25</td>
</tr>
<tr>
<td>$30,000 - $39,000</td>
<td>15</td>
</tr>
<tr>
<td>$40,000 - $49,000</td>
<td>8</td>
</tr>
<tr>
<td>$50,000 - $59,000</td>
<td>4</td>
</tr>
<tr>
<td>$60,000 - $69,000</td>
<td>3</td>
</tr>
<tr>
<td>$70,000 or over</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
</tr>
</tbody>
</table>

The demographics appear to present a representative sample at this particular military installation. A relatively equal proportion of males to females was noted, whereas the majority of subjects in terms of racial/ethnic background were Caucasian. In terms of marital status, the majority of subjects were married. In reference to age, the majority of subjects were between the ages of 20 and 39. In terms of education, the majority possessed a high-school diploma or its equivalent. Finally, in terms of annual income, the majority of subjects earned between $10,000 and $29,000.

This particular sample of 113 individuals was used in establishing the internal consistency of the Biofeedback Intervention Confidence Scale and appears to be a more representative selection of anxiety...
and/or pain-related complaints than the sample used in the pilot study.

Data-Collection Procedures

In addition to agreeing to complete the BICS, or Biofeedback Intervention Confidence Scale, individuals participating in the study also agreed to complete the following instruments before entering the biofeedback treatment program: the Gambrill Assertion Inventory (GAI) and the pre-test describing the presenting problem "baseline parameter." The baseline parameter attempts to assess the frequency and intensity of the presenting complaint, that is, the anxiety-related or the pain-related complaint.

Each patient who agreed to participate in the study met with the department biofeedback technician to fill out the BICS, GAI, and pre-test instruments.

The technician was not involved with the scoring of the instruments, thus, did not know which category each patient belonged to in the study. It was believed that this would reduce any bias on the part of the biofeedback technician in terms of administering the biofeedback program.

The patient then met with the researcher to receive more specific information regarding the biofeedback program. If, after receiving this information, they were indeed interested in pursuing the program, they were asked to contact the biofeedback
technician to schedule the first biofeedback appointment. A standardized 6-week biofeedback treatment intervention would then ensue for the patient. All of the test results (the BICS, the GAI, and the pre-test) were given a number code to protect the identity of the patient. Only the pre-test remained in the patient's treatment file. The BICS and the GAI were given to the researcher to score and file away in separate research files. At the conclusion of the study, the post-test was administered and given the same number code, and both the pre-test and post-test were presented to the researcher by the biofeedback technician to be combined with the BICS and GAI for analysis in the study. It was believed that protecting the identity of the patient would free the patients to be more honest with their test responses.

All participants in the study worked with the same biofeedback technician, an individual who had administered biofeedback treatment programs, almost exclusively, for approximately 8 years. Individuals were asked to keep a journal, that is, a daily log of the frequency and intensity of their presenting complaint during the first week of treatment. This assignment was given in an attempt to identify behaviors or conditions that may be actually exacerbating an individual's presenting complaint. The collected data were then discussed in the second session with the subject, and ensuing recommendations concerning behavior modification were made.
A general example of the above may include an individual who has been experiencing chronic lower back pain (LBP) who identifies, through keeping the journal, that his or her complaints are greatly aggravated when too much time is spent in a sitting position, i.e., working long periods at his or her desk, driving in heavy traffic for extended periods of time, watching several hours of television during the evening, etc. Possible recommendations to such an individual may include one or all of the following: for every 30 minutes of sitting, a 5-minute period of walking, stretching, and/or muscle relaxation must be instituted.

In the first biofeedback session, patients were asked to focus on general relaxation exercises such as diaphragmatic breathing, visual imagery, and muscle relaxation to include muscle tensing-relaxing exercises and autogenics (verbal cues to assist with relaxation, i.e., "My arm is heavy, limp, and warm"). Patients were strongly encouraged to practice these techniques at home during the ensuing week.

In subsequent sessions, more specific biofeedback techniques were chosen and were based upon the presenting complaint, previous biofeedback research, and/or what the patient reported to be most useful in terms of decreasing the frequency or intensity of his or her presenting complaint. For example, an individual with Reflex Sympathetic Dystrophy Syndrome (RSDS) or Raynaud's Disease would be asked to focus primarily on temperature
biofeedback in that these two presenting complaints have been shown to respond positively, in previous research, to temperature biofeedback training. However, if an individual indicated that his or her presenting complaint was more positively affected by another biofeedback intervention such as Galvanic Skin Response (GSR) training, treatment would then focus primarily on this particular intervention.

At the conclusion of the treatment intervention, a post-test describing the presenting problem "end of treatment parameter" was administered. Pre-test and post-test questions were identical and attempted to measure both frequency and intensity of the presenting complaint. A copy of this instrument, entitled the "Biofeedback Survey," can be found in Appendix D.

Patients were informed that they could choose to terminate treatment and/or withdraw from the study while still choosing to remain in treatment at any time during the study.

Based upon past experience with a number of biofeedback patients, it was known that patients generally terminate treatment for one of four reasons: (1) treatment was not judged helpful and/or aggravated the presenting problem, (2) treatment was judged completely successful and further sessions were declined, (3) other pressing priorities occurred and the patient was, as a result, drawn away from treatment, or (4) the patient was sent to another military assignment in an abrupt manner.
making further follow-up impossible. It was determined that if one of the first two reasons outlined above applied, and at least three sessions were conducted as well as a post-test administered, then the data could be included in the analysis of the study in that it was considered that treatment had been received. It was strongly felt that an extension of sessions in each of the first two situations would not significantly alter the treatment outcome.

Individuals who were judged "non-assertive" in orientation were those who produced either an "unassertive" or an "unassertive/doesn't care" response set on the Gambrill Assertion Inventory. Individuals who produced either an "anxious-performer" or "assertive" response set were placed in the "assertive" category. Cut-off scores developed by the authors of the Gambrill Assertion Inventory were used in determining which category, assertive vs. unassertive, an individual was assigned.

Individuals possessing low confidence levels in a biofeedback intervention were those individuals who produced a raw score that fell at or below an identified score on the BICS. Individuals not meeting this particular criterion were placed in the high confidence level category. Specific global cut-off scores were established in the development of the scale and are discussed below.
The total number of points, that is, the highest raw score available on the BICS, is 200. An individual who answers all the items with a completely neutral response set (all items are scored a 3) would obtain a raw score of 120. It was strongly believed that a completely neutral response set does not represent a high level of confidence in the biofeedback program. It was also determined that an individual who rated a little more than half the items a 4 would obtain a raw score of 141 (19 items are scored a 3, and 21 items are scored a 4). This was thus judged the acceptable global cut-off score for the BICS in that this meant that an individual produced an other-than-neutral or a positive-committed stance.

Individuals who produced a score of 140 or less on the BICS were judged to possess low levels of confidence in a biofeedback intervention, whereas individuals who scored 141 or more were judged to possess high levels of confidence in a biofeedback intervention.

It should be noted that not one of the individuals who enrolled in the research study produced a score that fell below 120 on the BICS.

The above score distribution strongly suggests that clients with low biofeedback confidence levels are less likely to present themselves for biofeedback treatment.
Null Hypotheses

The identified null hypotheses of the study were as follows:

1. There is no significant difference between the adjusted intensity post-test means of the group with high biofeedback confidence levels and the group with low biofeedback confidence levels, when the pre-test is used as a covariate.

2. There is no significant difference between the adjusted intensity post-test means of the group with high assertiveness levels and the group with low assertiveness levels, when the pre-test is used as the covariate.

3. There is no significant interaction between biofeedback confidence levels and measures of assertiveness with respect to intensity of the presenting complaint.

4. There is no significant difference between the adjusted frequency post-test means of the group with high biofeedback confidence levels and the group with low biofeedback confidence levels, when the pre-test is used as the covariate.

5. There is no significant difference between the adjusted frequency post-test means of the group with high assertiveness levels and the group with low assertiveness levels, when the pre-test is used as the covariate.
6. There is no significant interaction between biofeedback confidence levels and measures of assertiveness with respect to frequency of the presenting complaint.

The null hypotheses were tested with an alpha level set at .05.

Method of Analysis

A two-way ANCOVA with a fixed model design was utilized in this study. This analysis involved two levels of the first independent variable: low levels of biofeedback confidence vs. high levels of biofeedback confidence; and two levels of the second independent variable: low measures of assertiveness vs. high measures of assertiveness. If a significant interaction between these two variables should be found, then simple effects tests would be made using one-way ANCOVA. These tests would, in effect, test the null hypotheses of the research hypotheses described above.

A pre-test and post-test were used to measure biofeedback efficacy, that is, an individual's ability to modify presenting complaints through biofeedback techniques.

The pre-test and post-test questions were identical and attempted to measure both the frequency of the presenting complaint as well as the intensity of the
presenting complaint, the dependent variables. The pre-test and post-test, each entitled the "Biofeedback Survey," were comprised of two general questions:

1. How often, on the average, does your "presenting complaint" actually occur?

2. On the average, on a scale of 0 to 10 (zero representing the absence of the presenting problem and 10 representing the most intense form of the presenting problem), how would you rate your presenting complaint?

For each question, a list of choices was provided in an attempt to standardize the answers.

The analysis of covariance attempts to address the variability of the dependent variable that is not accounted for by the covariate. The post-test "presenting problem" parameter was used as the criterion or the dependent variable and the pre-test parameter, that is, the uncontrolled variable was used as the covariate or concomitant variable. The analysis of covariance determines whether there are differences among the groups or conditions over and above the differences that could be accounted for by the differences in the pre-test performance that have occurred.

Thus, if significance is not attained in the analysis of covariance, that is, if the null hypothesis is retained, then no significant difference among the conditions would be noted. However, if significance is obtained, then the variation in the criterion would be
attributed to the influence of some variable other than the covariate. The most likely variables to influence this change would have been the identified independent variables, that is, levels of biofeedback confidence and measures of assertiveness. Thus, these results would have suggested that the level of biofeedback confidence and/or measures of assertiveness did have a significant impact on biofeedback treatment outcome.
CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter is organized into two major sections: (1) the presentation of the data and (2) the analysis of the data. In the first section, the following areas are covered: (1) data relating to the instruments used, (2) profile of the sample, and (3) basic data for analysis. In the final section, the following areas are covered: (1) testing of the null hypotheses, and (2) summary of results.

Presentation of Data

My specific interest was in studying the interactional effects of assertiveness and biofeedback intervention confidence on biofeedback success.

Data Relating to the Instruments Used

The instruments used in this study included the following: the Biofeedback Intervention Confidence Scale (BICS), the Gambrill Assertion Inventory (GAI), and the "Biofeedback Survey."
Biofeedback Intervention
Confidence Scale

The Biofeedback Intervention Confidence Scale (BICS) attempts to measure the level of confidence an individual has in the ability of a biofeedback treatment intervention to assist him or her with a pain-related or anxiety-related complaint. An individual's scale score will place an individual in either a low or high biofeedback confidence category.

Item analysis revealed that all items on the instrument had point-biserials ranging between .32 and .71. These results indicate that all of the items made appropriate contributions to the reliability of the instrument.

In the original sample, demographic information on 13% of that sample, for a variety of reasons, could not be obtained. Thus, in order to obtain more complete demographics, an adjusted sample was sought. In addition, this new sample, or adjusted sample, produced a better representation of anxiety and pain-related complaints.

The Alpha Cronbach reliability coefficient on the pilot study, or the original sample of 241 subjects, was found to be .93. The Alpha Cronbach was also calculated on an adjusted sample of 113 individuals which included 37 new subjects and 76 subjects from the original group of subjects. The Alpha Cronbach reliability coefficient on this sample was found to be .95. This result, quite consistent with the reliability coefficient found on the
original sample of 241, suggests that this instrument has high internal consistency.

Gambrill Assertion Inventory

Also used in the study was the Gambrill Assertion Inventory. Factor analysis demonstrates that this inventory is a multi-dimensional scale. The inventory is comprised of 11 factors, which account for 61% of the total variance.

The Gambrill Assertion Inventory possesses two scales, the discomfort and the response probability scales. Subjects are asked to rate degree of discomfort with a particular assertive behavior as well as the likelihood of displaying the behavior. The discomfort scale produced a test-retest reliability of .87, whereas the response probability scale produced a test-retest reliability of .81.

Four possible profiles are generated by the instrument to include the following: unassertive (high discomfort and low assertion), doesn't care (low discomfort and low assertion), anxious-performer (high discomfort and high assertion), and assertive (low discomfort and high assertion).

In this particular study, the four profiles were collapsed into two general categories: unassertive and assertive. The unassertive category includes the
"unassertive" and "doesn't care" profiles whereas the assertive category includes the "anxious-performer" and "assertive" profiles.

Biofeedback Survey

One instrument was used for the pre-test and the post-test. This instrument was developed by me to rate both the intensity and frequency of an anxiety-related or pain-related presenting complaint. Face validity was used in the development of this instrument. That is, the content of the test appeared relevant to the purpose it was intended to serve. No other validity or reliability measures were conducted on this instrument.

Profile of the Sample

The sample used in this study included a total of 40 subjects. These subjects were individuals who were referred to the biofeedback program or who referred themselves to the biofeedback program for treatment of either a pain-related or an anxiety-related complaint.

The Biofeedback Intervention Confidence Scale (BICS), the Gambrill Assertion Inventory, and the pre-test, which attempts to assess the frequency and intensity of the presenting complaint, were administered to any individual who agreed to participate in the study.

Subjects were informed that their participation in the study was completely voluntary. All subjects understood that it was possible to refuse to participate in the study without jeopardizing the biofeedback
treatment offered or received. The subjects also understood that at any time during the study, and for any reason, they could withdraw from participating in the study without treatment consequences. Tables 10-15 present more information regarding the demographics of the sample.

### TABLE 10
SEX OF SAMPLE

<table>
<thead>
<tr>
<th>Sex</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>12</td>
</tr>
<tr>
<td>Females</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

### TABLE 11
AGE OF SAMPLE

<table>
<thead>
<tr>
<th>Age</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 to 29</td>
<td>1</td>
</tr>
<tr>
<td>30 to 39</td>
<td>11</td>
</tr>
<tr>
<td>40 to 49</td>
<td>14</td>
</tr>
<tr>
<td>50 to 59</td>
<td>10</td>
</tr>
<tr>
<td>60 to 69</td>
<td>2</td>
</tr>
<tr>
<td>70 to 79</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>
### TABLE 12
MARITAL STATUS OF SAMPLE

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>2</td>
</tr>
<tr>
<td>Married</td>
<td>36</td>
</tr>
<tr>
<td>Divorced</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

### TABLE 13
RACIAL/ETHNIC BACKGROUND OF SAMPLE

<table>
<thead>
<tr>
<th>Racial/Ethnic Background</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>White/Caucasian</td>
<td>37</td>
</tr>
<tr>
<td>Black/African American</td>
<td>2</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>1</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>0</td>
</tr>
<tr>
<td>Native American</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>
TABLE 14
EDUCATIONAL BACKGROUND OF SAMPLE

<table>
<thead>
<tr>
<th>Educational Background</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not Complete High School</td>
<td>6</td>
</tr>
<tr>
<td>High School Diploma or it’s Equivalent</td>
<td>18</td>
</tr>
<tr>
<td>Associate’s Degree</td>
<td>8</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>6</td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>2</td>
</tr>
<tr>
<td>Doctoral Degree</td>
<td>0</td>
</tr>
<tr>
<td>Post-Doctoral Experience</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>

TABLE 15
ANNUAL INCOME OF SAMPLE

<table>
<thead>
<tr>
<th>Annual Income</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Response</td>
<td>2</td>
</tr>
<tr>
<td>Under $10,000</td>
<td>2</td>
</tr>
<tr>
<td>$10,000 - $19,000</td>
<td>5</td>
</tr>
<tr>
<td>$20,000 - $29,000</td>
<td>9</td>
</tr>
<tr>
<td>$30,000 - $39,000</td>
<td>9</td>
</tr>
<tr>
<td>$40,000 - $49,000</td>
<td>6</td>
</tr>
<tr>
<td>$50,000 - $59,000</td>
<td>4</td>
</tr>
<tr>
<td>$60,000 - $69,000</td>
<td>3</td>
</tr>
<tr>
<td>$70,000 and over</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
</tr>
</tbody>
</table>
Tables 10 to 15 indicate that the majority of participants in the study were female. In regards to racial/ethnic background, the majority of subjects were Caucasian. In terms of marital status, the majority were married. The most common age range was between the ages of 40 and 49. In terms of education, the majority of subjects possessed a high-school diploma or its equivalent. Finally, in terms of annual income, the majority earned between $20,000 and $39,000.

Based upon my clinical biofeedback experience at General Leonard Wood Army Community Hospital, the majority of individuals who typically present for biofeedback treatment are Caucasian married females between the ages of 30 and 49. However, more recently, the number of Caucasian males presenting for treatment has been increasing.

As the reader may recall, four categories of subjects were sought for this particular study: low assertiveness/low biofeedback confidence, low assertiveness/high biofeedback confidence, high assertiveness/low biofeedback confidence, and high assertiveness/high biofeedback confidence.

To achieve a large effect size, a minimum of 10 entries per cell would be required. Unfortunately, as projected, adequate numbers for all of the categories could not be obtained in the 2 years over which data collection occurred. Two categories, low biofeedback confidence/low assertiveness and low biofeedback
confidence/high assertiveness, fell short of the minimum number of 10 subjects. These results appear to be substantial in and of themselves, suggesting that, in general, individuals with low levels of biofeedback confidence are not only less likely to believe that a biofeedback intervention for an anxiety or pain-related complaint can be helpful, but are less likely to enter or pursue such a treatment program even if referred for treatment. Table 16 shows the number of cases in this particular sample who lie in each group in terms of levels of assertiveness and biofeedback confidence.

<table>
<thead>
<tr>
<th>Assertiveness</th>
<th>Confidence</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>High</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>25</td>
</tr>
</tbody>
</table>

Although the sample of individuals delineated in Table 17 may have presented with multiple pain-related and/or anxiety-related complaints, one predominant anxiety-related or pain-related complaint was identified for treatment and tracked in the study for treatment success. This was intentionally done to assist with ease
in the analysis of the data. A few respondents did respond to both the anxiety and pain-related questions. However, in these situations, again, the most predominant complaint was used in the analysis of the data.

Pain-related complaints included complaints such as tension headaches, migraines, gastrointestinal distress, lower back pain, and temporomandibular joint pain.

Anxiety-related complaints included complaints such as panic disorder, generalized anxiety disorder, sleep onset insomnia, social phobia, and post-traumatic stress disorder.

Table 17 has information on the proportion of presenting complaints: anxiety-related, pain-related, and mixed presenting complaints.

<table>
<thead>
<tr>
<th>Type of Complaint</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Complaint</td>
<td></td>
</tr>
<tr>
<td>Anxiety-Related</td>
<td>13</td>
</tr>
<tr>
<td>Pain-Related</td>
<td>11</td>
</tr>
<tr>
<td>Mixed Complaints</td>
<td></td>
</tr>
<tr>
<td>Predominant Anxiety</td>
<td>11</td>
</tr>
<tr>
<td>Predominant Pain</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>
Basic Data for Analysis

Total scale scores for each subject were obtained on the Biofeedback Intervention Confidence Scale (BICS), the Gambrill Assertion Inventory (GAI), and the pre-test. After a 6-week treatment program, individuals were also administered a post-test. Table 18 outlines these scores for each subject.

On the BICS, individuals with scores of 141 or more represent high levels of confidence in a biofeedback treatment intervention, whereas scores of 140 or less represent low levels of confidence. Based on these cut-off scores, it was found that 25 subjects fell within the high confidence range, whereas 15 subjects fell within the low confidence range.

On the GAI, individuals with scores of 104 or below represent high levels of assertiveness, whereas scores of 105 or more represent low levels of assertiveness. Based on these cut-off scores, it was found that 22 subjects fell within the high assertiveness range, whereas 18 subjects fell within the low assertiveness range.
### TABLE 18
DISTRIBUTION OF RESULTS FOR EACH SUBJECT

<table>
<thead>
<tr>
<th>Subject</th>
<th>BICS</th>
<th>GAI</th>
<th>Intensity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Test/Post-Test</td>
<td>Pre-Test/Post-Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>151</td>
<td>107</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>131</td>
<td>111</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>179</td>
<td>66</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>126</td>
<td>78</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>137</td>
<td>94</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>141</td>
<td>127</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>113</td>
<td>102</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>163</td>
<td>92</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>184</td>
<td>125</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>149</td>
<td>97</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>174</td>
<td>136</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>152</td>
<td>133</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>13</td>
<td>145</td>
<td>85</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>143</td>
<td>99</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>15</td>
<td>141</td>
<td>108</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>150</td>
<td>140</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>17</td>
<td>123</td>
<td>108</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>18</td>
<td>138</td>
<td>114</td>
<td>8</td>
<td>5</td>
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<tr>
<td>19</td>
<td>136</td>
<td>122</td>
<td>5</td>
<td>4</td>
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<tr>
<td>20</td>
<td>144</td>
<td>99</td>
<td>3</td>
<td>1</td>
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<td>21</td>
<td>192</td>
<td>75</td>
<td>5</td>
<td>3</td>
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<tr>
<td>22</td>
<td>141</td>
<td>99</td>
<td>7</td>
<td>3</td>
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<tr>
<td>23</td>
<td>136</td>
<td>76</td>
<td>10</td>
<td>2</td>
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<tr>
<td>24</td>
<td>144</td>
<td>98</td>
<td>5</td>
<td>1</td>
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<tr>
<td>25</td>
<td>150</td>
<td>113</td>
<td>6</td>
<td>4</td>
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<tr>
<td>26</td>
<td>162</td>
<td>142</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>27</td>
<td>184</td>
<td>60</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>28</td>
<td>145</td>
<td>131</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>29</td>
<td>188</td>
<td>117</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>30</td>
<td>156</td>
<td>99</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>31</td>
<td>121</td>
<td>159</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>32</td>
<td>158</td>
<td>104</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>33</td>
<td>128</td>
<td>101</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>34</td>
<td>166</td>
<td>61</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>35</td>
<td>157</td>
<td>81</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>36</td>
<td>148</td>
<td>114</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>37</td>
<td>136</td>
<td>98</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>38</td>
<td>196</td>
<td>96</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>39</td>
<td>157</td>
<td>61</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>40</td>
<td>136</td>
<td>116</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>
The pre-test and post-test scores were based on frequency and intensity totals using a 1-month, or 28-day scale. On the frequency totals, if individuals stated that they experienced a pain-related or anxiety-related complaint, "all of the time" on "some" level, then 6 times a day, for 28 days, that is, 168 times, was used as the total. This particular total was chosen for an "all of the time" response in that the next lowest answer subjects chose in terms of frequency of presenting complaint was 5 times a day or 140 times a month.

A rough visual scan of the data in Table 18 seems to indicate that the majority of individuals had some minor or major improvement with regard to their presenting complaint, in terms of both intensity and frequency levels.

Table 19 presents information on the means and standard deviations for this sample in each of the categories described above.

### TABLE 19

SAMPLE MEANS AND STANDARD DEVIATIONS

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BICS</td>
<td>150.53</td>
<td>12.93</td>
</tr>
<tr>
<td>GAI</td>
<td>103.60</td>
<td>22.99</td>
</tr>
<tr>
<td>BIOFEEDBACK SURVEY Intensity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>6.70</td>
<td>2.14</td>
</tr>
<tr>
<td>Post-test</td>
<td>3.23</td>
<td>2.46</td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>39.15</td>
<td>47.67</td>
</tr>
<tr>
<td>Post-test</td>
<td>20.05</td>
<td>39.26</td>
</tr>
</tbody>
</table>
The data do seem to indicate that the sample, as a whole, did appear to improve in terms of intensity and frequency of presenting complaint.

Much variance within the frequency of presenting complaint was noted for both the pre-test and post-test. This variance might have been reduced if the categories for choices of frequency had been made much broader, i.e., Does your presenting complaint occur 1-4 times a week? 5-8 times a week? etc., vs. once a week? twice a week? . . . ten times a week? etc. However, with a broader categorical approach, an individual who suffered from "severe" migraine headaches could conceivably move from a frequency of four times a week to once a week and not be recognized by the data as having experienced any improvement in terms of his or her presenting complaint. This approach certainly seemed an inappropriate way to interpret the data. Thus, a decision was made not to broaden the categories of choices for frequency of the presenting complaint.

Analysis of the Data

A two-way ANCOVA with a fixed model design was used. This analysis involved two levels of the first variable, low vs. high levels of biofeedback confidence as measured by the Biofeedback Intervention Confidence
Scale (BICS), and two levels of the second variable, low vs. high levels of assertiveness, as measured by the Gambrill Assertion Inventory (GAI).

A pre-test and post-test were used to assist the researcher in assessing the results of biofeedback treatment outcome in terms of both intensity and frequency of presenting complaint. The pre-test and post-test were composed of identical questions, developed by the researcher for use in this study. The pre-test was used as the covariate or concomitant variable, whereas the post-test was used as the criterion or dependent variable.

Testing of the Null Hypotheses

Analysis of covariance was conducted on the following null hypotheses.

**Null Hypothesis 1**

There is no significant difference between the adjusted intensity post-test means of the group with high biofeedback confidence levels and the group with low biofeedback confidence levels, when the pre-test is used as a covariate.

**Null Hypothesis 2**

There is no significant difference between the adjusted intensity post-test means of the group with high assertiveness levels and the group with low assertiveness levels, when the pre-test is used as the covariate.
Null Hypothesis 3

There is no significant interaction between biofeedback confidence levels and measures of assertiveness with respect to intensity of the presenting complaint.

For the first three null hypotheses, in regards to the intensity of the presenting complaint, the cell means of the covariate and dependent variable as well as adjusted cell means of the dependent variable are shown in Table 20.

<table>
<thead>
<tr>
<th>Assertiveness Levels</th>
<th>Cell Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>7.38</td>
</tr>
<tr>
<td>Post</td>
<td>4.38</td>
</tr>
<tr>
<td>Adjusted</td>
<td>4.28</td>
</tr>
<tr>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>8.57</td>
</tr>
<tr>
<td>Post</td>
<td>4.14</td>
</tr>
<tr>
<td>Adjusted</td>
<td>3.80</td>
</tr>
<tr>
<td>Cell Means</td>
<td>4.06</td>
</tr>
</tbody>
</table>

In simply looking at the data, a meaningful difference between the cell means is called into question.
An analysis of covariance, in regards to the intensity of the presenting complaint, was conducted. Table 21 provides these ANCOVA results.

In examining the interaction effects (Table 21), analysis of covariance revealed an $F$ ratio of .09, which is not significant at the .05 level. Thus, the null hypothesis is retained in regards to the third hypothesis. There is no significant interaction between biofeedback confidence levels and measures of assertiveness with respect to the intensity of the presenting complaint.

**TABLE 21**

**ANCOVA RESULTS:**

<table>
<thead>
<tr>
<th>SOURCE OF VARIANCE</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>$F$</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofeedback Confidence Level</td>
<td>13.25</td>
<td>1</td>
<td>13.25</td>
<td>2.28</td>
<td>.1402</td>
</tr>
<tr>
<td>Assertiveness Level</td>
<td>.4162</td>
<td>1</td>
<td>.4162</td>
<td>.07</td>
<td>.7907</td>
</tr>
<tr>
<td>Interaction Effects</td>
<td>.5348</td>
<td>1</td>
<td>.5348</td>
<td>.09</td>
<td>.7635</td>
</tr>
<tr>
<td>Pre-Test Intensity Covariate</td>
<td>4.40</td>
<td>1</td>
<td>4.40</td>
<td>.76</td>
<td>.3903</td>
</tr>
<tr>
<td><strong>ERROR</strong></td>
<td>203.66</td>
<td>35</td>
<td>5.82</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the absence of interactional effects, only main effects will thus be tested.

In examining biofeedback confidence levels (Table 21), analysis of covariance revealed an $F$ ratio of 2.28,
which is not significant at the .05 level. Thus, the first null hypothesis is retained. There is no significant difference between the adjusted intensity post-test means of the group with high biofeedback confidence levels and the group with low biofeedback confidence levels, when the pre-test is used as a covariate.

In examining assertiveness levels (Table 21), analysis of covariance revealed an $F$ ratio of .07, which is not significant at the .05 level. Thus, the second null hypothesis is retained. There is no significant difference between the adjusted intensity post-test means of the group with high assertiveness levels and the group with low assertiveness levels, when the pre-test is used as a covariate.

In examining the covariate, that is, the pre-test in regards to the intensity of the presenting complaint (Table 21), analysis of covariance revealed an $F$ ratio of .76 which is not significant at the .05 level.

**Null Hypothesis 4**

There is no significant difference between the adjusted frequency post-test means of the group with high biofeedback confidence levels and the group with low biofeedback confidence levels, when the pre-test is used as the covariate.
Null Hypothesis 5

There is no significant difference between the adjusted frequency post-test means of the group with high assertiveness levels and the group with low assertiveness levels, when the pre-test is used as the covariate.

Null Hypothesis 6

There is no significant interaction between biofeedback confidence levels and measures of assertiveness with respect to frequency of the presenting complaint.

For the last three null hypotheses, in regards to the frequency of the presenting complaint, the cell means of the covariate and dependent variable, as well as the adjusted cell means of the dependent variable, are shown in Table 22.

In simply looking at the data in Table 22, unlike the first three null hypotheses, a meaningful difference between the cell means is suggested.

An analysis of covariance, in regards to the frequency of the presenting complaint, was conducted. Table 23 provides these ANCOVA results.
### TABLE 22

**CELL MEANS:**
**FREQUENCY OF PRESENTING COMPLAINT**

<table>
<thead>
<tr>
<th>Assertiveness Levels</th>
<th>Low Pre</th>
<th>41.00</th>
<th>24.40</th>
<th>Cell Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Post</td>
<td>45.88</td>
<td>4.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low Adjusted</td>
<td>45.35</td>
<td>11.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Pre</td>
<td>64.00</td>
<td>38.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Post</td>
<td>32.29</td>
<td>11.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Adjusted</td>
<td>21.35</td>
<td>11.92</td>
<td>14.92</td>
</tr>
</tbody>
</table>

### TABLE 23

**ANCOVA RESULTS:**
**FREQUENCY OF PRESENTING COMPLAINT**

<table>
<thead>
<tr>
<th>SOURCE OF VARIANCE</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofeedback Confidence</td>
<td>4189.05845</td>
<td>1</td>
<td>4189.05845</td>
<td>4.28</td>
<td>.0459</td>
</tr>
<tr>
<td>Assertiveness Levels</td>
<td>1192.62953</td>
<td>1</td>
<td>1192.62953</td>
<td>1.22</td>
<td>.2770</td>
</tr>
<tr>
<td>Interaction Effects</td>
<td>1415.04399</td>
<td>1</td>
<td>1415.04399</td>
<td>1.45</td>
<td>.2371</td>
</tr>
<tr>
<td>Pre-Test Freq. Covariate</td>
<td>17328.89558</td>
<td>1</td>
<td>17328.89558</td>
<td>17.72</td>
<td>.0002</td>
</tr>
<tr>
<td>ERROR</td>
<td>34222.70799</td>
<td>35</td>
<td>977.79166</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In examining the interaction effects (Table 23), analysis of variance revealed an $F$ ratio of 1.45, which is not significant at the .05 level. Thus, for hypothesis six, the null hypothesis is retained. There is no significant interaction between biofeedback confidence levels and measures of assertiveness with respect to the frequency of the presenting complaint.

In examining the interactional effects, only main effects will thus be tested.

In examining biofeedback confidence levels (Table 23), analysis of covariance revealed an $F$ ratio of 4.28, which is significant at the .05 level. Thus, the fourth null hypothesis is rejected. There is a significant difference between the adjusted frequency post-test means of the group with high biofeedback confidence levels and the group with low biofeedback confidence levels, when the pre-test is used as a covariate.

In examining assertiveness levels (Table 23), analysis of covariance revealed an $F$ ratio of 1.22, which is not significant at the .05 level. Thus, the fifth null hypothesis is retained. There is no significant difference between the adjusted frequency post-test means of the group with high assertiveness levels and the group with low biofeedback confidence levels, when the pre-test is used as a covariate.

In examining the covariate, that is, the pre-test in regards to the frequency of the presenting complaint.
(Table 23), analysis of covariance revealed an $F$ ratio of 17.72, which indicates that the covariate is significant.

The variation in the criterion or dependent variable is thus attributed to some extent to the influence of something other than the covariate.

Thus, this result indicates that an individual's ability to modify presenting complaints through biofeedback techniques, in terms of frequency of presenting complaint, is related to level of confidence in the treatment.

In looking over the raw score results in Table 18, it is interesting to note that subject number 17 experienced a significant increase in terms of frequency of presenting complaint. It is difficult to say if this patient attributed the increase in symptomology to the biofeedback treatment program itself and/or to an increase in significant life stressors since such records were not kept. Regardless, if this score is treated as an outlier and removed from the analysis of the study, ANCOVA results reveal that all of the null hypotheses are retained at the .05 level. However, it was decided that this patient's score would be kept in the analysis of the study in that periodically patients will experience an increase in symptomology as a result of a biofeedback intervention. Although not common, this would be considered a possible treatment outcome.
Summary of Results

Only one measure, biofeedback confidence, appeared to have a significant impact on influencing the frequency of a presenting complaint. That is, the higher the level of confidence in a biofeedback intervention, the more likely an individual was able to reduce the frequency of a presenting complaint.

An individual's level of confidence in a biofeedback treatment program appeared to have no significant influence on intensity level of a presenting complaint. Assertiveness levels appeared to have no influence on either intensity or frequency of a presenting complaint.
CHAPTER V

SUMMARY, DISCUSSION, IMPLICATIONS
AND RECOMMENDATIONS

This research study was an attempt to determine some of the factors contributing to a successful biofeedback program. Specifically, levels of biofeedback confidence and measures of assertiveness were chosen and examined in terms of their impact upon biofeedback treatment outcome.

This chapter is organized into the following sections: (1) summary, (2) discussion and implications, and (3) recommendations.

Summary

This section is divided into four subsections: the problem, overview of related literature, methodology, and findings.

The Problem

Some individuals seem to benefit significantly from a biofeedback intervention for their presenting complaint, while others do not seem to be able to profit at all. Reasons for this wide variance are, no doubt, multi-dimensional in nature. Nevertheless, adding to our
knowledge in this particular field was judged important in that such knowledge could be used to help further refine biofeedback treatment approaches. Thus, techniques that elicit greater success for a wider number of individuals may be generated as a result of research in this particular area.

Biofeedback training is a specialized area of treatment that teaches individuals how to use medical equipment designed to measure specific physiological responses such as heart rate, muscle tension, blood pressure, and body temperature.

Once an individual learns how to recognize subtle physiological responses through the use of a "feedback" mechanism, then that individual can work towards learning how to control such responses through the use of these same "feedback" mechanisms. Typically, the "feedback" mechanisms are stand-alone biofeedback equipment monitors or computer-generated biofeedback systems that give immediate and accurate information on current physiological functioning. This immediate physiological feedback, whether it is visual and/or auditory in nature, is often considered invaluable to patients attempting to cope with various pain-related and/or anxiety-related complaints.

Specialized biofeedback treatment is offered in a number of pain-related and/or anxiety-related areas and includes: tension headaches, migraines, lower back pain, Raynaud's disease, irritable bowel syndrome, hypertension,
panic attacks, generalized anxiety, post-traumatic stress disorder, and various insomnia-related complaints.

Biofeedback training focuses on emphasizing appropriate and efficient relaxation techniques. It can certainly be argued that an individual who is thoroughly relaxed cannot be extremely anxious at the same time. It can also be argued that muscle tension cannot only agitate a pre-existing pain-related complaint, but it can also create a pain-related complaint where none previously existed. For example, persons who perform 100 push-ups and 100 sit-ups in the span of 2 hours are likely to experience muscle pain if such activity has been preceded by a relatively sedentary lifestyle. If these same individuals have a serious lower back problem, then it can be almost guaranteed that an increase in this particular presenting complaint will be noted sometime in the next 24 hours.

Biofeedback treatment would, once again, emphasize relaxation exercises to assist with a particular pain-related or anxiety-related complaint. However, not everyone who enters a biofeedback program benefits from such a program, even though he or she may possess a presenting complaint that, for a majority of individuals, appears to respond positively to a typical biofeedback intervention. Thus, as mentioned earlier, this study was conducted in the hopes of identifying possible contributing variables to biofeedback treatment success.
Overview of Related Literature

Several factors that seem to contribute to treatment success for anxiety or pain-related complaints have been noted: immediacy of treatment (Sedlacek, 1985), high motivation levels ("Mind Over Matter," 1980), the presence of rewarding activities in a person's life, (Fordyce, 1978), absence of major psychological dysfunction and/or severe personality disorders (Hanson & Gerber, 1990; Sedlacek, 1985; Witt, 1981), absence of litigation surrounding the presenting complaint (Beals & Hickman, 1972, Krusen & Ford, 1958; Sternbach, Wolf, Murphy, & Akeson, 1973; Swanson et al., 1976), treatment of any co-existing depressive symptomology (Hahn et al., 1989; Sternbach, Murphy, Akeson, & Wolf, 1973), use of treatment programs that emphasize some self-management (Hanson & Gerber, 1990), and an absence of "significant" secondary gain surrounding the presenting complaint (Butcher et al., 1979; Fordyce, 1978; Krusen & Ford, 1958).

In addition to the above research, there is a body of research to suggest that an individual's set of expectations regarding a biofeedback intervention does indeed have an impact upon biofeedback success (Hanson & Gerber, 1990; Peper et al., 1979). That is, an individual who feels that such an intervention is basically useless, will probably gain very little, if anything at all, from such an intervention.
Some researchers also believe that individuals who possess "passive" or "unassertive" personality styles may have a tendency to use their pain-related or anxiety-related complaints, either consciously or unconsciously, as a shelter from environmental demands (Butcher et al., 1979). That is, individuals who have tremendous difficulty saying "no" to environmental demands are likely to find themselves easily overwhelmed in life by such demands. For such persons, the body, in time, may develop an indirect way of saying "no" to such demands in an attempt to insulate itself from stress. This indirect "no" may range from mild gastrointestinal complaints to more incapacitating complaints such as severe tension headaches. Regardless, eliminating such a presenting complaint may prove quite difficult in that the body has used the complaint as a viable means to cope with its environment. Thus, the body may be unwilling to eliminate this coping mechanism if nothing is offered in its place, such as learning how to be more comfortable saying "no" directly to environmental demands, i.e., assertiveness training.

Methodology

The study was conducted in order to examine the interactional effects between levels of biofeedback confidence and measures of assertiveness on biofeedback treatment outcome.
A two-way analysis of covariance, using a fixed effects model, was conducted on a small sample of 40 subjects. The population was restricted to a military hospital setting in south-central Missouri. The subjects were either self-referred or were referred to the biofeedback program by other therapists within the psychiatry clinic, or other clinics within the hospital.

Each of the 40 subjects who agreed to participate in the study, was administered the Biofeedback Intervention Confidence Scale (BICS), the Gambrill Assertion Inventory (GAI), and the "Biofeedback Survey" pre-test. Subjects then participated in a 6-week biofeedback treatment program. At the end of the treatment, subjects were again administered the Biofeedback Survey, this time used as the post-test.

Participation in the study was completely voluntary. Subjects clearly understood that refusal to participate in the study, or the decision to withdraw from the study once they entered the study, would not jeopardize the biofeedback treatment provided.

The analysis involved two levels of the first independent variable, low biofeedback confidence vs. high biofeedback confidence as measured by the Biofeedback Intervention Confidence Scale (BICS), and two levels of the second independent variable, low assertiveness levels vs. high assertiveness levels as measured by the Gambrill Assertion Inventory (GAI).
The pre-test, the "Biofeedback Survey," an instrument designed to measure both the intensity and frequency of a presenting complaint, was used as the covariate or concomitant variable, whereas the post-test, the same "Biofeedback Survey" used for the pre-test, was used as the criterion or dependent variable.

Four categories of subjects were sought: low biofeedback confidence/low assertiveness, low biofeedback confidence/high assertiveness, high biofeedback confidence/low assertiveness, and high biofeedback confidence/high assertiveness.

It was determined that by setting alpha at .05 and power at .90, a large effect size would require a minimum number of 10 entries per cell. However, as projected, a minimum number of subjects could not be obtained for all of the treatment groups required. Two treatment groups fell short of the required number of subjects: low biofeedback confidence/low assertiveness and low biofeedback confidence/high assertiveness. Thus, the power of the statistical tests is somewhat lower than .90.

Results of the testing were then subjected to an ANCOVA analysis, using a fixed effects model design. I expected that interactional effects between biofeedback confidence levels and measures of assertiveness on biofeedback treatment outcomes would be found.
Findings

Analysis of covariance revealed no interactional effects between biofeedback confidence levels and measures of assertiveness. Only one variable, biofeedback confidence, was found to have a significant impact on treatment outcome in terms of the frequency of the presenting complaint.

It should be noted that due to a low obtained sample size, some caution interpreting the results of the study, that is, in terms of the retained null hypotheses, is judged necessary. It can be speculated that insufficient numbers in the sample failed to bring about the appropriate power needed for the analysis, increasing the possibility that Type II errors occurred.

In terms of the "Biofeedback Survey," that is, the pre-test and post-test instrument, it can also be speculated that the large variances noted within each subgroup (Table 19, chapter 4) represent possible reliability problems with the instrument and also may have contributed to Type II errors, that is, increasing the error variance and thus reducing the F-ratio.

Nevertheless, specific results of the ANCOVA analysis were as follows:

Null Hypothesis 1

The first null hypothesis was retained. There was no significant difference between individuals with a high level of biofeedback confidence and individuals with a low
level of biofeedback confidence, with respect to "intensity" of presenting complaint.

Null Hypothesis 2

The second null hypothesis was retained. There was no significant difference between individuals with a high level of assertiveness and individuals with a low level of assertiveness, with respect to "intensity" of presenting complaint.

Null Hypothesis 3

The third null hypothesis was retained. There was no significant interaction between levels of biofeedback confidence and measures of assertiveness, in terms of "intensity" of presenting complaint.

Null Hypothesis 4

The fourth null hypothesis was rejected. There was a significant difference between individuals with a high level of biofeedback confidence and individuals with a low level of biofeedback confidence, with respect to "frequency" of presenting complaint. That is, individuals who possessed a high level of biofeedback confidence did significantly better in terms of biofeedback treatment outcome, that is, in terms of "frequency" of presenting complaint, than individuals who possessed a low level of biofeedback confidence.
Null Hypothesis 5

The fifth null hypothesis was retained. There was no significant difference between individuals with a high level of assertiveness and individuals with a low level of assertiveness, with respect to "frequency" of presenting complaint.

Null Hypothesis 6

The sixth null hypothesis was retained. There was no significant interaction between levels of biofeedback confidence and measures of assertiveness, in terms of "frequency" of presenting complaint.

Discussion and Implications

This section is divided into the following sections: assertiveness, interactional effects between assertiveness and biofeedback confidence, biofeedback confidence, implications of findings from Null Hypothesis 4, and problems with the study.

Assertiveness

The literature suggests that individuals who possess "unassertive" or "passive" personality styles may use their anxiety-related or pain-related complaints, either consciously or unconsciously, as a means of shelter from environmental demands. That is, the presenting complaint is, on some level, an indirect way of saying "no" to such demands. The implication of that research is that such persons are not likely to benefit from
interventions such as biofeedback training, unless more direct ways of coping with the environment can be developed. For example, assertiveness training may be able to effectively assist an individual in developing a more direct means of saying "no" to overwhelming environmental demands.

The results of my study do not seem to support the line of thinking described above. Assertiveness levels did not appear to have a significant impact on biofeedback treatment outcome.

Interactional Effects Between Assertiveness and Biofeedback Confidence

Interactional effects between measures of assertiveness and biofeedback confidence on biofeedback treatment outcome were not found. However, as mentioned earlier in the "Findings" section, reasons for the absence of interactional effects may possibly be related to Type II errors. That is, it can be speculated that insufficient numbers in the sample contributed to a loss of power in terms of the analysis. It can also be speculated that possible reliability problems with the "Biofeedback Survey" instrument contributed to Type II errors as well.

Biofeedback Confidence

The literature also suggests that an individual's expectations regarding a biofeedback intervention do indeed have an impact upon biofeedback treatment outcome.
However, the results of this study do not support this viewpoint except in the area of frequency of presenting complaint.

One factor that may explain why the results of the study were not more consistent with previous research is that the established cut-off scores for the Biofeedback Intervention Confidence Scale (BICS) may have been inappropriately set in that it aimed at grouping neutral response sets with low levels of confidence.

As described in chapter 3, the cut-off score was based upon the hypothesis that a high level of confidence would probably be demonstrated by a score of 141 or more. This sum, or raw score total, was based upon 19 of the scale items being rated a neutral response of three, and a little more than half of the test, 21 scale items, being rated a four, which represented a level of some confidence in the biofeedback program in terms of that particular item. It was felt that this sum would represent an above "neutral" or high confidence response set. A completely neutral response style would be 40 responses rated at a three or a raw score of 120. It was felt that any raw score of 140 or below, in that it indicated an absence of a high level of confidence in the program, could be considered representing a low level of confidence in the program.

Perhaps a low level of confidence in the biofeedback program would be better represented by a score much lower than a completely "neutral" response set.
Thus, a possible cut-off score for low confidence might be 99. That is, 19 of the scale items are rated as a three and 21 of the scale items are rated as a two. It is interesting to note that none of the participants in the study, produced a raw score lower than 121. Table 24 outlines the possible new divisions for the BICS.

TABLE 24

<table>
<thead>
<tr>
<th>SUGGESTED NEW CUT-OFF SCORES FOR BICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divisions</td>
</tr>
<tr>
<td>High Confidence</td>
</tr>
<tr>
<td>Neutral</td>
</tr>
<tr>
<td>Low Confidence</td>
</tr>
</tbody>
</table>

Implications of Findings from Null Hypothesis 4

The only significant finding of the study was that an individual's confidence in a biofeedback program did have a significant impact upon treatment outcome in terms of "frequency" of presenting complaint.

If a high level of confidence in a biofeedback program can have a positive and significant impact on biofeedback outcome in terms of "frequency" of presenting complaint, then increasing an individual's level of confidence in a biofeedback program would be viewed as cost-effective in terms of treatment.
A clinician may be able to increase biofeedback confidence by providing a positive set of educational experiences regarding biofeedback efficacy to the patient before treatment onset. Educational experiences may include some of the following: simple and informative reading material, research articles, videotapes, and question-and-answer biofeedback sessions.

Continuing with biofeedback educational experiences while the patient is engaged in the treatment process may also prove quite useful. These experiences may involve, once again, active use of reading materials and access to educational videotapes, as well as involving the patient in a more intense biofeedback group process.

In that a patient's confidence in an intervention is often influenced by the degree of confidence inspired by the treatment provider, a clinician may also be able to increase patient biofeedback confidence by continual refinement and improvement of personal biofeedback skills.

Refinement of biofeedback techniques may be achieved through active consultation with other biofeedback therapists, accessing resources such as relevant biofeedback journals, and attendance at biofeedback conferences that focus on refining techniques as well as discussion of the latest developments in terms of research.

Finally, biofeedback confidence can be fostered in the treatment session by active recognition and
affirmation of gains that the patient makes in the sessions.

Problems With the Study

One problem noted in the study was the restricted sample population, that is, subjects were military or military-related (active duty personnel, dependents of active duty personnel or military retirees and their dependents). Military hospitals provide a socialized medicine approach where co-payments and/or monetary deductions are not required for treatment services if such services are readily available. Access to treatment that is basically "free of charge" may lend itself to reduced active internal investments regarding treatment. In addition, a military setting can be extremely stressful and secondary gain issues can sometimes be accentuated as a result, i.e., a family member may resist getting well because this may facilitate a spouse's deployment overseas.

Another problem noted in the sample was that it appeared restricted to what might be labelled a "skewed" biofeedback population, that is, high and neutral biofeedback confidence vs. low biofeedback confidence. As noted earlier, no one scoring lower than 120 on the Biofeedback Intervention Confidence Scale (BICS) presented for treatment. This observation suggests that individuals who possess "low biofeedback confidence" are not likely to present for such treatment.
Another problem with the study was the inability to focus on only one presenting complaint to assist with the standardization of the treatment protocol. For example, an ideal sample population would have been patients presenting with migraines and migraines only. Unfortunately, in this particular study it took two years to collect a sample of 40 individuals with a variety of presenting complaints, and even then the 40 individuals were not equally represented in the four treatment groups. The variety of presenting complaints required some flexibility with the treatment protocol to focus more heavily on a treatment that appeared to coincide with accepted research practices, i.e., migraine treatment would focus on thermal or temperature biofeedback techniques while tension headache treatment would focus on EMG frontalis/frontal biofeedback techniques.

Other problems with the study included the following: (1) absence of medication records (patients were encouraged to work with their referring physician regarding decrease of medications if biofeedback treatment began showing some measures of success in terms of their presenting complaint, however, such records were not kept), (2) absence of symptom logs (a symptom diary was requested in the first session but not in subsequent sessions, this could have helped identify any treatment gains achieved through behavioral changes), and (3) absence of psychiatric records (although such records were available, they were not collected for use in the analysis.
of the study - such use may have assisted in understanding some of the results achieved in the study, i.e., "Did major psychological problems exist in patients whose presenting problem increased during treatment?).

Finally, in that the study was conducted in a military hospital setting, it was impossible to manipulate intervening variables that existed. Data collection was conducted in a manner that was as inobtrusive as possible and biofeedback treatment interventions did not vary from normal treatment protocols offered within the department. Focusing on only one presenting complaint like migraines and controlling intervening variables such as daily activity, diet, sleeping schedules, and exercise in an inpatient setting would have desirable. However, once again, this was not judged possible in the setting where the research was conducted.

Recommendations

It is hoped that further research on these two measures, levels of biofeedback confidence and measures of assertiveness, will continue, and that this study will be attempted again after major revisions have been made.

If such research continues, it seems appropriate to recommend first that the instrument used for both the pre-test and post-test, that is, the "Biofeedback Survey," be refined and subjected to reliability testing in that problems with reliability, especially on the frequency portion of the instrument, are suspected. One
recommendation for increasing reliability would be to further standardize responses on the frequency portion of the test. A format for the revision can be found in Appendix E.

Another recommendation is that the cut-off scores for the BICS be adjusted to include the following three categories: low level of biofeedback confidence (0 to 99), neutral response set (100 to 140), and high level of biofeedback confidence (141 to 200).

It is also strongly recommended that if further research is conducted, a much larger sample population be obtained. This would reduce the possibility of Type II errors, errors that may have occurred in this study by the limited numbers obtained in the sample.

At the military hospital where this study was conducted, it took over 2 years to obtain the small sample of 40 subjects. Given these results, obtaining larger numbers in all of the treatment groups may require small-to-moderate monetary rewards for participation in the study, especially in light of the fact that individuals with raw scores of 140 or less, tended not to either present themselves for treatment or to follow through with treatment once the intervention was described and offered.

In terms of actual clinical practice, it is recommended that clinicians do what they can to educate patients regarding the efficacy of biofeedback interventions for their presenting complaints. Such
careful attention to the education process may encourage the level of biofeedback confidence in such an intervention, which in turn, may have a positive impact on treatment outcome.

It is also recommended that biofeedback providers utilize pre-test and post-test measures with their patients to help inform patients, in an objective way, as to whether treatment gains in terms of the presenting complaint are actually achieved. This not only assists the patient in making such treatment gains more visible, thereby reinforcing such gains, but it can also assist the clinician in tracking biofeedback efficacy rates for personal growth, i.e., self-development in terms of which techniques appear to provide the most successful outcomes.
APPENDIX A

GAMBRILL ASSERTION INVENTORY (GAI)
GAMBRILL ASSERTION INVENTORY

Many people experience difficulty in handling interpersonal situations requiring them to assert themselves in some way, for example, turning down a request, asking a favor, giving someone a compliment, expressing disapproval or approval, etc. Please indicate your degree of discomfort or anxiety in the space provided before each situation listed below. Utilize the following scale to indicate degree of discomfort.

1 = none
2 = a little
3 = a fair amount
4 = much
5 = very much

Then, go over the list a second time and indicate after each item the probability or likelihood of your displaying the behavior if actually presented with the situation.* For example, if you rarely apologize when you are at fault, you would mark a "4" after that item. Utilize the following scale to indicate response probability.

1 = always do it
2 = usually do it
3 = do it about half the time
4 = rarely do it
5 = never do it

*Note: It is important to cover your discomfort ratings (located in front of the items) while indicating response probability. Otherwise, one rating may contaminate the other and a realistic assessment of your behavior is unlikely. To correct for this, place a piece of paper over your discomfort ratings while responding to the situations a second time for response probability.

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<tr>
<th>Degree of discomfort</th>
<th>Situation</th>
<th>Response probability</th>
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<td>1. Turn down a request to borrow your car</td>
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<td>2. Compliment a friend</td>
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<td>3. Ask a favor of someone</td>
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<td>4. Resist sales pressure</td>
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<td>5. Apologize when you are at fault</td>
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<td>6. Turn down a request for a meeting or date</td>
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<td>7. Admit fear and request consideration</td>
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8. Tell a person you are intimately involved with when he/she says or does something that bothers you

9. Ask for a raise

10. Admit ignorance in some area

11. Turn down a request to borrow money

12. Ask personal questions

13. Turn off a talkative friend

14. Ask for constructive criticism

15. Initiate a conversation with a stranger

16. Compliment a person you are romantically involved or interested in

17. Request a meeting or a date with a person

18. Your initial request for a meeting is turned down and you ask the person again at a later date

19. Admit confusion about a point under discussion and ask for clarification

20. Apply for a job

21. Ask whether you have offended someone

22. Tell someone that you like them

23. Request expected service when such is not forthcoming, e.g., in a restaurant

24. Discuss openly with the person his/her criticism of your behavior

25. Return defective items, e.g., store or restaurant

26. Express an opinion that differs from that of the person you are talking to

27. Resist sexual overtures when you are not interested

28. Tell the person when you feel he/she has done something that is unfair to you

29. Accept a date

30. Tell someone good news about yourself

31. Resist pressure to drink

32. Resist a significant person's unfair demand

33. Quit a job

34. Resist pressure to "turn on"

35. Discuss openly with the person his/her criticism of your work

36. Request the return of borrowed items

37. Receive compliments

38. Continue to converse with someone who disagrees with you

39. Tell a friend or someone with whom you work when he/she says or does something that bothers you
40. Ask a person who is annoying you in a public situation to stop.

Lastly, please indicate the situations you would like to handle more assertively by placing a circle around the item number.

Behavior Therapy, 6, 1975, pp. 550-561
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Harcourt, Brace, and Company
APPENDIX B

ITEM ANALYSIS OF BIOFEEDBACK INTERVENTION CONFIDENCE SCALE (BICS)
ITEM ANALYSIS OF BICS

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<th>Alternative</th>
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APPENDIX C

BIOFEEDBACK INTERVENTION CONFIDENCE SCALE (BICS)
ITEM STATEMENTS
BIOFEEDBACK INTERVENTION CONFIDENCE SCALE
ITEM STATEMENTS

Please read each of the following statements. Indicate your degree of agreement with each statement on the short line to the left, using the following scale. No identification is requested in that your answers will be kept anonymous.

__ 1. The "mind" cannot directly influence the body's physiological processes.

__ 2. I feel a biofeedback intervention can help me overcome my presenting problem.*

__ 3. I believe we can learn to control internal processes such as blood pressure through biofeedback training.

__ 4. I don't feel I can influence my presenting problem* using only biofeedback techniques.

__ 5. I believe I can learn how to successfully control internal processes such as heart rate.

__ 6. Biofeedback can assist a person with just about any physical or anxiety-related complaint.

__ 7. I do not feel confident that biofeedback can help a person manage a pain-related complaint.

__ 8. I do not feel confident that biofeedback can help a person eliminate a pain-related complaint.

__ 9. Humans really cannot control internal processes such as heart rate, blood pressure, and body temperature using only biofeedback techniques.

__ 10. I have had some success in the past controlling my presenting problem* using only mental techniques.

__ 11. I believe there are people who have completely overcome their physical problems using only biofeedback techniques.

__ 12. I believe there are people who have completely overcome their anxiety-related problems using only biofeedback techniques.
13. I don’t believe I can learn how to regulate internal processes such as heart rate through biofeedback techniques.

14. I feel that biofeedback techniques have little promise in the area of pain-related complaints.

15. Use of biofeedback techniques should help individuals cope more effectively with their presenting problem.*

16. I would use biofeedback techniques to cope with my presenting problem* if I were taught such techniques.

17. Biofeedback techniques cannot really assist with pain management in serious physical conditions like cancer.

18. I believe biofeedback techniques are not as effective as medications in controlling pain.


20. Biofeedback techniques cannot eliminate panic attacks completely.

21. Biofeedback training will help me cope with my presenting complaint* more effectively.

22. Adding biofeedback training to pain management is more effective than the use of medications alone.

23. Adding biofeedback training to panic attack treatment is more effective than the use of medications alone.

24. Biofeedback training can help with a number of physical or anxiety-related complaints.

25. Biofeedback techniques cannot reduce the intensity of a presenting complaint.*

26. I don’t believe biofeedback will help me with my presenting complaint.*

27. I don’t feel that biofeedback training is a successful intervention for a number of presenting complaints.
28. Biofeedback techniques have a sound scientific basis for their use in reducing physical complaints.

29. The average person can easily learn biofeedback techniques.

30. I feel I can manage my pain without medications.

31. I feel I cannot manage my pain using only biofeedback techniques.

32. I feel confident in my ability to learn how to manage my pain more effectively.

33. I believe I can stop my "panic feelings" by using biofeedback techniques.

34. I don't believe biofeedback techniques can reduce the frequency of headaches.

35. Biofeedback training can help alleviate pain-related complaints.

36. Biofeedback training can help alleviate anxiety-related complaints.

37. I don't believe biofeedback techniques can reduce the intensity of a headache.

38. I believe the relaxation exercises I'll learn in biofeedback will reduce my presenting complaint.*

39. Biofeedback techniques have a sound scientific basis for their use in reducing anxiety-related complaints.

40. I feel biofeedback training will assist me in regaining my health once again.

* "Presenting Problem" or "Presenting Complaint" refers to any problem a person is hoping to overcome through a biofeedback program, i.e., migraines, tension headaches, TMJ, panic anxiety attacks, insomnia, etc.
APPENDIX D

THE BIOFEEDBACK SURVEY
PRE-TEST/POST-TEST
BIOFEEDBACK SURVEY
PRE-TEST/POST-TEST

1. How often, on the average, does your presenting complaint (headache, anxiety attack, etc.), actually occur?*

   How Many Times:  Specific Period of Time:
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

   *Note: For example, if you average two headaches a week, your response would be:

   How Many Times:  Specific Period of Time:
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________
   __________________________________________

2. Answer only one of the following, depending upon your presenting complaint:

   a) On a scale of 0 to 10 (if we are using a pain-related complaint such as a headache, zero would represent the absence of a headache, ten would represent your worst headache possible), on the average, how would you rate your pain-related complaint most of the time?

      Check the response that best applies:
      0 1 2 3 4 5 6 7 8 9 10
      __________________________________________

   b) On a scale of 0 to 10 (if we are using an anxiety-related complaint such as an anxiety attack, zero would represent the absence of an anxiety attack, ten would represent your worst anxiety attack possible), on the average, how would you rate your anxiety-related complaints most of the time?

      Check the response that best applies:
      0 1 2 3 4 5 6 7 8 9 10
      __________________________________________

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APPENDIX E

ADJUSTED BIOFEEDBACK SURVEY
ADJUSTED BIOFEEDBACK SURVEY

1. How often, on the average, does your presenting complaint actually occur in the span of one month, that is, a span of 28 days? Check only one of the following that "best" applies to your situation.

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<tr>
<th>Frequency</th>
<th>Response</th>
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<td>zero or once a month</td>
<td>17 times a month</td>
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<td>2 times a month</td>
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<td>16 times a month</td>
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2. Answer either (a) or (b), depending upon your presenting complaint:

a) If your complaint is pain-related such as a headache, on a scale of 0 to 10 (zero would represent the absence of a headache and ten would represent your worst headache), on the average, how would you rate your pain-related complaint?

Check the response that best applies:
0 1 2 3 4 5 6 7 8 9 10

b) If your complaint is anxiety-related such as anxiety attacks, on a scale of 0 to 10 (zero would represent the absence of anxiety attacks and ten would represent your worst anxiety attack), on the average, how would you rate your anxiety-related complaint?

Check the response that best applies:
0 1 2 3 4 5 6 7 8 9 10
APPENDIX F

APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECCTS
Application for Approval of Research Involving Human Subjects
Human Subjects Review Board
Office of Scholarly Research
Andrews University

INSTRUCTIONS
Use the form as a cover sheet and attach to it the following items: (1) The appropriate Research Protocol, (2) An Informed Consent Form, (3) An Abstract and, (4) Other documentation as needed: Cover Letter of Explanation, Questionnaire Sample, William Copy of Verbal Instructions, and/or Letters of Permission. Submit the required number of full sets (1 set for General Review, and 1 set for Full Review to:
Andrews University, Office of Scholarly Research, Houghton Hall, Rm. 120, Berrien Springs, MI 49103-0586 (269) 471-6088 / (269) 471-6188 FAX

SUGGESTED CATEGORY OF HSRB REVIEW:

The investigator should read carefully the Brief Guidelines for Human Subjects Research and consult with his/her advisor under department prior to the submission of the present research project to the in the above document. After this consultation the investigator should request that the research project be considered by the Human Subjects Review Board under one of the categories listed below.

- Full HSRB Review (Quarterly)
- Exempt from Full HSRB Review (Semi-annually)
- Exempt from HSRB Review (Annually)

DESCRIPTION OF RESEARCH PROJECT:

Project Title: Interactional Effects of Measures of Assertiveness and Biofeedback Confidence on Biofeedback Intervention Outcomes

Beginning and Ending Dates of Human Subjects Involvement in Research:

Place/Location of Human Subject Involvement in Research: General Leonard Wood Army Community Hospital

Target Population (Description and Age Range): Patients referred to biofeedback program with various anxiety-related and pain-related complaints; adult sample only.

INVESTIGATOR(S) AGREEMENT:

I hereby agree to abide by the terms and methodology as set forth in the attached research protocol. I also agree to begin the implementation of the project only after written notification of its approval has been received. Furthermore, I hereby agree that in the event involving the research is conducted at non-university sites, such research will commence only after written authorization has been received from an officer of the organization at each site involved and I agree with the Office of Scholarly Research. Notification of any deviations in the attached protocol will be submitted to the Director of the Office of Scholarly Research.

Name: Sara D. Clarke-Pine
Address: 1225 Loyhers Street
Ft. Leonard Wood, MO 65473
Telephone: (314) 562-0533 (work) Telephone: 562-6211 (home)

(Supporting Investigator’s Signature) (Date) (Co-Investigator’s Signature) (Date)

SUPPORTING SIGNATURES:

"I have reviewed the above project with the investigator and concur in the requested category of HSRB review."

Name of Advisor: Marion Merchant

(Signature of Advisor Supervising Research) (Date)

"The project has been reviewed for research merit and has the academic endorsement of the department."

Academic Department of Investigator:

(Signature of Department Chairperson) (Date)
Abstract of Project:

Please type an abstract of your project in the space provided. (Attach separate sheet if necessary.)

See attached.

Exempt Category Checklist:

1. Research conducted in educational settings, involving normal educational practices such as:
   (a) Regular and special education instruction, or
   (b) Research on the effectiveness of, or the comparability of, instructional techniques, personnel, or management methods.

2. Research involving standardized educational tests, cognitive, diagnostic, aptitude, achievement, and the information gathered will be
   recorded in such a manner that subjects CANNOT be identified directly or indirectly.

3. Research involving survey or interview procedures, EXCEPT where ALL of the conditions listed above in #2 (i.e., a, b, c) also exist.
   *Category 2 does not apply to research where children (minors) are subjects.

4. Research involving the observation (including observation by participants) of public behavior, EXCEPT where ALL of the conditions
   listed above in #3 (i.e., a, b, c) also exist.

5. Research involving the collection or study of existing data, documents, or records, unless the information is recorded by the investigator in such a way that the subjects CANNOT be identified directly or indirectly.

6. Research involving a category specifically added to this list by the Department of Health and Human Services and published in
   the Federal Register.

In signing this form requesting exempt status, I (the principal investigator) assure the HSRRB that the description of the category(ies) checked above strictly applies to this proposed research project.

Principal Investigator's Signature Date

2/16/99

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ABSTRACT

This research study attempts to examine variables that may influence biofeedback success. Not everyone who receives biofeedback treatment will benefit, thus, understanding more clearly reasons for such variance is considered important. It is felt that such understanding may encourage the development of techniques that could elicit greater biofeedback efficacy rates.

This particular study will focus on the interactional effects of assertiveness levels and biofeedback confidence on biofeedback intervention outcomes.

A standardized biofeedback treatment intervention will be administered to four different categories of subjects: (1) individuals who are considered assertive in orientation and who possess low biofeedback confidence, (2) individuals who are considered assertive in orientation and who possess high biofeedback confidence, (3) individuals who are considered unassertive in orientation and who possess low biofeedback confidence, and (4) individuals who are considered unassertive in orientation and who possess high biofeedback confidence. The sample will consist of patients referred to the biofeedback program at General Leonard Wood Army Community Hospital in Ft. Leonard Wood, Missouri.

A two-way ANOVA design, using a fixed effects model, will be used in the analysis of the data. The null hypotheses in this study are: (1) those individuals with a high level of confidence in a biofeedback intervention will not perform significantly better in the intervention than those individuals with a low level of confidence in the same intervention, (2) those individuals who possess "assertive" personality styles will not perform significantly better in a biofeedback intervention than those individuals who possess "unassertive" personality styles, and (3) no interaction between these two specific variables will be found.
RESEARCH PROTOCOL

Purpose of Study and Possible Benefits of Research:
This research study is an attempt to determine some of the factors that may help contribute to a successful biofeedback program. Not all individuals who enter a biofeedback program obtain the relief that they are seeking. Some individuals obtain little or no relief, while others may eliminate their pain-related or anxiety-related complaints completely. Understanding more clearly the reasons for such variance is considered important. It is strongly felt that such understanding may encourage the development of techniques that would elicit greater biofeedback efficacy rates.

Methods:
There is a body of research to suggest an individual's set of expectations regarding a biofeedback intervention has a significant impact upon biofeedback success. Some researchers also believe that individuals who possess "passive" or "unassertive" personality styles may have a tendency to use their pain-related or anxiety-related complaints, either consciously or unconsciously, as a means to avoid environmental demands. Thus, it is theorized that such individuals may not respond positively to interventions designed to reduce these complaints.

This study will involve one standardized biofeedback treatment intervention administered to four different categories of subjects, i.e., those individuals who were judged by an assertiveness inventory as generally "unassertive" in orientation and who had either a high level of confidence in the program or a low level of confidence in the program (as measured by a biofeedback confidence inventory), or those individuals who were judged by the same assertiveness inventory as generally "assertive" in orientation and who had either a high level of confidence in the program or a low level of confidence in the program.

A two-way ANOVA design, using a fixed effects model, will be used in the analysis of the data. The null hypotheses in this study are: (1) those individuals with a high level of confidence in a biofeedback intervention will not perform significantly better in the intervention than those individuals with a low level of confidence in the same intervention, (2) those individuals who possess "assertive" personality styles will not perform significantly better in a biofeedback intervention than those individuals who possess "unassertive" personality styles, and (3) no interaction between these two specific variables will be found.

Description of Subjects:
The sample will be composed of individuals who have been referred to the biofeedback program for various pain-related or anxiety-related complaints at General Leonard Wood Army Community Hospital. Individuals under the age of 18 will be excluded from the study. Patients will receive a standardized biofeedback treatment for their particular presenting complaint, that is, treatments received will not vary from treatments provided by this clinic in the past to individuals with similar complaints.
Method of Recruitment:

All patients referred to the biofeedback program at General Leonard Wood Army Community Hospital are processed for biofeedback candidacy through a clinical intake and psychological testing. This has been the standard practice at this particular clinic since January of 1991. During the clinical intake, patients will be asked if they would also like to participate in a research study. Subjects will be made aware that their lack of participation in the study will not influence the treatment provided to them. Informed consent will be obtained and responses will be kept anonymous. If individuals are interested in participating in the study, they will then be asked to fill out an assertiveness inventory, a biofeedback confidence scale, and a pre-test that rates the intensity and frequency of their current complaint. At the conclusion of the biofeedback treatment provided, subjects will be administered a post-test (this will be a form identical to the pre-test).

Additional Ethical Responsibilities to Subjects:

Patients, if they indicate that they are interested in receiving the results, will be sent a brief description of the overall results of the study when the research has been completed and analyzed.

Methods to Protect Privacy/Confidentiality:

In order to maintain anonymity, patients will be allowed to place a personalized identification code on their packet. Thus, they will be able to retrieve their packet in order to complete the last piece of paperwork, i.e., the post-test, when biofeedback treatment has been completed.

Time-frame:

Data collection will be approximately two months in duration.

Risks and Discomforts to Subjects:

No significant risks or discomforts are noted. Participation is voluntary. In addition, results are anonymous and surveys administered are not considered socially, psychologically, or physically intrusive.
INFORMED CONSENT

I am attempting to conduct clinical research on the biofeedback program offered at General Leonard Wood Army Community Hospital. The research is being conducted with the assistance of several research faculty members at Andrews University in Berrien Springs. It is hoped that the results of this research will facilitate a greater understanding of factors contributing to a successful biofeedback program.

Your participation in this study is strictly voluntary. It is important to emphasize that your lack of participation will not influence the treatment provided to you through our clinic. In addition, at any time during the study you have the right to discontinue your involvement in the study. Termination of involvement will not influence the treatment provided to you by this clinic.

Your responses will be completely anonymous. Thus, full confidentiality is assured. You will be able to assign a code number to your research packet. This number will be known only to you. Before your first scheduled biofeedback session, you will be asked to fill out the first three surveys enclosed in this packet. The first survey obtains information about your assertiveness levels, the second survey obtains information about your feelings regarding biofeedback, and the third survey is a survey that asks you to currently rate the intensity and frequency of your presenting complaint. At the conclusion of your biofeedback treatment, you will be asked to fill out a fourth survey. This survey is identical to the third survey, and again asks you to rate the current intensity and frequency of your presenting complaint.

The data collected in this study will be analyzed thoroughly. Your participation will enable us to identify factors that may influence biofeedback outcomes.

If you have further questions regarding this study, please feel free to contact me either by phone or through correspondence:

Dora D. Clarke-Pine
Chief, Psychology Services
General Leonard Wood Army Community Hospital
Ft. Leonard Wood, MO 65473
Phone: (314) 596-5522

If you are interested in a brief summary of the results of this study, please check the box at the bottom of this form. In addition, please provide your name and address in the identified sections and return this form and only this form to the secretary at the front desk. Thank you.

Name: __________________________
Address: ____________________________

☐
March 17, 1994

Dora D. Clarke-Pine  
45 Humphrey's Street  
Ft. Leonard Wood MO 65473

Dear Dora:

The Human Subjects Review Board (HSRB) has reviewed your proposal, "Interactional Effects of Measures of Assertiveness and Biofeedback Confidence on Biofeedback Intervention." under the Exempt Review Procedure. You have been given clearance to proceed with your research plans.

Please be advised that any serious or adverse reactions and/or physical injury must be reported immediately in writing to the Human Subjects Review Board. Any physical injury must also be immediately reported to the University physician, Dr. Loren Hamel by calling (616) 473-2222. All changes made to the study and/or consent form after initiation require prior approval from the HSRB before changes are implemented. Feel free to contact our office if you have any questions.

The duration of the present approval is for one year. If your research is going to take more than one year, you must apply for an extension of your approval in order to be authorized to continue with this project.

We wish you success as you implement the research project as outlined in the approved protocol.

Sincerely,

James R. Fisher, Director  
Office of Scholarly Research

c: M. Merchant
March 4, 1994

Ms. Cora D. Clarke-Pine
65 Humphrey's Street
Ft. Leonard Wood, MO 65473

Dear Ms. Clarke-Pine,

We are in receipt of your correspondence dated 02/23/1994 regarding permission to reprint "Assertion Inventory" from BEHAVIOUR THERAPY 6 (Request IO Num.: 60643) in your work. To consider granting your request for permission, we will need the following EXACT information:

Please supply exact material by opening and closing words and page numbers in our volume.

Please supply us with a copy of the material you wish to reprint within the context of your volume.

Adapted or abridged material must be submitted for approval.

Please indicate how you wish to use this material; as a chapter heading, epigraph, or in context.

Please provide us with a photocopy of the title and copyright pages of our volume.

Please provide the anticipated number of copies that will be published in ALL PRINTINGS OF THE EDITION (example: 20,000 copies, 50,000 copies, 100,000 copies).

This is an anthology and we ourselves had to obtain permission to reprint it in our volume. Please apply directly to the original source cited.

We are unable to identify this as our publication and therefore cannot grant permission at this time. Please recheck the source.

We are unable to determine our rights in this publication and therefore cannot grant permission at this time.

Our records indicate that this material is in the public domain, although we cannot guarantee this to be so.

Please indicate who will be publishing your volume.

Please provide the estimated price of your publication.

In what market will your volume be distributed? (United States, Canada, throughout the world?)

Will your book be published in a hardbound or paperbound edition, or both?

What is the scheduled date of publication of your work?

Please provide name and address of party who will be issuing the check for any permission fee.

Please provide daytime telephone number where you can be reached.

How will you bind our material? (hardcover, softcover, spiral, 3-hole punch, etc.)

What is the ISBN number of the work for which permission is requested?

Other:

In order to keep our records current, please supply any requested information COMPLETELY, and include our Reference and Request ID number(s) as mentioned above within 90 days. If it is not received within that time, we will assume that you do not wish to pursue the matter further and your request will be considered withdrawn.

Sincerely,

Kimberly A. Lewis
Permissions Assistant

A Publishing Division of Harcourt General, Inc.
10 MAR 1994

Harcourt, Brace, & Company
Attn.: Todd Rupp
Orlando, FL 32887-6777

Dear Sir:

I am conducting research that seeks to assess the interactional effects of measures of assertiveness and biofeedback confidence levels on biofeedback training outcomes. I have developed an instrument that measures biofeedback confidence levels, i.e., the Biofeedback Intervention Confidence Scale (BICS), however I am still in need of an instrument that measures assertiveness. Thus, I would like your permission to use the Assertion Inventory in my research as soon as possible.

A copy of the Assertion Inventory, which was published in Behavior Therapy 6, 550-561 (1975), is included with this correspondence.

Please send your reply to: Dora Clarke-Pine
45 Humphrey's St.
Ft. Leonard Wood, MO 65473
314-329-6211

Sincerely,

Dora Clarke-Pine
Chief, Psychology Services
Ft. Leonard Wood Army Community Hospital
March 25, 1994

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Todd L. Rupp
Permissions Department
ACADEMIC PRESS, INC.
Orlando, FL 32887
APPENDIX H

BIOFEEDBACK INTERVENTION CONFIDENCE SCALE
CORRESPONDENCE
Dear colleague:

I am currently working on developing a biofeedback intervention confidence scale, a 1-like scale, for use in screening biofeedback candidates.

This newly developed scale will be used in the research for my dissertation. I am attempting to determine if there is a relationship between measures of assertiveness and confidence and biofeedback intervention and biofeedback success. It is hoped that this instrument will become a valuable screening tool in determining biofeedback candidate.

Needless to say, your assistance in this project would be most appreciated. You are one of 15 individuals chosen to participate in this study as a Council of Chapter representative of the ARPB.

With the assistance of several mental health professionals in the state of Missouri, I have drawn up a list of statements that attempt to measure an individual's confidence in a biofeedback intervention and/or biofeedback techniques. If you could take a few minutes to judge the statements using the directions outlined on the attached sheet, I would be most indebted. Your responses will be kept confidential and are anonymous.

Keep in mind that the attached statements are only preliminary statements. The confidence scale will, in the end, contain only 10 or 20 statements.

It is hoped that you will attempt to return the survey, if possible. In appreciation of your assistance, I would be happy to provide you with a brief summary of my findings at the conclusion of the study. If you are interested in the results, please return the enclosed postcard. Results of the study should become available by December of this year. Thank you very much for your time and assistance.

Sincerely,

[Signature]

Jane J. Clarke-Pine
Chief, Psychology Services
General Leonard Wood Army Comm. Hospital
Please take a few minutes to look over the following statements and answer the following questions in relation to each:

1. Is the statement positive or negative in focus?
2. Does the statement express confidence or the lack of confidence with a presenting complaint, or something else?
3. Are any statements ambiguous? If so, please add your corrections next to the statement.
### Biofeedback Intervention Confidence Scale Statements

**YES = Measures confidence in the face of confidence in a biofeedback program**  
**NO = Appears unrelated to what you are attempting to measure in your study.**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Positive (Circle one)</th>
<th>Negative (Circle one)</th>
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</thead>
<tbody>
<tr>
<td>1. The &quot;mind&quot; cannot directly influence the body's physiological processes.</td>
<td></td>
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<tr>
<td>2. I feel a biofeedback intervention can help me overcome my presenting problem.</td>
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<tr>
<td>3. A person's mental attitude would have little positive effect on physical illness such as cancer.</td>
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<tr>
<td>4. I believe we can learn to control internal processes such as blood pressure through biofeedback training.</td>
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<tr>
<td>5. I don't feel I can influence my presenting problem using only biofeedback techniques.</td>
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<td></td>
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<tr>
<td>6. I believe I can learn how to successfully control internal processes such as heart rate.</td>
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<tr>
<td>7. Biofeedback can assist a person with just about any physical or anxiety-related complaint.</td>
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<td></td>
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<tr>
<td>8. I do not feel confident that biofeedback can help a person manage a pain-related complaint.</td>
<td></td>
<td></td>
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<tr>
<td>9. I do not feel confident that biofeedback can help a person eliminate a pain-related complaint.</td>
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<td></td>
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<tr>
<td>10. Humans really cannot control internal processes such as heart rate, blood pressure, and body temperature using only biofeedback techniques.</td>
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<tr>
<td>11. I have had some success in the past in controlling my presenting problem using only mental techniques.</td>
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<td></td>
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<tr>
<td>12. I believe there are people who have completely overcome their physical problems using only biofeedback techniques.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I believe there are people who have completely overcome their anxiety-related problems using only biofeedback techniques.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. If biofeedback techniques were taught early in life, there would probably be fewer physical problems as adults, i.e., fewer people suffering from migraines, tension headaches, anxiety attacks, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I don't believe a biofeedback intervention can help me overcome my presenting problem completely.</td>
<td></td>
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<tbody>
<tr>
<td>16. I don't believe I can learn how to regulate internal processes such as heart rate through biofeedback techniques.</td>
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<tr>
<td>17. I feel that biofeedback techniques have little promise in the area of pain-related complaints.</td>
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<tr>
<td>18. Use of biofeedback techniques would help individuals cope more effectively with their presenting problem.</td>
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<tr>
<td>19. I would use biofeedback techniques to cope with my presenting problem if I were taught such techniques.</td>
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<tr>
<td>20. Individuals with presenting complaints such as headaches should be taught biofeedback techniques as a matter of course.</td>
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<tr>
<td>22. I believe biofeedback techniques are not as effective as medications in controlling pain.</td>
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<tr>
<td>23. Biofeedback techniques cannot eliminate a presenting problem.</td>
<td></td>
<td></td>
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<tr>
<td>24. Using only biofeedback techniques to control pain is like a drowning person who is using only a life-preserver when there is a boat nearby.</td>
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<tr>
<td>25. Biofeedback techniques cannot eliminate panic attacks completely.</td>
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<tr>
<td>26. Biofeedback training will help me cope with my presenting complaint more effectively.</td>
<td></td>
<td></td>
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<tr>
<td>27. Adding biofeedback training to your management is more effective than the use of medications alone.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Adding biofeedback training to panic attack treatment is more effective than the use of medications alone.</td>
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<tr>
<td>29. Biofeedback training can help with a number of physical or anxiety-related complaints.</td>
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<tr>
<td>30. Biofeedback techniques cannot modify or reduce the intensity of a presenting complaint.</td>
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<tr>
<td>31. I don't believe biofeedback will help me with my presenting complaint.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. I don't feel that biofeedback training is a successful intervention for a number of presenting complaints.</td>
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</table>
152

53. Biofeedback techniques have a sound scientific basis for their use in reducing physical complaints.

54. The average person can learn biofeedback techniques.

55. I feel I can manage my pain without medications.

56. I feel I cannot manage my pain using only biofeedback techniques.

57. I do not need medications to manage my pain.

58. I feel confident in my ability to learn how to manage my pain more effectively.

59. I believe I can stop my "panic feelings" by using biofeedback techniques.

60. I believe I would feel uncomfortable working with biofeedback equipment.

61. I don't believe biofeedback techniques can reduce the frequency of headaches.

62. Biofeedback seems like a waste of time.

63. Biofeedback training can help alleviate pain-related complaints.

64. Biofeedback training can help alleviate anxiety-related complaints.

65. People who feel that they have benefited from biofeedback techniques are really only "tricked" into believing that the techniques really work.

66. I don't believe biofeedback techniques can reduce the intensity of headaches.

67. Biofeedback techniques have a sound scientific basis for their use in reducing anxiety-related complaints.

68. Biofeedback techniques help individuals reduce their "presenting complaints" only through luck.

69. I believe the relaxation exercises I'll learn in biofeedback will reduce my "presenting complaint."

70. I feel biofeedback training will assist me in regaining my health once again.

* "Presenting Problem" or "Presenting Complaint" refers to any problem a person is trying to overcome through a biofeedback program, i.e., migraines, tension headaches, Tmj, panic anxiety attacks, insomnia, etc.
24 May 1993

Dear Colleague:

Some time ago I sent out surveys to Council of Chapter representatives of the AARE.

As you may recall, I am currently working on developing a biofeedback intervention confidence scale, a likert scale, for use in screening biofeedback candidates.

To date, 15 of the 39 surveys have been returned. If you have already returned the survey, please disregard this letter. If you have not yet had a chance to respond to this survey, would you consider taking the time to assist me in this study? Needless to say, your assistance in this project would be most appreciated.

It is hoped that you will attempt to return the survey by May 31 if possible. In appreciation of your assistance, I would be happy to provide you with a brief summary of my findings at the conclusion of the study. If you are interested in the results, please return the enclosed postcard. Results to the study should become available by December of this year. Thank you very much for your time and assistance.

Sincerely,

Dora D. Clarke-Pine
Chief, Psychology Services
General Leonard Wood Army Comm. Hospital
List of Names and Addresses of respondents to Chapters Legislative Contact Request

**Alabama**
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(907) 786-4630 FAX

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(616) 842-1507 FAX

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(612) 831-2921 FAX

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Ridgewood, NJ 07450
(201) 444-3088
No FAX

Harold Smelson, M.D.
700 N. Broad St.
Elizabeth, NJ 07208
(908) 355-5903
FAX is same number - must call to have it turned on.

Ell A. Ison, Ph.D.
25 Kitchell
Ridgewood, NJ 07450
(201) 625-7300

**New Mexico**
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(505) 298-7909
(505) 888-4582 FAX
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(718) 377-7187
(718) 252-3201 FAX (Call First)

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(704) 274-9452

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Portland, OR 97213
(503) 249-3812

Sam Gill
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Portland, OR 97219
(503) 684-7246
(503) 244-6630 (Home)

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(215) 776-3172 FAX

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Bellaire, TX 77401
(713) 447-5336

Texas - Harris County
Edward Charlesworth
George Allan Brown, M.A.
Behavioral Medicine Consultants
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FAX (703) 642-1498

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Oakton, VA
(703) 255-2347

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(360) 357-4225
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(301) 666-0554
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Home:
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Potomac, MD 20856
(301) 299-2244

Wisconsin
Rick Rubow, Ph.D.
Stress Management Inst.
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(608) 251-7702
(608) 351-2231 FAX

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Dear Colleague:

In May of 1993 I asked for your assistance in developing a survey scale that would measure an individual’s confidence level in a biofeedback intervention. I want to thank everyone who participated in the research and provide you with a summary of my results.

Out of the original 50 statements sent, 10 statements were eliminated based upon valid criticisms by those surveyed. The remaining 40 statements were subjected to an item analysis on a sample of 241 subjects. All statements produced point-biserials between .3 and .8 suggesting moderate difficulty levels. In addition, the Cronbach Alpha reliability coefficient was found to be .93 suggesting high internal consistency of the instrument. Another Cronbach Alpha reliability coefficient was calculated on an adjusted sample of 113 subjects. This reliability coefficient was calculated to be .95, once again, suggesting high internal reliability.

The new instrument, called the Biofeedback Intervention Confidence Scale or BICS, was then used in subsequent research along with the Gambrill Assertion Inventory. It was hypothesized that interactional effects between measures of assertiveness and biofeedback confidence on biofeedback treatment outcome would be found. It was discovered that assertiveness levels did not appear to have a significant impact upon biofeedback treatment outcome in terms of frequency or intensity of presenting complaint. The only significant finding of the study, at the .05 level, was that an individual’s confidence level in a biofeedback treatment program did have a significant impact upon treatment outcome in terms of “frequency” of presenting complaint. That is, a high level of biofeedback confidence had a significant impact on reducing the frequency of a presenting complaint.

I want to thank you once again for your assistance in this research.

Sincerely,

Dora D. Clarke-Pine
Chief, Psychology Services
12 June 1995

Dear Biofeedback Participant:

Some time ago you filled out some surveys used for ongoing research in our biofeedback program. I want to personally thank you for your assistance as well as provide you a brief summary of the research results.

The Biofeedback Intervention Confidence Scale (BICS) and the Gambrill Assertion Inventory (GAI) was administered to forty test subjects. It was hypothesized that interactional effects between measures of assertiveness and biofeedback confidence on biofeedback treatment outcome would be found. It was discovered that assertiveness levels did not appear to have a significant impact upon biofeedback treatment outcome in terms of frequency or intensity of presenting complaint. The only significant finding of the study was that an individual's confidence level in a biofeedback treatment program did have a significant impact upon treatment outcome in terms of "frequency" of presenting complaint. That is, if a person possessed a high level of biofeedback confidence, they had significantly more success reducing the frequency of a presenting complaint than those individuals who possessed low levels of biofeedback confidence.

I want to thank you once again for your assistance in this research.

Sincerely,

Dora D. Clarke-Pine
Chief, Psychology Services
MEMORANDUM FOR: Chief, Dept of Clinical Investigation, FAMC

SUBJECT: Review of Exempted Category Research

1. On 24 Jan 94 I was contacted by phone by CPT Clark-Pine who asked me if her dissertation proposal required Institutional Review Committee review and approval.

2. She stated that her proposal has been reviewed and approved by the Dissertation Committee of Andrews University, Michigan. Since the proposal is quite lengthy, I suggested she FAX the abstract and questionnaires which are attached.

3. After review of the attachments, I believe this research is Category B-3 of Appendix B, AR 40-38. The research is to determine the effectiveness of techniques of instruction, i.e., biofeedback training.

4. Please comment, an endorsement is provided below. CPT Clark-Pine can be reached at 314-596-0522/FAX 314-596-0537.

Encls

MARCIA BILAK
Research Protocol Specialist
Dept of Clinical Investigation

TO CPT Clark-Pine, Psychiatry Dept, General Leonard Wood Army Community Hospital, Fort Leonard Wood, MO

I concur that your research is exempt from IRC review.

I do not concur with the statements in the above memo.

COMMENTS:

KENNETH E. SHERMAN
MAJ, MC
Chief, Department of Clinical Investigation
TO: FORMER BIOFEEDBACK PATIENTS
RE: REQUEST FOR PARTICIPATION IN A SURVEY

Dear [Name]:

I am currently attempting to develop a scale to measure an individual's confidence in a biofeedback intervention in that this area is suspected to play a role in biofeedback success. Some time ago you were offered treatment at our clinic in our biofeedback program. Some of you received treatment and some of you chose not to pursue the treatment that was offered at the time of the evaluation.

Regardless of which category described above applies to you, would you be willing to take a few minutes to fill out the following survey and return it in the self-addressed stamped envelope? I know I am asking you to invest some time and effort into filling out the survey, but your responses will be deeply appreciated. Keep in mind your responses are also anonymous.

Sincerely,

Dora C. Clarke-Pine
Chief, Psychology Services
MEMORANDUM FOR CPT Shimoni, Commander, A Company, 12nd BN, 10th Brigade, Ft. Leonard Wood, MO 65473

SUBJECT: Biofeedback Survey Request

1. I am requesting your assistance with the development of a survey that will be used in biofeedback research here at General Leonard Wood Army Community Hospital. If you would allow me to pass out these surveys to the soldiers in your company, this will assist me in refining the instrument that I am developing for use.

2. I will provide the results of the survey back to you so that soldiers who are interested in such results can have access to the results.

3. If you have any specific questions regarding this research, please contact me at 546-0622. I will follow up this letter with phone contact to verify accessibility to your soldiers. Thank you.

DORA O. CLARKE-PINE
CPT, MG
Chief, Psychology Services
RECOMMEND FOR CPT Stephens, Commander, A Company, 2nd Bn. 10th
Brigade, Ft. Leonard Wood, MO 65473

SUBJECT: Biofeedback Survey Results

1. Results of the survey are as follows: 64% favorable response to biofeedback interventions, 4% unfavorable response to biofeedback interventions, and a 32% neutral response to biofeedback interventions. Thus, the majority of the individuals who filled out the survey seemed to believe biofeedback interventions made the ability to be successful in treatment of anxiety-related and angina-related complaints.

2. The classroom responses on the 40 item survey will be used to determine which questions measure biofeedback confidence more accurately. After an item analysis is conducted, the survey will be reduced to 10 to 20 statements instead of the 40 statements originally given in order to make it a shorter as well as more accurate survey.

3. The improved survey will then be used in our current research with our biofeedback program here at the hospital. We will be monitoring to study the relationships between an individual's level of confidence in a biofeedback program and resulting biofeedback success.

4. If you would like more information on the results of this research when completed, research is projected to be finished in March of next year. Please contact myself at the following address:

CPT Dora D. Clarke-Pine
Chief, Psychology Services
General Leonard Wood Army Community Hospital
Ft. Leonard Wood, MO 65473

5. Again, your assistance in this research was deeply appreciated.

DORA D. CLARKE-PINE
CPT, MS
Chief, Psychology Services
Dear Professor:

Thank you for agreeing to pass out the enclosed survey to your class. The survey is self-explanatory, and should be easy to fill out. When your students are finished with the survey, please place them back in the envelope and return to the individual who presented the survey to you for distribution.

The survey will be used in ongoing research on our biofeedback program at General Leonard Wood Army Community Hospital. Your participation will be deeply appreciated. I will be happy to send the results of the survey to your class when the data has been evaluated. If your class is interested in receiving such results, please check the appropriate box below. Thank you again for your assistance.

Sincerely,

Dora D. Clarke-Pine
Chief, Psychology Services

☐ I do want the results of survey sent to the class.
☐ I do not want the results of the survey sent to the class.

Name of Professor: ____________________________
Name of class: ________________________________
APPENDIX K

BIOFEEDBACK INTERVENTION CONFIDENCE SCALE SURVEY
BACKGROUND INFORMATION SHEET
SURVEY

I am working on developing a scale to measure individuals' confidence in biofeedback interventions. If you can read the section below and fill out the attached survey while waiting for your medical appointment today, your assistance will be deeply appreciated. Please respond to the questions on this survey with your honest feelings even if you disagree with the statements on the following page. Your answers will be kept anonymous. When finished filling out the survey simply return to the front desk of the clinic you are visiting today, or if this survey was passed out in your unit, please return the survey to the appropriate individual identified by your unit. Thank you.

Dora D. Clarke - Pine
Chief, Psychology SYS

BIOFEEDBACK

"What is biofeedback?"

In biofeedback, a person learns how to use equipment designed to measure specific physical responses such as heart rate, muscle tension, blood pressure, body temperature, and skin conductance.

Once you understand how your body works, that is, what your body is actually doing at any given moment, then you can use the techniques that you've learned in a biofeedback training program to change a negative physical response into a more positive physical response.

For example, if certain types of headaches such as "tension" headaches are related to muscle tension, I can learn how to decrease muscle tension in specific parts of my body to levels that are likely to discourage these type of headaches from occurring.

"How does the equipment used assist me in overcoming my problem?"

The equipment that is used provides feedback on how successful you are in achieving your treatment goals. In other words, I may feel that I am actually reducing muscle tension quite successfully when in reality I am making very few gains in reducing muscle tension. The feedback I receive tells me if what I am doing is working or not.

"What kinds of medical conditions is biofeedback used to treat?"

Biofeedback is often used in the treatment of the following: tension, migraine, and vascular headaches, T.M.J., back-related pain complaints, blood pressure, insomnia, panic attacks, just to name a few.

"Who can I contact if I am interested in biofeedback treatment?"

If you are interested in pursuing a biofeedback evaluation further, request a consult to Psychology Services from your physician.
Please read each of the following statements. Indicate your degree of agreement with each statement on the short line to the left, using the following scale. No identification is requested in that your answers will be kept anonymous.

1 = strongly disagree
2 = disagree
3 = neutral
4 = agree
5 = strongly agree

1. The "mind" cannot directly influence the body's physiological processes.
2. I feel a biofeedback intervention can help me overcome my presenting problem.
3. I believe we can learn to control internal processes such as blood pressure through biofeedback training.
4. I don't feel I can influence my presenting problem using only biofeedback techniques.
5. I believe I can learn how to successfully control internal processes such as heart rate.
6. Biofeedback can assist a person with just about any physical or anxiety-related complaint.
7. I do not feel confident that biofeedback can help a person manage a pain-related complaint.
8. I do not feel confident that biofeedback can help a person eliminate a pain-related complaint.
9. Humans really cannot control internal processes such as heart rate, blood pressure, and body temperature using only biofeedback techniques.
10. I have had some success in the past controlling my presenting problem using only mental techniques.
11. I believe there are people who have completely overcome their physical problems using only biofeedback techniques.
12. I believe there are people who have completely overcome their anxiety-related problems using only biofeedback techniques.
13. I don't believe I can learn how to regulate internal processes such as heart rate through biofeedback techniques.
14. I feel that biofeedback techniques have little promise in the area of pain-related complaints.
15. Use of biofeedback techniques should help individuals cope more effectively with their presenting problem.
16. I would use biofeedback techniques to cope with my presenting problem if I were taught such techniques.
17. Biofeedback techniques cannot really assist with pain management in serious physical conditions like cancer.
18. I believe biofeedback techniques are not as effective as medications in controlling pain.
20. Biofeedback techniques cannot eliminate panic attacks completely.
21. Biofeedback training will help me cope with my presenting complaint* more effectively.

22. Adding biofeedback training to pain management is more effective than the use of medications alone.

23. Adding biofeedback training to panic attack treatment is more effective than the use of medications alone.

24. Biofeedback training can help with a number of physical or anxiety-related complaints.

25. Biofeedback techniques cannot reduce the intensity of a presenting complaint.*

26. I don't believe biofeedback will help me with my presenting complaint.*

27. I don't feel that biofeedback training is a successful intervention for a number of presenting complaints.*

28. Biofeedback techniques have a sound scientific basis for their use in reducing physical complaints.

29. The average person can easily learn biofeedback techniques.

30. I feel I can manage my pain without medications.

31. I feel I cannot manage my pain using only biofeedback techniques.

32. I feel confident in my ability to learn how to manage my pain more effectively.

33. I believe I can stop my "panic feelings" by using biofeedback techniques.

34. I don't believe biofeedback techniques can reduce the frequency of headaches.

35. Biofeedback training can help alleviate pain-related complaints.

36. Biofeedback training can help alleviate anxiety-related complaints.

37. I don't believe biofeedback techniques can reduce the intensity of a headache.

38. I believe the relaxation exercises I'll learn in biofeedback will reduce my presenting complaint.*

39. Biofeedback techniques have a sound scientific basis for their use in reducing anxiety-related complaints.

40. I feel biofeedback training will assist me in regaining my health once again.

* "Presenting Problem" or "Presenting Complaint" refers to any problem a person is hoping to overcome through a biofeedback program, i.e. migraines, tension headaches, TMJ, panic anxiety attacks, insomnia, etc.
## BACKGROUND INFORMATION

1. **Age:**

2. **Sex:**
   - Male
   - Female

3. **Socioeconomic Status:**
   (Annual Gross Income)
   - Under $10,000
   - $10,000 - $19,000
   - $20,000 - $29,000
   - $30,000 - $39,000
   - $40,000 - $49,000
   - $50,000 - $59,000
   - $60,000 - $69,000
   - $70,000 and over

4. **Marital Status:**
   - Single
   - Married
   - Divorced
   - Other: _______________________

5. **Racial Background:**
   - White/Caucasian
   - Black/African-American
   - Hispanic/Latino
   - Asian or Pacific Islander
   - Native American
   - Other: _______________________

6. **Educational Background:**
   - Did Not Complete High School
   - High School Degree or its Equivalent
   - Associate's Degree
   - Bachelor's Degree
   - Master's Degree
   - Doctoral Degree
   - Post-Doctoral Experience
REFERENCE LIST


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VITA

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WORK EXPERIENCE:
5/1995 – to date

12/1990 – to date
Chief, Psychology Services: budget acquisition, administrative services, crisis intervention/triage officer, biofeedback treatment, supervision/consultation, inservice instructor, psychometric evaluations, diagnostic assessment, and individual, marital, family, & group therapy. General Leonard Wood Army Community Hospital, Ft. Leonard Wood, MO.

U.S. Army Captain, Medical Services: Psychology Intern in an A.P.A. approved internship site. Psychology Services, Eisenhower Army Medical Center, Ft. Gordan, GA 30905.

Psychology Instructor: general psychology courses. Southwestern Michigan College, Cherry Grove Road, Dowagiac, MI 49047.

Statistics & Adult Assessment Lab Instructor: graduate level. Educational & Counseling Psychology Department, Andrews University, Berrien Springs, MI 49104.

Summer 1985/88
Instructor, Andrews University, Berrien Springs, MI 49104.

ASSOCIATIONS:
American Psychological Association.
Association for Applied Psychophysiology & Biofeedback.

EDUCATION:

