

AN ABSTRACT OF THE THESIS OF

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Title: THE EFFECTS OF BIOFEEDBACK ON PERSONALITY: AN EXPLORATORY STUDY

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The hypothesis was tested that biofeedback relaxation training, a method of enhancing relaxation by the use of analog feedback from autonomic systems related to relaxation, has an effect on personality. A total of thirty subjects drawn from a volunteer pool of college students was randomly divided into three groups, with each group administered the Personality Research Form. One group received biofeedback relaxation training supplemented with autogenic phrase practice, that is, exercises using phrases to enhance imagery related to relaxation. The second received autogenic phrase practice without biofeedback, and the third received no treatment. At the end of the treatment period each group was administered a parallel form of the Personality Research Form. The scores were analyzed using a 2 X 3 mixed design analysis of variance and the Scheffe Test of All Possible Comparisons. The results indicated that biofeedback did not have an effect on personality traits.

THE EFFECTS OF BIOFEEDBACK ON PERSONALITY:

AN EXPLORATORY STUDY

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by

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## Chapter 1

### INTRODUCTION

This chapter is an introduction to the concepts and intentions of the study. Presented are theoretical formulations, the problem, the statement of the problem, the statement of the hypothesis, purpose of the study, significance of the study, definition of terms, and the limitations of the study.

#### Theoretical Formulation

The relative newness of the field of psychology has lent itself to a proliferation of inquiries and discoveries about the human organism. One of the most recent has been a phenomenon known as biofeedback. Biofeedback involves the use of training to create a relaxed state by providing amplified feedback from certain body systems related to relaxation (Danskin, 1976; Danskin & Lowenstein, 1975; Danskin & Walters, 1973; Green, Green & Walters, 1970; Walters, 1976).

The initial interest in these relaxation processes was directed at physiological change and psychosomatic related diseases such as hypertension, migraine, or tension headache. As research with biofeedback expanded, researchers (Budzynski, Stoyva, Adler, & Mullaney, 1973; Budzynski & Stoyva, 1973; Legalos, 1973), periferally noted changes in personality traits and non-physiological behaviors coinciding with the physiological changes. There has been minimal research dealing with the

types and degree of changes attributed to biofeedback relaxation training (Danskin, 1976; Walters, 1976).

With these observations an increasing number of therapists have begun to use biofeedback as an aid in the psychotherapeutic process. While it is reasonably established that relaxation can be induced, physiological states of stress can be controlled or eliminated, and anxiety can be successfully reduced by biofeedback (Reeves & Mealiea, 1975; Kando, Canter, & Knott, 1975), the effect on the personality is uncertain. In other words, biofeedback for psychotherapy is a relatively untested process with few completely predictable and proven outcomes.

Elmer Green (Green, Green, & Walters, 1970), Director of the Voluntary Controls Project at the Menninger Clinic, Topeka, Kansas, has postulated what he calls the "psychophysiological principle":

Every change in the physiological state is accompanied by an appropriate change in the mental-emotional state, conscious or unconscious, and conversely, every change in the mental-emotional state, conscious or unconscious, is accompanied by an appropriate change in the physiological state. (p. 3)

If Green is correct, then one must expect and be able to predict mental-emotional changes related to physical adjustments brought about through biofeedback. The usefulness and effectiveness of this powerful tool could be decreased without sufficient research and data on which to base its application.

#### THE PROBLEM

It has been suggested that biofeedback facilitates changes in personality (Budzynski, Stoyva, Adler, & Mullaney, 1973; Danskin, 1976; Walters, 1976). There has been a need to establish the validity of

this hypothesis and to specifically determine what traits may be changed.

#### Statement of the Problem

Is there significant personality change as measured by the Personality Research Form for subjects having had biofeedback relaxation training, in subjects having had autogenic phrase relaxation training, and subjects not having had biofeedback or autogenic phrase training?

#### Statement of the Hypothesis

##### (Null Form)

There is no significant personality change as measured by the Personality Research Form for subjects having had biofeedback relaxation training, in subjects having had autogenic phrase relaxation training, and in subjects not having had biofeedback or autogenic phrase relaxation training.

#### Purpose of the Study

This study was an exploratory study to determine the types, if any, of changes in the personality traits represented on the Personality Research Form after a person has undergone biofeedback training. The study was used to help gain more insight as to what factors merit further study to understand how biofeedback may be used as a psychotherapeutic tool.

#### Significance of the Study

The ability to induce physiological changes with biofeedback has been documented; the mental-emotional interaction as it is observed in personality traits is unclear. This study explored and provided

information concerning those personality traits which may merit further study.

#### DEFINITION OF TERMS

The meanings of the descriptive terminology relevant to this study are listed below.

##### Autogenic Phrase Relaxation Training

This is a type of training that is self-generated or self-willed using phrases and imagery conducive to relaxation. The process is taught by a trainer and facilitated by practice (Headrick, 1976a).

##### Biofeedback

This is the use of sensitive detectors with visual and auditory displays to reveal to an individual minute changes in his internal physiological functions. An electronic instrument detects and amplifies a signal from such physiological functions as muscle tension, temperature, blood pressure, heart rate, or brain waves. This is "fed back" to the person in an objective way by visual (meters, lights) and auditory (tones, clicks) displays so the person can watch the minute changes (Danskin & Lowenstein, 1975, p. 2).

##### Biofeedback Training (BFT)

This is a term referring to a type of training by which a person learns the process of voluntary self-regulation of normally involuntary functions that is accomplished by the feedback of immediate objective information about a specific physiological process (Danskin & Lowenstein, 1975, p. 2).

### Biofeedback Relaxation Training

In relaxation training, those techniques which use biofeedback to produce relaxation and reduces stress and tension are collectively called biofeedback relaxation training.

### Electromyograph (EMG)

The degree of tension in a muscle is directly correlated to the degree of electrical activity in that muscle. This activity is measured in microvolts (millionths of a volt). The usual EMG feedback instrument detects and amplifies these changes in electrical potential and instantaneously presents changes on a meter or by changes in the pitch or a tone or the frequency of clicks (Danskin & Lowenstein, 1975, p. 4-5).

### Feedback

In the process of learning, feedback is the report of the result of behavior so that behavioral adaptations might be made (English & English, 1958).

### Flight or Fight Reaction

Stressful situations that require behavioral adjustment appear to trigger a physical response popularly called the "Flight or Fight Reaction." When a person perceives a threatening "Flight or Fight" situation, his/her reflexive response is an integrated physical response that prepares him/her for running or fighting. This response is characterized by increases in metabolism, blood pressure, heart rate, rate of breathing, amount of blood pumped by the heart, and the amount of blood pumped to the skeletal muscles (Benson, 1975).

### Home Practice or Home Training

These are terms referring to the non-instrument practice of biofeedback, usually on a daily basis when biofeedback devices are unavailable, used to maintain biofeedback abilities.

### Passive Volition

The control factor of biofeedback involves choosing to allow the body to achieve a particular state; rather than active volition, such as gross motor activity, biofeedback requires passive volition. It also is described as detached effortless volition (Green, Green, & Walters, 1970, p. 5).

### Personality Research Form

The Personality Research Form is a non-projective personality test designed to yield a set of scores for personality traits broadly relevant to the functioning of individuals in a wide variety of situations. It is primarily focused on areas of normal functioning and uses twenty scales measuring personality traits as defined by Henry Murry in Explorations in Personality, published in 1938. Also included are two validity scales. (For scale description, see Appendix 1, pp. 93-95.) (Jackson, 1974)

### Personality Trait

A personality trait constitutes a lasting quality of a person that accounts for his relative consistency in emotional, temperamental and social behavior or a trait that accounts for differences in personality (English & English, 1958).

## Relaxation

A state or the process of achieving the state in which there is an easing up or lowering of "mental tension" or reducing the tendency to anxiety, fear, anger, or any other emotion response (English & English, 1958).

## Temperature Feedback Trainer (Skin Temperature Trainer)

This is a term referring to an instrument which displays, on a meter, temperature changes on the surface of the skin. Typically temperature is detected by a thermister attached to the middle finger of the dominant hand. Research shows that one of the physiological results of stress is a change in the hands and feet. The temperature feedback instrument directly reports the temperature of the finger. This reflects the volume of blood in the finger, which is related to the volume of stress (Danskin & Lowenstein, 1975, p. 3-4).

### LIMITATIONS OF THE STUDY

The study was limited to volunteer students at Emporia State University. From this volunteer group of students the study groups were randomly selected with a total of ten subjects per group at the conclusion of the study.

The treatment time was eight weeks. This time was an arbitrary figure. The schedule within the time allowed was also arbitrarily set.

### SUMMARY

Biofeedback, a recently developed technique of training to create a relaxed state by providing amplified feedback from certain body systems related to relaxation, is noted as having some effect on personality.

This is in view of the concept that physiological state changes are accompanied by mental-emotional state changes, and mental-emotional state changes are accompanied by certain physiological state changes. Biofeedback is a successful method of treating certain physical problems such as hypertension, migraine headache, or cardiovascular irregularities, and holds promise as a means of aiding in psychological adjustment.

To use this tool, there is a need to understand if there is a change in personality traits and the types of personality changes it may facilitate. This exploratory study provides data on twenty personality traits to help determine what changes, if any, are facilitated by biofeedback.

## Chapter 2

### REVIEW OF THE LITERATURE

This chapter is a review and summary of the literature regarding biofeedback techniques. Presented is an introduction which discusses the general biofeedback concept as it appears in the literature, a brief history of biofeedback, biofeedback as used in physiological treatments and psychotherapy, autogenic phrase relaxation training, and the placebo effect.

### INTRODUCTION

Biofeedback is a relatively new concept in the scientific field. The term "feedback" was coined by the first developers of radio (Karlins & Andrews, 1972). Mathematician Norbert Wiener, one of the first researchers of feedback, defined it as "a method of controlling a system by reinserting into it the results of its past performance" (Karlins & Andrews, 1972). It is gaining of knowledge of results of a particular behavior; to know about past performance or behavior gives reference points from which to change, adjust, or improve that performance or behavior. Mayr (1970, p. 111) points out, "Every animal is a self-regulating system owing its existence, its stability, and most of its behavior to feedback controls."

"Bio" refers to biology or biological. Therefore, biofeedback is a particular kind of feedback, biological feedback. Biofeedback Training (BFT) is the procedure that makes it possible to know our bodily functions

and eventually control them. It is a probe into the "inner space" of our own bodies so we can "see" or "hear" our bodily functions translated quantitatively as brain waves, skin temperature, heart beats, or muscle tension, and gain the information necessary to begin to control them (Karlins & Andrews, 1972). Davidson and Krippner (1972) stated, "Biofeedback techniques are based on the principle that certain responses are made when informational feedback is received by the organism. These responses are adjusted, corrected, and modified as feedback is continually received until it is determined that the final goal is achieved." (p. 3)

More technically, biofeedback has been defined by Birk (1973b) as:

The use of monitoring instruments . . . to detect and amplify internal physiological processes within the body in order to make this ordinarily unavailable internal information available to the individual and literally to feed it back to him in some form (p. 362).

Brown (1974a) describes biofeedback as having three parts:

technology, techniques, and practice. The technology is developing a "translation" instrument, usually an electronic device, to make signals internal to the human perceivable to an individual. The technique is putting inside signals on the outside where they can be easily sensed and interpreted. The practice is to watch or listen to the signals of a selected activity until one is aware of the activity. The phenomenon of biofeedback is that in this awareness a person gains some type of voluntary control of physiological content.

Birk (1973a) in further description suggests:

All biofeedback procedures follow the operant or instrumental paradigm of learning:

criterion (autonomic) reinforcing stimulus. . .with or without instruction, cognitive awareness or conscious intention to change a particular bodily function, the fundamental and irreducible paradigm of biofeedback

is the operant conditioning of bodily responses that are usually largely out of awareness (Italics, Birk's, p. 365-366).

The definitive aspect of this is that the real control lies with the individual rather than outside as operant conditioners have indicated. The body is allowed to be conditioned at the "will" of the mind. A response is learned, but the mind is the key to its operation. Brown (1975) writes, "It has become clear that man may, after all, have a mind resource to control his own being, down to the most minute fragments of his physical structure." (p. 24)

As pointed out by Lawrence (1972), "Biofeedback is the brainchild of a wedding between the psychologist, engineers, physicists, meditators, and physiologists" (p. 18). Western culture has long looked askant, but with some awe, at the oriental meditator's inward involvement. Lawrence (1972) quoted Joe Kamiya, a pioneer in biofeedback research and a past president of the Biofeedback Research Society, in making an apt distinction between the approaches of Western and Eastern cultures toward control and self-control:

Western man has tended to focus on the external world, assuming the internal world to be beyond control, except for what happens to it as a result of efforts toward goal achievement in the external world. Eastern man, on the other hand, appears to have focused more attention on achievements (knowledge and control) in his internal world assuming the world to be largely beyond control (p. 22).

Brown (1974b) called biofeedback an "interacting with the interior self", and anticipated its being a long awaited tool for exploration of such illustrative functions as creativity, insight, inspiration, and motivation. The change may be more than physiological change; it may also be a higher level of functioning for the total organism.

While it is reasonably clear that for every physiological change there is a mental-emotional change and conversely every change in the mental-emotional state is accompanied by physiological change (Green, Green, & Walters, 1971), Brown (1975) indicated that little concrete neurophysiologic knowledge is available on the difference between mind and brain on the mind/brain unity, or about "how volition turns into action". Lawrence (1972) cited speculation by researchers that RNA storage alterations take place within retraining by biofeedback. When animals so trained were killed and brain tissue examined, "increased amounts of RNA" were found; what the "increase" was in relation to was not cited.

In research at the Menninger Foundation, Green, Green, and Walters (1976) hypothesized the biofeedback process:

The chain of events involved in the biofeedback for control of autonomic processes might be hypothesized as follows:  
 Perception of somatic behavior (through biofeedback) →  
 cortical (cognitive) elaboration → limbic (emotional)  
 response → hypothalamic response → autonomic  
 response → somatic response → perception of the  
 somatic behavior, etc. How volition enters into this scheme  
 for self-regulation is not easy to say, but in any event  
 each person becomes his own programmer, so to speak, when,  
 through biofeedback, self-regulation of a physiological  
 process is established (p. 159-160).

Biofeedback must be classified as an awareness or cognitive process because it is an awareness of the relationship between subjective activity and the feedback signals operated by physiologic activity which is the behavior that is learned. It seems that in all experiments dealing with any system of the body, complex learning takes place on a pre- or sub-conscious level and that it is orderly, symbolic, specific, and highly discriminating (Brown, 1974b).

To learn to control a selected phenomenon and body behavior, the phenomenon to be controlled must be identified and its activity converted into a signal. The signal is not the phenomenon to be learned, but a label for the behavior once it has occurred. It is neutral until the central nervous system has identified it as an abstract label for a complex dynamic event. In the beginning the feedback signal is activated on the basis of the probability that the event will occur. It is later that activation is intentional. The behavior is learned by self-analysis of the symbols of its occurrence. Other types of learning are directed by external events while biofeedback depends upon internal efforts by the learner. One must generate the behavior to be learned and the reward for learning it.

#### HISTORY

Even though researchers have formulated the hypotheses and sought answers to these points, the field is still very new. The pre-biofeedback discoveries necessary for its development go back to Caton's observation of electrical activity in the brains of monkeys and rabbits and that there were brain reactions to light and arousal from sleep (Lawrence, 1972). By 1900, research was going on with the goal of finding ways of exploring body functions and recording these functions. Bair (1901) reported one of the first "biofeedback" experiments. A device was developed to report ear twitches. Subjects tried to twitch their ears and "trained" until able to do so. Unfortunately, not much value was found in ear twitching and the experiment remained a curiosity. In the 1920's Hans Berger began to develop EEG records and note patterns to correlate to brain-mind activity. In 1929 he told of varieties of

frequencies and amplitude he had seen on his graphs and tried to relate them to changes in consciousness (Lawrence, 1972).

The first record found in the biofeedback era that could be classed as instrumentally monitored feedback for human training was in 1958. A Russian psychologist, M. I. Lisina, announced success in teaching human subjects dilation and constriction of blood vessels only after she let them watch a recording of vascular changes (Brown, 1974b).

Through the 1960's several separate investigators were beginning independent explorations. Neal Miller, L. V. DiCara, and others under their influence at Yale demonstrated that laboratory rats were capable of learning to control glandular and visceral responses (Di Cara & Miller, 1968a, 1968b, 1969; Miller, 1961, 1964, 1963, 1969a, 1969b; Miller & Carmona, 1967; Miller & DiCara, 1967). Several West Coast researchers experimenting with a process they termed "biofeedback" were, at the same time as Miller's experiments, discovering one another. Barbara Brown, Joe Kamiya and Thomas Mulholland began a correspondence which ultimately led to the formation of the Biofeedback Research Society and the spread of biofeedback research (Lawrence, 1972). In the mid-1970's clinics and research facilities have begun treating biofeedback training as one of the more promising techniques in facilitating greater physical and mental health.

#### PHYSIOLOGICAL TRAINING

Research of biofeedback phenomena has dealt primarily with the treatment and training of physiological systems with limited research in the area of psychotherapy. In its use, biofeedback training is reported to bring therapeutic change when used alone and is enhanced when used

with other therapy procedures such as home relaxation practice, progressive relaxation, autogenic training phrases and good therapist/patient relationships (Budzynski & Stoyva, 1973; Danskin, 1976).

In medical research biofeedback has been demonstrated useful in dealing with hypertension (Brener & Kleinman, 1970; Schwartz, Shapiro, & Turdky, 1973; Green, Green, & Walters, 1972; Green & Green, 1975; Elkins, 1976), heart rate (Hnatiow & Lang, 1965; Berman & Johnson, 1971; Brener, Kleinman, & Goesling, 1969; Headrick, Feather, & Wells, 1971; Weiss & Engel, 1971), gastric ulcers (Beaty, 1976), physical rehabilitation (Brudney, 1974a, 1974b; Johnson & Garton, 1973; Toomin & Johnson, 1974; Lyndes, 1976; Findley, Niman, Standley, & Phifer, 1976), tension headache control (Budzynski & Stoyva, 1969, 1973; Budzynski, Stoyva, & Adler, 1970; Budzynski, Stoyva, Adler, & Mullaney, 1973; Estrada & Estrada, 1974; Wickramasekera, 1972), sphincter control (Engel, Nikoomanesh, & Shuster, 1974), the elimination of subvocalization (Hardyck, Petrinovich, & Ellsworth, 1966; Hardyck & Petrinovich, 1969), epilepsy (Serman, 1972, 1974; Finley, Smith, & Etherson, 1974; Kaplan, 1974; Rouse, Peterson, & Shapiro, 1974; Seifert & Lubar, 1975), hyperkinesis (Haight, Jampolesky, & Jampolesky, 1976), asthma (Davis, 1976; Kotses, Glaus, Crawford, Edwards, & Schear, 1976) migraine headache (Goering, 1973; Green, Green, & Walters, 1970; Sargent, Green, & Walters, 1975; Sargent, Walters, & Green, 1973; Cohen, Levee, McArthur, & Rickles, 1976), and Raynaud's disease (Sargent, Green, & Walters, 1975; May & Weber, 1976; Taub, Emurian, & Howell, 1974; Schwartz, Shapiro, & Turdky, 1973). The potential for benefit in the medical area seems to be limited only by the lack of technology to develop instruments which accurately measure and report physiological functions.

## PSYCHOTHERAPEUTIC USES

The use of biofeedback as a support for psychotherapy is a more recent research phase. The first indications that biofeedback had psychotherapeutic value came as secondary comments and observations to physiologic research. Budzynski, Stoyva, Adler, and Mullaney (1973), using EMG biofeedback, undertook a controlled study to reduce tension headaches. Training consisted of sixteen, semi-weekly, twenty minute EMG feedback sessions, augmented by daily home practice. A pseudo-feedback control group and a non-treatment control group failed to show significant reductions; significant reduction in muscle contractions and headache activity was observed in the experimental group. All subjects were given the Minnesota Multiphasic Personality Inventory (MMPI) pre- and post-test. The pre-test profile showed the Hs (hysteria), D (depression) and Hy (hypochondriasis) scales were somewhat elevated. The post-test profiles of all three groups showed reductions on these three scales, although the only significant change occurred in the Hy score of the group receiving biofeedback.

Budzynski and Stoyva (1973) and Reeves and Mealiea (1975) reported applying EMG in desensitization treatment of phobic fears and pervasive anxiety. The process capitalized on the uses of biofeedback as a means of providing accurate objective information about the level of relaxation. The deep relaxation necessary for systematic desensitization (Wolpe, 1958) could be determined and taught more rapidly thus enhancing the probability of success (Canter, Kondo, & Knott, 1975; Raskin, Johnson, & Rondestvedt, 1973).

Training in self-regulation of hand temperature is being used in combination with other techniques in the treatment of alcoholism and

drug addiction (Fitzsimmons & Peiffer, 1974; Green, Green, & Walters, 1976). This seems to be of particular interest as the question of variables is involved. Kurtz (Green, Green, & Walters, 1976) suggests,

. . . they [alcoholics] think they cannot control anything for certain. They feel that they are robots of some kind. They feel that they can't guarantee their behavior because they are victims of impulses and compulsions completely beyond their capacity to handle (p. 160).

In gaining control of hand temperature, etc., their locus of control evidently shifts (Jordan & Schallow, 1975). Again this appears to be true with such things as weight loss (Weinstock, 1975).

At the Veterans Administration Hospital in Topeka, Kansas, psychiatrist Kenneth Godfrey (1976) in an interview reported that the VA Hospital staff had noted and been impressed by ongoing research being done by Elmer and Alyce Green and Dale Walters at the Menninger Foundation in which students at Washburn University in Topeka spontaneously reported positive change in study skills, problem solution, and in general maturity and integration. The VA had noted that alcoholics tend to be very immature and hoped to use biofeedback to improve maturity levels. Also they noted that alcoholics do not "look" at themselves, persons, and events. Biofeedback training is useful in helping alcoholics look at themselves and their environment and to help them begin to realize and control the outcome of their behaviors.

Dwane Piercy (1976), also of the Topeka VA Hospital, notes that biofeedback for alcoholics works best with people somewhat intellectually advanced and works poorly with those who cannot deal with isolation. Piercy and other VA staff suggest an important consideration in the use of biofeedback for alcoholics is the promoting of a shift of locus of control from external to internal and that biofeedback may aid in that

shift as a patient learns to control some physiological system as well as produce anxiety and stress reduction.

In psychotherapy, insomniacs have found relief using biofeedback (Montgomery & Besner, 1975; Coursey, Frankel, & Gaarder, 1976). In therapy Legalos (1973) reported two cases in which physical symptoms, migraine headaches in one case and insomnia and general tension in another, were dealt with through biofeedback while the clients were in psychotherapy. The psychotherapy alone had no more progress in either case. With the combination of biofeedback and psychotherapy, the physical discomforts were significantly reduced or eliminated and very significant breakthroughs were made in therapy. In other therapeutic settings biofeedback relaxation was used successfully as a means of reducing anxiety as associated with depression (Kando, Canter, & Knott, 1975).

As a psychotherapeutic technique, Townsend, House, and Addario (1975) found:

The results for the feedback group indicate that successful EMG relaxation is accompanied by significant decreases in mood disturbance and anxiety test scores and is thus an effective adjunct therapy for chronic anxiety . . . it is expected that . . . decreases in anxiety and mood disturbance would continue as long as the patient practices regularly (p. 599-600).

This is also supported by Budzynski, Stoyva, and Adler (1973), and Raskin, Johnson, and Rondestvedt (1973).

In practice Danskin and Walters (1973) and Danskin and Lowenstein (1975) suggest biofeedback promoted reduction of body tensions, a heightened self esteem, and enhanced "symptom relief" such as a decreased nail biting, lessened feelings of abandonment, improvement with speech impediments, and a decreased need to get "high" on drugs.

Budzynski (1972), Goering (1973), Green, Green, and Walters (1974), and Green, Green, and Walters (1970, 1971) suggest that biofeedback may enhance creativity and productivity toward the greatest potential of the individual.

#### AUTOGENIC PHRASE RELAXATION TRAINING

Autogenic training, often used with biofeedback training, and preceding it in the field of physiological self-management, arose from auto-hypnosis. First called "autohypnotic rest", its originator, Oskar Vogt, noticed its "remarkable recuperative effect" and introduced it into the medical world during the period 1894-1903 (Luthe, 1969). In 1910 Vogt's co-worker and follower, J. H. Schultz, developed six basic exercises which use repetition of relaxing phrases to enhance focus on and training various body components; at this time Vogt suggested the name autogenic training (Headrick, 1977). Luthe (1969, p. 441) described the autogenic focusing method as promoting in one's self "certain self-normalizing functions which are directed and coordinated by his brain". He pointed out that the term "autogenic means self-generated" and he has frequently spoken and written of the need for therapy to enhance homeostatic balance. The relaxation provides the internal situation to allow the balance.

The central aspect of autogenic training is "passive somatic attention". Autogenic training involves the subject leaning back in an arm chair with his eyes closed in a quiet room. Phrases, which suggest physiological states associated with relaxation (e.g., my right arm is

heavy) and the subject is instructed to "passively concentrate" on its repetition. The phrases are intended to facilitate concentration upon and "mental contact" with the part of the body indicated by the phrases (Davidson & Schwartz, 1976).

Autogenic training has been used with meditation and progressive relaxation as a support to maintain gains achieved in biofeedback and as a means of facilitating biofeedback practice. The passive concentration feature is particularly useful in translating to passive volition aspects of biofeedback.

It is reported that autogenic training has been useful in the treatment of heart disease, high blood pressure, and lipid metabolism disorders, although Luthe, chief North American proponent of autogenic therapy, is cautious in approaching bodily dysfunction and, in various statements at the Biofeedback Research Society Annual Meetings, has warned against naïve and wholesale "curing with a hammer"--his category for a treatment method by those who understand the therapy, but not the disease (Headrick, 1976b).

Progressive relaxation, similar to autogenic training in that its emphasis is on somatic relaxation, is also used as a supportive technique in biofeedback training and in Wolpe's (1958; Wolpe & Lazarus, 1966) systematic desensitization. Jacobson (1938, 1957, 1964) developed the process of relaxation and its effectiveness has been well established (Davidson & Schwartz, 1976).

This relaxation technique involves the systematic focus of attention on various gross muscle groups through the body. The subject is instructed to actively tense each group for a few seconds after which he is told to release his muscles and relax. The tensing of each major

muscle group increases the awareness of somatic cues enabling subjects to passively concentrate on specific body parts, thus enabling complete somatic relaxation.

### PLACEBO EFFECT

A point of considerable discussion among biofeedback researchers has continued to be that of controlling the placebo effect, that is, "any medication used to alleviate symptoms, not by reasons of specific pharmacologic action but solely by reinforcing the patient's favorable expectations from treatment" (Hirsie & Campbell, 1960). Stroebel and Glueck (1973) suggest:

As clinicians, we have wondered if it will ever be possible to separate out the "real" versus the placebo effects of biofeedback in human subjects. Probably not, much to the anguish of our scientific side, which demands objectivity, experimental precision, and epistemologic surity in our understanding of man and his problems.

. . . the perplexing objective-subjective mix that characterizes biofeedback may force us to reorganize the existence of "soft" clinical issues. . . . The "contaminating" placebo effect may be a crucial clinical variable of utmost importance that we have minimized in our zeal for a scientific medicine (p. 379-398).

Unfortunately, there have been insufficient means for evaluating the placebo component and its interaction with the active principle in determining effectiveness of biofeedback treatment. Shapiro and Schwartz (1972) noted that some biofeedback studies using normal subjects:

. . . have eliminated suggestion effects by using identical instructions for different groups of subjects and by administering the instructions before the experimental condition is determined so that unintentional nonverbal experimenter effects are eliminated (p. 181).

Even so, the ordinary placebo control in experiments is not appropriate for biofeedback research because the effects of suggestion are so much a part of autonomic learning effects. This is to say that a positive or a negative expectation enhances the direct learning effect or significantly reduces the outcome (Birk, 1973b).

Brown (1974b) concludes:

Acknowledging the reality of the placebo effect is important to the future of biofeedback. They are both drugless and their benefits originate in the activity of the mind. The only difference is that the placebo action stems from nebulous subconscious desire; biofeedback effects are accomplished by awareness and learning (p. 376).

#### SUMMARY

A review of the pertinent literature indicated biofeedback is a process that makes possible knowing our internal bodily functions and controlling these functions. This appears to have numerous physiologic benefits such as the control of hypertension (Brener & Kleinman, 1970) or migraine headaches (Green, Green, & Walters, 1973). Further, there are indications that the use of biofeedback techniques may promote personality or behavioral changes (Legalos, 1973) as well as enhance more abstract aspects of human function as creativity (Green, Green, & Walters, 1970). Techniques related to biofeedback and frequently used with biofeedback are autogenic phrase relaxation training, a derivative of auto-hypnosis, developed by Oskar Vogt, J. H. Schultz, and Wolfgang Luthe (Luthe, 1969), and progressive relaxation, developed by Joseph Wolpe (Wolpe, 1958). These techniques enhance relaxation and promote results similar to some, but not all, biofeedback results.

In addition, the placebo effect as related to biofeedback was reviewed. Placebo effect has been difficult to evaluate in biofeedback

research. It may be possible that the placebo effect is an important part of biofeedback as a technique and should be accepted as a part of the technique.

The review of the literature indicates that biofeedback may be associated with personality or behavioral traits and it also indicates other methods may enhance biofeedback or may obtain similar results. Further indicated is that biofeedback is or contains an element of placebo. With these factors in view, the quest for research is, "Do biofeedback techniques actually, predictably, promote or have an effect on personality traits?"

## Chapter 3

### METHOD AND PROCEDURE

The procedure followed in the study is discussed in this chapter. This chapter includes population and sampling, design of the study, materials and instrumentation, procedure and data collection and method of data analysis.

#### Population

All male and female university students enrolled at Emporia State University were included in the population limits. This population was selected because of its availability.

#### Sample

Volunteers were solicited from the population by advertisement in a campus circular and by a memo requesting announcement of a need for volunteers that was sent to instructors and graduate teaching assistants. Three groups of subjects were randomly drawn from the pool of volunteers. After screening for physical and psychiatric histories which could present potential hazards to the subjects during the experiment, as well as screening for experience with biofeedback, transcendental meditation or other similar experience, the autogenic phrase treatment group totaled eighteen, the biofeedback treatment group totaled seventeen and the control group totaled fifteen at the beginning of treatment. The final number of subjects per group after dropouts was ten.

Of the subjects completing the study, eight were males and twenty-two were females. The average age was 21.2 years with the age range of 17 years to 40 years. The average age of the biofeedback group was 25.1, of the autogenic phrase group, 19.3 years and of the control group, 19.2 years. This was not a random sample of the population and was non-representative of the population proportions.

### Design

A between-within two factor mixed design was used. This is also known as a "split-plot" design. Basically there are two categories in the within groups factors or levels, the pre-test and the post-test and there are three factors or levels between groups, biofeedback relaxation, autogenic phrase relaxation, and a control group.

## MATERIALS AND INSTRUMENTATION

### Instrumentation

All subjects were tested using the Personality Research Form (PRF) (see Appendix 1, p. 99). The PRF is a 440-item non-projective test designed to measure broadly relevant personality traits in settings such as school and college. Twenty trait scales were identified (see Appendix 1, p. 93): abasement, achievement, affiliation, aggression, autonomy, change, cognitive structure, defendence, dominance, endurance, exhibition, harmavoidance, impulsivity, nuturance, order, play, sentience, social recognition, succorance, and understanding. Two validity scales were also included.

## Materials

In the experimental procedures, charts and handouts were distributed and used by treatment group subjects. Each subject signed a training agreement (see Appendix 2, p.116) explaining the requirement and expectations of participation. Each subject, during the treatment period, received handouts providing direction in progressive and autogenic phrase relaxation techniques (see Appendices 3, 4, & 5, pp. 119-135.)

The biofeedback group received skin temperature training record charts which provided for the recording of beginning temperatures, the highest temperature observed during practice and subjective observations and EMG training charts which provided for the recording of beginning and lowest tension levels observed during practice and subjective observations (see Appendix 6, p.136). The autogenic phrase group used a chart for home practice which provided for the recording, on a continuum, subjective levels of tension at the beginning and the end of practice and other observations made (see Appendix 7, p.137.)

The control group was not observed in any way or required to keep any charts during the treatment period. Contact with the treatment group was only during testing.

### PROCEDURES AND DATA COLLECTION

A pre-test of each group was made using Form AA or Form BB of the Personality Research Form (see Appendix 1, p. 99). After eight weeks training was completed, all groups were post-tested with the corresponding parallel form of the Personality Research Form. With each administration, because of the length of the test, the forms were distributed and requested to be returned by the next day.

One group received a maximum of four weeks of temperature feedback training and four weeks of EMG feedback training for a total of eight weeks. Subjects were told they would be allowed to complete training in less than eight weeks by reaching a training goal of being able to demonstrate voluntary control of hand temperature and/or control of levels of tension to a level of less than 0.5 microvolts in the frontalis (forehead) muscles. The group met once per week and was required to practice with training devices at least three times per week, and was asked to home practice on those days in which they did not train using biofeedback devices. At the first and fifth weekly meetings the biofeedback group was instructed in the use of devices and charts. At each weekly meeting, progressive relaxation and autogenic phrase relaxation methods were demonstrated in the same sequence as the autogenic phrase relaxation group. Each subject kept a record as to his/her biofeedback experience. A skin temperature chart and an EMG chart (see Appendix 6, p. 136) were used.

Another group met weekly and was instructed on the facilitation of relaxation by autogenic phrase training. The initial meeting involved the use of a progressive relaxation method (see Appendix 3, p. 119). Succeeding training sessions involved the instruction of autogenic phrase methods (see Appendices 4 and 5, pp. 123-135). The autogenic phrase group was required to home train, using the methods presented, at least three times per week and preferably every day. They were asked to keep a chart of training experiences (see Appendix 7, p. 140) and submit these charts every second week.

Both treatment groups were asked to sign training agreements (see Appendix 2, p. 115). Also at each group's weekly meeting, time was

allowed for an interaction with the experimenter for the recording of subjective observations and answering of questions. The observations were recorded on the training sheets and by the experimenter if the observations were verbal. While the interaction and answering of questions held a potential for contamination, it was a part of the training procedure and important to its delivery. As much as possible the interactions with each experimental group were of similar procedure and content.

At the same time as the treatment groups, the control group was asked to take the Personality Research Form for a study that was being done. After eight weeks the control group was asked to take a parallel form of the test for the same study as the first test. No other information was provided to the control group.

#### DATA ANALYSIS

Collected data were treated with the use of a 2 x 3 between-within mixed design analysis of variance to test for significant differences between the means of the groups (Litton & Gallow, 1975) (see Tables 1 and 2). The sample was treated as a random sample although subjects were volunteers from the population, because analysis of variance has been shown to be robust enough to tolerate some violation of the assumptions of a random sample from a normal population, a homogeneous variation of subgroups ( $H_0: \bar{X}_1 = \bar{X}_2 = \bar{X}_3$ ) and independent samples. In addition, where there was a significant difference between the means, the Scheffe Test for all possible comparisons (see Table 3) was applied (Roscoe, 1969). The .05 level of confidence was used.

Table 1

Table for Raw Data for a 2X3 Between-Within Model Design  
of Analysis of Variance

Group	WITHIN SUBJECTS		Total
	Pre-Test	Post-Test	
Biofeedback Relaxation Training	10 subjects	10 subjects	Total <sub>BFT</sub> $n_{BFT} = 20$ $n_s = 2$
Autogenic Phrase Relaxation Training	10 subjects	10 subjects	Total <sub>APT</sub> $n_{APT} = 20$ $n_s = 2$
Control	10 subjects	10 subjects	Total <sub>Control</sub> $n_{control} = 20$ $n_s = 2$
	Total <sub>Pre</sub> $n_{Pre} = 30$	Total <sub>Post</sub> $n_{Post} = 30$	$N = 60$ $G = \text{Pre+Post}$ $+ \text{BFT+APT}$ $+ \text{Control}$

Summary Table: Between-Within Analysis of Variance

Two-Factor Mixed Design

(Linton and Gallow, 1975)

Source	df	Sum of squares (SS)	Mean square (MS)	F
Between-Subjects	$s - 1$	$SS_S = \sum_{S=1}^s T_S^2/n_S - G^2/N$		
A	$a - 1$	$SS_A = \sum_{A=1}^a T_A^2/n_A - G^2/N$	$MS_A = SS_A/(a - 1)$	$F_A = MS_A/MS_{E:BS}$
Error:Between-Subjects	$s - a$	$SS_{E:BS} = SS_S - SS_A$	$MS_{E:BS} = SS_{E:BS}/(s-a)$	
Within-Subjects	$s(b-1)$	$SS_{WS} = SS_T - SS_S$		
B	$b - 1$	$SS_B = \sum_{B=1}^b T_B^2/n_B - G^2/N$	$MS_B = SS_B/(b-1)$	$F_B = MS_B/MS_{E:WS}$
AB	$(a-1) \cdot (b-1)$	$SS_{AB} = \sum_{AB=1}^{ab} T_{AB}^2/n_{AB} - SS_A$	$MS_{AB} = SS_{AB}/(a-1)(b-1)$	$F_{AB} = MS_{AB}/MS_{E:WS}$
Error:Within-Subjects	$(b-1) \cdot (s-a)$	$SS_{E:WS} = SS_{WS} - SS_B - SS_{AB}$	$MS_{E:WS} = SS_{E:WS}/(b-1)(s-a)$	
Total	$N - 1$	$SS_T = X^2 - G^2/N$		

Table 3

## Scheffe Test for All Possible Comparisons

(Procedure for Arriving at Critical  
Differences Between the Means  
for Samples of Equal Size)

(Roscoe, 1969)

$$d = \sqrt{\frac{2 (k-1) (\text{Tabled } F) (MS_W)}{n}}$$

where:  $d$  = critical difference

$k$  = number of groups

$MS_W$  = mean square within

$n$  = number of subjects in each group

## Chapter 4

### ANALYSIS OF DATA

The purpose of this chapter is to present the analysis of collected data from the Personality Research Form (see Appendix 1, p. 99). Presented is an analysis trait by trait for those trait scales showing significance at the .05 level when tested by the analysis of variance. The scales showing significance have been analyzed using the Scheffe Test for All Possible Comparisons, significant at the .05 level.

### ANALYSIS OF TRAIT SCALES

The trait scales not showing significance were abasement, achievement, affiliation, aggression, autonomy, cognitive structure, dominance, endurance, harmavoidance, nurturance, order, play and sentience. Summary tables for each analysis of variance may be found in Appendix 8, p. 141. The null hypothesis was retained for those scales ( $p > .05$ ), that is, for those traits biofeedback was not related to significant personality trait changes. The analysis of variance indicates significant variation ( $p < .05$ ) on the scales of the Personality Research Form known as change, defence, exhibition, impulsivity, social recognition, succorance and understanding. These results are discussed separately.

## Change

"Change" was a measure of the trait related to the ability to deal with new experiences and adapt readily to change in the environment. A high scorer was described as:

Likes new and different experiences; dislikes routine and avoids it; may readily change opinions or values in different circumstances; adapts readily to changes in the environment (Jackson, 1974, p. 6).

Significance ( $p < .05$ ) was indicated between the subjects by the analysis of variance (see Tables 4 and 5, and Figure 1). Inspection of Table 4 and Figure 1 indicated that the control group means total ( $\bar{X}_{Ctotal} = 45.40$ ) are lower than the treatment groups ( $\bar{X}_{BFTtotal} = 52.75$ ;  $\bar{X}_{APtotal} = 53.50$ ), suggesting a tendency to be less receptive to change and more rigid, and that the treatment post-test means ( $\bar{X}_{BFTpost} = 54.20$ ;  $\bar{X}_{APpost} = 54.10$ ) increased over the pre-test means ( $\bar{X}_{BFTpre} = 51.30$ ;  $\bar{X}_{APpre} = 52.90$ ) whereas the control post-test mean ( $\bar{X} = 43.90$ ) decreased from the pre-test mean ( $\bar{X} = 46.90$ ).

The Scheffe Test of All Possible Comparisons was used to identify the specific differences between all obtained means (see Tables 6 and 7). The Scheffe Test revealed no significant differences ( $p > .05$ ) between any of the means. Roscoe (1969) stated:

It is not at all uncommon to follow a significant finding by the analysis of variance with the Scheffe procedure and find that no two means differ significantly. This may be attributed to the fact that the analysis of variance provided a more powerful test of the hypothesis of equal means. When this occurs, if the variance yields a significant finding, it is reasonable to conclude that the largest mean is significantly larger than the smallest mean, even though the Scheffe test was unable to detect this difference. Of course, the investigator may wonder whether there are other significant differences that are not detected by the Scheffe test (p. 241).

Table 4

Table of Pre-test, Post-test and Total Group Means of the Experimental and Control Groups for the Change Trait

	Biofeedback	Autogenic phrase	Control
Pre-test	51.30	52.90	46.90
Post-test	54.20	54.10	43.90
Total	52.75	53.50	45.40

Table 5

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Change Trait for the Biofeedback, Autogenic Phrase and Control Groups

Source	df	Sum of squares	Mean squares	F	F <sub>Tabled</sub>
Between-subjects	29	3292.00			
Treatment	2	800.95	400.48	4.34	3.35*
Error: Between-subjects	27	2491.05	92.26		
Within-subjects	30	1616.85			
Pre-Post	1	1.66	1.66	0.01	4.20*
Treatment X Pre-Post	2	92.59	46.30	0.26	3.35*
Error: Within-subjects	27	4814.60	178.32		
Total	59	4908.85			

\*p < .05

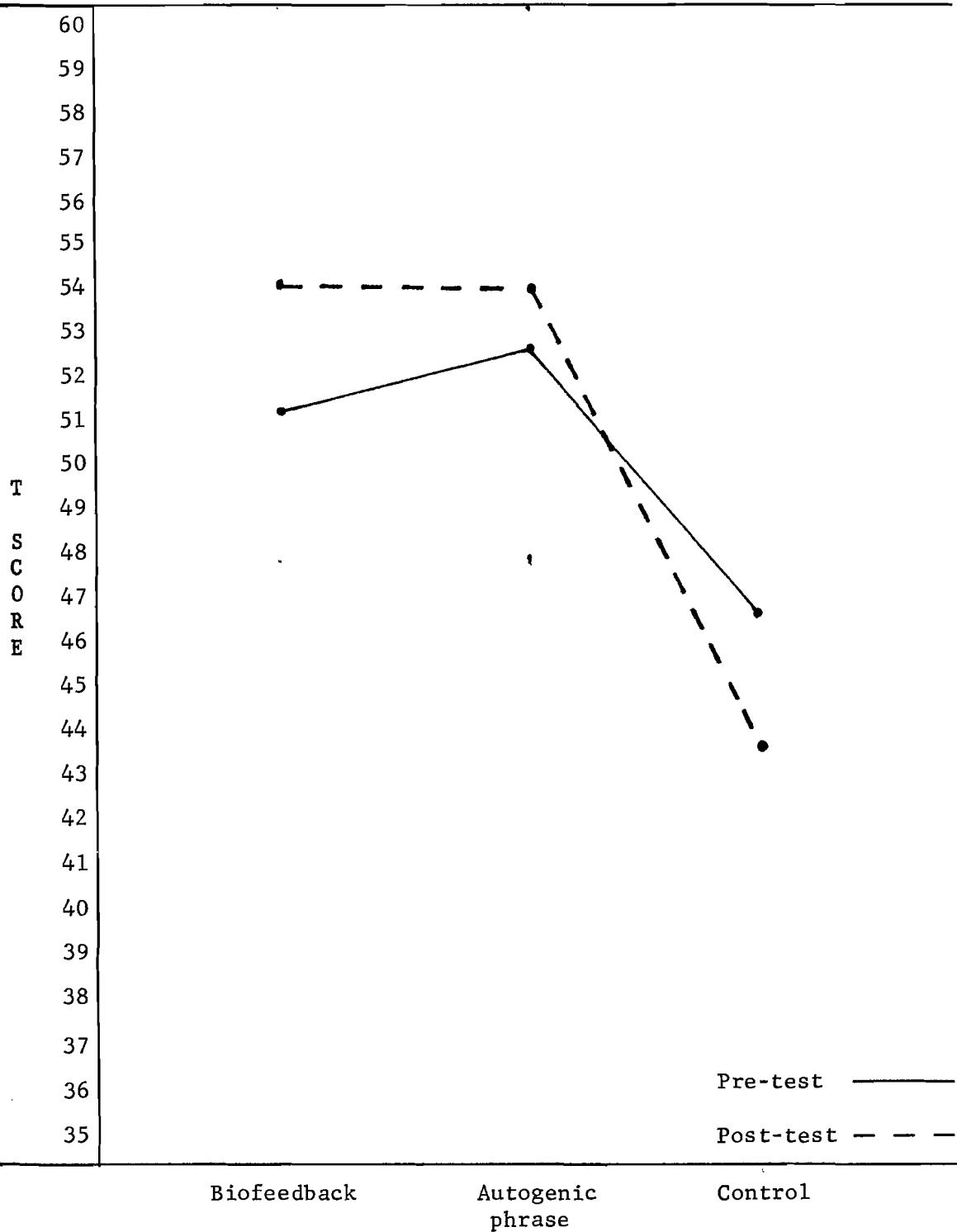


Figure 1

Experimental and Control Group Means  
for the Change Trait

Table 6

Table of Obtained Mean Differences of the Change Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Treatment	$\bar{X}$	$\bar{X}-43.9$	$\bar{X}-46.9$	$\bar{X}-57.3$	$\bar{X}-52.9$	$\bar{X}-59.1$
Biofeedback Post	54.2	10.3	7.3	2.9	1.3	0.1
Autogenic Phrase Post	54.1	10.2	7.2	2.8	1.2	
Autogenic Phrase Pre	52.9	9.0	6.0	1.6		
Biofeedback Pre	51.3	7.4	4.4			
Control Pre	46.9	3.0				
Control Post	43.9					

\*significant differences (see Table 7)

Table 7

Table of Critical Differences: Scheffe Test of All Possible Comparisons of the Change Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Number of Groups compared	$F_{\text{Tabled}}$	Minimum value for critical differences
6	2.42	20.773*
5	2.59	19.222*
4	2.85	17.523*
3	3.35	15.458*
2	4.35	12.455*

\*p < .05

Considering this statement, a significant difference between the means of the biofeedback post-test ( $\bar{X}=54.20$ ) and the control post-test ( $\bar{X}=43.00$ ) was assumed and was consistent with the analysis of variance. As no significant differences were indicated within subjects, that is, between the pre-test and post-test means within one group, the null hypothesis was retained.

### Defence

The trait related to defensiveness, rationalization and the tendency to suspect others was measured on a scale titled "Defence." An individual scoring high on the defence scale was characterized as:

Readily suspects that people mean him harm or are against him; ready to defend himself at all times; takes offense easily; also does not accept criticism readily (Jackson, 1974, p. 6).

Significance ( $p < .05$ ) was revealed between the groups and in the interaction Treatment X Pre-Post (Between X Within) by the analysis of variance (see Tables 8 and 9, and Figure 2). On the examination of Table 8 and Figure 2, it may be noted that the autogenic pre-test ( $\bar{X}=46.80$ ) post-test ( $\bar{X}=49.40$ ) mean differences showed an increase whereas the control group pre-test ( $\bar{X}=57.10$ ) post-test ( $\bar{X}=54.90$ ) mean difference was a decrease. The biofeedback pre-test mean ( $\bar{X}=55.20$ ) was greater than the post-test mean ( $\bar{X}=52.50$ ). In average pre-test, post-test total means the autogenic mean ( $\bar{X}=48.10$ ) was lower than the biofeedback ( $\bar{X}=53.85$ ) or control ( $\bar{X}=56.00$ ) mean. Visual examination of Figure 2 showed a movement toward all groups becoming similar, the biofeedback and control group less defensive and the autogenic group more defensive. This was a change in range differences of 10.3 T-scores on the pre-test reduced to 7.9 on the post-test.

Table 8

Table of Pre-test, Post-test and Total Group Means of the  
Experimental and Control Groups  
for the Defence Trait

	Biofeedback	Autogenic phrase	Control
Pre-test	55.20	46.80	57.10
Post-test	52.50	49.40	54.90
Total	53.85	48.10	56.00

Table 9

Table for the Between-Within Analysis of Variance Summary for  
Pre-test and Post-test Measures of the Defence Trait  
for the Biofeedback, Autogenic Phrase and  
Control Groups

Source	df	Sum of squares	Mean squares	F	F <sub>Tabled</sub>
Between-subjects	29	2671.15			
Treatment	2	667.30	333.65	4.50	3.35*
Error: Between-subjects	27	2003.85	74.22		
Within-subjects	30	1216.50			
Pre-Post	1	8.81	8.81	0.52	4.20*
Treatment X Pre-Post	2	761.75	380.88	23.06	3.35*
Error: Within-Subjects	27	445.94	16.52		
Total	59	3887.65			

\*p < .05

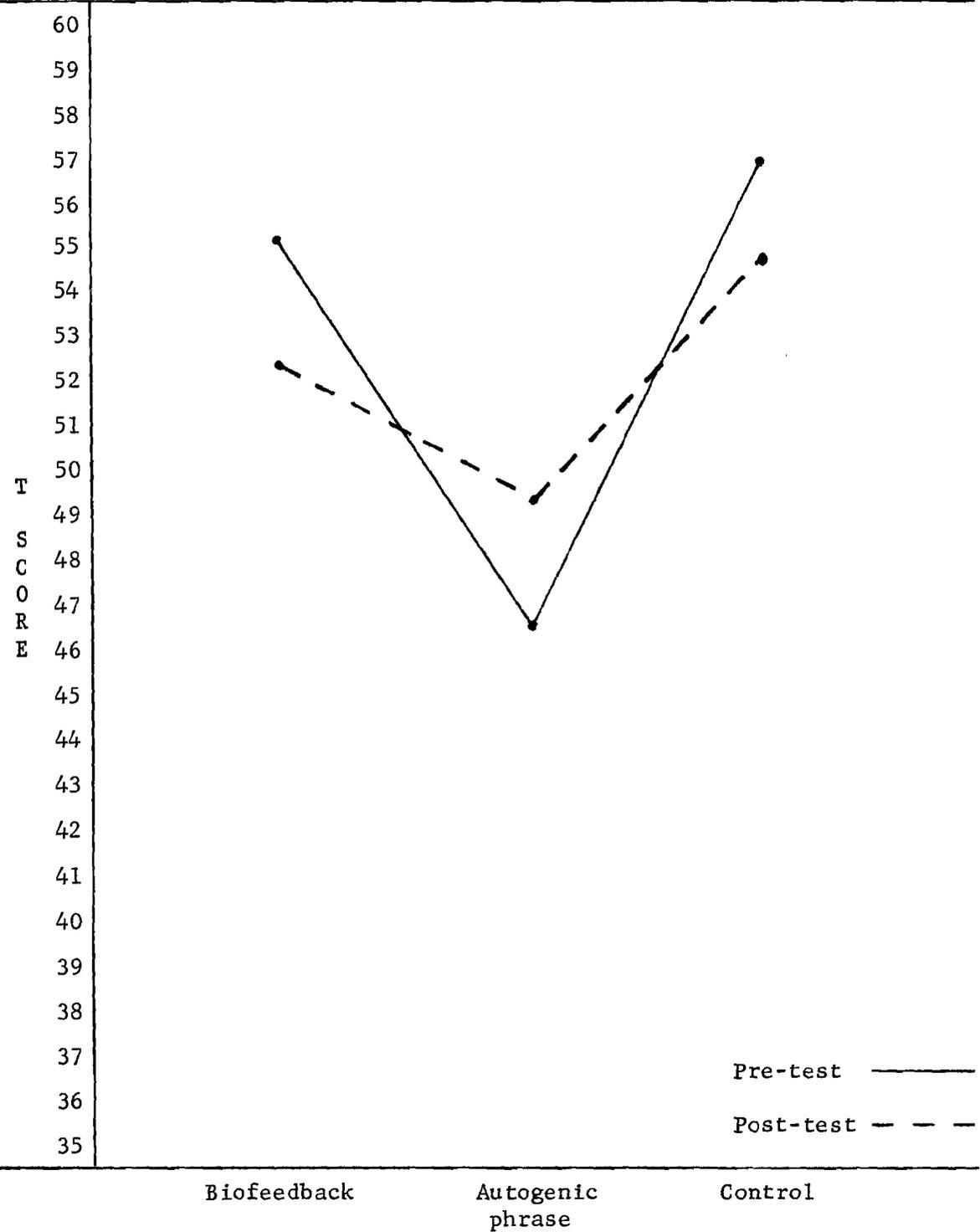


Figure 2  
Experimental and Control Group Means  
for the Defence Trait

The Scheffe Test of All Possible Comparisons revealed critical differences between the mean of the autogenic phrase pre-test ( $\bar{X}=46.80$ ) and the control pre-test ( $\bar{X}=57.10$ ) and post-test ( $\bar{X}=54.90$ ) means and the biofeedback pre-test ( $\bar{X}=55.20$ ) and post-test ( $\bar{X}=52.50$ ) means, respectively, and a critical difference between the mean of the autogenic phrase post-test ( $\bar{X}=49.40$ ) and the control pre-test ( $\bar{X}=57.10$ ) and post-test ( $\bar{X}=54.90$ ) and the biofeedback pre-test ( $\bar{X}=55.20$ ) means, respectively (see Tables 10 and 11).

The significance between the pre-test and post-test means not-within subjects were irrelevant to the hypothesis in this study. These differences may have contributed to the interaction, Treatment X Pre-Post (or Between X Within), noted in the analysis of variance summary. This was consistent with the analysis of variance results and as there were no significant variances within subjects, the null hypothesis was retained.

### Exhibition

The scale on the Personality Research Form which sought to determine levels of the need to be the receiver of attention or to be noticed by others was known as "Exhibition". A high scorer was described as:

Wants to be the center of attention; enjoys having an audience; engages in behavior which wins the notice of others; may enjoy being dramatic or witty (Jackson, 1974, p. 6).

Significance ( $p < .05$ ) was found within subjects and in the interaction, Treatment X Pre-Post (Between X Within), by the analysis of variance (see Tables 12 and 13, and Figure 3). Of note on the examination of Table 12 and Figure 3 was that the pre-test means were within a 1.3 T-score range ( $\bar{X}_{BFTpre} = 47.90$ ,  $\bar{X}_{APpre} = 48.7$ ,  $\bar{X}_{Cpre} = 49.20$ ). The

Table 10

Table of Obtained Mean Differences of the Defence Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Treatment	$\bar{X}$	$\bar{X}-46.8$	$\bar{X}-49.4$	$\bar{X}-52.5$	$\bar{X}-54.9$	$\bar{X}-55.2$
Control Pre	57.1	10.3*	7.7*	4.6	2.2	1.9
Biofeedback Pre	55.2	8.4*	5.8*	2.7	3.0	
Control Post	54.9	8.1*	5.5*	2.4		
Biofeedback Post	52.5	5.7*	3.1			
Autogenic Post	49.4	2.6				
Autogenic Pre	56.8					

\*significant differences (see Table 11)

Table 11

Table of Critical Differences: Scheffe Test of All Possible Comparisons of the Defence Trait for the Pre-Test and Post-Test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Number of groups compared	$F_{\text{Tabled}}$	Minimum value for critical differences
6	2.42	6.323*
5	2.59	5.851*
4	2.85	5.315*
3	3.35	4.705*
2	4.35	3.791*

\*p < .05

biofeedback post-test mean ( $\bar{X}=55.10$ ) increased as did the control post-test mean ( $\bar{X}=55.60$ ), but the autogenic phrase decreased ( $\bar{X}=44.50$ ).

In order to define the variance the Scheffe Test of All Possible Comparisons was used (see Tables 14 and 15). The Scheffe indicated a critical difference ( $p < .05$ ) exists between the mean of the control post-test ( $\bar{X}=55.6$ ) and the means of the autogenic post-test ( $\bar{X}=44.5$ ) and the control post-test ( $\bar{X}=49.2$ ), respectively, and a critical difference between the mean of the biofeedback post-test ( $\bar{X}=55.1$ ) and the means of the biofeedback pre-test ( $\bar{X}=47.9$ ), the autogenic pre-test ( $\bar{X}=44.5$ ) and post-test ( $\bar{X}=48.7$ ) and the control pre-test ( $\bar{X}=49.2$ ), respectively. The significant differences between the pre-test and post-test means not-within subjects were irrelevant to the hypothesis of this study, but probably contributed to the interaction, Treatment X Pre-Post (Between X Within) noted in the analysis of variance summary. There was a significant difference ( $p < .05$ ) between groups, between the biofeedback post-test ( $\bar{X}=55.1$ ) and autogenic post-test means ( $\bar{X}=44.5$ ) and between the control post-test ( $\bar{X}=55.6$ ) and autogenic post-test means ( $\bar{X}=44.5$ ). Within groups a significant difference ( $p < .05$ ) was shown within the biofeedback ( $\bar{X}_{\text{BFTpre}}=47.9$ ,  $\bar{X}_{\text{BFTpost}}=55.1$ ) and control ( $\bar{X}_{\text{Cpre}}=49.2$ ,  $\bar{X}_{\text{Cpost}}=55.6$ ) groups. The null hypothesis was retained where significance was found in the biofeedback group scores and one of the other groups scores (see Chapter V: Conclusions, p. 67).

### Impulsivity

The measure of impulsiveness on the Personality Research Form was labeled "Impulsivity." Specifically, one who received a high score was characterized as:

Table 12

Table of Pre-test, Post-test and Total Group Means of the  
Experimental and Control Groups for the  
Exhibition Trait

	Biofeedback	Autogenic phrase	Control
Pre-test	47.90	48.70	49.20
Post-test	55.10	44.50	55.60
Total	51.50	46.60	57.40

Table 13

Table for the Between-Within Analysis of Variance Summary for  
Pre-test and Post-test Measures of the Exhibition Trait  
for the Biofeedback, Autogenic Phrase and  
Control Groups

Source	df	Sum of squares	Mean squares	F	F <sub>Tabled</sub>
Between-subjects	29	4478.84			
Treatment	2	387.74	194.87	1.29	3.35*
Error: Between-subjects	27	4090.10	151.49		
Within-subjects	30	1347.50			
Pre-Post	1	147.27	147.27	5.00	4.20*
Treatment X Pre-Post	2	404.93	202.47	6.87	3.35*
Error: Within-Subjects	27	795.30	29.46		
Total	59	5826.34			

\*p < .05

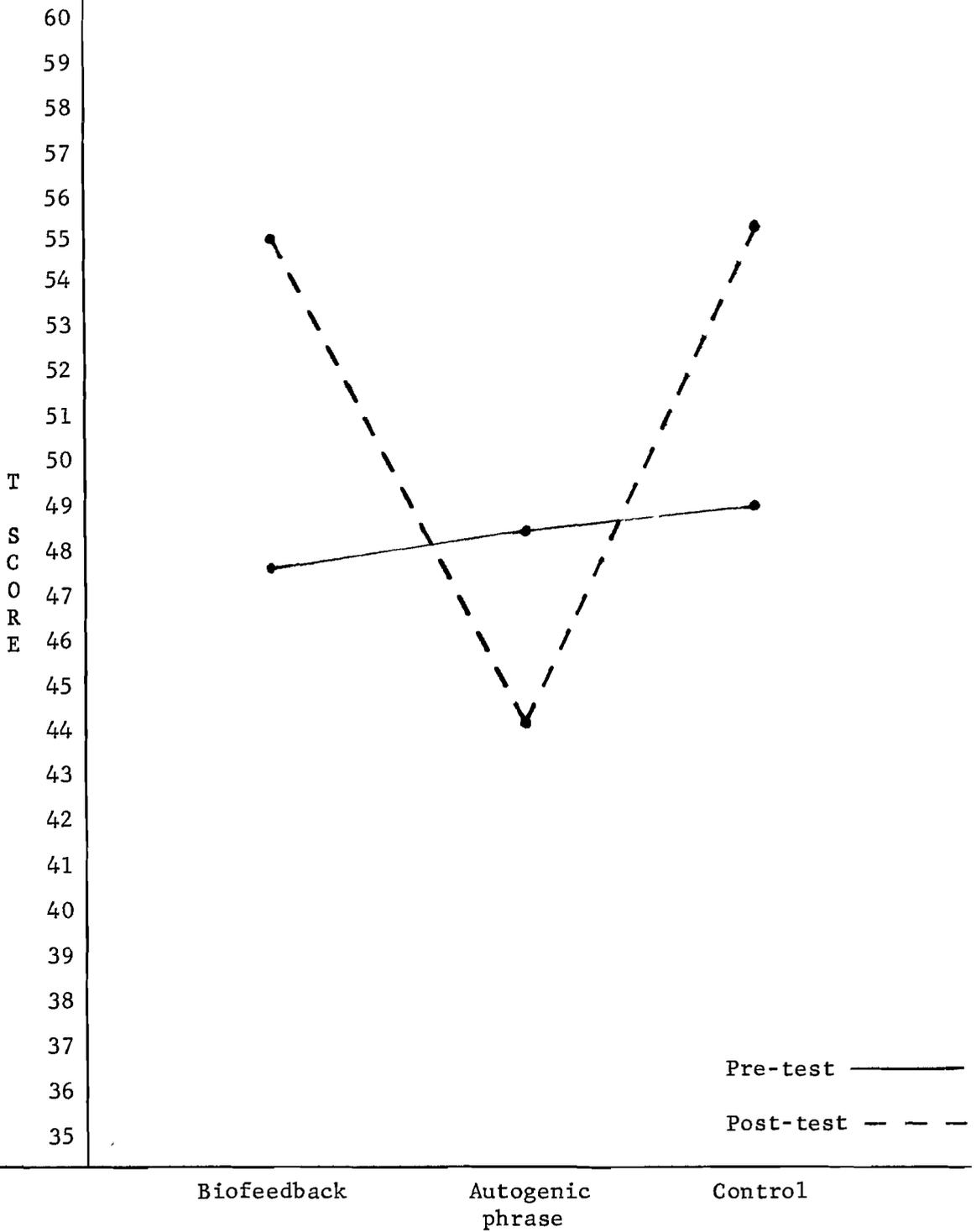


Figure 3  
Experimental and Control Group Means  
for the Exhibition Trait

Table 14

Table of Obtained Mean Differences of the Exhibition Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Treatment	$\bar{X}$	$\bar{X}-44.5$	$\bar{X}-47.9$	$\bar{X}-48.7$	$\bar{X}-49.2$	$\bar{X}-55.1$
Control Post	55.6	11.1*	7.7	6.9	6.4*	0.5
Biofeedback Post	55.1	10.6*	7.2*	6.4*	5.9*	
Control Pre	49.2	4.7	1.3	0.5		
Autogenic Pre	48.7	4.2	0.8			
Biofeedback Pre	47.9	3.4				
Autogenic Post	44.5					

\*significant differences (see Table 15)

Table 15

Table of Critical Differences: Scheffe Test of All Possible Comparisons of the Exhibition Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Number of groups compared	$F_{\text{Tabled}}$	Minimum value for critical differences
6	2.42	8.443*
5	2.59	7.812*
4	2.85	7.122*
3	3.35	6.283*
2	4.35	5.062*

\*p < .05

Tends to act on the "spur of the moment" and without deliberation; gives vent readily to feelings and wishes; speaks freely; may be volatile in emotional expression (Jackson, 1974, p. 7).

The analysis of variance indicated significance ( $p < .05$ ) within subjects (see Tables 16 and 17, and Figure 4). Inspection of Table 16 and Figure 4 reveals that all three post-test means ( $\bar{X}_{\text{BFTpost}} = 55.30$ ,  $\bar{X}_{\text{APpost}} = 53.60$ ,  $\bar{X}_{\text{Cpost}} = 52.70$ ) increased over the pre-test means ( $\bar{X}_{\text{BFTpre}} = 51.90$ ,  $\bar{X}_{\text{Apré}} = 48.60$ ,  $\bar{X}_{\text{Cpre}} = 47.80$ ).

The variance within groups indicated by the analysis of variance was further defined by applying the Scheffe Test of All Possible Comparisons. Significant differences ( $p < .05$ ) were indicated by the Scheffe Test between the biofeedback post-test mean ( $\bar{X} = 55.3$ ) and the means of the control pre-test ( $\bar{X} = 47.8$ ) and the autogenic pre-test ( $\bar{X} = 48.6$ ), respectively, and between the autogenic post-test mean ( $\bar{X} = 53.6$ ) and the control pre-test mean ( $\bar{X} = 47.8$ ). No within subjects differences were found as was indicated by the analysis of variance. The significant differences revealed by the Scheffe Test showed pre-test post-test differences between subjects rather than within subjects. This might be expected to be near significance on the analysis of variance interaction relationship ( $p > .05$ ), but was far from it (Treatment X Post $_F = 0.26$ ,  $F_{\text{Tabled}} = 3.35$ ). The analysis of variance also shows little variance ( $p > .05$ ) between groups (Between $_F = 0.31$ ,  $F_{\text{Tabled}} = 3.35$ ). As the known differences were between subjects rather than within subjects, in this instance the null hypothesis was retained.

Table 16

Table of Pre-test, Post-test and Total Group Means of the Experimental and Control Groups for the Impulsivity Trait

	Biofeedback	Autogenic phrase	Control
Pre-test	51.90	48.60	47.80
Post-test	55.30	53.60	52.70
Total	53.60	51.10	50.25

Table 17

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Impulsivity Trait for the Biofeedback, Autogenic Phrase and Control Groups

Source	df	Sum of squares	Mean square	F	F <sub>Tabled</sub>
Between-subjects	29	5438.15			
Treatment	2	121.30	60.65	0.31	3.35*
Error: Between-subjects	27	5316.85	196.92		
Within-subjects	30	721.50			
Pre-Post	1	294.81	249.81	19.01	4.20*
Treatment X Pre Post	2	8.04	4.02	0.26	3.35*
Error: Within-subjects	27	418.65	15.51		
Total	59	6159.65			

\*p < .05

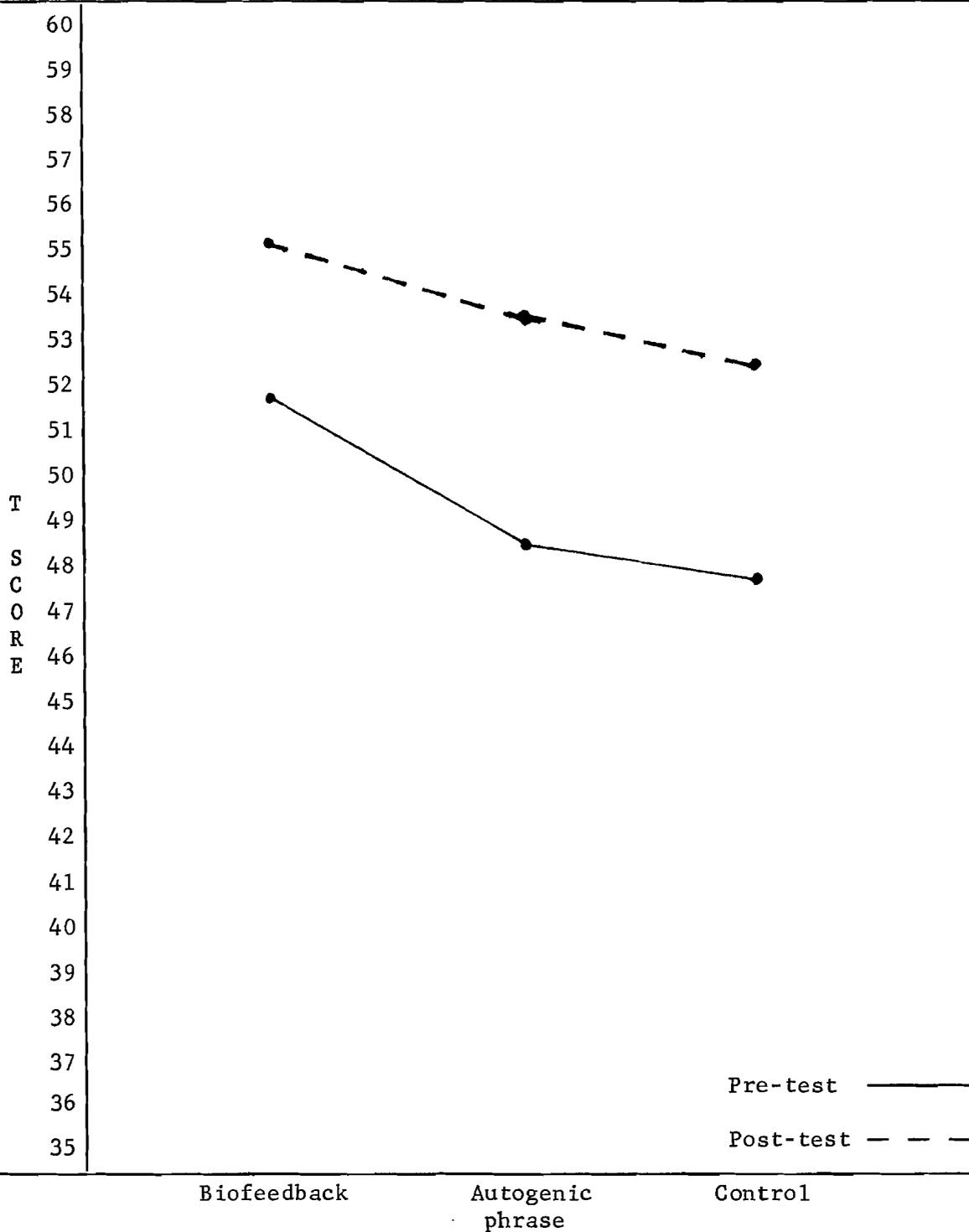


Figure 4  
Experimental and Control Group Means  
of the Impulsivity Trait

Table 18

Table of Obtained Mean Differences of the Impulsivity Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Treatment	$\bar{X}$	$\bar{X}-47.8$	$\bar{X}-48.6$	$\bar{X}-51.9$	$\bar{X}-52.7$	$\bar{X}-53.1$
Biofeedback Post	55.3	7.5*	6.7*	3.4	2.6	1.7
Autogenic Post	53.6	5.8*	5.0	1.7	0.9	
Control Post	52.7	4.9	4.1	0.8		
Biofeedback Pre	51.9	4.1	3.3			
Autogenic Pre	48.6	0.8				
Control Pre	47.8					

\*significant differences (see Table 19)

Table 19

Table of Critical Differences: Scheffe Test of All Possible Comparisons of the Impulsivity Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Number of groups compared	$F_{\text{Tabled}}$	Minimum value for critical differences
6	2.42	6.127*
5	2.59	5.669*
4	2.85	5.150*
3	3.35	4.559*
2	4.35	3.673*

\*p < .05

## Social Recognition

"Social recognition" was a measure of the traits related to levels of the need to be accepted and have the approval and recognition of others. A high scorer was described as:

Desires to be held in high esteem by acquaintances; concerned about reputation and what other people think of him; works for the approval and recognition of others (Jackson, 1974, p. 7).

Significant variance ( $p < .05$ ) was indicated within subjects by the analysis of variance (see Tables 20 and 21, and Figure 5). Examination of Table 20 and Figure 5 reveals that the control group means ( $\bar{X}_{Ctotal} = 57.15$ ) were overall higher than the treatment groups ( $\bar{X}_{BFTtotal} = 51.25$ ;  $\bar{X}_{APtotal} = 48.60$ ). While all groups had a pre-test to post-test increase in means, the biofeedback group ( $\bar{X}_{BFTpre} = 48.1$ ,  $\bar{X}_{BFTpost} = 54.4$ ) had on Figure 5 a noticeably larger increase than the other groups ( $\bar{X}_{APpre} = 47.8$ ;  $\bar{X}_{APpost} = 49.4$ ;  $\bar{X}_{Cpre} = 55.4$ ;  $\bar{X}_{Cpost} = 58.9$ ).

The Scheffe Test of All Possible Comparisons was applied to reveal the specific differences. Significant differences ( $p < .05$ ) were noted between the mean of the control post-test ( $\bar{X} = 58.9$ ) and the means of the autogenic phrase pre-test ( $\bar{X} = 47.8$ ) and the biofeedback pre-test ( $\bar{X} = 48.1$ ), respectively. These were pre-test post-test differences, but were between subjects rather than within subjects, and were not applicable to the hypothesis. This may have been the source of the significant variance found by the analysis of variance, but as the Scheffe Test was a very conservative comparison, it was possible that there was a significant difference pre-test to post-test for the biofeedback group. If so this may mean that the biofeedback relaxation training was promoting a change in the social recognition trait. As no significance was indicated to be within groups by the Scheffe Test of All

Table 20

Table of Pre-test, Post-test and Total Group Means of the  
Experimental and Control Groups for the Social  
Recognition Trait

	Biofeedback	Autogenic phrase	Control
Pre-test	48.10	47.80	55.40
Post-test	54.40	49.40	58.90
Total	51.25	48.60	57.15

Table 21

Table for the Between-Within Analysis of Variance Summary for  
Pre-test and Post-test Measures of the Social Recognition  
Trait for the Biofeedback, Autogenic Phrase  
and Control Groups

Source	df	Sum of squares	Mean square	F	F <sub>Tabled</sub>
Between-subjects	29	5478.34			
Treatment	2	766.24	383.12	2.20	3.35*
Error: Between-subjects	27	4712.10	174.52		
Within-subjects	30	1449.00			
Pre-Post	1	216.60	216.60	4.97	4.20*
Treatment X Pre Post	2	55.90	27.95	0.64	3.35*
Error: Within-subjects	27	1176.50	43.57		
Total	59	6927.34			

\*p < .05

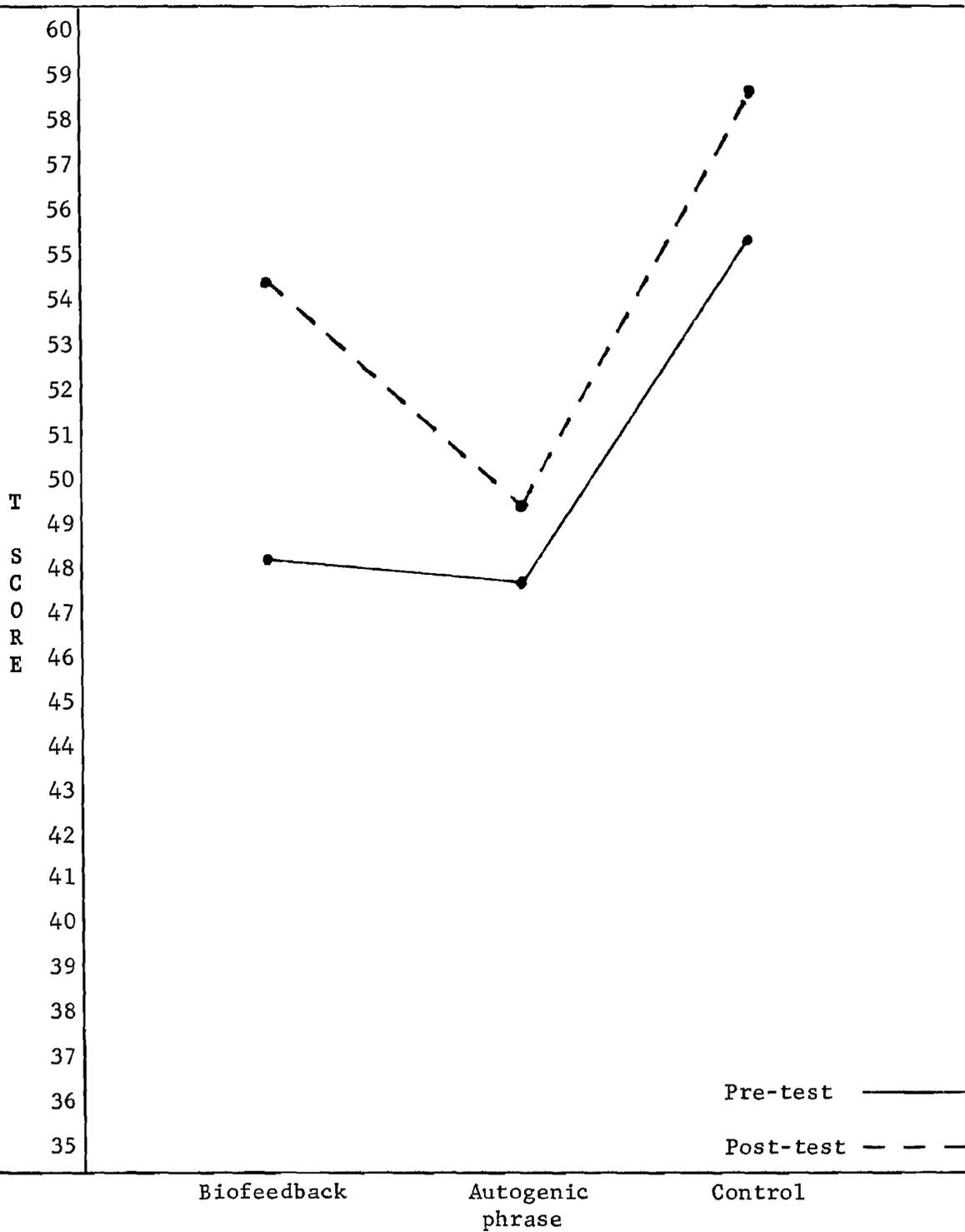


Figure 5

Experimental and Control Group Means  
of the Social Recognition Trait

Possible Comparisons (see Tables 22 and 23), the null hypothesis was retained.

### Succorance

The trait related to the need to be supported and protected was measured on a scale titled "Succorance". An individual scoring high on the succorance scale would have been described as:

Frequently seeks the sympathy, protection, love, advice and reassurance of other people; may feel insecure or helpless without such support; confides difficulties readily to a receptive person (Jackson, 1974, p. 7).

Significance ( $p < .05$ ) was indicated between subjects by the analysis of variance (see Tables 24 and 25, and Figure 6). Table 24 and Figure 6 show that the means of the control group were notably higher

( $\bar{X}_{Ctotal} = 56.50$ ) than the treatment groups ( $\bar{X}_{BFTtotal} = 49.80$ ;  $\bar{X}_{APtotal} = 46.50$ ) as was true with social recognition indicating a greater need for external support by the control group. Within groups there was little notable change from pre-test to post-test ( $\bar{X}_{BFTpre} = 50.2$ ,  $\bar{X}_{BFTpost} = 49.4$ ;  $\bar{X}_{APpre} = 46.8$ ;  $\bar{X}_{APpost} = 46.2$ ;  $\bar{X}_{Cpre} = 54.6$ ;  $\bar{X}_{Cpost} = 57.4$ ).

The Scheffe Test of All Possible Comparisons was used to specifically determine the variance (see Tables 26 and 27, and Figure 6). The Scheffe Test revealed no significant differences ( $p > .05$ ) between any means, although Roscoe (1969) suggests one may assume significance between the largest and smallest mean, in this case between the control post-test ( $\bar{X} = 57.4$ ) mean and the autogenic post-test mean ( $\bar{X} = 46.2$ ). No within subjects differences were noted, therefore, the null hypothesis was retained.

Table 22

Table of Obtained Mean Differences of the Social Recognition Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Treatment	$\bar{X}$	$\bar{X}-47.8$	$\bar{X}-48.1$	$\bar{X}-49.4$	$\bar{X}-54.4$	$\bar{X}-55.4$
Control Post	58.9	11.1*	10.8*	9.5*	4.5	3.5
Control Pre	55.4	7.6	7.3	6.0	1.0	
Biofeedback Post	54.4	6.6	6.3	5.0		
Autogenic Post	49.4	1.6	1.3			
Biofeedback Pre	48.1	0.3				
Autogenic Pre	47.8					

\*significant differences (see Table 23)

Table 23

Table of Critical Differences: Scheffe Test of All Possible Comparisons of the Social Recognition Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Number of groups compared	$F_{\text{Tabled}}$	Minimum value for critical differences
6	2.42	10.268*
5	2.59	9.501*
4	2.85	8.632*
3	3.35	7.641*
2	4.35	6.157*

\*p < .05

Table 24

Table of Pre-test, Post-test and Total Group Means of the  
Experimental and Control Groups for the  
Succorance Trait

	Biofeedback	Autogenic phrase	Control
Pre-test	50.20	46.80	54.60
Post-test	49.40	46.20	57.40
Total	49.80	46.50	56.50

Table 25

Table of the Between-Within Analysis of Variance Summary for  
Pre-test and Post-test Measures of the Succorance Trait  
for the Biofeedback, Autogenic Phrase and  
Control Groups

Source	df	Sum of squares	Mean square	F	F <sub>Tabled</sub>
Between-subjects	29	1761.74			
Treatment	2	930.54	465.27	115.11	3.35*
Error: Between-subjects	27	831.20			
Within-subjects	30	3131.00			
Pre-Post	1	3.27	3.27	0.03	4.20*
Treatment X Pre Post	2	40.93	20.47	0.18	8.35*
Error: Within-subjects	27	3086.80	114.33		
Total	59	4892.74			

\*p <.05

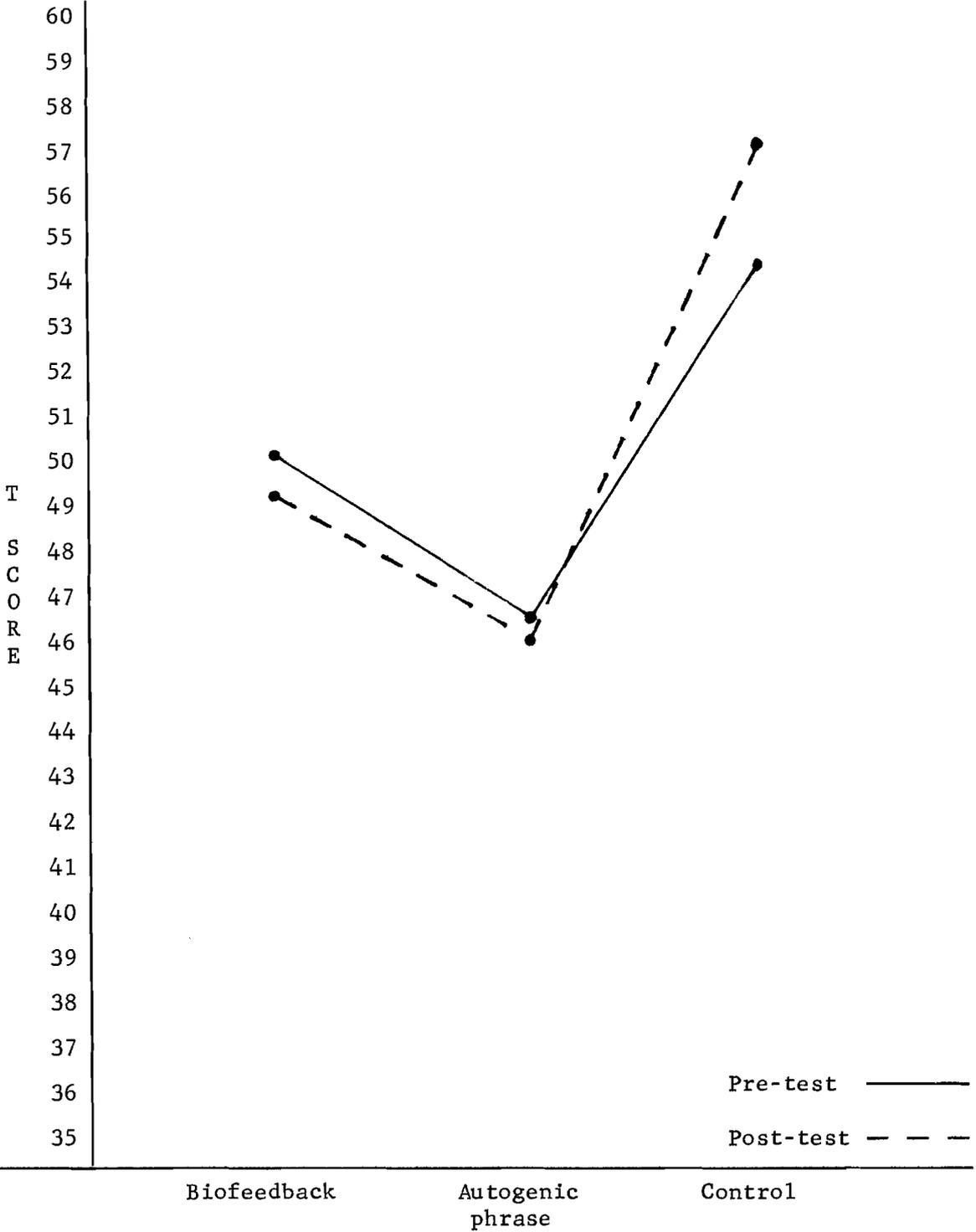


Figure 6  
Experimental and Control Group Means  
of the Succorance Trait

Table 26

Table of Obtained Mean Differences of the Succorance Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Treatment	$\bar{X}$	$\bar{X}-46.2$	$\bar{X}-46.8$	$\bar{X}-49.4$	$\bar{X}-50.2$	$\bar{X}-54.6$
Control Post	57.4	11.2*	10.6*	8.0*	7.2	2.6
Control Pre	54.6	8.4	7.8	5.2	4.4	
Biofeedback Pre	50.2	4.0	3.4	0.8		
Biofeedback Post	49.4	3.2	2.6			
Autogenic Pre	46.8	0.6				
Autogenic Post	46.2					

\*significant differences (see Table 27)

Table 27

Table of Critical Differences: Scheffe Test of All Possible Comparisons of the Succorance Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Number of groups compared	$F_{\text{Tabled}}$	Minimum value for critical differences
6	2.42	16.634*
5	2.59	15.391*
4	2.85	13.982*
3	3.35	12.377*
2	4.35	9.973*

\* $p < .05$

## Understanding

The scale on the Personality Research Form which sought to determine curiosity and the need to know was labeled "Understanding". A high scorer was characterized as:

Wants to understand many areas of knowledge; values synthesis of ideas, verifiable generalization, logical thought, particularly when directed at satisfying intellectual curiosity (Jackson, 1974, p. 7).

Significance ( $p < .05$ ) was indicated between groups by the analysis of variance (see Tables 28 and 29, and Figure 7). Indicated in Table 28 and on Figure 7 were differences of at least five T-scores. The control group received the lowest scores ( $\bar{X}_{Cpre} = 37.2$ ,  $\bar{X}_{Cpost} = 43.6$ ,  $\bar{X}_{Ctotal} = 40.4$ ), the autogenic group next lowest ( $\bar{X}_{APpre} = 54.3$ ,  $\bar{X}_{APpost} = 46.7$ ,  $\bar{X}_{APtotal} = 50.5$ ) and the biofeedback group the highest ( $\bar{X}_{BFTpre} = 56.9$ ,  $\bar{X}_{BFTpost} = 55.0$ ,  $\bar{X}_{BFTtotal} = 55.95$ ). The autogenic and control groups both showed a much larger change ( $AP_{pre-post} = 7.6$ ;  $AP_{pre-post} = -6.4$ ) than the biofeedback group ( $BFT_{pre-post} = 1.9$ ).

To make clear the differences between the means, the Scheffe Test for All Possible Comparisons was used (see Tables 30 and 31). The Scheffe Test indicated significant differences ( $p < .05$ ) between the mean of the biofeedback pre-test ( $\bar{X} = 56.9$ ) and the means of the control pre-test ( $\bar{X} = 37.2$ ) and post-test ( $\bar{X} = 43.6$ ), respectively, between the biofeedback pre-test ( $\bar{X} = 55.0$ ) and the control pre-test ( $\bar{X} = 37.2$ ) and between the mean of the autogenic pre-test ( $\bar{X} = 54.3$ ) and the means of the control pre-test ( $\bar{X} = 37.2$ ) and post-test ( $\bar{X} = 43.6$ ), respectively. No within subjects differences were noted, therefore, the null hypothesis was retained.

Table 28

Table of Pre-test, Post-test and Total Group Means of the  
Experimental and Control Groups for the  
Understanding Trait

	Biofeedback	Autogenic phrase	Control
Pre-test	56.90	54.30	37.20
Post-test	55.00	46.70	43.60
Total	55.95	50.50	40.40

Table 29

Table of the Between-Within Analysis of Variance Summary for  
Pre-test and Post-test Measures of the Understanding  
Trait for the Biofeedback, Autogenic Phrase  
Control Groups

Source	df	Sum of squares	Mean square	F	F <sub>Tabled</sub>
Between-subjects	29	7617.35			
Treatment	2	2490.10	1245.05	6.56	3.35*
Error: Between-subjects	27	5127.25	189.90		
Within-subjects	30	2625.50			
Pre-Post	1	16.01	16.01	0.20	4.20*
Treatment X Pre Post	2	495.64	247.82	3.17	3.35*
Error: Within-subjects	27	2113.85	78.29		
Total	59	10242.85			

\*p < .05

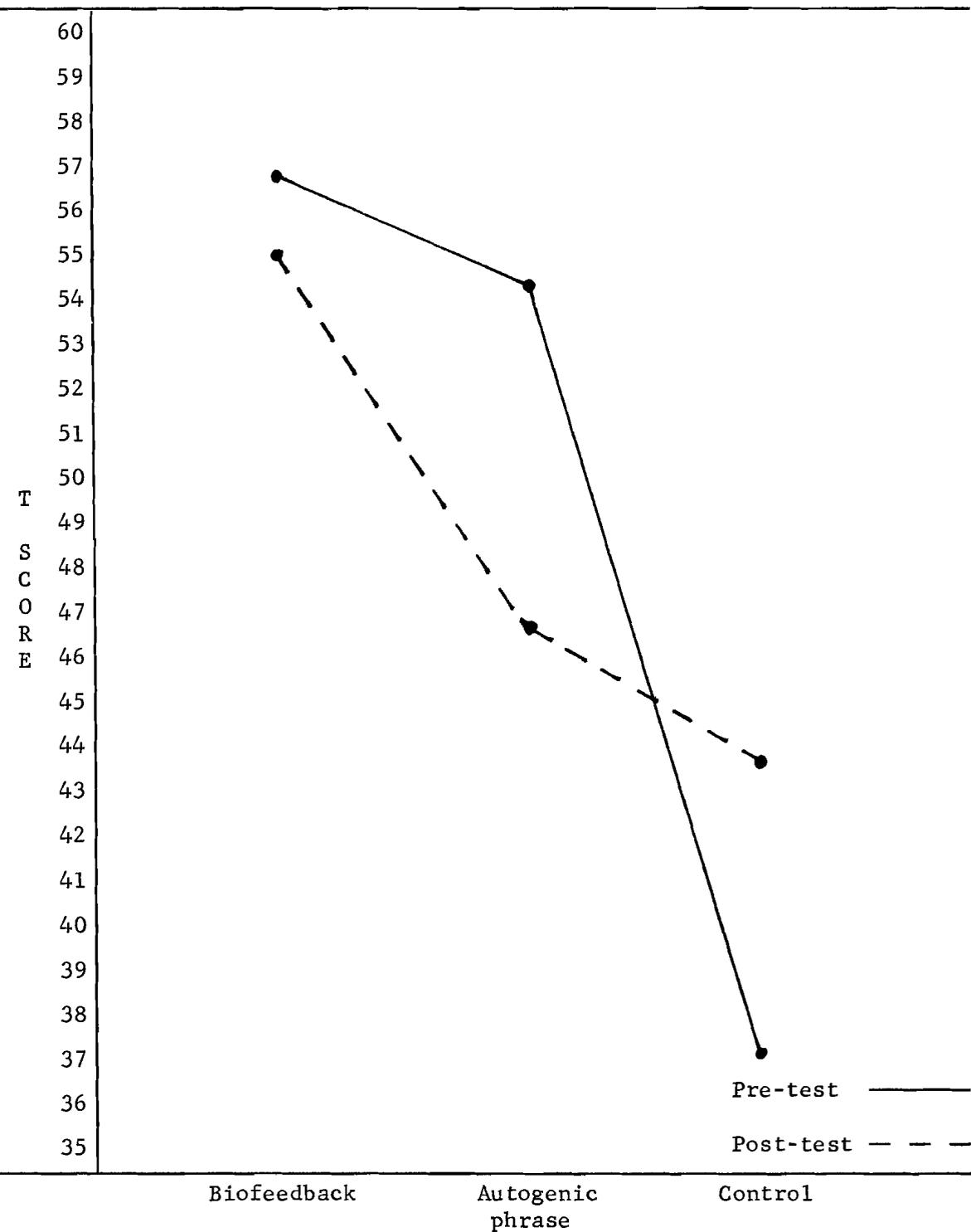


Figure 7

Experimental and Control Group Means  
of the Understanding Trait

Table 30

Table of Obtained Mean Differences of the Understanding Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Treatment	$\bar{X}$	$\bar{X}-37.2$	$\bar{X}-43.6$	$\bar{X}-46.7$	$\bar{X}-54.3$	$\bar{X}-55.0$
Biofeedback Pre	56.9	19.7*	13.3*	10.2	2.6	1.9
Biofeedback Post	55.0	17.8*	11.4	8.3	0.7	
Autogenic Pre	54.3	17.1*	10.7*	7.6		
Autogenic Post	46.7	9.5	3.1			
Control Post	43.6	6.4				
Control Pre	37.2					

\*significant differences (see Table 31)

Table 31

Table of Critical Differences: Scheffe Test of All Possible Comparisons of the Understanding Trait for the Pre-test and Post-test Measures of the Biofeedback, Autogenic Phrase and Control Groups

Number of groups compared	$F_{\text{Tabled}}$	Minimum value for critical differences
6	2.42	13.765*
5	2.59	12.736*
4	2.85	11.570*
3	3.35	10.243*
2	4.35	8.253*

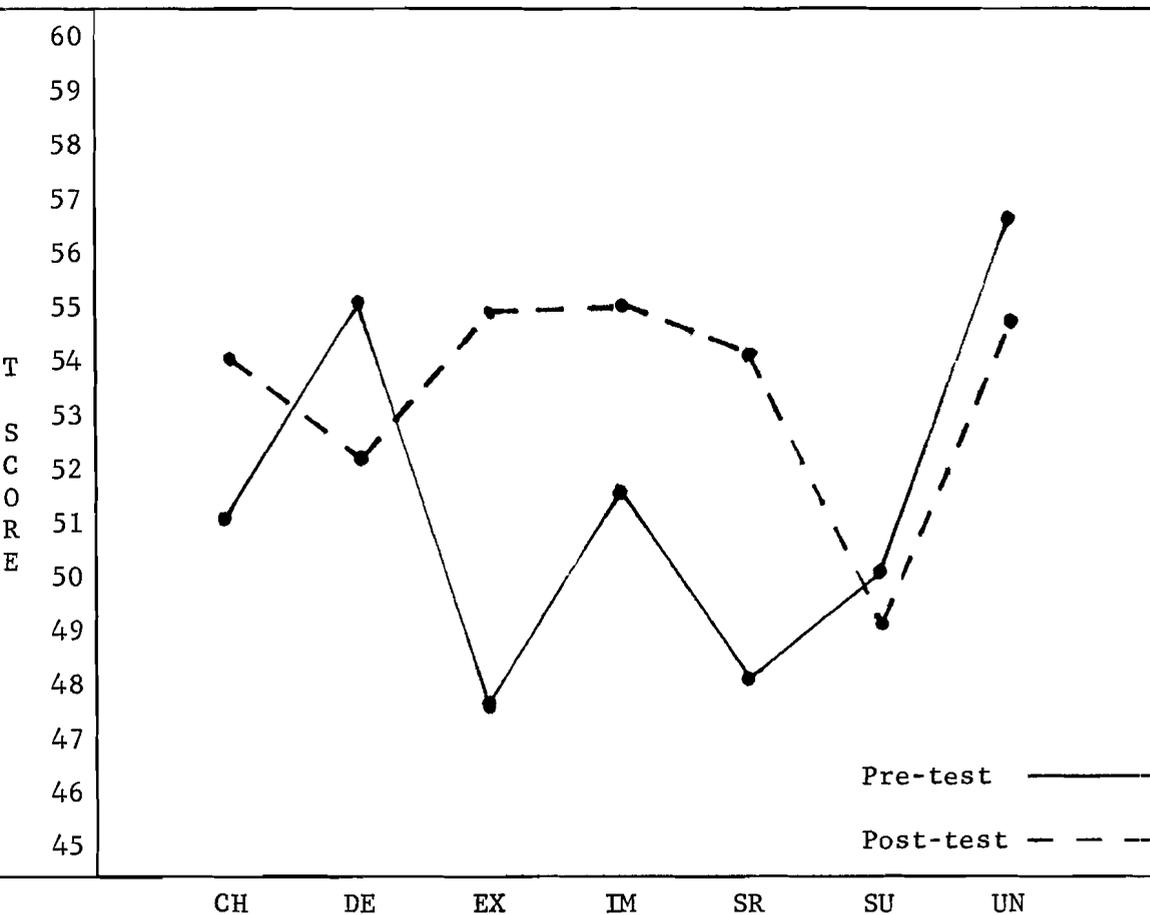
\* $p < .05$

## SUMMARY

In all cases in which the analysis of variance indicated a significant variance at the .05 level of confidence, the Scheffe Test did not indicate a significant difference within subjects except on the exhibition scale and this significance was for both the biofeedback and control groups. Therefore, the null hypothesis was still retained. In all cases the null hypothesis was retained, that is, biofeedback was not related to personality trait changes in this study.

Inspecting the tables of pre-test, post-test and total group means of the experimental and control groups for each trait and each graph of the experimental and control group means for each trait, a relative increase was observed for the biofeedback group for the traits change, exhibition, impulsivity and social recognition, and a relative decrease was observed for the biofeedback group on the defence scale (see Figure 8). Compared to the Personality Research Form norms, the biofeedback group means were within one standard deviation of the standardized mean.

In general the biofeedback group tended to consistently move toward being more flexible and less defensive and rigid in function. The autogenic phrase group had no consistent relative changes or tendencies. Scales with notable relative increases for the autogenic phrase group were change, defence, and impulsivity and a relative decrease on the trait scales exhibition and understanding (see Figure 9). The control group also was without consistent changes with relative increases on the trait scales exhibition, impulsivity, succorance and understanding and a decrease in the trait scales defence and change (see Figure 10).



CH - Change  
 DE - Defence  
 EX - Exhibition  
 IM - Impulsivity

SR - Social Recognition  
 SU - Succorance  
 UN - Understanding

Figure 8

Mean T-Scores for the Biofeedback Group

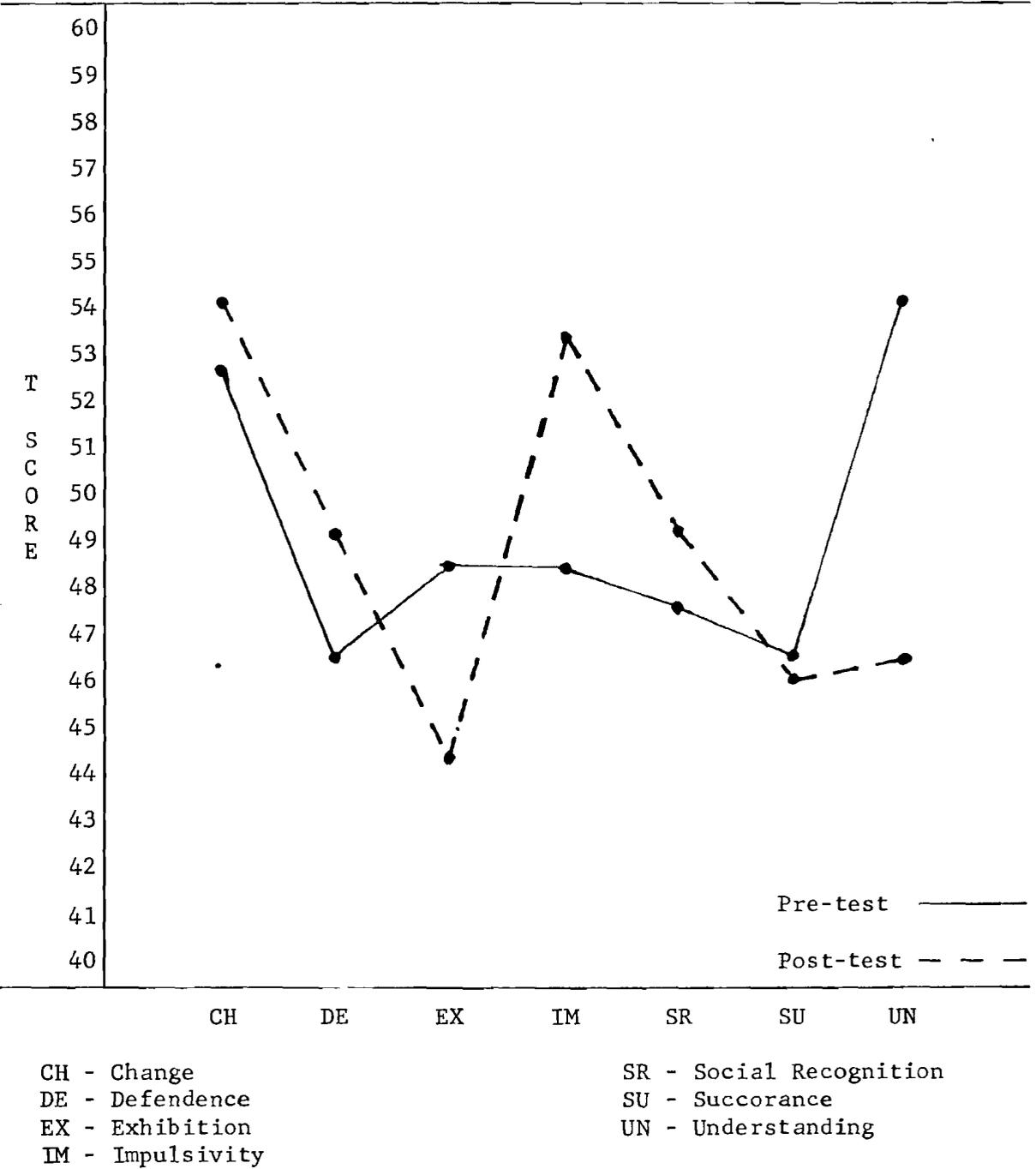


Figure 9

Mean T-Scores for the Autogenic Phrase

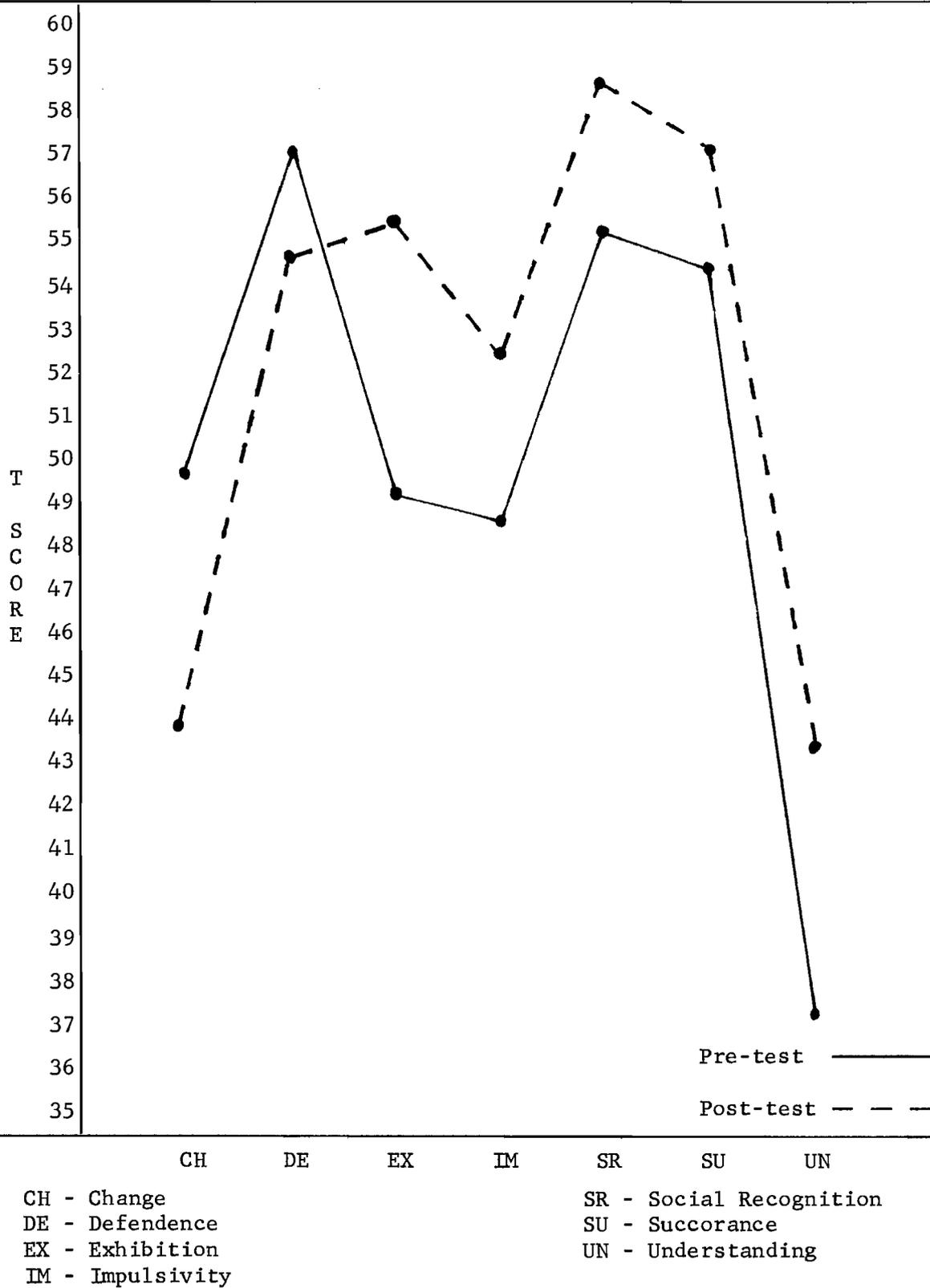


Figure 10

Mean T-Scores for the Control Group

The consistence shown in the biofeedback group may give an indication of a trend, toward greater integration of personality traits, but this was not statistically supported or made clear in this study.

## Chapter 5

### CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

This chapter is a presentation of the conclusions made from the analysis of data, discussion of the conclusions, observations and other factors involved in the study, recommendations for future study, and a summary of the study.

#### CONCLUSIONS

For all trait measures the null hypothesis was retained. There were no significant personality trait changes as measured by the Personality Research Form in subjects having had biofeedback relaxation training, in subjects having had autogenic phrase relaxation training, and in subjects not having had biofeedback or autogenic phrase relaxation training.

On the exhibition scale of the Personality Research Form, significant variance was found within subjects for the biofeedback measure, but also significance was found within subjects for the control group. The null hypothesis called for (1) the biofeedback group to not have significant within-subjects variance with the autogenic phrase and control group also not having within-subjects variance, (2) significant within-subjects variation for all groups, or (3) significant within-subjects variation in the biofeedback group and one other group. Therefore, the result called for the null hypothesis to be retained. It is assumed that variables other than biofeedback were responsible for the significance

in the two groups. For the null hypothesis to not be retained, the biofeedback group must show significant within-subjects variance while the other groups had no significant variance or the biofeedback group had no significant variance while the other groups had significant variance; this would indicate biofeedback was the probable variable involved in the variance.

#### DISCUSSION

In the examination of this study one need consider several factors which qualify the results. This study was initially conceived to be exploratory in nature. The data obtained and observations made indicated a number of potential avenues for expanded research. In addition, the exploration provided an understanding of the problems and virtues of the methodology rather than providing clear conclusions about the effects of biofeedback on personality.

The sample was not a random sample of the population, but a volunteer group obtained from Emporia State University. The groups were randomly selected from this volunteer pool. The total number per group after attrition was ten. The effects of attrition were not determined although this small number of subjects increased the probability of obtained scores as a result rather than a representation of any population parameters. Also the groups differed in age with the mean age of the biofeedback group being 25.1 years, for the autogenic phrase group, 19.3 years, and for the control group, 19.2 years. The impact of this difference was undetermined, although it might be noted that the autogenic phrase group and control group were similar in age but differed on the pre-test measures of the traits change, dependence, social recognition, succorance, and understanding.

In terms of the Personality Research Form norms, the control group was more than one standard deviation lower than the other two groups on the pre-test of the understanding measure ( $\bar{X}_{\text{BFT}}=56.9$ ;  $\bar{X}_{\text{AP}}=54.3$ ;  $\bar{X}_{\text{C}}=37.2$ ) and there was a trend to be higher than the other two groups on the measures of succorance ( $\bar{X}_{\text{BFT}}=50.2$ ;  $\bar{X}_{\text{AP}}=46.8$ ;  $\bar{X}_{\text{C}}=54.6$ ), and social recognition ( $\bar{X}_{\text{BFT}}=48.1$ ;  $\bar{X}_{\text{AP}}=47.8$ ;  $\bar{X}_{\text{C}}=55.4$ ). This indicates the control group members may have been less assured of themselves and when the control pre-test measure ( $\bar{X}_{\text{C}}=46.9$ ) for change was considered, the mean was somewhat lower than the other groups ( $\bar{X}_{\text{BFT}}=51.3$ ;  $\bar{X}_{\text{AP}}=52.9$ ) and indicates the control group as a whole may have been more rigid or sensitive to external controls such as peer responses than the other groups. The autogenic phrase group had some tendency to be less defensive than the other two groups and certainly the autogenic phrase group on the defence scale ( $\bar{X}_{\text{BFT}}=55.2$ ;  $\bar{X}_{\text{AP}}=46.8$ ;  $\bar{X}_{\text{C}}=57.1$ ).

Some attention may be given to the procedure of the two experimental groups receiving training agreements (See Appendix 2, p. 116) and the control group not receiving a training agreement. The agreements were intended to promote a sense of commitment needed for these types of training and indicated what was expected in the training of each group. They were designed as similarly as possible to prevent the agreements being a confounding variable between these groups. The principal differences between the forms were that the autogenic training agreement did not contain information about biofeedback instruments and biofeedback instrument training schedules. The control group did not receive an agreement form to prevent the contamination of the control group. It was felt anything beyond the most necessary of instruction could influence the control group and introduce a confounding variable. The lack of an

agreement form for the control group did not appear to produce any unusual effects.

Another consideration was the length of study and training schedule. The length and schedule did not appear to be standardized or the limits established in any of the literature. Budzynski, Stoyva, Adler, and Mullaney (1973) used a training period of sixteen weeks to obtain a significant change on the hypochondrias scale of the MMPI. In a presentation at the second meeting of the Kansas Biofeedback Society, Elkins (1976) felt that the training period would be six months to a year for success in treatment of psychosomatic problems. It appeared in this study that subjective recognition of change, if any, was not observed until the seventh week, although an increased awareness of self was noted by biofeedback subjects in the third and fourth week.

#### Discussion of Trends

In noting trends, one finds a noticeable increase in pre-test over post-test for the trait scales change ( $\bar{X}_{pre}=51.3$ ,  $\bar{X}_{post}=54.2$ ), exhibition ( $\bar{X}_{pre}=47.9$ ,  $\bar{X}_{post}=55.1$ ), impulsivity ( $\bar{X}_{pre}=51.9$ ,  $\bar{X}_{post}=55.3$ ), and social recognition ( $\bar{X}_{pre}=48.1$ ,  $\bar{X}_{post}=54.4$ ), and a decrease on the defence scale ( $\bar{X}_{pre}=55.2$ ,  $\bar{X}_{post}=52.5$ ) for biofeedback. This was a tendency toward greater flexibility, freedom to react and deal with change, and a lowering of defensiveness. Social awareness or needs may have also been enhanced. This pattern was integrated whereas with the autogenic phrase and the control groups the patterns were inconsistent such as the autogenic phrase groups having shown notable post-test over pre-test increase in defence and impulsivity, a conflict, and for the control group notable pre-test or post-test decreases in change and defence, again a conflict.

The only individual scale hinting of a tendency for biofeedback to be a factor in trait adjustment was on the Social Recognition trait. While the control group and autogenic phrase group both increased slightly ( $\bar{X}_{APpre} = 47.80$ ,  $\bar{X}_{APpost} = 49.40$ ;  $\bar{X}_{Cpre} = 48.10$ ,  $\bar{X}_{Cpost} = 58.90$ ) the variation for the biofeedback group was twice as great ( $\bar{X}_{BFTpre} = 48.10$ ,  $\bar{X}_{BFTpost} = 54.40$ ). This may imply that biofeedback training by some means aids in a person's feeling at ease in social situations especially when this means the person will be at a center of attention.

In general variations tended to appear capricious, or at least not as a result of treatment. The small number of subjects increases the influence of chance being the determining factor involved in the scores.

#### Speculative Subjective Observations

While the null hypothesis was retained, subjective observations of change were noted by biofeedback and autogenic phrase group participants on practice report forms (see Appendices 6 and 7, pp. 136-140).

Practice forms were used in autogenic and biofeedback training as a part of the training method. These forms provided a means of recording information and data that was subjective and difficult to convert into quantifiable data. Also the quantifiable information obtained from biofeedback was recorded on the same forms, thus allowing a comparison of subjective and objective information generated during biofeedback training as a part of biofeedback training to allow a person to become independent of information from the biofeedback devices. As the goal of biofeedback training is to allow a person to learn self-awareness so one will not be dependent on the instrumental feedback, it was felt the inclusion of objective and subjective data on the same form was

consistent with biofeedback procedures as a facilitation of learning to relax without the devices. Also the subjective information may have provided clues for research into different aspects of biofeedback or possible causes for obtained results.

Initially the changes were somatic, increased relaxation of back, neck and facial muscles, and a decrease in the intensity of headaches. The ability to go to sleep within "a few" minutes of going to bed was noted by both groups. After the fourth week the biofeedback group began reporting minor changes in sleep patterns such as needing less sleep per day and "beating the alarm up," Five members of the autogenic group reported similar, but less pronounced experiences in the seventh week on their practice sheets and in group meetings.

The autogenic group reported on practice sheets and in group meetings muscle relaxation and occasional, but inconsistent, emotional anxiety reduction, while the biofeedback group reported on practice sheets and in group meetings increasing anxiety reduction in all areas. The emotional anxiety, tension, and worry reduction was not specifically noted until the fifth week, but by the eighth week was reported in the biofeedback group. Biofeedback subjects also reported using their learned skills to help prepare for tests, keep their tensions at "creative" levels and in general "not worry about what couldn't be helped."

Subjective comments on the practice sheets and in group meetings in the eighth week suggested self-esteem was enhanced in the biofeedback group. Two individuals commented "I just feel more able." Seven in a group meeting agreed that when embarrassed, they got over it much faster and they worried less about what others thought and began to value their own opinions. In the eighth week one subject, a drama major, came with

visible excitement to the experimenter saying that she had not agreed with another student about a character in a play and, "I told him I didn't agree. I don't know if it is biofeedback, but I never tell anyone I disagree . . . I felt good about it."

The "I don't know if its biofeedback but . . ." comments in biofeedback group subjects was also a response among clients at the Biofeedback Relaxation Laboratory at Emporia State University when clients talked about anxiety reduction, self-awareness or self-esteem (Headrick, 1976). It may not be biofeedback, but its occurrence during training indicated that these subjective observations very well may be the result of biofeedback enhanced changes.

The autogenic phrase group and the biofeedback group both expressed that they were on some level more aware of themselves. In the biofeedback group the comment generally ran, "I don't know if it is biofeedback, but I've noticed things I've never noticed before and they must have always been there." In that it was all the biofeedback group noting a greater subjective, internally and externally, and the autogenic group noted internal on a limited basis, biofeedback may have been a deciding factor.

Subjects in the autogenic and biofeedback groups both reported improved interpersonal relationships, seemingly because of a higher level of tolerance. Several subjects from both groups made comments about relationship with others, such as, "We just seem to get along better," "I've been more patient," or "What they do doesn't bother me as much."

With these subjective observations and with evidence of change in the psychosomatic realm, one might conclude something was beginning to

happen, temporary or permanent, to subjects' behavior and in general more consistently and intensely with the biofeedback group. One may speculate the changes: (1) were not incorporated sufficiently in behavior for the individual to respond on the Personality Research Form; (2) were not measured by the trait scales included on the Personality Research Form; (3) the observations were a response to suggestion and do not represent real change; or (4) change took place primarily on a physical level and effects on behavior were random or on a very individual basis.

The first two speculations are answerable only by more research which controls and manipulates the variables involving length of study, frequency of practice, and factors involving personality and behavior that were not measured by the Personality Research Form. In examining the subjective comments of subjects, these support the possibility of the change not being incorporated and established and that the changes that occurred and/or will occur may have started in the seventh and eighth week. The changes that take place in relaxation training are very subjective and subtle (Headrick, 1976a) and may not have taken place or been of significant intensity so as to be noticed in this study until after the seventh week. It may be that a totally new instrument should be developed to measure in quantifiable terms those subjective subtle changes.

Anxiety and tension reduction were changes noted after biofeedback training by researchers (Reeves & Mealiea, 1975; Kando, Canter, & Knott, 1975; Legalos, 1973). Headrick (1976a) suggests a tendency toward being "present oriented"; Danskin and Walters (1974) and Danskin and Lowenstein (1975) note "relief" of feelings of abandonment, heightened self-esteem

happen, temporary or permanent, to subjects' behavior and in general more consistently and intensely with the biofeedback group. One may speculate the changes: (1) were not incorporated sufficiently in behavior for the individual to respond on the Personality Research Form; (2) were not measured by the trait scales included on the Personality Research Form; (3) the observations were a response to suggestion and do not represent real change; or (4) change took place primarily on a physical level and effects on behavior were random or on a very individual basis.

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and improved integration; and Budzynski (1972), Green, Green, and Walters (1974) and Green, Green, and Walters (1970, 1971) hypothesize biofeedback may enhance creativity. If so, these are factors or traits which the Personality Research Form may not measure or is not sensitive enough to measure.

Regardless of the speculation, this study did not support the hypothesis that biofeedback promotes personality change. More specifically it did not support the hypothesis where an eight-week period of training was used with a minimum of three practice sessions per week.

As for the effect of suggestion or a placebo, this seemed to have had little effect on the outcome, although some procedures inherent to the group meeting process may have opened the possibility of contaminating factors. Within each group, biofeedback and autogenic phrase, relaxation and body awareness were discussed, but not specific personality trait changes. In the group meetings changes noted during general discussion were recorded by the experimenter. These discussions were started with the question, "Have you noticed any changes?" leaving the replies open to physical or behavioral change. No other inquiry was made. This type of group meeting and interaction was considered a necessary part of the training process. As much as possible the activities of these groups were made identical as a means of controlling the placebo effect. If the placebo effect were a factor, mean changes from pre-test to post-test measures in the experimental groups would have been similar, in the same direction and different from the control group. They were not.

Having found that the literature supports biofeedback as an effective means of dealing with certain physical problems and assuming the

psychophysiological principle to be true (Green, Green, & Walters, 1971), it becomes difficult to believe that the effect on personality is a hit or miss. William James (1890) made observation of body to motion suggesting:

The feeling, in the coarser emotions, results from the bodily expression. Our natural way of thinking about these coarser emotions is that the mental perception of some fact excites the mental affection called the emotion, and that this latter state of mind gives rise to the bodily expression. My theory, on the contrary, is that the bodily changes follow directly the perception of the exciting fact and that our feeling of the same changes as they occur is the emotion. Common-sense says, we lose our fortune, we are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis to be defended says that this order of sequence is incorrect, that the one mental state is not immediately induced by the other, and bodily manifestations must first be interposed between and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble. . . . (p. 375)

James was dealing with a less accepted and observed portion of the psychophysiological principle. If the body expresses something it is also expressed in an emotion or personality factor. If the body prepares for a flight reaction, a flight or fight emotional response will occur on some behavioral level and if the reaction is frequent, personality may reasonably be expected to adjust as the body provides the final bit of supportive data to the psychological system, saying that the flight or fight anxiety is necessary all or a significant portion of the time. This appears to be a circular process; the emotion enhances a body state which enhances the emotion--a body state enhances an emotion which enhances a body state. If the body state cannot preclude or integrate with the emotion, this circular concept is not functional. If the body in some way dysfunctions, personality change may be enhanced or predisposed; if the body is helped or taught to have improved function, then again personality changes are enhanced.

James points to specific bodily functions being related to specific emotions. Flight or fight reactions of the body are related to emotions such as fear, anger, and aggression and/or the lack of these emotions. They may result in a personality that is characterized as being anxious, aggressive, non-aggressive, or relaxed. Wolpe (1958) points to deep muscle relaxation, a body state, as a means of anxiety and tension reduction, and through reciprocal inhibition, changing behavior, in specific eliminating phobic fear and anxiety. Budzynski and Stoyva (1973) have presented the use of biofeedback to increase the quality and speed of learning of deep muscle relaxation to use in reciprocal inhibition. Specific physiological conditions are related to specific personality conditions. With some exceptions, an area of uncertainty is what physiological conditions are related to what personality conditions and how various psychophysiological factors interact to modify these effects.

In other areas psychotropic agents are given because they produce reasonably specific results. The biochemical changes result in emotional changes, that is, body states which promote behavior states. Schizophrenia in particular and other psychoses may be related to genetic, biochemical and/or endocrine changes or states which predispose, cause, or contribute to the schizophrenic conditions. Buss (1966) comments on biological theories of psychosis:

There is evidence that psychosis is at least partially determined by heredity. But regardless of the specific genetic mechanism, there must be some biological defect which predisposes the individual to psychosis (p. 328).

. . . today there is compelling evidence of biochemical changes in psychosis. Linking biochemical evidence with . . . the genetic approach, we must give weight to the hypothesis that an important etiological factor in psychosis is an inherited defect in one or more enzyme systems. . . . The degree to which this inherited defect predisposes to psychosis remains a controversial issue (p. 336).

Buss further goes on to look at physiological theories of psychosis and states, ". . . the theory of excessive sympathetic tonus has much to recommend it." (p. 344). Buss cites research which maintains that the imbalance of the autonomic nervous system is an important aspect of psychopathology and that there is a "familiar pattern of hyperactivity in the autonomic functioning of schizophrenias," (p. 343) and that this results in a lowered level of reactivity which predisposes the personality dysfunction.

Biofeedback research has indicated biochemical changes can be facilitated (Elkins, 1976; Eversoul, 1975; Fowler, Budzynski, & VanderBergh, 1976), particularly with thyroid and insulin levels. When biofeedback training tasks are successfully learned and maintained, there appears to be a tendency for body systems to move toward optimum functioning. This optimum function in the endocrine system, in any body system, logically must enhance psychological functioning toward an optimum. One might hypothesize that if biofeedback has an impact on biochemical levels of the body, and particularly those related to the autonomic nervous system, then biofeedback can have an impact on personality functioning.

Whatever the physiologic system and/or emotion or personality trait, it is reasonable to speculate we may be able to facilitate personality toward a more optimum functioning, facilitate, not manipulate, with biofeedback training. The potential gains without the use of chemicals, possibly shortened treatment time, and an inexpensive means of the maintenance of gains are as extensive as those being discovered and identified in the use of biofeedback to treat physiological dysfunction.

If physiological systems adjust toward an optimum function, then one may expect the same in personality. Legalos (1973) reports breakthrough in psychotherapy when biofeedback is used to deal with physical

problems. The unconscious may become more readily available at least as a spontaneous and creative factor (Green, Green, & Walters, 1970, 1971; Green, Green, & Walters, 1974), thus opening it for easier and more complete observation with a psychotherapist providing an environment of unconditional acceptance and support to facilitate adjustment.

#### RECOMMENDATIONS

While it was concluded from the data gathered that in this study biofeedback did not have any effect on personality, the study was inconclusive for the hypothesis in general. The benefit from this study lay in providing an expanded understanding of what and how variables might be controlled to produce clearly conclusive studies.

In terms of subjects, two different samples could be obtained for two different studies, one sample from a normal population, and one from a population experiencing psychological discomfort or showing abnormal scores on a standardized personality test. The number of subjects per treatment group in the study was very small. A much larger sample needs to be obtained for a full study. The use of a sample of more than ten creates a number of practical problems. Further studies using larger samples will best be carried out by a research team rather than one or two individuals.

The length of study could be greatly expanded to at least four months and better to a full year. Elkins (1976) suggests that psychosomatic problems are treated in six to twelve months and Budzynski, Stoyva, Adler, and Mullaney (1973) used sixteen weeks. In a year-long test a study using retesting at intervals might be desirable. Eight weeks is too short a time span for conclusive results.

The training schedule could also be intensified. At least three times per week with home practice is workable, but better would be five times per week with daily home practice and if possible, at least in the initial stages, a portable biofeedback device might be sent with each subject to use when at home.

In using autogenic phrases a better means of providing the phrases would be to use cassette tape programs for home practice which would better standardize the variable of the home practice phrases, especially with larger samples. This would produce finer control over the time length of the practice period as well as the phrases used.

A greater emphasis could be placed on controlling the influence of the experimenter. The use of taped instructions, a greater emphasis on uniformity of group meetings, the use of a variety of trainers or any number of procedures could be used.

Finally it could be recommended that other methods of relaxation other than autogenic phrases be included in studies. In place of autogenic phrases to supplement the biofeedback and to train an experimental group, relaxation response (Benson, 1975), or meditation might be used.

#### SUMMARY

The analysis of variance indicated significant variance ( $p < .05$ ) on the scales entitled change, dependence, exhibition, impulsivity, social recognition, succorance, and understanding. The Scheffe Test of all Possible Comparisons did not reveal any significant ( $p > .05$ ) change pre-test or post-test in the biofeedback group, autogenic phrase or control groups for any one scale, therefore, the null hypothesis was retained for all scales, that is, in this study biofeedback did not appear to have had an effect on personality.

Even though the null hypothesis was retained for all scales, there was still reason to research the hypothesis further, based on previous research observations, the vast number of traits and variables not tested by the research instrument, subjective observations, trends, and the qualifications involved in the study; the results gave direction for further study procedures rather than providing readily conclusive data as to the effect of biofeedback on personality. Recommended was the selection of larger samples, samples from a normal population and from a population with personality abnormalities, use of more intense practice schedules with studies to have a duration from at least sixteen weeks to one year, using cassette tape programs of autogenic phrases for home practice, seeking to control the influence of the experimenter on subjects, and using other relaxation procedures such as relaxation response (Benson, 1975), or meditation in place of autogenic phrases.

Biofeedback has been a new phenomenon bursting forth into the science of behavior. In these early stages it has brought about new speculation about disease, healing, creativity, and the whole of human existence. Just more than a decade old, it has remained an area wide open for research and investigation. More than any recent discovery biofeedback has emphasized the complex and far-ranging interaction of the human mind, body, environment, and spirit.

REFERENCES CITED

## REFERENCES CITED

- American Psychological Association. Publications manual (2nd ed.). Washington, D.C.: Author, 1974.
- Bair, J. H. Development of voluntary control. Psychological Review, 1901, 8, 474-510.
- Beaty, E. T. Feedback-assisted relaxation training as treatment for gastric ulcers. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1976 (Abstract)
- Benson, Herbert. The relaxation response. New York: William Morrow and Company, Inc., 1975.
- Bergman, J. S., & Johnson, H. J. The effects of instructional set and autonomic perception on cardiac control. Psychophysiology, 1971, 8, 180-190.
- Birk, Lee. Basic science foundations of biofeedback and autonomic learning: Introduction. Seminars in Psychiatry, November, 1973, 5(4), 365-366. (a)
- Birk, Lee. Biofeedback--furor therapeutics. Seminars in Psychiatry, November, 1973, 5(4), 361-364. (b)
- Brener, J., & Kleinman, R. A. Learned control of systolic blood pressure. Nature, 1970, 226, 1063-1064.
- Brener, J. M., Kleinman, R. A., & Goesling, W. J. The effects of different exposures to augmented sensory feedback on the control of heart rate. Psychophysiology, 1969, 5, 510-516.
- Brown, Barbara B. Biofeedback: An exercise in self-control. Saturday Review, February 22, 1975, pp. 22-26.
- Brown, Barbara B. An interview with Barbara Brown. Del Mar, California: Psychology Today Interview Cassettes/CRM Books, 1974. (Cassette Tape) (a)
- Brown, Barbara B. New Mind, New Body: New Directions for the Mind. New York: Harper and Row, Inc., 1974. (b)
- Brudney, J. New sensory feedback therapy unit established in ICD's medical service. ICD News, 1974, 9(1). (a)

- Brudney, J. Sensory feedback therapy as a modality of treatment in the central nervous system disorders of voluntary movement. Neurology, 1974, 24, 925-932. (b)
- Budzynski, T. H. Some applications of biofeedback produced twilight states. Fields Within Fields...Within Fields, 1972, 5, 105-114.
- Budzynski, T. H., & Stoyva, J. M. Biofeedback techniques in behavior therapy. In J. M. Stoyva, et al (eds.), Biofeedback and Self-control: 1972. Chicago: Aldine-Atherton, Inc., 1973.
- Budzynski, T. H., & Stoyva, J. M. An instrument for producing deep muscle relaxation by means of analog feedback. Journal of Applied Behavior Analysis, Winter, 1969, 4, 231-237.
- Budzynski, T. H., Stoyva, J. M., & Adler, C. Feedback induced muscle application to tension headache. Journal of Behavior Therapy and Experimental Psychiatry, 1970, 1, 205-211.
- Budzynski, T. H., Stoyva, J. M., Adler, C., & Mullaney, D. EMG biofeedback and tension headache: A controlled outcome study. Seminars in Psychiatry, November, 1973, 5(4), 397-410.
- Buss, Arnold. Psychopathology. New York: John Wiley and Sons, Inc., 1966.
- Canter, Arthur, Kondo, Charles, & Knott, John. A comparison of EMG feedback and progressive muscle relaxation training in anxiety neurosis. British Journal of Psychiatry, November, 1975, 127, 470-477.
- Cohen, Michael J., Levee, Jack R., McArthur, David L., & Rickles, William H. Physiological and psychological dimensions of migraine headache and biofeedback training. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1976. (Abstract)
- Coursey, Robert, Frankel, Bernard, & Gaarder, Ken. EMG biofeedback and autogenic training as relaxation techniques for chronic sleep-onset insomnia. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1976. (Abstract)
- Danskin, David G. Kansas State University, Manhattan, Kansas. Personal communication, during the "4th Annual Biofeedback Workshop" at Kansas State University, Manhattan, Kansas, January 12, 1976.
- Danskin, David G., & Lowenstein, Timothy J. An introduction to applications of biofeedback training in counseling. Unpublished manuscript, Center for Student Development, Kansas State University, 1975.
- Danskin, David G., & Walters, E. Dale. Biofeedback and voluntary self-regulation: counseling and education. Personnel and Guidance Journal, 1973, 51, 633-638.

- Davidson, Richard, & Krippner, Standley. Biofeedback research: the data and their implications. In J. M. Stoyva, et al (eds.), Biofeedback and Self-control: 1971. Chicago: Aldine-Atherton, Inc., 1972.
- Davidson, Richard J., & Schwartz, Gary E. Matching relaxation therapies to types of anxiety: A patterning approach. In John White and James Fadiman (eds.), Relax. New York: Confucian Press, 1976.
- Davis, Margaret H. Relaxation training facilitated by biofeedback apparatus as a supplemental treatment in bronchial asthma. Dissertation Abstracts International, October, 1976, 33(4-b), 1786. (Abstract)
- DiCara, L. V., & Miller, N. E. Changes in heart rate instrumentally learned by curarized rats as avoidance responses. Journal of Comparative Physiological Psychology, 1968, 64, 8-12. (a)
- DiCara, L. V., & Miller, N. E. Heart rate learning in non-curarized state, transfer to the curarized state, and subsequent retraining in the non-curarized state. Psychological Behavior, 1969, 4, 621-624.
- DiCara, L. V., & Miller, N. E. Instrumental learning of systolic blood pressure responses by curarized rats: Dissociation of cardiac and vascular changes. Psychosomatic Medicine, 1968, 30, 489-494. (b)
- Elkins, Barbara. "Hypertension." Presented at Kansas Biofeedback Society Meeting, Prairie View Hospital, Newton, Kansas, November 13, 1976.
- Engel, B. T., Nikoomanesh, M. D., & Shuster, M. M. Operant conditioning of rectosphincteric responses in the treatment of fecal incontinence. The New England Journal of Medicine, 1974, 290, 646-649.
- English, Horace B., & English, Ava Champney. A comprehensive dictionary of psychological and psychoanalytic terms. New York: David McKay Co., 1958.
- Estrada, A. E., & Estrada, N. Biofeedback, some clinical applications. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1974. (Abstract)
- Eversoul, George A. Practical and potential applications of feedback thermister training and nutrition in crisis and preventive medicine. Paper presented at the Biofeedback Research Society Annual Meeting, Monterey, California, 1975. (Abstract)
- Fensterheem, Herbert, & Baer, Jean. Dont say yes when you want to say no. New York: Dell Publishing Company, Inc., 1975.
- Findley, William, Niman, Carol, Standley, Janet, & Phifer, Ronald. Forntalis EMG biofeedback training of cerebal palsy children. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1976. (Abstract)

- Finley, W. W., Smith, H. A., & Etherson, M. D. Reducation of seizures and normalization of the EEG in a severe epileptic following sensori-motor feedback training. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1974. (Abstract)
- Fitzsimmons, C. I., & Peiffer, M. A. Autonomic sensitization in the treatment of acute, chronic alcoholism. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1974. (Abstract)
- Fowler, Jane, Budzynski, Thomas, & VanderBergh, Richard L. Effects of an EMG biofeedback relaxation program on control of diabetes. Biofeedback and Self-Regulation, 1(1), March, 1976, 105-112.
- Goering, Pete. Migraine. Menninger Perspective, April, 1973, 4(3), 12-15.
- Godfrey, Kenneth. Veterans Administration Hospital, Topeka, Kansas, personal communication, July 9, 1976.
- Green, Alyce M., & Green, Elmer E. Biofeedback: Research and Therapy. Topeka, Kansas: Menninger Foundation, 1975.
- Green, Alyce M., Green, Elmer E., & Walters, E. Dale. Brainwave training, imagery, creativity and integrative experiences. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1974. (Reprint)
- Green, Elmer E., Green, Alyce M., & Walters, E. Dale. Biofeedback for anxiety tension reduction. In John White and James Fadiman (eds.), Relax. New York: Confucian Press, 1976.
- Green, Elmer E., Green, Alyce M., & Walters, E. Dale. Biofeedback for mind-body self-regulation: Healing and creativity. Paper read at the symposium called "The Varieties of Healing Experiences", DeAnza College, Cupertino, California, October, 1971. (Menninger Foundation Reprint)
- Green, Elmer, Green, Alyce, & Walters, Dale. A demonstration of voluntary control of bleeding and pain. Topeka, Kansas: Menninger Foundation, 1972.
- Green, Elmer E., Green, Alyce M., & Walters, E. Dale. Voluntary control of internal states: Psychological and physiological. Journal of Transpersonal Psychology, 1970, 2(1), 1-26. (Reprint)
- Haight, Maryellen, Jampolesky, Anna B., & Jampolesky, Irvine. Responses to hyperkinesis to EMG biofeedback. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1976. (Abstract)

- Hardyck, C. D., & Petrinovich, L. F. Treatment of subvocal speech during reading. Journal of Reading, 1969, 1, 1-11.
- Hardyck, C. D., Petrinovich, L. F., & Elsworth, D. W. Feedback of speech muscle activity during silent reading: rapid extinction. Science, 1966, 154, 1467-1468.
- Headrick, Mary. Biofeedback Relaxation Training Course, sponsored by Center for Personal Growth, Emporia Kansas State College, January-May, 1976. (a)
- Headrick, Mary. Emporia Kansas State College, Emporia, Kansas, personal communications, April-May, 1976. (b)
- Headrick, Mary. Unpublished doctoral dissertation. East Texas State University, Commerce, Texas, 1977.
- Headrick, M. W., Feather, B. W., & Wells, D. F. Undirectional and large magnitude heart rate changes with augmented sensory feedback. Psychophysiology, 1971, 8, 132-142.
- Hirsie, L. E., & Campbell, R. T. Psychiatric dictionary (3rd. ed.). New York: Oxford University Press, 1960.
- Hnatiow, M. H., & Lang, P. J. Learned stability of heart rate. Psychophysiology, 1965, 1, 330-336.
- Jackson, Douglas N. Personality Research Form. Goshen, New York: Research Psychologists Press, Inc., 1965.
- Jackson, Douglas N. Personality Research Form Manual. Goshen, New York: Research Psychologists Press, Inc., 1974.
- Jacobson, E. Anxiety and Tension Control. Philadelphia: Lippincott, 1964.
- Jacobson, E. Progressive Relaxation. Chicago: University of Chicago Press, 1938.
- Jacobson, E. You Must Relax. New York: McGraw-Hill, 1957.
- James, William. Psychology. New York: Henry Holt, 1890.
- Johnson, H. E., & Garton, W. H. Muscle re-education in hemiplegia by use of electromyographic device. Archives of Physical and Medical Rehabilitation, 1973, 54, 320-322.
- Jordan, Cynthia, & Schallow, John. The role of locus of control in electromyographic feedback and brief progressive relaxation. Paper presented at the Biofeedback Research Society Annual Meeting, Monterey, California, February, 1975. (Abstract)
- Kando, C., Canter, A., & Knott, J. Relaxation training as a method of reducing anxiety as associated with depression. Paper presented at the Biofeedback Research Society Annual Meeting, Monterey, California, February, 1975. (Abstract)

- aplan, B. J. EEG biofeedback and epilepsy. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1974. (Abstract)
- arlins, Marvin, & Andrews, Lewis M. Biofeedback: Turning on the Power of Your Mind. New York: J. B. Lippincott, 1972.
- otses, H., Glaus, K., Crawford, P., Edwards, J., & Schear, M. The effects of operant conditioning of the fontalis muscle on peak expiratory flow in asthmatic children. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1976. (Abstract)
- angbein, Walter Edwin. A comparison of two approaches for teaching neuromuscular relaxation. Unpublished doctoral dissertation, George Williams College, Downers Grove, Illinois, 1969.
- awrence, Jodi. Alpha Brain Waves. New York: Nash Publishing Corporation--Avon Books, 1972.
- egalos, Charles. Biofeedback and psychotherapy. Seminars in Psychiatry, November, 1973, 5(4), 529-533.
- linton, Marigold, & Gallow, Phillip S. The Practical Statistician: Simplified Handbook of Statistics. Monterey, California: Brooks/Cole Publishing Company, 1975.
- luthe, Wolfgang (ed.). Autogenic Therapy (Vol. 1). New York: Grune and Stratton, 1969.
- lyndes, Kellogg O. EMG biofeedback and its application to demonstrated laryngeal pathology. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1976. (Abstract)
- ay, David, & Weber, Charles. Temperature feedback training for symptom reduction in Raynaud's disease: A controlled study. Paper presented to the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1976. (Abstract)
- Mayr, Otto. The origins of feedback control. Scientific American, 1970, 223, 110-118.
- Miller, N. E. Integration of neurophysiological and behavioral research. Annals of the New York Academy of Sciences, 1961, 92, 830-839.
- Miller, N. E. Learning of visceral and glandular responses. Science, 1969, 163, 434-445. (a)
- Miller, N. E. Psychosomatic efforts of specific types of training. Annals of the New York Academy of Sciences, 1969, 159, 1025-1040. (b)

- Miller, N. E. Some implications of modern behavior theory for personality change and psychotherapy. In D. Byrne and P. Warchel (eds.), Personality Change. New York: John Wiley and Sons, 1964.
- Miller, N. E. Some reflections on the law of effect produce a new alternative to drive reduction. In M. E. Jones (ed.), Symposium on Motivation, 1963 (Vol. 11). Lincoln: University of Nebraska Press, 1963.
- Miller, N. E., & Carmona, A. Modification of a visceral response, salivation in thirsty dogs, by instrument training in water reward. Journal of Comparative Physiological Psychology, 1967, 63, 1-6.
- Miller, N. E., & DiCara, L. V. Instrumental learning of heart rate change in curarized rats. Journal of Comparative Physiological Psychology, 1967, 63, 12-19.
- Montgomery, Doil, & Besner, Hilda. Reduction of chronic onset insomnia through electromyographic relaxation training. Paper presented at the Biofeedback Research Society Annual Meeting, Monterey, California, February, 1975. (Abstract)
- Piercy, Dwane. Veterans Administration Hospital, Topeka, Kansas, personal communication, July 9, 1976.
- Raskin, M., Johnson, G., & Rondestvedt, J. W. Chronic anxiety treated by feedback-induced muscle relaxation: Pilot study. Archives of General Psychiatry, 1973, 28, 263-267.
- Reeves, John, & Mealiea, Wallace. Biofeedback-assisted cue-controlled relaxation for the treatment of flight phobias. Journal of Behavior Therapy and Experimental Psychiatry, August, 1975, 6(2), 105-109.
- Roscoe, John T. Fundamental Research Statistics for the Behavioral Sciences. New York: Holt, Rinehart and Winston, Inc., 1969.
- Rouse, L., Peterson, J., & Shapiro, G. EEG alpha entrainment reaction to the biofeedback setting and some possible effects on epilepsy. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1974. (Abstract)
- Sargent, Joseph, Green, Elmer, & Walters, Dale. Preliminary report on the use of autogenic feedback training in the treatment of migraine and tension headaches. Psychosomatic Medicine, March, 1975, 35(2), 129-135.
- Sargent, Joseph, Walters, Dale, & Green, Elmer. Psychosomatic self-regulation of migraine headaches. Seminars in Psychiatry, November, 1973, 5(4), 415-428.
- Schwartz, G. E., Shapiro, D., & Turdky, B. Biofeedback as therapy: Some theoretical and practical issues. American Psychologist, 1973, 28, 666-673.

- Seifert, A. R., & Lubar, J. F. Reduction of epileptic seizures through EEG biofeedback training. Biological Psychology, November, 1975, 3(3), 157-184.
- Shapiro, D., & Schwartz, G. E. Biofeedback and visceral learning: Clinical applications. Seminars in Psychiatry, 1972, 4, 181.
- Sterman, M. B. Neurophysiologic and clinical studies of sensorimotor EEG biofeedback training: Some effects on epilepsy. Seminars in Psychiatry, 1974, 5, 507-525.
- Sterman, M. B. Studies of EEG biofeedback training in man and cats. Paper presented at the 17th Annual Conference, V.A. Cooperative Studies in Mental Health and Behavior Science, St. Louis, 1972. (Reprint)
- Stroebel, Charles, & Glueck, Benard. Biofeedback treatment in medicine and psychiatry: An ultimate placebo. Seminars in Psychiatry, November, 1973, 5(4), 379-398.
- Taub, E., Emurian, C., & Howell, P. Further progress in training self-regulation of a skin temperature. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, February, 1974. (Abstract)
- Toomin, H., & Johnson, H. E. Electromyometer feedback in paraplegia: A case study in neuromuscular re-education. Paper presented at the Biofeedback Research Society Annual Meeting, Colorado Springs, Colorado, February, 1974. (Abstract)
- Townsend, Richard, House, John, & Addario, Dominick. Comparison of Biofeedback-mediated relaxation and group therapy in the treatment of chronic anxiety. American Journal of Psychiatry, June, 1975, 136(6), 598-607.
- Walters, E. Dale. Menninger Foundation, Topeka, Kansas, personal communication, January 12, 1976.
- Weinstock, Alexander. A biofeedback approach to the problem of obesity. Paper presented at the Biofeedback Research Society Annual Meeting, Monterey, California, February, 1975. (Abstract)
- Weiss, T., & Engel, B. T. Operant conditioning of heart rate in patients with premature ventricular contractions. Psychosomatic Medicine, 1971, 33, 301-321.
- Wickramasakerz, Ian. Electromyographic feedback training and tension headache: Preliminary observations. American Journal of Clinical Hypnosis, 1972, 15, 83-85.
- Wolpe, Joseph. Psychotherapy by Reciprocal Inhibition. Stanford, California: Stanford University Press, 1958.
- Wolpe, Joseph, & Lazarus, A. A. Behavior Therapy Techniques: A Guide to the Treatment of Neurosis. New York: Pergamon Press, 1966.

## APPENDICES

## APPENDICES

APPENDIX 1

Descriptions of the Personality Trait Scales and Forms AA and  
BB of the Personality Research Form

## PERSONALITY RESEARCH FORM SCALES

Scale Description\*  
(Jackson, 1974)

### ABASEMENT

Shows a high degree of humility; accepts blame and criticism even when not deserved; exposes himself to situations where he is in an inferior position; tends to be self-effacing.

### ACHIEVEMENT

Aspires to accomplish difficult tasks; maintains high standards and is willing to work toward distant goals; responds positively to competition; willing to put forth effort to attain excellence.

### AFFILIATION

Enjoys being with friends and people in general; accepts people readily; makes efforts to win friendships and maintain associations with people.

### AGGRESSION

Enjoys combat and argument; easily annoyed; sometimes willing to hurt people to get his way; may seek to "get even" with people whom he perceives as having harmed him.

### AUTONOMY

Tries to break away from restraints, confinement, or restrictions of any kind; enjoys being unattached, free, not tied to people, places or obligations; may be rebellious when faced with restraints.

### CHANGE

Likes new and different experiences; dislikes routine and avoids it; may readily change opinions or values in different circumstances; adapts readily to changes in environment.

### COGNITIVE STRUCTURE

Does not like ambiguity or uncertainty in information; wants all questions answered completely; desires to make decisions based upon definite knowledge, rather than upon guesses or probabilities.

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\*Description of high scorer

DEFENCE

Readily suspects that people mean him harm or are against him; ready to defend himself at all times; takes offense easily; does not accept criticism readily.

DOMINANCE

Attempts to control his environment, and to influence or direct other people; expresses opinions forcefully; enjoys the role of leader and may assume it spontaneously.

ENDURANCE

Willing to work long hours; doesn't give up quickly on a problem; persevering, even in the face of great difficulty; patient and unrelenting in his work habits.

EXHIBITION

Wants to be the center of attention; enjoys having an audience; engages in behavior which wins the notice of others; may enjoy being dramatic or witty.

HARMAVOIDANCE

Does not enjoy exciting activities, especially if danger is involved; avoids risk of bodily harm; seeks to maximize personal safety.

IMPULSIVITY

Tends to act on the "spur of the moment" and without deliberation; gives vent readily to feelings and wishes; speaks freely; may be volatile in emotional expression.

NURTURANCE

Gives sympathy and comfort; assists others whenever possible, interested in caring for children, the disabled, or the infirm; offers a "helping hand" to those in need; readily performs favors for others.

ORDER

Concerned with keeping personal effects and surroundings neat and organized; dislikes clutter, confusion, lack of organization; interested in developing methods for keeping materials methodically organized.

PLAY

Does many things "just for fun"; spends a good deal of time participating in games, sports, social activities, and other amusements; enjoys jokes and funny stories; maintains a light-hearted, easy-going attitude toward life.

SENTIENCE

Notices smells, sounds, sights, tastes, and the way things feel; remembers these sensations and believes that they are an important part of life; is sensitive to many forms of experience; may maintain an essentially hedonistic or aesthetic view of life.

SOCIAL RECOGNITION

Desires to be held in high esteem by acquaintances; concerned about reputation and what other people think of him; works for the approval and recognition of others.

SUCCORANCE

Frequently seeks the sympathy, protection, love, advice, and reassurance of other people; may feel insecure or helpless without such support; confides difficulties readily to a receptive person.

UNDERSTANDING

Wants to understand many areas of knowledge; values synthesis of ideas, verifiable generalization, logical thought, particularly when directed at satisfying intellectual curiosity.

## PERSONALITY RESEARCH FORM SCALES

## Defining Trait Adjectives

ABASEMENT

Meek, self-accusing, self-blaming, obsequious, self-belittling, surrendering, resigned, self-critical, humble, apologizing, subservient, obedient, yielding, deferential, self-subordinating.

ACHIEVEMENT

Striving, accomplishing, capable, purposeful, attaining, industrious, achieving, aspiring, enterprising, self-improving, productive, driving, ambitious, resourceful, competitive.

AFFILIATION

Neighborly, loyal, warm, amicable, good-natured, friendly, companionable, genial, affable, cooperative, gregarious, hospitable, sociable, affiliative, good-willed.

AGGRESSION

Aggressive, quarrelsome, irritable, argumentative, threatening, attacking, antagonistic, pushy, hot-tempered, easily-angered, hostile, revengeful, belligerent, blunt, retaliative.

AUTONOMY

Unmanageable, free, self-reliant, independent, autonomous, rebellious, unconstrained, individualistic, ungovernable, self-determined, non-conforming, uncompliant, undominated, resistant, lone-wolf.

CHANGE

Inconsistent, fickle, flexible, unpredictable, wavering, nutable, adaptable, changeable, irregular, variable, capricious, innovative, flighty, vacillating, inconsistent.

COGNITIVE STRUCTURE

Precise, exacting, definite, seeks certainty, meticulous, perfectionistic, clarifying, explicit, accurate, rigorous, literal, avoids ambiguity, defining, rigid, needs structure.

DEFENCE

Readily suspects that people mean him harm or are against him; ready to defend himself at all times; takes offense easily; does not accept criticism readily.

DOMINANCE

Governing, controlling, commanding, domineering, influential, persuasive, forceful, ascendant, leading, directing, dominant, assertive, authoritative, powerful, supervising.

ENDURANCE

Persistent, determined, steadfast, enduring, unfaltering, persevering, unremitting, relentless, tireless, dogged, energetic, has stamina, sturdy, zealous, durable.

EXHIBITION

Colorful, entertaining, unusual, spellbinding, exhibitionistic, conspicuous, noticeable, expressive, ostentatious, immodest, demonstrative, flashy, dramatic, pretentious, showy.

HARMAVOIDANCE

Fearful, withdraws from danger, self-protecting, pain-avoidant, careful, cautious, seeks safety, timorous, apprehensive, precautionary, unadventurous, avoids risks, attentive to danger, stays out of harm's way, vigilant.

IMPULSIVITY

Hasty, rash, uninhibited, spontaneous, reckless, irrepressible, quick-thinking, mercurial, impatient, incautious, hurried, impulsive, foolhardy, excitable, impetuous.

NURTURANCE

Sympathetic, paternal, helpful, benevolent, encouraging, caring, protective, comforting, maternal, supporting, aiding, ministering, consoling, charitable, assisting.

ORDER

Neat, organized, tidy, systematic, well-ordered, disciplined, prompt, consistent, orderly, clean, methodical, scheduled, planful, unvarying, deliberate.

PLAY

Playful, jovial, jolly, pleasure-seeking, merry, laughter-loving, frivolous, prankish, sportive, mirthful, fun-loving, gleeful, carefree, blithe.

SENTIENCE

Aesthetic, enjoys physical sensations, observant, earthy, aware, notices environment, feeling, sensitive, sensuous, open to experience, perceptive, responsive, noticing, discriminating, alive to impressions.

SPECIAL RECOGNITION

Approval seeking, proper, well-behaved, seeks recognition, courteous, makes good impression, seeks respectability, accommodating, socially proper, seeks admiration, obliging, agreeable, socially positive, desirous of credit, behaves appropriately.

SECURANCE

Trusting, ingratiating, dependent, entreating, appealing for help, seeks support, wants advice, helpless, confining, needs protection, pleading, craves affection, pleading, helpseeking, defenseless.

UNDERSTANDING

Inquiring, curious, analytical, exploring, intellectual, reflective, sensitive, investigative, probing, logical, scrutinizing, theoretical, precise, rational, inquisitive.

# PERSONALITY RESEARCH FORM FORM AA



DOUGLAS N. JACKSON, Ph.D.

## DIRECTIONS

On the following pages you will find a series of statements which a person might use to describe himself. Read each statement and decide whether or not it describes you. Then indicate your answer on the separate answer sheet.

If you agree with a statement or decide that it does describe you, answer TRUE. If you disagree with a statement or feel that it is not descriptive of you, answer FALSE.

In marking your answers on the answer sheet, be sure that the number of the statement you have just read is the same as the number on the answer sheet.

Answer every statement either true or false, even if you are not completely sure of your answer.



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1. I like to be the first to apologize after an argument.
2. I enjoy doing things which challenge me.
3. I pay little attention to the interests of people I know.
4. I get a kick out of seeing someone I dislike appear foolish in front of others.
5. If public opinion is against me, I usually decide that I am wrong.
6. I get annoyed with people who never want to go anywhere different.
7. I live from day to day without trying to fit my activities into a pattern.
8. When someone presents me with strong arguments, I usually try to settle on some middle ground.
9. I would enjoy being a club officer.
10. If I can't finish a task within a certain amount of time, I usually decide not to waste any more time on it.
11. Others think I am lively and witty.
12. I almost always accept a dare.
13. I admire free, spontaneous people.
14. I think a man is smart to avoid being talked into helping his acquaintances.
15. I often decide ahead of time exactly what I will do on a certain day.
16. I feel that adults who still like to play have never really grown up.
17. Sometimes a certain smell reminds me of a place or experience in my past.
18. I consider it important to be held in high esteem by those I know.
19. If I have had an accident, I want sympathy from no one.
20. Philosophical discussions are a waste of time.
21. I was born over 90 years ago.
22. I always try to be considerate of the feelings of my friends.
23. I would never apologize if someone bumped into me and it was his fault.
24. Self-improvement means nothing to me unless it leads to immediate success.
25. I believe that a person who is incapable of enjoying the people around him misses much in life.
26. It doesn't bother me much to have someone get the best of me in a discussion.
27. I would like to wander freely from country to country.
28. Changes in routine disturb me.
29. When I talk to a doctor, I want him to give me a detailed explanation of any illness I have.
30. When someone opposes me on an issue, I usually find myself taking an even stronger stand than I did at first.
31. I am not very insistent in an argument.
32. I don't mind doing all the work myself if it is necessary to complete what I have begun.
33. I am too shy to tell jokes.
34. I am careful about the things I do because I want to have a long and healthy life.
35. I have a reserved and cautious attitude toward life.
36. When I see someone who looks confused, I usually ask if I can be of any assistance.
37. I don't especially care how I look when I go out.
38. I love to tell, and listen to, jokes and funny stories.
39. Most animals are rather uninteresting to watch.
40. I give little thought to the impression I make on others.
41. I always appreciate it when people are concerned about me.
42. I often try to grasp the relationships between different things that happen.
43. I try to get at least some sleep every night.
44. Nothing that happens to me makes much difference one way or the other.
45. Several people have embarrassed me publicly but I always take it like a good sport.
46. I get disgusted with myself when I have not learned something properly.
47. Trying to please people is a waste of time.
48. I swear a lot.
49. Adventures where I am on my own are a little frightening to me.
50. I like to have new things to eat from week to week.
51. It doesn't bother me to put aside what I have been doing without finishing it.
52. If someone finds fault with me I either listen quietly or just ignore the whole thing.
53. I try to control others rather than permit them to control me.
54. If I find it hard to get something I want, I usually change my mind and try for something else.
55. I like to have people talk about things I have done.
56. I would enjoy learning to walk on a tightrope.
57. I find that I sometimes forget to "look before I leap."
58. All babies look very much like little monkeys to me.
59. When I am going somewhere I usually find my exact route by using a map.
60. I consider most entertainment to be a waste of time.
61. The smell of freshly-baked bread makes my mouth water.
62. I very much enjoy being complimented.
63. I am perfectly capable of solving my personal problems without consulting anyone.
64. I can't see how intellectuals get personal satisfaction from their impractical lives.

65. I have a number of outfits of clothing, each of which costs several thousand dollars.
66. I often take some responsibility for looking out for newcomers in a group.
67. I do everything in my power not to have to admit defeat.
68. I work because I have to, and for that reason only.
69. Loyalty to my friends is quite important to me.
70. If someone does something I don't like, I seldom say anything.
71. When I was a child, I wanted to be independent.
72. My likes and dislikes are the same from year to year.
73. I don't enjoy confused conversations where people are unsure of what they mean to say.
74. I don't like people to joke about what they feel are my shortcomings.
75. I have little interest in leading others.
76. If people want a job done which requires patience, they ask me.
77. I would not like the fame that goes with being a great athlete.
78. I would never want to be a forest-fire fighter.
79. Rarely, if ever, do I do anything reckless.
80. I feel very sorry for lonely people.
81. My personal papers are usually in a state of confusion.
82. I enjoy parties, shows, games — anything for fun.
83. I don't pay much attention to my surroundings.
84. Social approval is unimportant to me.
85. I often seek out other people's advice.
86. I do almost as much reading on my own as I did for classes when I was in school.
87. I make all my own clothes and shoes.
88. I have a number of health problems.
89. I sometimes take the blame for things that aren't really my fault in order to make someone else feel better.
90. I will keep working on a problem after others have given up.
91. Most of my relationships with people are business-like rather than friendly.
92. If someone has a better job than I, I like to try to show him up.
93. I don't want to be away from my family too much.
94. I would be willing to give up some financial security to be able to change from one job to another if something interesting came along.
95. I tend to start right in on a new task without spending much time thinking about the best way to proceed.
96. I usually let unkind things someone might say about me pass without making any return comment.
97. I feel confident when directing the activities of others.
98. The mere prospect of having to put in long hours working makes me tired.
99. I don't mind being conspicuous.
100. I would never pass up something that sounded like fun just because it was a little bit hazardous.
101. The people I know who say the first thing they think of are some of my most interesting acquaintances.
102. I dislike people who are always asking me for advice.
103. I keep all my important documents in one safe place.
104. When I have a choice between work and enjoying myself, I usually work.
105. I like to listen to the sound of rain falling.
106. The good opinion of one's friends is one of the chief rewards for living a good life.
107. I would not like to be married to a protective person.
108. If the relationships between theories and facts are not immediately evident, I see no point in trying to find them.
109. I have attended school at some time during my life.
110. In the long run humanity will owe a lot more to the teacher than to the salesman.
111. I resent being punished.
112. I try to work just hard enough to get by.
113. I am considered friendly.
114. I am quite soft-spoken.
115. My greatest desire is to be independent and free.
116. I have a specific routine of recreational activities.
117. Before I ask a question, I figure out exactly what I know already and what it is I need to find out.
118. I try never to allow anyone to get the upper hand with me.
119. I would make a poor judge because I dislike telling others what to do.
120. If I want to know the answer to a certain question, I sometimes look for it for days.
121. I feel uncomfortable when people are paying attention to me.
122. I can't imagine myself jumping out of an airplane as skydivers do.
123. I am not an "impulse-buyer."
124. People like to tell me their troubles because they know that I will do everything I can to help them.
125. Most of the things I do have no system to them.
126. Once in a while I enjoy acting as if I were tipsy.
127. I rarely notice how things smell.
128. The opinions that important people have of me cause me little concern.

129. When I need money, it makes me feel good to know that someone can help me out.
130. I have unlimited curiosity about many things.
131. I rarely use food or drink of any kind.
132. I often have the feeling that I am doing something evil.
133. I would rather let others have their way with me than try to protest.
134. I often set goals that are very difficult to reach.
135. After I get to know most people, I decide that they would make poor friends.
136. Stupidity makes me angry.
137. I usually try to share my problems with someone who can help me.
138. I am always looking for new routes to take on a trip.
139. When I need one thing at the store I get it without thinking what else I may need soon.
140. Most people are honest enough that I would let them work in my home without close supervision.
141. I am quite good at keeping others in line.
142. When someone thinks I should not finish a project, I am usually willing to follow his advice.
143. I like to be in the spotlight.
144. I think it would be enjoyable and rather exciting to feel an earthquake.
145. I have often broken things because of carelessness.
146. I get little satisfaction from serving others.
147. Before I start to work, I plan what I will need and get all the necessary materials.
148. I only celebrate very special events.
149. Going barefoot in cool grass is great fun.
150. I constantly try to make people think highly of me.
151. If I feel sick, I don't like to have friends or relatives fuss over me.
152. When I was a child, I showed no interest in books.
153. I have never ridden in an automobile.
154. I am seldom ill.
155. I would never allow someone to blame me for something which was not my fault.
156. I would rather do an easy job than one involving obstacles which must be overcome.
157. I enjoy being neighborly.
158. I seldom feel like hitting anyone.
159. I would like to have a job in which I didn't have to answer to anyone.
160. It would take me a long time to adapt to living in a foreign country.
161. It upsets me to go into a situation without knowing what I can expect from it.
162. I tend to react strongly to remarks which find fault with my personal appearance.
163. Most community leaders do a better job than I could possibly do.
164. I don't like to leave anything unfinished.
165. I was one of the quietest children in my group.
166. I avoid some hobbies and sports because of their dangerous nature.
167. I make certain that I speak softly when I am in a public place.
168. I believe in giving friends lots of help and advice.
169. I can work better when conditions are somewhat chaotic.
170. Most of my spare moments are spent relaxing and amusing myself.
171. I feel about the same after a hearty meal as before one.
172. It seems foolish to me to worry about my public image.
173. I think it would be best to marry someone who is more mature and less dependent than I.
174. I would very much like to know how and why natural events occur in the way they do.
175. I could easily count from one to twenty-five.
176. I almost always feel sleepy and lazy.
177. I am the kind of person who is always doing errands for others.
178. My goal is to do at least a little bit more than anyone else has done before.
179. Usually I would rather go somewhere alone than go to a party.
180. Life is a matter of "push or be shoved."
181. I often do things just because social custom dictates.
182. Most people have a hard time predicting how I will respond to something they say to me.
183. I like to be with people who are unpredictable.
184. I don't get angry when people laugh at my errors.
185. I seek out positions of authority.
186. When other people give up working on a problem, I usually quit too.
187. I would enjoy being a popular singer with a large fan club.
188. I would enjoy the feeling of riding to the top of an unfinished skyscraper in an open elevator.
189. I enjoy arguments that require good quick thinking more than knowledge.
190. I really do not pay much attention to people when they talk about their problems.
191. I dislike to be in a room that is cluttered.
192. Practical jokes aren't at all funny to me.

193. I like to run through heaps of fallen leaves.
194. Nothing would hurt me more than to have a bad reputation.
195. I usually make decisions without consulting others.
196. Abstract ideas are of little use to me.
197. Sometimes I feel thirsty or hungry.
198. My memory is as good as other people's.
199. I avoid situations which would make me seem inferior.
200. I really don't enjoy hard work.
201. I try to be in the company of friends as much as possible.
202. If someone hurts me, I just try to forget about it.
203. If I have a problem, I like to work it out alone.
204. I would be satisfied to stay at the same job indefinitely.
205. I won't answer a person's question until I am very clear as to what he is asking.
206. I would get into a long discussion rather than admit I am wrong.
207. I think it is better to be quiet than assertive.
208. When I hit a snag in what I am doing, I don't stop until I have found a way to get around it.
209. At a party, I usually sit back and watch the others.
210. I try to get out of jobs that would require using dangerous tools or machinery.
211. I am not one of those people who blurt out things without thinking.
212. I am usually the first to offer a helping hand when it is needed.
213. I seldom take time to hang up my clothes neatly.
214. I like to go "out on the town" as often as I can.
215. I have never seen a statue that reminded me of a real person.
216. I will not go out of my way to behave in an approved way.
217. I usually tell others of my misfortunes because they might be able to assist me.
218. When I see a new invention, I attempt to find out how it works.
219. I have never seen an apple.
220. I am not willing to give up my own privacy or pleasure in order to help other people.
221. When people try to make me feel important, I feel guilty and uncomfortable about it.
222. I prefer to be paid on the basis of how much work I have done rather than on how many hours I have worked.
223. I have relatively few friends.
224. I often find it necessary to criticize a person sharply if he annoys me.
225. Family obligations make me feel important.
226. The main joy in my life is going new places and seeing new sights.
227. I don't keep a very accurate account of my financial resources.
228. I am only very rarely in a position where I feel a need to actively argue for a point of view I hold.
229. When I am with someone else I do most of the decision-making.
230. I don't believe in sticking to something when there is little chance of success.
231. If I were to be in a play, I would want to play the leading role.
232. Swimming alone in strange waters would not bother me.
233. I often get bored at having to concentrate on one thing at a time.
234. If someone is in trouble, I try not to become involved.
235. A messy desk is inexcusable.
236. I prefer to read worthwhile books rather than spend my spare time playing.
237. I like to have my neck massaged.
238. When I am doing something, I often worry about what other people will think.
239. I prefer not being dependent on anyone for assistance.
240. It is more important to me to be good at a sport than to know about literature or science.
241. I usually wear something warm when I go outside on a cold day.
242. Most of my teachers were helpful.
243. I try not to let anyone else take credit for my work.
244. I have rarely done extra studying in connection with my work.
245. To love and be loved is of greatest importance to me.
246. If I have to stand in line, I seldom try to cut ahead of the other people.
247. I delight in feeling unattached.
248. When I find a good way to do something, I avoid experimenting with new ways.
249. I don't like situations that are uncertain.
250. Since people are always looking for a person's weak spots, I am careful never to talk about mine.
251. I would make a poor military leader.
252. I am willing to work longer at a project than are most people.
253. When I was young I seldom competed with the other children for attention.
254. I prefer a quiet, secure life to an adventurous one.
255. I always try to be fully prepared before I begin working on anything.
256. I would prefer to care for a sick child myself rather than hire a nurse.

257. I could never find out with accuracy just how I have spent my money in the past several months.
258. I spend a good deal of my time just having fun.
259. All cheeses taste the same to me.
260. I don't care if my clothes are unstylish, as long as I like them.
261. The thought of being alone in the world frightens me.
262. I am more at home in an intellectual discussion than in a discussion of sports.
263. I think the world would be a much better place if no one ever went to school.
264. We ought to let the rest of the world solve their own problems and just look out after ourselves.
265. When I was a child I allowed other children to take my toys away from me.
266. People have always said that I am a hard worker.
267. I seldom go out of my way to do something just to make others happy.
268. I often make people angry by teasing them.
269. I respect rules because they guide me.
270. I would like the type of work which would keep me constantly on the move.
271. I very seldom make detailed plans.
272. If faced by a good argument, I am usually willing to change my position even on important issues.
273. When two persons are arguing, I often settle the argument for them.
274. If I had to do something I didn't like, I would put it off and hope that someone else might do it.
275. I often monopolize a conversation.
276. To me, crossing the ocean in a sailboat would be a wonderful adventure.
277. It seems that emotion has more influence over me than does calm meditation.
278. I avoid doing too many favors for people because it would seem as if I were trying to buy friendship.
279. My work is always well organized.
280. Most of my friends are serious-minded people.
281. I like the way my muscles tingle after a good workout.
282. One of the things which spurs me on to do my best is the realization that I will be praised for my work.
283. I prefer to face my problems by myself.
284. I really don't know what is involved in any of the latest cultural developments.
285. I have no sense of touch in my fingers.
286. My life is full of interesting activities.
287. I would resist anyone who tried to bully me.
288. When people are not going to see what I do, I often do less than my very best.
289. Most people think I am warm-hearted and sociable.
290. I show leniency to those who have offended me.
291. I find that I can think better without having to bother with advice from others.
292. I would be content to live in the same town for the rest of my life.
293. I would never make something without having a good idea of what the finished product should look like.
294. People find it very difficult to convince me that I am wrong on a point no matter how hard they try.
295. I would not do well as a salesman because I am not very persuasive.
296. When I am working outdoors I finish what I have to do even if it is growing dark.
297. I think that trying to be the center of attention is a sign of bad taste.
298. I never go into sections of a city that are considered dangerous.
299. I generally rely on careful reasoning in making up my mind.
300. When I see a baby, I often ask to hold him.
301. I often forget to put things back in their places.
302. I like to watch television comedies.
303. I rarely sit and watch the water at a beach or stream.
304. If I have done something well, I don't bother to call it to other people's attention.
305. If I ever think that I am in danger, my first reaction is to look for help from someone.
306. If I believe something is true, I try to prove that my theory will hold up in actual practice.
307. If someone pricked me with a pin, it would hurt.
308. I often question whether life is worthwhile.
309. Sometimes I let people push me around so they can feel important.
310. I don't mind working while other people are having fun.
311. When I see someone I know from a distance, I don't go out of my way to say "Hello."
312. I become angry more easily than most people.
313. I find that for most jobs the combined effort of several people will accomplish more than one person working alone.
314. I like to work on several projects at the same time so I can change from one to another.
315. When I take a vacation I like to go without detailed plans or time schedules.
316. Most of the people with whom I am in contact ignore any minor errors I make.
317. If I were in politics, I would probably be seen as one of the forceful leaders of my party.
318. If I get tired while playing a game, I generally stop playing.
319. I try to get others to notice the way I dress.
320. I would enjoy exploring an old deserted house at night.

321. Often I stop in the middle of one activity in order to start something else.
322. People's tears tend to irritate me more than to arouse my sympathy.
323. I spend much of my time arranging my belongings neatly.
324. People consider me a serious, reserved person.
325. One of my favorite pastimes is sitting before a crackling fire.
326. I feel that my life would not be complete if I failed to gain distinction and social prestige.
327. When I was a child, I disliked it if my mother was always fussing over me.
328. I would rather be an accountant than a theoretical mathematician.
329. If I were exploring a strange place at night, I would want to carry a light.
330. I am able to make correct decisions on difficult questions.
331. I would never be the "low man on the totem pole" if I could help it.
332. It doesn't really matter to me whether I become one of the best in my field.
333. I truly enjoy myself at social functions.
334. I do not like to see anyone receive bad news.
335. I would not mind living in a very lonely place.
336. I see no reason to change the color of my room once I have painted it.
337. My work is carefully planned and organized before it is begun.
338. I am always ready to defend myself against remarks people might make about me or my friends.
339. I feel incapable of handling many situations.
340. I will continue working on a problem even with a severe headache.
341. I never attempt to be the life of the party.
342. Surf-board riding would be too dangerous for me.
343. If I am playing a game of skill, I attempt to plan each move thoroughly before acting.
344. I feel most worthwhile when I am helping someone who is disabled.
345. I rarely clean out my bureau drawers.
346. If I didn't have to earn a living, I would spend most of my time just having fun.
347. I don't like the feeling of wind in my hair.
348. I don't try to "keep up with the Joneses."
349. I like to be with people who assume a protective attitude toward me.
350. I like to read several books on one topic at the same time.
351. I wear clothes when I am around other people.
352. I believe people tell lies any time it is to their advantage.
353. I let people get ahead of me when waiting in a line since they probably have something more important to do than I do.
354. Sometimes people say I neglect other important aspects of my life because I work so hard.
355. I want to remain unhampered by obligations to friends.
356. I have a violent temper.
357. To have a sense of belonging is very important to me.
358. I like to change the pictures on my walls frequently.
359. I like the adventure of going into a new situation without knowing what might happen.
360. I don't mind answering questions about my family or friends when applying for a job.
361. I try to convince others to accept my political principles.
362. I am easily distracted when I am tired.
363. When I was in school, I often talked back to the teacher to make the other children laugh.
364. I would like to drive a motorcycle.
365. Most people feel that I act spontaneously.
366. I become irritated when I must interrupt my activities to do a favor for someone.
367. I keep my possessions in such good order that I have no trouble finding anything.
368. I usually have some reason for the things I do rather than just doing them for my own amusement.
369. Certain pieces of music remind me of pictures or moving patterns of color.
370. I would not consider myself a success unless other people viewed me as such.
371. I am usually very self-sufficient.
372. I would rather build something with my hands than try to develop scientific theories.
373. I can't believe that wood really burns.
374. Rarely, if ever, has the sight of food made me ill.
375. I don't particularly enjoy being the object of someone's jokes.
376. I am sure people think that I don't have a great deal of drive.
377. I spend a lot of time visiting friends.
378. I do not think it is necessary to step on others in order to get ahead in the world.
379. Having a home has a tendency to tie a person down more than I would like.
380. When I was in school, I preferred to work on one subject until I had finished the assignment.
381. Each day I check the weather report so that I will know what to wear.
382. I deliberately keep people from getting to know me too well.
383. I would not want to have a job enforcing the law.
384. I won't leave a project unfinished even if I am very tired.

385. I don't like to do anything unusual that will call attention to myself.
386. I will not climb a ladder unless someone is there to steady it for me.
387. I think that people who fall in love impulsively are quite immature.
388. Seeing an old or helpless person makes me feel that I would like to take care of him.
389. I feel comfortable in a somewhat disorganized room.
390. I delight in playing silly little tricks on people.
391. I am not very good at describing things.
392. When I am being introduced, I don't like the person to make lengthy comments about what I have done.
393. When I was a child, I usually went to an adult for protection if another child threatened me.
394. I am unable to think of anything that I wouldn't enjoy learning about.
395. I can run a mile in less than four minutes.
396. I find it very difficult to concentrate.
397. I am only worthy of an inferior position in most groups.
398. I enjoy work more than play.
399. I am quite independent of the people I know.
400. I often quarrel with others.
401. I can do my best work when I have the encouragement of others.
402. I would rather make new and different friends than spend my time with old friends.
403. Once in a while I like to take a chance on something that isn't sure — such as gambling.
404. Most of the criticism I receive can be used to my advantage by helping me to improve myself.
405. With a little effort, I can "wrap most people around my little finger."
406. When I feel ill, I stop working and try to get some rest.
407. I perform in public whenever I have the opportunity.
408. I like the feeling of speed.
409. Life is no fun unless it is lived in a carefree way.
410. It doesn't affect me one way or another to see a child being spanked.
411. I can't stand reading a newspaper that has been messed up.
412. I would prefer a quiet evening with friends to a loud party.
413. I like to feel sculptured objects.
414. I do a good job more to gain approval than because I like my work.
415. I prefer to take care of things for myself, rather than have others watch out for me.
416. There are many activities that I prefer to reading.
417. I would have a hard time keeping my mind a complete blank.
418. I am always prepared to do what is expected of me.
419. If my house were robbed, I would insist that the police make every effort to catch the thief.
420. It is unrealistic for me to insist on becoming the best in my field of work all of the time.
421. I go out of my way to meet people.
422. I try to show self-restraint to avoid hurting other people.
423. My idea of an ideal marriage is one where the two people remain as independent as if they were single.
424. I like to go to stores with which I am quite familiar.
425. I have no use for theories which are only good guesses and are not closely tied to facts.
426. If someone accused me of making a mistake, I would call his attention to a few mistakes of his own.
427. I don't have a forceful or dominating personality.
428. I am very persistent and efficient even when I have been working for many hours without rest.
429. The idea of acting in front of a large group doesn't appeal to me.
430. To me, it seems foolish to ski when so many people get hurt that way.
431. I like to take care of things one at a time.
432. I can remember that as a child I tried to take care of anyone who was sick.
433. If I have brought something home, I often drop it on a chair or table as I enter.
434. Things that would annoy most people seem humorous to me.
435. I would never spend my money to have a steam bath.
436. Inner satisfaction rather than fame is my goal in life.
437. I usually feel insecure unless I am near someone whom I can ask for support.
438. If I were going to an art exhibit, I would first try to learn about the artist, his style and technique, his philosophy of art, and the story behind each piece of work.
439. I am able to breathe.
440. Many things make me feel uneasy.

# PERSONALITY RESEARCH FORM

## FORM BB



DOUGLAS N. JACKSON, Ph.D.

## DIRECTIONS

On the following pages you will find a series of statements which a person might use to describe himself. Read each statement and decide whether or not it describes you. Then indicate your answer on the separate answer sheet.

If you agree with a statement or decide that it does describe you, answer TRUE. If you disagree with a statement or feel that it is not descriptive of you, answer FALSE.

In marking your answers on the answer sheet, be sure that the number of the statement you have just read is the same as the number on the answer sheet.

**Answer every statement** either true or false, even if you are not completely sure of your answer.



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1. When someone bumps into me in a crowd, I usually say "I'm sorry."
2. As a child I worked a long time for some of the things I earned.
3. Often I would rather be alone than with a group of friends.
4. I have been known to fly into a rage if things didn't go as I had planned.
5. I would rather submit to any demand of my neighbors than move to a lonely place.
6. For the most part, I am very receptive to new ideas of any type.
7. When I talk to a doctor, I would rather just have him tell me what to do than go into details of my problem.
8. I either ignore or agree with people who correct me rather than argue.
9. I would like to be an executive with power over others.
10. If I run into great difficulties on a project, I usually stop work rather than trying to solve the problem.
11. I seldom feel shy when I am the center of attention.
12. Thrill rides at amusement parks seem a little tame to me.
13. I have, at times, hurt someone unintentionally because I didn't think before speaking.
14. I think helping others is a waste of time.
15. I am careful to select clothes to wear that look well together.
16. I don't waste my time on foolish games of skill.
17. I enjoy the feel of cool, smooth sheets on my bed.
18. I must admit that I consider how others will evaluate my actions before I do something.
19. I don't like to be waited on.
20. I care very little about progress being made in space technology.
21. My picture has been on the cover of a national news magazine a number of times in the last year.
22. I usually use good judgment.
23. I would never deliberately call attention to any of my weaknesses.
24. The many extra hours of work needed to do a job perfectly are simply not worth the effort.
25. If a person does a favor for me, I like to do something in return.
26. I rarely swear.
27. I like to be on my own in most matters.
28. Every time I go out to eat, I like to go to the same restaurant.
29. I often try to predict what will happen in the future from my own past experiences.
30. I am ready to protect myself when someone picks on me.
31. I feel uneasy when I have to tell people what to do.
32. If I know that I must have a job finished in a short time, I work straight through on it until it is done.
33. I am much too bashful to play mischievous tricks.
34. I think it is foolish to accept a dare if doing so might cause an accident.
35. Emotion seldom causes me to act impulsively.
36. Showing people I am interested in their troubles is very important to me.
37. Even if I made a shopping list, I would probably just lose it.
38. I like to be entertained.
39. When I am indoors I rarely notice the sound of rain.
40. I'm not concerned about my reputation.
41. It is important to me to know that others care how I feel.
42. When I was a child, I loved to explore.
43. Sometimes I see cars near my home.
44. I tend to be a very nervous, irritable person.
45. I have often let others take credit for something I have done rather than be impolite about it.
46. Even when people do not see what I do, I try to do things at a level of perfection.
47. I think that fame is more rewarding than friendship.
48. When I am irritated, I let it be known.
49. If I face a crisis, I immediately look for help.
50. I have a tendency to get bored unless I can find new ways of doing routine jobs.
51. Uncertainty in a situation doesn't bother me.
52. I don't mind having my mistakes pointed out to me at times when other people can hear.
53. The ability to be a leader is very important to me.
54. I often give up in the middle of a project.
55. I am never one to sit on the sidelines at a party.
56. I like to live dangerously.
57. I get a kick out of doing something just "for the heck of it."
58. I think children are a nuisance because they require so much care.
59. If I have to pack a suitcase, I usually organize it very well.
60. I don't really enjoy going out in the evening.
61. Listening to music gives me great pleasure.
62. When I am dressing for a party, I look for something that will be liked by other guests.
63. It doesn't depress me to realize that no one is thinking about me.

64. I think it does no good to concentrate on abstract problems.
65. I have never had any hair on my head.
66. I am glad I grew up the way I did.
67. I don't like being an errand boy for others, even my friends.
68. I am sure people seldom think of me as a hard worker.
69. When I meet old acquaintances, I usually give them a very warm welcome.
70. When I bump into a piece of furniture, I don't usually get angry.
71. I believe that being able to stand alone is a true sign of greatness.
72. I seldom like a piece of music when I hear it for the first time.
73. In general, I feel that people should be more definite and decisive.
74. Even when I can't convince others that my opinions are best, I can always justify them to myself.
75. I would rather follow than lead.
76. I have occasionally spent hours looking for something that I needed to have to complete a project.
77. People think I am quite shy.
78. I get worried just watching a trapeze artist so I would never actually want to try it myself.
79. I am careful to consider all pros and cons before taking action.
80. If someone is lonely, I spend some time trying to cheer him up.
81. Having dirty hands doesn't bother me too much.
82. I often do something for no reason at all except that it sounds like it might be fun.
83. To me, there is nothing beautiful about falling leaves.
84. What others think of my work doesn't matter to me.
85. I usually try to share my burdens with someone who can help me.
86. Sometimes I like to consider concepts even though they may be of no practical consequence.
87. I have never bought anything in a store.
88. I have never been really happy.
89. I remember my failures more easily than my successes.
90. I hate to do a job half-heartedly.
91. I don't spend much of my time talking with the people I see every day.
92. Sometimes I feel like smashing things.
93. I think that most men should seek help and guidance in all that they do.
94. I'm horrified at the dull lives some people lead.
95. My work is organized loosely, if at all, and therefore it is adjustable.
96. It is usually quite easy for me to admit I am wrong.
97. In an argument, I can usually win others over to my side.
98. I can never stick to anything very long.
99. At a party I enjoy entertaining others.
100. I think it would be fun to be a test pilot for experimental jet planes.
101. My thoughts often get ahead of me.
102. I don't like it when friends ask to borrow my possessions.
103. When writing something, I keep my pencils sharpened.
104. I rarely waste my time merely amusing myself.
105. The sound of a rushing stream seems almost musical to me.
106. I am quite interested in having a good public image.
107. As a child, I disliked having to be dependent on other people.
108. I tend to shy away from intellectual discussions.
109. I usually prefer to have meat cooked before eating it.
110. Doing something that would benefit humanity appeals to me.
111. I try to avoid being blamed when things go wrong.
112. I don't stick to goals which prove hard to reach.
113. Having friends is very important to me.
114. If someone has a better job than I, I don't feel envious.
115. When I was in school, I preferred to do all my work by myself.
116. I like to return to the same vacation spot year after year.
117. When someone gives me street directions I usually ask several questions and repeat the directions to make sure I have everything clearly in mind.
118. When people say insulting things about me, I usually get back at them by pointing out their faults.
119. I don't like to have responsibility for directing the work of others.
120. I don't shy away from a task just because it will require me to work late into the night.
121. I don't like to be the topic of conversation even among a group of old friends.
122. I would never travel alone in another country for fear that something might happen to me.
123. I am considered rather reserved in thought and action.
124. I find satisfaction in giving sympathy to someone who is ill.
125. I always have to hunt for anything when I need it.

126. At times I get fascinated by some unimportant game and play it for hours.
127. Unless a noise startles me, I don't notice it.
128. I don't put much stock in what other people say about me.
129. I like to ask other people's opinions concerning my problems.
130. I am usually eager to find a new approach to an old problem.
131. I have never felt sad.
132. Sometimes I am afraid of my friends, although I can't say why.
133. One of my good points is that I never mind when others make fun of me.
134. If I had to make a choice, I would prefer to do a job that was very hard for me, rather than one that was very easy.
135. I don't care whether or not the people around me are my friends.
136. If someone does something I don't like, I usually tell him about it.
137. I would feel lost and lonely roaming around the world alone.
138. I would not like to work at the same job all of my life.
139. I don't mind being around people who change their minds often.
140. I enjoy playing question and answer games even if I am not very good at getting the answers.
141. I am quite effective in getting others to agree with me.
142. I don't have enough patience to do work that must be very accurate.
143. I was one of the loudest and liveliest children in my neighborhood.
144. The excitement of fighting forest fires would be worth the discomfort.
145. When I go to the store, I often come home with things I had not intended to buy.
146. To me, it seems foolish to try to solve another fellow's problems.
147. I have a plan for most things that I do.
148. I very seldom take the time to go to parties.
149. The smell of pine trees refreshes me greatly.
150. I usually try to take the course of action which is most likely to merit public approval.
151. I keep my problems to myself.
152. We have enough to think about without attempting to predict the future.
153. Some of my brain is missing.
154. I have never been an unusually weak or sickly person.
155. I dislike being criticized by younger people.
156. I seldom set standards which are difficult for me to attain.
157. People consider me to be warm and friendly.
158. I would never start a fight with someone.
159. People who try to regulate my conduct with rules are a bother.
160. My life is pretty much the same from year to year.
161. I don't like to start a project until a decision has been made as to the best way to proceed.
162. I am on guard against people who might try to make a big thing of my mistakes.
163. I am often reluctant to express my ideas publicly for fear that they might be criticized.
164. Even when I am feeling quite ill, I will continue working if it is important.
165. I could never be a popular singer because I am too shy.
166. I would not take an ocean voyage except on a large, safe ship.
167. Life is a serious matter which should be lived with caution and a cool head.
168. I would be an incomplete human being if I did not make every effort to help my fellow man.
169. My important papers are scattered in several places.
170. I think it's enjoyable to have a big celebration even for small events.
171. I rarely notice whether a woman has perfume on.
172. I don't care whether people compliment me or not.
173. I prefer to face misfortune with a friend at my side.
174. I often try to comprehend the marvellous balance of nature.
175. Things with sugar in them usually taste sweet to me.
176. I am afraid to speak to a friend who has not spoken to me first.
177. I don't mind being considered unimportant.
178. I enjoy hard work.
179. I am not considered sociable.
180. I never allow an attack on my honor to go unpunished.
181. I find that I can think better when I have the advice of others.
182. I like to see changes being made even though they don't always turn out for the best.
183. I can feel comfortable even when I have a number of questions in mind for which I have no good answer.
184. If someone made a nasty comment about me or my family I wouldn't really know what to say or do.
185. If I were a salesman, I would probably convince most people to buy what I was selling.
186. I can't keep my mind on a problem for very long without getting bored.
187. When I am in a crowd, I want others to see and notice me.

188. Sometimes I take up a sport or hobby just because there is a certain amount of danger or excitement involved in it.
189. Sometimes I get several projects started at once because I don't think ahead.
190. I think giving sympathy to people does them more harm than good.
191. Working in a room which is disorderly is very difficult for me.
192. I never play jokes on people, and prefer not to have jokes played on me.
193. I like to feel a breeze blowing through my hair.
194. I am most proud of those of my accomplishments which are recognized by others.
195. The person I marry won't have to spend much time taking care of me.
196. I seldom read extensively on any one subject.
197. I usually drink from a glass or cup.
198. I try to consider all sides of an issue before I form an opinion.
199. If someone accidentally burned me with his cigarette I would certainly mention it to him.
200. I am not working toward any specific goal.
201. I think that a person must know how to get along well with others before he can be a success.
202. I avoid quarreling with others.
203. When I work alone I frequently do a better job than when I must work with others.
204. I would rather repeat an experience that I know is fun than experiment with a new one.
205. Once I begin to solve a puzzle or problem I have a hard time concentrating on anything else until I find the answer.
206. I seldom let a critical comment pass without saying something in my own defense.
207. When I go somewhere with another person, I let him do most of the talking.
208. Often I continue to work on a task after everyone else has given up.
209. I try to be inconspicuous.
210. I don't like to go near trucks carrying explosive materials.
211. If I want to buy something, I make certain that it will be just what I want before purchasing it.
212. I like pictures of babies because they are always so cute.
213. I often have a hard time finding what I want among my belongings.
214. One of my greatest incentives to work is the promise of a good time when I am through.
215. I seldom notice how objects feel when I touch them.
216. I make few attempts to give people a favorable impression of me.
217. As a child, if I imagined frightening things, I ran to my mother for comfort.
218. I would enjoy being a scientist who was studying the effects of the sun on our earth.
219. I have never talked with anyone by telephone.
220. I am not living what I would consider to be the right kind of life.
221. I don't try to protect myself from the bullying of others, because I don't think it makes any difference.
222. People should be more involved with their work.
223. I seldom put out extra effort to make friends.
224. Sometimes I just want to hit someone.
225. I like to have specific directions before I do something.
226. If I had the chance, I would like to move to a different part of the country every few years.
227. I often start work on something when I have only a very hazy idea of what the end result will be.
228. I don't mind answering personal questions for surveys or questionnaires.
229. I would like to participate in making laws.
230. When I get to a hard place in my work I usually stop and go back to it later.
231. I like to give speeches.
232. Parachute-jumping is a hobby that appeals to me.
233. I often say the first thing that comes into my head.
234. I avoid doing too many favors for people because it would seem as if I were trying to buy friendship.
235. "A place for everything and everything in its place" is the way I like to live.
236. I watch the news reports on television more often than the comedy programs.
237. I like to have my back rubbed.
238. Social status is important to me.
239. If I have a problem, I like to work it out alone.
240. The main reason I studied while I was in school was because it was required of me.
241. On clear days the sky is usually blue.
242. If someone gave me too much change I would tell him.
243. I refuse to be pushed around.
244. I am not really very certain what I want to do or how to go about doing it.
245. I need the feeling of "belonging" that comes from having many friends.
246. I don't become upset when someone disagrees with me.
247. I would like to be alone and my own boss.
248. I begin to think about a second project only after the first has been completed.
249. When I go on a trip I try to plan a timetable for it beforehand.

250. I never allow anyone to talk me down on an important issue.
251. When people are arguing, I keep out of it.
252. I am more concerned with finishing what I start than is the average person.
253. I wouldn't be caught dead doing some of the silly things other people do at parties.
254. I would not explore an old deserted house on a dark night.
255. If I start one activity, I stay with it until it is finished.
256. Babysitting is a rewarding job.
257. I have a lot of trouble keeping an accurate record of my expenses.
258. Rarely, if ever, do I turn down a chance to have a good time.
259. I rarely notice the texture of a piece of clothing.
260. I don't go out of my way to earn the high esteem of those I know.
261. If I am depressed I go to friends who can snap me out of it.
262. I would rather study than watch television.
263. I often sit and stare directly into the sun for hours on end.
264. I never bother to consider the results of any act of mine before I do it.
265. I would never say anything if someone hurt my feelings.
266. I would work just as hard whether or not I had to earn a living.
267. I don't really have fun at large parties.
268. I often find it necessary to point out people's faults to them.
269. I like to do whatever is proper.
270. I make an effort to think of new things to eat for breakfast.
271. I rarely consider the daily weather report when deciding what to wear.
272. I don't mind being teased about silly things I have done.
273. I would like to be a judge.
274. I can't imagine spending hours on a chess game like some people do.
275. I think that I would like to be in show business.
276. If I discovered a cave I would explore it right away, even if I weren't sure how risky it was.
277. I often do daring things on the spur of the moment.
278. I have never done volunteer work for charity.
279. If I remove an object from a shelf, I always replace it when I have finished with it.
280. I prefer to be with people who are relatively serious.
281. One of the great pleasures in my life is eating good food.
282. What my friends think is extremely important in helping me shape my own thoughts.
283. I don't like to be with people who are always trying to protect me from danger.
284. I think that a new invention is no good unless it has an obvious practical application.
285. I don't believe in gravity.
286. I get along with people at parties quite well.
287. I am not the type of person to be always following orders.
288. I am not really bothered by learning something incompletely.
289. I think that any experience is more significant when shared with a friend.
290. I seldom make people angry by teasing them.
291. I am quite independent of the opinions of others.
292. When I travel, I usually take a route I know so I won't be bothered with road maps.
293. Often when I telephone someone, I think about what I intend to say or make a list of things to discuss.
294. Whenever I make a deal with anyone, I like to have it in writing to refer to later.
295. I usually let others take the lead and go along with their ideas.
296. I rarely let interruptions interfere with an important job.
297. I do not recall ever saying something shocking just to call attention to myself.
298. I have absolutely no desire to drive a motorcycle.
299. Statements I make are usually well thought out.
300. I often take young people "under my wing."
301. I am often disorganized.
302. I try to make my work into a game.
303. I am not particular about the taste or appearance of my food.
304. I don't often consult other people before I make a big decision.
305. I would like to be married to a protective and sympathetic person.
306. My favorite part of school was working on research and independent projects.
307. I have travelled away from my home town.
308. I did many very bad things as a child.
309. I always feel much better after I have been punished.
310. I will not be satisfied until I am confident that I am the best in my field of work.
311. I don't believe in showing lots of affection toward friends.
312. If I have to stand in line, I usually find some way to move up quickly.

313. I want the sense of security that comes with having my own home.
314. I believe the more hobbies I have the better.
315. I seldom organize my activities so completely that I can tell what I will be doing at some future time.
316. I value certain friends who can frankly criticize the way I do things.
317. I would make a powerful military leader.
318. I would quit working on an outdoor project if the weather turned bad.
319. When I was a child, I enjoyed performing for company.
320. Exploring dangerous sections of a city sounds like fun to me.
321. Many of my actions seem to be impulsive.
322. I feel no responsibility for the troubles of other people.
323. I spend quite a lot of time keeping my personal effects in order.
324. Even if I had the money and the time, I wouldn't feel right just playing around.
325. I would like the feeling of rolling down a grassy slope.
326. I follow carefully the standards set by others so as not to appear out of line.
327. I would rather act on my own responsibility than have a superior help me.
328. Study of the history of ideas has no appeal for me.
329. I can usually tell the difference between a plant and an animal.
330. Before I do something I try to figure out how it will affect my friends and family.
331. When standing in line, I am willing to wait my turn, but I don't let other people get ahead of me.
332. In my work I seldom do more than is necessary.
333. My friendships are many.
334. I would never intentionally hurt someone's feelings.
335. I could live alone and enjoy it.
336. I don't like to try new products until they have been proved to be good.
337. I keep very close track of my money and finances so that I will know how much I can spend if anything unexpected comes up.
338. I am usually suspicious of people who want to know a lot of details about my work.
339. I avoid positions of dominance.
340. No one can discourage me from completing a job I have begun.
341. I am more of a listener than a talker.
342. I don't ever go walking in places where there may be poisonous snakes.
343. I am pretty cautious.
344. I would rather have a job serving people than a job making something.
345. Being in a cluttered room doesn't bother me.
346. I enjoy children's games.
347. I don't understand why people rave about the odors of certain foods.
348. I have no desire to buy things just because they are similar to those valued by my friends.
349. I want to be sure someone will take care of me when I am old.
350. I think I would enjoy studying most of my life so I could learn as many things as possible.
351. I have little or no difficulty recognizing people I see every day.
352. I am never able to do things as well as I should.
353. Humility is my greatest virtue.
354. Even when I have just finished an excellent piece of work, I feel that I must do something even better.
355. I would not be very good at a job which required me to meet people all day long.
356. I believe in getting ahead in this world even if it means stepping on the people who get in my way.
357. To have a sense of belonging is very important to me.
358. I would like to redecorate my room about every six months.
359. I think theories are useful as guides for thought even when they are not related to facts.
360. I am willing to give in on a point when I am faced with good arguments.
361. At a party I am the one who usually organizes the games and other activities.
362. I don't have the perseverance to do some of the things I would like.
363. Appearing on the stage is so much fun that I can't understand why people get stage fright.
364. I think I would enjoy mountain climbing.
365. I find that thinking things over very carefully often destroys half the fun of doing them.
366. Caring for plants is a bother.
367. If I have brought something home, I always put it away as soon as I enter.
368. I believe in working toward the future rather than spending my time in fun now.
369. Sometimes I feel like stepping into mud and letting it ooze between my toes.
370. If I fail to receive credit for something I have accomplished, I become very upset.
371. I am not afraid of being alone.
372. I would rather be a businessman than a philosopher.
373. I have never brushed or cleaned my teeth.
374. I am careful to plan for my distant goals.
375. I think it is my right to try to get at least my share of things.
376. People rarely say I let my work interfere with the other aspects of my life.
377. I like to work with other people rather than all alone.
378. I am reluctant to distress someone even if I don't like him.

379. I would rather own a big sailing boat than an expensive house.
380. To my friends, my behavior seems predictable in most situations.
381. I try to organize for my future so that I can tell what I will be doing at any given time.
382. When I make a mistake, I usually figure that the best way to handle it is not to mention it to anyone concerned.
383. When I don't like what someone is doing, I try to keep my complaints to myself.
384. I put tireless effort into almost everything I do.
385. If others are engaged in a conversation, I usually sit quietly without interrupting.
386. I never go near the edge of cliffs or steep places.
387. My thinking is usually careful and purposeful.
388. I would enjoy spending a lot of time taking care of pets.
389. Sometimes I take a long time starting a project because I don't get everything together ahead of time.
390. I joke and talk rather than work whenever possible.
391. I don't get any particular enjoyment from sitting in the sun.
392. A person should lead a good life for his own satisfaction, not for what others will think of him.
393. If I have a problem I prefer to take it to an expert instead of solving it alone.
394. I like magazines which explain how electronic apparatus operates.
395. I was born early on the 29th of February.
396. Most people won't believe the truth no matter how obvious it is.
397. I feel very guilty when I argue with another person.
398. I cannot respect people who can be satisfied with being less than the best.
399. Sometimes I have to make a concentrated effort to be sociable.
400. If someone hurts me, I don't forget it until I can get even.
401. I want to have people show interest in what happens to me.
402. I seldom do things the same way twice in succession.
403. I enjoy a certain amount of unpredictability in my daily activities.
404. I don't mind talking with a person who disagrees with a decision I have made.
405. My friends think of me as being forceful.
406. If I become tired, I set my work aside until I am more rested and more interested.
407. When I was in school, I would speak up as soon as I thought I knew the answer to a question.
408. If the opportunity arose, I would learn to ride a surf-board in the ocean.
409. Outlining a paper or talk has always struck me as a waste of time.
410. If I could, I would hire a professional nurse to care for a sick child rather than do it myself.
411. I spend more time than most people do in making sure that my clothes are always ready to wear.
412. Many things are more important to me than having a good time.
413. I enjoy the feeling of mist and fog.
414. Doing a good job doesn't satisfy me unless others notice it.
415. I enjoy making my own decisions.
416. I read more books that deal with practical matters than books that deal with basic ideas in philosophy and science.
417. I have been inside more than one house.
418. I am one of the lucky people who could talk with my parents about my problems.
419. I would never remain in a position of inferiority if I had a choice.
420. I would rather be paid on the basis of how many hours I have worked than by how much work I have done.
421. I choose hobbies that I can share with other people.
422. I don't like to watch anyone make a fool of himself.
423. I think that marriage is just another form of bondage.
424. If I find a good brand of clothing, I stick to it.
425. I plan my work carefully in advance and follow the plan exactly.
426. I feel that I must always be on guard because so many people are trying to take advantage of me.
427. I don't force my opinions on other people.
428. Once I start to do something, nothing can distract me.
429. I seldom try to call attention to myself.
430. I never go too near a construction site for fear that something might fall on me.
431. If I have to give a talk, I like to have plenty of time to plan it.
432. Sometimes when a friend is in trouble, I am unable to sleep because I want so much to help.
433. I find it necessary to keep only general accounts rather than detailed ones.
434. I pride myself on being able to see the funny side of every situation.
435. I could not possibly identify flowers just by their fragrance.
436. The personal satisfaction I feel when doing something makes my job worthwhile, whether others approve of it or not.
437. I have trouble making decisions without advice.
438. When I was a child, I read every book in my house and went to the library frequently.
439. I am able to read English.
440. My daily life includes many activities I dislike.

## APPENDIX 2

The Training Agreement Forms for the Biofeedback and  
Autogenic Phrase Relaxation Training Groups

BIOFEEDBACK RELAXATION LAB.

Personal Growth Center - - - Plumb Hall 207  
Emporia Kansas State College

T R A I N I N G A G R E E M E N T

I desire to enter the Biofeedback Relaxation Training Program. I understand that this will require me to reserve the time necessary and make the effort necessary for such training in the following manner:

(Choose one):

- \_\_\_ (a) I will spend at least 3 half-hour practice sessions per week on the biofeedback instrument for the 4-week duration of the training period. Also, I will meet once a week for a 1 1/2 hour session with the group going through the training with me and will learn and practice body relaxation daily at home.
- \_\_\_ (b) I will spend one half-hour daily (Mon. through Fri.) for one week, and then 3 half-hour practice sessions per week for the next two weeks--making a total training period of 3 weeks. Also, I will meet once a week for a 1 1/2 hour session with the group going through the training with me and will learn and practice body relaxation daily at home.
- \_\_\_ (c) I will spend one half-hour daily (Mon. through Fri.) in practice sessions on the biofeedback instrument for the 2-week duration of the training period. Also, I will meet once a week for a 1 1/2 hour session with the group going through the training with me and will learn and practice body relaxation daily at home.

The biofeedback instrument I wish to train on is:

EMG:\_\_\_ Temperature:\_\_\_ EEG:\_\_\_

I understand that I am: (1) to meet the designated times to learn the techniques, and (2) to practice these techniques on my own. I also understand that I may ask questions about or terminate my training at any time I so wish.

I am aware that this service is offered for my own personal awareness and development and does not prepare or certify me to train others. I also understand that it is not offered as treatment for physical or medical problems. It has been explained to me that, with training, a person's requirements for medication may vary (often decrease) and drug levels might need to be readjusted. Therefore, if I am taking any medications prescribed by a physician, I list them below (as information for the relaxation trainer) but I also assume responsibility for having the physician check to see whether or not the amount of medication might need to be changed as I learn to use these biofeedback relaxation techniques.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
date

(continued on the next page)

## Biofeedback Relaxation Lab Training Agreement continued

\_\_\_\_ Blood Pressure

\_\_\_\_ Diabetes

\_\_\_\_ Thyroid

\_\_\_\_ Anti-convulsant

\_\_\_\_ Allergy ( \_\_\_\_\_ )

\_\_\_\_ Other ( \_\_\_\_\_ )

## RELAXATION RESEARCH PROJECT

Personal Growth Center - - - Plumb Hall 207  
Emporia Kansas State College

TRAINING AGREEMENT

I desire to participate in the Relaxation Research Project. I understand that this will require me to reserve the time necessary and make the effort necessary for such training in the following manner:

I will spend at least 3 half-hour practice sessions per week for the 8-week duration of the training period. Also, I will meet once a week for a 1-hour session with the group going through the training with me.

I understand that I am: (1) to meet the designated times to learn the techniques, and (2) to practice these techniques on my own. I also understand that I may ask questions about or terminate my training at any time I wish.

I am aware that this is a research project. I also understand that it is not offered as treatment for physical or medical problems. It has been explained to me that, with training, a person's requirements for medication may vary (often decrease) and drug levels might need to be readjusted. Therefore, if I am taking medications prescribed by a physician, I list them below (as information for the relaxation trainer) but I also assume responsibility for having the physician check to see whether or not the amount of medication might need to be changed as I learn to use these biofeedback techniques.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Blood pressure

\_\_\_\_\_  
Anti-convulsant

\_\_\_\_\_  
Diabetes

\_\_\_\_\_  
Allergy (\_\_\_\_\_)

\_\_\_\_\_  
Thyroid

\_\_\_\_\_  
Other (\_\_\_\_\_)

APPENDIX 3

Progressive Relaxation Exercise Used in Treatment Group Meetings  
and for Home Practice

Feusterheim and Baer (1975)

Lie down. Your eyes are closed. Your arms are at your sides, your fingers open. Get yourself good and comfortable. If stray thoughts enter your mind, say to your self, STOP. Push them away and concentrate on what we are doing----

The first thing to do is tighten certain muscles and then relax them--this is in order to focus attention on the difference in feeling tense and in feeling relaxed. First, we will concentrate on the muscles in the upper part of your face. . .Make a grimace with the top part of your face. . .Squeeze your eyes tight shut. . .Wrinkle your nose. . . Frown. . .Notice where you feel the tension. . .Study it. . .Note that you feel the tension in the forehead, between the eyebrows, in the cheeks below the eyes. . .not so tight that they are strained, but tight enough to feel the tension. . .Study it, study the tension. . .hold it for about 5 seconds. . .

Now relax--just feel the tension flow out. . .Concentrate on relaxing the muscles of your forehead. . .Let them go. . .Relax your eyelids. . . As they relax, you note they begin to feel heavy. . .They make you feel drowsy, but you're not going to sleep. . .You must stay alert. . .Relax the muscles at the bridge of your nose. . .Let them go. . .Relax the muscles of your cheeks. . .Remember where they felt tight. . .Let them go. . . (10-second pause)

And now the muscles of your jaws and tongue. . .Bite hard with your back teeth, press them together until your jaws are tight. . .Feel the tension at your temples, by your ears. . .Wherever you feel the tension, study it. . .Push your tongue against the back of your lower front teeth. . .Your jaws are tight. . .Your tongue is tight. . .Study the tension. . .Get to know it. . .Learn the feel of the tension. . .Hold it. . . Hold it tense. . .Study the tension. . .

Now relax. Relax the muscles of your jaws. . .Let them go. . . Relax your tongue. . .Your teeth should be slightly parted. . .Your jaw is hanging slack. . .More and more relaxed. . . (10-second pause)

Now the muscles around the lower part of your face. . .Tense the muscles around your mouth and chin. . .The best way to make them tense is to grin. . .A big grin, a grimace. . .Draw back your lips to show your teeth upper and lower teeth. . .Draw the corners of your mouth wide, pull them back and down. . .Feel the tension in your lips, around your mouth, in your chin. . .Let the tension build up. . .Hold it. . . feel it. . .study it. . .Tense. . .tense. . .

Now relax. . .Relax the muscles around your mouth and chin. . .Let them go. . .Get all the tension out. . . (10-second pause) . . .Now try to relax the muscles of your throat. . .Relax the soft part of your

throat where you swallow. . .Relax the muscles of your voice box. . .  
Just try to get all the tension out of there. . . (10-second pause)

And now the muscles between the shoulder blades and the muscles of your neck. . .Pull your shoulders back until your shoulder blades are almost touching. . .At the same time arch your neck until your chin points to the ceiling. . .These are the areas very sensitive to nervous tension. . .Many people feel most of their tension here. . .Feel the tension. . .Not so tight that it hurts. . .Study the tension. . .Let it build up. . .

Now relax. . .Relax the muscles between your shoulder blades. . . Let the tension flow out. . .Let it go. . .And relax the muscles of your neck. . .Let them go. . .Your neck muscles are not supporting your head. . .Your head is falling limply against the pillow. . .All the tension out. . .Feel it flowing out. . . (10-second pause)

And now the muscles of your fingers, arms, and shoulders. . .Make a tight fist with each hand. . .Keep your elbows stiff and straight. . . Elbows stiff and straight as rods. . .Raise your arms from the shoulders to a forty-five degree angle. . .The angle of your arms is halfway between the couch and vertical. . .Now feel the tension. . .Study the tension . . .Study the tension in your fingers. . .in your forearms. . .in your arms and your shoulders. . .Hold the tension for ten seconds. . .Hold it . . .Hold it. . .Tense. . .tense. . .

And now relax. . .Fingers open. . .Arms down to sides. . .Just relax. . .Relax the muscles of your fingers. . .Let them go. . .Relax the muscles of your upper arms. . .Let them go. . .And now the muscles of your shoulders. . .Let them go. . . (Pause) . . .Fingers relaxed. . . arms relaxed. . .shoulders relaxed. . .Let your arms feel limp and heavy . . .Just keep letting go. . . (10-second pause)

And now the muscles of your chest. . .Take a deep breath and hold it. . .Just keep on holding it. . .Five seconds. . .Notice as you hold your breath the tension begins to build up. . .Note the tension in your chest muscles. . .Study where it is. . .Ten seconds. . .Keep holding your breath. . .Recognize the feeling of tension. . .Fifteen seconds . . .Now slowly, as slowly as you can, let your breath out. . .Slowly . . .Now breathe easily and comfortably as in a deep sleep. . . (Pause). . .Keep on relaxing the muscles of your chest. . .Let them go. . .Let the tension out. . . (10-second pause)

Now concentrate on the muscles of your back. . .Arch your back. . . arch the small of your back until you feel the tension build. . .Try to locate the tension. . .There are two long muscle columns alongside your spine. . .You may feel the tension there. . .Wherever it is, get to know the feel of tension. . .Your back is tense. . .tense. . .tense. . .

And now relax. . . Relax the muscles of your back. . .Let them go . . .Let all the tension out. . .Your back feels limp and heavy. . . Let it stay that way. . .More and more and more relaxed. . . (10-second pause)

Now tighten up the muscles of your abdomen. Make the muscles of your abdomen as taut as if a child were going to sit on your stomach . . .Get them good and tight. . .Study the tension. . .Feel where the tension is. . .Hold it for ten seconds. . .Hold it. . .Tense. . . tense. . .tense.

And now relax. . .Relax the muscles of your abdomen. . .Let them go. . .Try to relax the muscles deep inside your abdomen. . .the muscles all through your gut. . .Let them go. . .You are more and more and more relaxed. . .(10 second pause)

Now concentrate on each part as I mention it. . .Chest relaxed . . .Back relaxed. . .Abdomen relaxed. . .All the tension out.

And now, let's tighten the muscles in the lower part of your body. Turn your feet inward, pigeon-toed, heels out. Tighten up your thighs, tighten up the muscles of your buttocks, and the muscles around your anus. Now extend the tension down along your calves and shins. Bend your feet upward toward you as you do this. . .(5 second pause). . .Now bend your feet downward away from you. . .Curl your toes tightly like a bird sitting on a limb. . .Hold it and study the tension. . .(5 second pause). . .

Now relax. . .Just feel the tension flow out. . .Concentrate on relaxing the muscles of your buttocks and anus. . .Relax the muscles of your thighs. . .Relax the muscles of your legs. . .Relax the muscles of your toes. . .All the tension flows right down and out. . .

That's the end of the first part of the exercise. . .Keep your eyes closed; you're still relaxing.

Now for the second part. Just ask yourself: Is there any tension in my face, my jaws, or my throat? If there is, let it go. . .All the tension out. . .(10 second pause). . .Now ask yourself: Is there any tension between my shoulder blades or in my neck? If there is, let it go. . .Your head falling limply back to the pillow. . .(Pause). . .And now, ask yourself: Is there any tension in my fingers, my arms, or my shoulders?. . .If there is, let it go. . .Let your arms get limp and heavy. . .(10 second pause). . .Then ask yourself: Is there any tension in my chest, my back or my abdomen? If there is, let it go. . .Breathe easily and comfortably, the way you do in a deep sleep. . .All the tension out. . .(10 second pause). . .Now ask yourself: Is there any tension in my buttocks, in my thighs, in my legs, in my feet? If there is, let it go. . .Try to get all the tension out. . .More and more relaxed. . .Just keep letting go. . .all of the tension drains right out of you. You feel limp and heavy all over. . .

Now, I'm going to count from three to one. . .At the count of one, you will sit up and open your eyes. You'll be alert and wide awake and very refreshed. . .Three. . .two. . .one.

#### APPENDIX 4

Six Lessons of Imagined Action Neuromuscular Relaxation Training Used  
for Autogenic Phrase Training in Treatment Group Meetings  
and for Home Practice

## Lesson One

(Fangbein, 1969)

### Discussion

Children create an atmosphere for play by starting with "Let's pretend". By pretending, the child builds an imagined world that is suitable to the direction of his play. Learning to eliminate unnecessary tensions by imagined action is very similar to playing, "Let's pretend".

The brain upon receipt of a suggested image such as, "Imagine yourself to be an empty shirt hung on a clothes line to dry in the soft warm breeze," created a picture that allows you without conscious or purposeful movement to empathize with the image. In so doing, without you always being aware of it the muscles of your body are tensing and relaxing in accordance to the picture your brain is creating from the suggested image. It can be shown by use of an oscilloscope that imagined movement such as imagining the raising of a finger causes muscles to tense. Relaxation is a motor skill and requires practice. Practice sessions in class will be done while you are comfortably seated in a chair. Out of class practices might best be done in the supine position. If, in the supine position, lower back pain interferes with practice, bend and raise the knees to a bent leg sit-up position. At the onset the student should be cautioned against letting past experience push you beyond the point of suggested image.

### Practice Outline

1. Quiet preparation.
2. Imagine you are a Raggedy Ann Doll. A child going to bed takes you along. He hugs you as he falls asleep. Gradually his grasp lessens.
3. Imagine swimming in cool water, getting out of the water, and lying down on the beach. The sand is clean and warm. Imagine the heat of the sun feels good on your body. There is a soft breeze. You have no pressures, no exams to study for, no need to push.
4. Imagine your right arm is a limp rope.
5. Imagine your left arm is a limp rope.
6. Imagine that the lower portion of your right arm is slowly melting into the floor (Repeat for left).

## Lesson One continued

7. Imagine that the lower portion of your right arm from the elbow to the tip of the fingers is a heavy iron bar. Suspended over the iron bar is a magnet lifting the bar. Gradually the magnet gets weaker and weaker until there is no pull at all.

8. Repeat for left.

9. Imagine the upper portion of the right arm from the shoulder to the elbow to be a cloth bag filled with bee-bees. The bag is tied shut at the elbow. The knot is not very tight and the bee-bees slowly fall out of the bag. Gradually the bag empties until it just hangs from your shoulder.

10. Imagine the upper portion of the left arm from the shoulder to the elbow to be a cloth bag filled with bee-bees. The bag is tied at the elbow. The knot is not very tight and the bee-bees slowly fall out of the bag. Gradually the bag empties until it just hangs from your shoulder.

11. Imagine your right shoulder to be an inflatable balloon. Several breaths cause it to inflate, but it does not stay inflated. There are many small leaks and the shoulder slowly deflates.

12. Imagine your left shoulder to be inflatable like a balloon. Several breaths cause it to inflate, but it does not stay inflated. There are many small leaks and the shoulder slowly deflates.

## Lesson Two

### Discussion

Practice is important to the mastery of the skills involved in neuromuscular relaxation, but it is not always possible to set aside practice time. It is necessary, therefore, to make the best use of moments that permit you an opportunity to create and practice imagery. An illustration of such a moment might be represented as follows. You are driving your car in stop-and-go traffic. You imagine yourself a puppet. The puppeteer moves only those strings that allow you to safely drive your car, other strings are slack. Other images might be made to fit other situations. Try it!

### Practice Outline

Quiet preparation.

Imagine yourself to be a puppet. You are dancing to lively music. The music stops. Slowly the puppeteer walks you to a chair and seats you, your strings go slack.

Imagine yourself to be lying on a soft billowy cloud on a quiet day. You cannot fall through the cloud because it is firm, yet soft. Visualize yourself lying there without a care in the world.

Imagine your right arm is a limp rope.

Imagine your left arm is a limp rope.

Imagine that the lower portion of your right arm from the elbow to the tip of the fingers is a heavy iron bar. Suspended over the iron bar is a magnet lifting the bar. Gradually the magnet gets weaker and weaker until there is no pull at all.

Imagine that the lower portion of your left arm from the elbow to the tip of the fingers is a heavy iron bar. Suspended over the iron bar is a magnet lifting the bar. Gradually the magnet gets weaker and weaker until there is no pull at all.

Imagine that the upper portion of the right arm from the shoulder to the elbow is an inflatable balloon. The balloon is blown up tight, but gradually the air leaks out.

Imagine the upper portion of the left arm from the shoulder to the elbow is an inflatable balloon. The balloon is blown up tight, but gradually the air leaks out.

## Lesson Two continued

Imagine that you are wearing a baggy pair of pants. The pants are comfortable and you can feel your legs spread out in them.

Imagine the upper portion of the right leg from the waist to the knee is a heavy iron bar. Suspended over the iron bar is a magnet lifting the bar. Gradually the magnet gets weaker and weaker until there is no pull at all.

Imagine the upper portion of the left leg from waist to the knee to be a heavy iron bar. Suspended over the iron bar is a magnet lifting the bar. Gradually the magnet gets weaker and weaker until there is no pull at all.

Imagine your right leg is getting longer.

Imagine your left leg is getting longer.

Imagine that you are a pair of pants hung on a clothes line and today there is a soft warm breeze.

Imagine yourself as a piece of string being slowly lowered onto a chair.

### Lesson Three

Quiet preparation.

Imagine that the lower portion of your right arm from the elbow to the tips of the finger is an iron bar. Suspended over the bar is a magnet lifting the bar. Gradually the magnet becomes weaker and weaker until there is no pull at all.

Imagine that the lower portion of your left arm from the elbow to the tip of the fingers is an iron bar. Suspended over the bar is a magnet lifting the bar. Gradually the magnet becomes weaker and weaker until there is no pull at all.

Imagine that your right leg is getting longer. It does not hurt for your leg to get longer.

Imagine that your left leg is getting longer. It does not hurt for your leg to get longer.

Imagine yourself to be a puppet. You are dancing to lively music. The music stops. Slowly the puppeteer walks you to a chair and seats you. Your strings go slack.

Imagine you are wearing a baggy pair of pants. The pants are comfortable and you feel the upper portion of your leg spread out in them.

Imagine that you are an empty shirt hung on the clothes line to dry. There is a soft warm breeze.

Imagine you are wearing a pair of baggy pants. The pants are comfortable and as you sit you can feel the back portion of your hips spread out in them.

Imagine that there are two magnets at the hips, one on each side. The magnetic pull is making the hips wider. Gradually the pull gets weaker and weaker until it is gone.

Imagine you are wearing a pair of trousers with a prominent crease running down the center of your leg. The crease on the right leg slowly moves inward.

Imagine that you are all wrinkles along your back from the base of the ribs to the base of the spine. Imagine the wrinkles to be slowly ironed out.

Imagine that you are a bag of sand. You have a number of leaks and slowly the sand runs out.

Lesson Four

Quiet preparation.

Imagine that you're melting.

Imagine that you are a puppet. There is lively music playing and you are dancing. The music stops. Slowly the puppeteer walks you to a chair and you go slack.

Imagine the lower portion of your left arm is slowly melting into the desk.

Imagine the lower portion of your right arm is slowly melting into the desk.

Imagine that you are wearing a pair of trousers with a prominent crease. The crease of the left leg is slowly moving inward.

Imagine that you are wearing a pair of trousers with a prominent crease. The crease of the right leg is slowly moving inward.

Imagine that there are two magnets at the hips, one on each side and their magnetic pull is making the hips wider. Gradually the pull gets less and less.

Visualize the buttocks where they rest on the chair as thin as pancake batter. Watch the batter flow to spread sideways.

Visualize the entire pelvic area as an accordion in a position with its handles at the sides, its plaits or folds on the front and back. Watch the accordion open to a very great width on the back.

Imagine your spine is getting longer.

Imagine that lying on your back, there is a heavy weight on your stomach. All at once it is gone.

Imagine a scroll is laid across the center of your back. Slowly the scroll unrolls.

Imagine that you are a bag of sand. You have a number of leaks and slowly the sand runs out.

Lesson Five

Quiet preparation.

Imagine that you are a bag of sand. You have a number of holes and slowly the sand runs out.

Imagine that you are a puppet. You are seated in a chair and your strings are slack.

Slowly the puppeteer raises your right arm as if you are waving hello. Gradually he lowers your arm until the strings go slack.

Slowly the puppeteer raises your left arm as if you are waving hello. Gradually he lowers your arm until the strings go slack.

Now the puppeteer pulls the strings attached to your knee and raises the upper portion of your right leg causing it to cross over your left leg. He lets the strings go slack very fast.

Now the puppeteer pulls the strings attached to your knee raising the upper portion of your left leg. He lets the strings go slack very fast.

Imagine the puppeteer pulling the strings attached to your shoulder making you very tall. Gradually the strings go slack.

Imagine the puppeteer makes your head nod as if to say yes. The strings go slack.

Imagine that there is a clean white handkerchief over your face. Gradually it slips off.

Imagine your face to be all wrinkled. Gradually the wrinkles disappear.

Imagine your eyelids are stage curtains. Slowly the curtains are being lowered.

Imagine that your head is a glass filled with water. Watch as the water level magically goes down.

Imagine you are a tin soldier. Gradually you begin to change. You are no longer rigid like a tin soldier, but more like a rag doll.

Lesson Six

Quiet preparation.

Imagine that you are a balloon like those in a zoo parade. You are filled with air. Slowly the air leaks out.

Imagine that there is a magnet in your lap. The magnet is pulling your head forward. Gradually the magnet becomes weaker and weaker until there is no pull at all. REPEAT.

Imagine that there is a magnet on the wall behind you. The magnet is pulling your head back. Gradually the magnet becomes weaker and weaker until there is no pull at all. REPEAT.

Imagine that there is a magnet on your right shoulder. The magnet is pulling your head to the right. Gradually the magnet becomes weaker and weaker until there is no pull at all. REPEAT.

Imagine that there is a magnet on your left shoulder. The magnet is pulling your head to the left. Gradually the magnet becomes weaker and weaker until there is no pull at all. REPEAT.

Imagine your head to be very heavy. It is hard for you to hold it up. Gradually you become tired and can no longer hold it up. REPEAT.

Show String. Imagine yourself to be a string slowly being lowered into a chair. REPEAT.

Visualize the rib cage as an over-inflated balloon. Watch the balloon shrink inward and collapse as if it were being deflated. REPEAT.

Imagine your mouth to be filled with marbles. You are trying to talk. Spit the marbles out. REPEAT.

Imagine your eyes are search lights sweeping the sky in search of something. The need for searching is over and the lights go out. REPEAT.

Imagine that your tongue is spreading like butter melting on a warm dish. REPEAT.

Imagine your forehead to be all wrinkled. Gradually the wrinkles disappear.

Imagine your face to be all wrinkled. The wrinkles are worse than what you are imagining now. Gradually they are gone. One by one they disappear.

Lesson Six continued

Imagine that you are a bag of sand. You have a number of leaks. Slowly the sand runs out.

## APPENDIX 5

Autogenic Exercise: Heaviness, an Exercise Used for  
Autogenic Phrase Training in Treatment Group  
Meetings and for Home Practice

It has been found that passive concentration will be facilitated and that the physiologic effects of the autogenic exercises in general will be enhanced if this first formula is associated with peaceful images which provide a calming background for the trainee's state of mind. This is why the first physiologically oriented formula of each exercise should be applied in combination with a "background" formula such as: "I am at peace." . . .When the exercises are done in a sitting posture, it is appropriate to think of "sitting in a boat while drifting over a peaceful lake." However, once the trainee has selected his image, he should be told to use the same background image throughout the autogenic therapy. . . .

For the first exercises. . .the following pattern has been adopted:

Trainee, relaxed in a training posture, closes his eyes.

Facilitator: "I am at peace. . .My right arm is heavy (repeat several times), I am at peace. . .My right arm is heavy. . .My right arm is heavy. . .My right arm is heavy."

Trainee: Continues with passive concentration on "My right arm is heavy" for about 30 seconds.

Facilitator: "Come back to normal."

Trainee: (a) flexes his arms vigorously, (b) breathes deeply, (c) opens his eyes.

The trainee should develop the habit of systematically innervating toes, feet, legs, shoulder, arms, fingers, neck and head directly after he has opened his eyes. The procedure is important in several respects. By slightly moving the different parts of the body, the trainee makes sure he has everything under control. At the same time, particular after-effects, such as residual tensions or residual heaviness in the training arm, can be detected. . .It has been observed that when there is no motor activity between exercises, the autogenic state of relaxation will establish itself in a reflex-like manner and/or that the trainee will fall asleep.

Usually, three exercises are done successively with about one minute between. After each, the trainee should take notes of what has happened during the exercises. The trainee should be encouraged to report his impressions and feelings during and after passive concentration. . .Practically no exercise will be the same as yesterdays or even the one just completed. There is always something to report. It should be emphasized that even those things which the trainee may regard as "funny" or "not important" may be valuable points. . . .

Autogenic training is best practiced after lunch, after supper and before going to sleep. When a trainee falls asleep during the

exercises, it is suggested that the exercises be retraced as soon as the trainee awakes.

. . .In the majority of cases the trainee will report that, apart from feeling a heaviness in the training arm, there are also occasionally or regularly some distinct sensations of heaviness in the other arm or in certain parts of the right (or left) leg. This spreading of heaviness to other parts of the body is called the generalization phenomenon, and it usually indicates that the trainee is ready for the next formula. In cases in which heaviness is spreading to the other arm, the next formula should be:

My left arm is heavy.

Furthermore, as soon as the trainee feels a distinct heaviness in both arms, it is proper to add:

Both arms are heavy.

As other areas of the body distinctly feel heavy, they too should be added.

APPENDIX 6

The Worksheet for Practice on Temperature Trainer and  
EMG Biofeedback Practice Log Used by the  
Biofeedback Group

WORKSHEET FOR PRACTICE ON TEMPERATURE TRAINER

Name \_\_\_\_\_

Directions:

For steps 1-3, see details on "Temperature Direction Sheet."

1. Place thermister on desired area.
2. Turn Function Switch to "test" and test battery.
3. Turn Function Switch to 25 scale and take baseline reading (beginning temp.). Record in "Beginning Temperature" column.
4. Turn Function Switch to 2.5 scale. Turn temperature meter dial until the needle is at zero (0).
5. Spend 5 to 10 minutes thinking vividly (in imagery, if possible) about various experiences and relationships in your life. Watch the needle move up and down in response to your vascular reaction. Note the feelings associated with the increasing and decreasing meter responses.
6. Next, spend another 15 to 20 minutes attempting to control the vascular reactions. Make the temperature go as high as you can. Attempt to maintain the meter reading at a given point sometimes.
7. Record the highest temperature gained.
8. -----TURN FUNCTION SWITCH TO OFF WHEN FINISHED-----

Date	Time of Day	Begin. Temp.	High Temp.	Total time of practice	WHAT were you AWARE of while practicing (thoughts, feelings, sensations)? How does the feedback help this awareness? What was DIFFERENT/ UNIQUE about today's practice? (For 5 & 6)



APPENDIX 7

The Worksheet for Autogenic Phrase Training Used for  
Home Practice by the Autogenic Phrase Group

WORKSHEET FOR AUTOGENIC PHRASE TRAINING

Directions:

1. Find a quiet comfortable setting, note beginning tenseness on Tension Scale.
2. Recline or lay down.
3. Spend a few minutes becoming aware of your body.
4. Begin phrase series.
5. Note how your body feels at the end of the phrase series.
6. Clear your thoughts and attempt to relax without purposeful thinking.
7. Record observations.

Date	Time of day	Total time practiced
Beginning	Very tense	Very relaxed
_____		
Ending		
_____		
Part of the body which relaxed most:		
Observations:		

Date	Time of day	Total time practiced
Beginning	Very tense	Very relaxed
_____		
Ending		
_____		
Part of the body which relaxed most:		
Observations:		

## APPENDIX 8

Tables of Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures for the Biofeedback, Autogenic Phrase and Control Groups of the Traits Abasement, Achievement, Affiliation, Aggression, Autonomy, Cognitive Structure, Dominance, Endurance, Harmavoidance, Nurture, Order, Play, and Sentience

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Abasement Trait for the Biofeedback, Autogenic Phrase, and Control Groups

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	3670.09			
Treatment	2	10.84	5.42	0.04	3.35*
Error:					
Between subjects	27	3659.25	135.53		
Within subjects	30	3336.50			
Pre-Post	1	132.02	132.02	1.16	4.20*
Treatment X Pre-Post	2	123.03	61.52	0.54	3.35*
Error:					
Within subjects	27	3081.45	114.13		
Total =	59	7006.59			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Achievement Trait for the Biofeedback, Autogenic Phrase, and Control Groups

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	1974.24			
Treatment	2	149.44	74.72	2.44	3.35*
Error:					
Between subjects	27	1824.80	30.55		
Within subjects	30	1438.50			
Pre-Post	1	77.07	77.07	1.55	4.20*
Treatment X Pre-Post	2	16.03	8.02	0.16	3.35*
Error:					
Within subjects	27	1344.40	49.83		
Total =	59	3412.74			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Affiliation Trait for the Biofeedback, Autogenic Phrase, and Control Groups

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	3833.84			
Treatment	2	161.24	80.62	0.59	3.35*
Error:					
Between subjects	27	3672.60	136.02		
Within subjects	30	1486.50			
Pre-Post	1	68.27	68.27	1.41	4.20*
Treatment X Pre-Post	2	99.63	49.82	1.02	3.35*
Error:					
Within subjects	27	1318.60	48.84		
Total =	59	5320.34			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Aggression Trait for the Biofeedback, Autogenic Phrase, and Control Groups

Source	df	Sum of Squares	Mean Squares	F	F <sub>Tabled</sub>
Between subjects	29	3777.40			
Treatment	2	343.90	121.95	0.93	3.35*
Error:					
Between subjects	27	3533.50	130.87		
Within subjects	30	4076.00			
Pre-Post	1	72.60	72.60	0.56	4.20*
Treatment X Pre-Post	2	472.50	236.25	1.81	3.35*
Error:					
Within subjects	27	3530.90	130.77		
Total =	59	7853.40			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Autonomy Trait for the Biofeedback, Autogenic Phrase, and Control Groups

Source	df	Sum of Squares	Mean Square	F	F Tabled
Between subjects	29	4680.69			
Treatment	2	673.24	336.62	2.27	3.35*
Error:					
Between subjects	27	4007.45	148.42		
Within subjects	30	1561.50			
Pre-Post	1	2.82	2.82	0.05	4.20*
Treatment X Pre-Post	2	149.23	74.62	1.43	3.35*
Error:					
Within subjects	27	1409.45	52.20		
Total =	59	6242.19			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Cognitive Structure Trait for the Biofeedback, Autogenic Phrase, and Control Groups

Source	df	Sum of Squares	Mean Squares	F	F Tabled
Between subjects	29	4972.40			
Treatment	2	12.70	6.35	0.04	3.35*
Error:					
Between subjects	27	4959.70	183.69		
Within subjects	30	2994.00			
Pre-Post	1	8.06	8.06	0.08	4.20*
Treatment X Pre-Post	2	216.04	108.02	1.04	3.35*
Error:					
Within subjects	27	2769.90	102.59		
Total =	59	7966.40			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Dominance Trait for the Biofeedback, Autogenic Phrase, and Control Groups

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	4203.94			
Treatment	2	416.04	208.02	1.48	3.35*
Error:					
Between subjects	27	3787.90	140.29		
Within subjects	30	3070.00			
Pre-Post	1	3.27	3.27		
Treatment X Pre-Post	2	87.23	44.62	0.02	4.20*
Error:					
Within subjects	27	3695.40	136.87	0.33	3.35*
Total =	59	7273.94			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Endurance Trait for the Biofeedback, Autogenic Phrase, and Control Groups

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	5557.94			
Treatment	2	393.64	196.82	1.03	3.35*
Error:					
Between subjects	27	5164.30	191.27		
Within subjects	30	1607.00			
Pre-Post	1	32.27	32.27		
Treatment X Pre-Post	2	288.43	144.22	0.13	4.20*
Error:					
Within subjects	27	6844.24	253.49	0.57	3.35*
Total =	59	7164.94			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-Test and Post-test Measures of the Harmavoidance Trait for the Biofeedback, Autogenic Phrase, and Control Group

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	5780.69			
Treatment	2	1122.54	561.27	3.25	3.35*
Error:					
Between subjects	27	4658.15	172.52		
Within subjects	30	708.50			
Pre-Post	1	0.02	0.02	0.00	4.20*
Treatment X Pre-Post	2	102.52	51.26	2.28	3.35*
Error:					
Within subjects	27	605.95	22.44		
Total =	59	6489.19			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Nuturance Trait for the Biofeedback, and Autogenic Phrase, and Control Group

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	3527.99			
Treatment	2	64.54	32.27	0.25	3.35*
Error:					
Between subjects	27	3463.45	128.28		
Within subjects	30	990.00			
Pre-Post	1	36.82	36.82		
Treatment X Pre-Post	2	59.73	29.87	1.11	4.20*
Error:					
Within subjects	27	893.45	33.09	0.90	3.35*
Total =	59	4517.99			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Order Trait for the Biofeedback, Autogenic Phrase, and Control Group

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	6442.34			
Treatment	2	301.64	150.82	0.66	3.35*
Error:					
Between subjects	27	6140.70	227.43		
Within subjects	30	1457.00			
Pre-Post	1	4.27	4.27	0.08	4.20*
Treatment X Pre-Post	2	63.23	31.62	0.61	3.35*
Error:					
Within subjects	27	1389.50	51.46		
Total =	59	7899.34			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Play Trait for the Biofeedback, Autogenic Phrase, and Control Group

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	6269.15			
Treatment	2	49.60	24.80	0.11	3.35*
Error:					
Between subjects	27	6219.55	230.35		
Within subjects	30	3086.50			
Pre-Post	1	340.81	340.81	4.06	4.20*
Treatment X Pre-Post	2	481.74	240.87	2.87	3.35*
Error:					
Within subjects	27	2263.95	83.85		
Total =	59	9355.65			

\*p < .05

Table for the Between-Within Analysis of Variance Summary for Pre-test and Post-test Measures of the Sentience Trait for the Biofeedback, Autogenic Phrase, and Control Group

Source	df	Sum of Squares	Mean Square	F	F <sub>Tabled</sub>
Between subjects	29	6318.35			
Treatment	2	622.30	311.15	1.48	3.35*
Error:					
Between subjects	27	5696.05	210.97		
Within subjects	30	1816.50			
Pre-Post	1	190.81	190.81	3.27	4.20*
Treatment X Pre-Post	2	50.04	25.02	0.43	3.35*
Error:					
Within subjects	27	1575.65	58.36		
Total =	59	8134.85			

\*p < .05