

BIOFEEDBACK AND EXPECTANCY AS A MEANS
TO CHANGE EXTERNAL LOCUS OF CONTROL

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A THESIS

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ABSTRACT

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Purpose

The purpose of this study was to evaluate the effectiveness of Alpha biofeedback training, experimenter induced expectancy, and the combination of Alpha biofeedback training with experimenter induced expectancy on precipitating an attitude change as measured by a locus of control scale. Three groups of college students were used.

Methods

Student volunteers were solicited to take Levenson's Multidimensional Locus of Control scales as a pre-test. Those who received treatment and completed the study had scores within two standard deviations of the mean on the adult scale as defined by Levenson (1972).

The Alpha group alone and the Alpha plus expectancy group received treatment within ten to fifteen days after the pre-test with the post-test immediately following the treatment. The expectancy group received instructions (treatment) immediately after the tabulations of the pre-test scores and randomization to groups. The post-test

was administered following a period of ten to fifteen days from the date of instructions.

Analysis of variance and Dunnett's (1955) multiple comparison method were used to determine significance. All results with a probability of .05 were considered significant.

Findings

Three treatment methods seemed to have the following impact on the subjects as measured by score changes on the locus of control scales:

- 1) Alpha biofeedback treatment had a significant impact on the Internal subjects' performance on the Internal scale.

- 2) Alpha biofeedback treatment had no significant impact on the Non-Internal subjects' performance on the Internal scale.

- 3) Alpha biofeedback treatment had no significant impact on the Powerful Other subjects' performance on the Powerful Other scale.

- 4) Alpha biofeedback treatment had no significant impact on the Non-Powerful Other subjects' performance on the Powerful Other scale.

- 5) Alpha biofeedback treatment had no significant impact on the Chance subjects' performance on the Chance scale.

6) Alpha biofeedback treatment had a significant impact on the Non-Chance subjects' performance on the Chance scale.

7) Alpha biofeedback and Expectancy treatment had no significant impact on the Internal subjects' performance on the Internal scale.

8) Alpha biofeedback and Expectancy treatment had no significant impact on the Non-Internal subjects' performance on the Internal scale.

9) Alpha biofeedback and Expectancy treatment had no significant impact on the Powerful Other subjects' performance on the Chance scale.

10) Alpha biofeedback and Expectancy treatment had no significant impact on the Non-Powerful Other subjects' performance on the Powerful Other scale.

11) Alpha biofeedback and Expectancy treatment had no significant impact on the Chance subjects' performance on the Chance scale.

12) Alpha biofeedback and Expectancy treatment had no significant impact on the Non-Chance subjects' performance on the Chance scale.

13) Expectancy treatment had a significant impact on the Internal subjects' performance on the Internal scale.

14) Expectancy treatment had no significant impact on the Non-Internal subjects' performance on the Internal

scale.

15) Expectancy treatment had no significant impact on the Powerful Other subjects' performance on the Powerful Other scale.

16) Expectancy treatment had no significant impact on the Non-Powerful Other subjects' performance on the Powerful Other scale.

17) Expectancy treatment had no significant impact on the Chance subjects' performance on the Chance scale.

18) Expectancy treatment had no significant impact on the Non-Chance subjects' performance on the Chance scale.

~~Supervising~~ Professor

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CHAPTER I

CYCLIC PATTERN OF CORRECTIONAL TREATMENT

For the most part, the American correctional process has failed to rehabilitate and resocialize criminals. The correctional system seems to perpetuate the ineffectiveness and inefficiency of the process by which criminals are resocialized. It is possible to state when a person with a medical problem is cured, but how and when is it stated that a criminal is no longer a criminal? Where medical treatment is applied to a specific condition of a person for his illness, correctional treatment is applied to the total person (Wilkins, 1970). The emphasis on "treating" the entire person, rather than the specific problems that led the person to criminal activity, is too broad. One of the concerns of treatment workers seems to be the ineffectiveness of the application of a general treatment modality to inmates who have a variety of behavioral problems.

Analogous to the medical concept, the judge acts as the diagnostician when he convicts an offender and prescribes a prison term. However, there is no similar procedure that acknowledges a criminal is no longer a criminal.

By the very nature of our courts and parole boards, there is disparity in sentencing and in the decision to

parole. There is disparity in sentencing and parole decisions because no one seems to know the specific problem of the offender. It follows, then, that a specific treatment modality can not be effectively prescribed.

The correctional treatment process is in an perpetual cycle of fads and treatment models that present the illusion of being effective and progressive. The area of correctional treatment, although historically a recent development, is presently going through a gradual change. This change may be viewed as a part of a cyclical pattern.

Nature of Man

Historically, humanitarian reforms have been the impetus for directing attention to treatment within the correctional setting.

Over 200 years ago the nature of man was assumed to be free-willed. Man was an entity which strived to obtain maximum pleasure with minimum pain. Utilitarian principles were a forerunner of what the nature of man was perceived to be. Conceptually, this, though, was known as the Classical School of Criminology. Principle factors in this concept included deterrence and retribution as well as a specific punishment for a specific crime. What this concept neglected to consider was those criminals who did not have a free-will as a function of psychological and/or environmental conditions.

In 1792 a Frenchman, Pinel, ordered his patients freed from chains and shackles and treated them as mentally disturbed people rather than as dangerous animals. This was one of the humanitarian reforms that started the change in thought concerning the nature of man.

This change of practice brought about a change in thought from crime control (Classical School), in which all men were perceived as having a free-will, to the causes of crime which evaluates man's ability to distinguish between criminal and non-criminal behavior. This new concept became known as the Positivistic School of Criminology.

The adoption of the Positivistic concept brought many queries from professionals and the public alike. Theorists and practitioners began developing conceptual schemes of man's behavior:

The differences between the Classical and the Positivistic approaches to solving the problem of crime should not be seen solely in terms of whether or not punishment is to be inflicted. Rather, the problem is to create an effective treatment model which will reduce the number of individuals who will have to endure the trauma and stigma of the correctional process [Carney, 1974, p. 38].

The birth of the behavioral sciences and the transition of criminological thought from Classical to Positivism gave rise to the medical model of treatment.

Rise and Fall of the Medical Model

From a correctional treatment viewpoint, this model provides for the possibility that an underlying cause pre-

cipitates behavior not consistent with moral or legal prescriptions. The medical model of treatment is aimed at eliminating underlying causes for such behavior and not behavioral artifacts (Mikulas, 1970).

Historical reasons, rather than the inherent value, have led to the adoption of the medical model as a standard correctional treatment (Lehman, 1970). Psychotherapy, of whatever form, has a very bad record in dealing with the reformation of character disorders.

New developments in psychoanalysis have represented a rebellion against the traditional concepts of Freudian psychoanalysis, but these developments have largely failed. These new developments either had damaging or no effects on behavior. "Psychoanalysis has been giving way to what some call the 'now therapy'" [Carney, 1974, p. 46].

To date, there have been various kinds of correctional treatment methods implemented. Still there is no efficient, effective method. "Treatment is now largely a situation in which someone does something to someone else" [Gibbons, 1962, p. 301]. Has correctional treatment regressed to the point where obsolete treatment modalities are now being considered for implementation?

This history of penal legislation during the last century has been one of compromise. The treatment philosophy has constantly made more inroads, but has now reached the point of diminishing returns, one might say. The hard core of the older philosophy which demands a life for a life or at least life imprisonment for a

life and a considerable degree of proportionality between the seriousness of the crime and the severity of the punishment still remains strong, however [Sellin, 1958, p. 593].

Is it possible to successfully break this cycle that seems to be perpetuated by ineffectiveness?

Many people in the correctional treatment process promote the concept of behavior modification as an effective modality. This method of treatment may be one of the various treatment modalities that can provide a clean escape from the cyclical pattern of treatment.

Behavior Modification

The recent development, the emergence of which began in the 1950's, of behavior modification calls for a revolution of the treatment concept; from the medical model to the behavioral model.

Behavior modification advantages over conventional, traditional modalities are probably more efficient even though behavior modification is in its infancy.

The emphasis upon treatment of overt behaviors and the measurement of observable events in the patient's environment gives the discipline (behavior modification) a great heuristic value over some of the more traditional, psychoanalytically oriented treatment procedures [Schwitzgebel, 1971, p. 205].

In terms of money, time and effort, behavior modification techniques have shown promise of being one of the more economical programs for penal institutions (Wicks, 1974). Hindelang (1970) believes that prison disturbances, riots,

attempted escapes as well as self-injurious behavior can be quelled by methods of behavior modification.

As an effort to use behavior modification as a non-coercive treatment modality, many state and federal correctional institutions are implementing one technique of behavior modification: biofeedback. Biofeedback is considered a sub-set of behavior modification and is based on operant conditioning (Lawrence, 1972). Traditionally, operant conditioning in a biofeedback framework was used to change the behavior of an organisms autonomic nervous system (Schwitzgebel, 1971).

Some studies (have shown that it is possible to) operantly change human skin potential, heart rate, and salivation. ...animals have been taught to increase or decrease heart rate, intestinal contractions, stomach contractions, urine formation, and electrical brain waves [Schwitzgebel, 1971, p. 205].

Biofeedback, then, is concerned with altering the physiological responses of an organism.

Federal and state institutions use biofeedback with or as an addition to systematic desensitization. As an example, the Texas Department of Corrections ("Walls" Unit) created a chemical abuse program which not only educates inmates with a drug abuse problem to the realities of drugs but also systematically desensitizes the inmates potential physiological responses to drug stimuli. Biofeedback equipment is used to detect and monitor these internal responses. Chapter Two will discuss the biofeedback concept

in the appropriate section.

Summary

From a historical viewpoint, it is possible to perceive an evolutionary process in corrections that appears to be progressive. However, the perception, as presented in the above discussion, is perhaps just an illusion. The American Criminal Justice System, as far as treatment of offenders is concerned, completed a full cycle in thought and action some ten years ago. The conceptual scheme of treatment is just now beginning to start the cycle over. Trends that were thought to be the escape were nothing more than fads. A "hit-and-miss" approach has been used when applying new correctional treatment modalities.

To say most treatment modalities have been ineffective, it must be realized that appropriate use, proper research, and long term application of these modalities have been, for the most part, neglected.

One of the recently developed disciplines, behavior modification, specifically biofeedback, has had proper research and some workers in the correctional treatment process are willing to break the cyclical pattern by the further use of this tool. It is at this point where much attention and devotion to behavior modification should be directed to truly make the treatment process progressive and effective.

Statement of the Problem

Through speculation that rehabilitative treatment of offenders has largely failed, correctional administrators are searching for a treatment modality which has been proven effective. The problem, then, is to find a proven method by which behavior can be changed. As Hindelang (1970) points out, behavior modification programs provide the most promise for use in the prison.

By the use of a measuring device, such as locus of control scales (discussed in the following chapter), treatment workers can evaluate the inmate's perceptions of the world. If an inmate perceives the world as an entity totally alienated from him and this alienation precipitated criminal behavior, then a specific treatment method, if proven effective, may be implemented to change his perceptions of the world thereby changing his responses to his environment. Hopefully, this will preclude future criminal behavior.

In the present study, an attempt was made to establish one treatment modality which was projected to not only change an individual's perception of his power of self-control but also change his behavior.

CHAPTER II

REVIEW OF LITERATURE ON LOCUS OF CONTROL BIOFEEDBACK, AND EXPECTANCY

Development and Use of Locus of Control

The inception of the internal-external dimension grew out of a concern for the need of a specific device to measure self-perceived expectancies of situational outcomes. Phares (1976), a psychotherapist, stated that in 1954 he concerned himself with the problem of developing a measuring device that attempted to characterize patients as either internally or externally oriented.

To specifically define the internal-external construct, Lefcourt (1966) provides a base from which it is possible to analyze each factor:

As a general principle, internal control refers to the perception of positive and/or negative events as being a consequence of one's own actions and thereby under personal control; external control refers to the perception of positive and/or negative events as being unrelated to one's own behaviors in certain situations and therefore beyond personal control [Lefcourt, 1966, p. 154].

A breakdown of this definition is helpful to better understand the development and concept of internal-external control. Four points will be discussed concerning this breakdown.

First, the definition alludes to perceptions of positive and/or negative events. The individual himself must make the distinction between positive or negative

and therefore the concept is intrapersonal in nature. All that is necessary is a method for relating self-perceptions to a second party. The method by which such a measurement is possible is known as a locus of control scale. One who believes he is in control of most situations and outcomes is said to have his locus of control internally oriented. Conversely, one who believes that fate, chance, or powerful others are in control of most situations and outcomes is said to have his locus of control externally oriented (Levenson, 1973(a)).

Phares (1976) developed the first crude scale for such a measurement and found it to have some significance despite its' simplicity. He used thirteen items promulgated as external attitudes and thirteen items internally attitudinal in nature. His test was developed using a summated rating scale method. Although development was on apriori grounds, suggestive evidence was noted, upon measuring individual differences, that prediction of behavior within a task situation was possible (Rotter, 1966).

Second, within the definition is a tacit compliance with a social learning theory. From Rotter's theory, the general theoretical background for the internal-external (I-E) concept was developed (Rotter, 1954). Since extinction of behavior will result if reinforcement is withheld, then expectancies of the consequences of a specific behavior is contingent on reinforcement (Rotter, 1966).

Third, as Rotter (1972) points out, subjects can build expectancies on behavior or behavioral consequences without actually having been in contact with or exhibiting a specific behavior. This is the result of generalization. Since many every day situations are new, it is impossible to have a standard repertoire of behaviors with a single level of expectancy. However, subjects do exhibit a specific behavior in a new situation because of generalization from previously experienced situations. How behaviors are selected and presented depend on the subjects perception of the reinforcement that will derive from those behaviors. The subject's perception of the reinforcement, if the reinforcement is satisfying to the subject, will develop his expectancy that his behavior is functional. This expectancy, in turn, will be used in all-new situations in which a specific behavior has not yet been tested.

Finally, Phares supports the usefulness of the construct by discussing a sample case. During psychotherapy, his client failed to achieve any internal attitudinal change. The client's immediate environment, however, progressed satisfactorily. This dilemma led Phares to categorize his client as a classic external case. Three external characteristics were ascribed to Phares' client: (1) a marked lack of capacity to delay gratifications, (2) non-aggressiveness, (3) little concern with personal achievement (Phares, 1976).

The strength to which a subject believes a relation-

ship exists between a behavior and it's potential for eliciting reinforcement is correlational with the score he achieves on an I-E locus of control scale (Rotter, 1966). The greater the perceived relationship between behavior and potential reinforcement, the more internal a subject's score will be. A subject who perceives little or no relationship between behavior and potential reinforcement, will score external on the I-E scale. Several points and problems must be referred to at this time.

It should be recognized that while a subject's generalized beliefs about control affect his behavior, so does the structure of the situation (Phares, 1976). While there may be a similarity in behavior from situation to situation, specific cues may directly affect the expectancies and reinforcement values thereby affecting behavior. As Phares (1976) states:

The crucial thing is to determine both the specific and general effects on behavior that a given situation will have by the manner in which that situation affects expectancies and reinforcement values [Phares, 1976, p. 17].

Another area which is closely related to the situation and expectancy is the area of subject expectation awareness. When trying to effect a change of expectancies, it is important to realize that subject sensitization of his expectancies may or may not be therapeutic, depending on the degree of awareness and the specific situation (Rotter, 1960).

Studies and Scales

Several studies have been done to isolate characteristics of those designated internals and externals. In one study, previously mentioned, (Phares, 1976) the subject was determined to be external by the researcher as a function of the subjects lack of perception of relationship between his behavior and its consequences.

Davis and Phares (1967) in another study, confirmed their belief that internals should more actively seek information that is relevant to their future behavior in order to be more prepared to deal effectively with their world if they in fact do possess a stronger generalized expectancy or belief that reinforcement will be contingent on their own behavior.

Seeman (1963, 1976) produced results similar to the Davis and Phares study, but concluded that the higher level of knowledge possessed by internals is a function, at least in part, of the higher level of knowledge seeking activity.

Levenson's Scales

The basic structure of locus of control scales have not varied greatly. One set of scales that were used in the present study, was developed by Levenson. Her set of scales is not different from Phares' basic concept, however she did add a scale to further isolate variables for future study. In order to expand description of personality

variables, Levenson constructed the following scales: Internal, Powerful Others, and Chance (Levenson, 1973a). The reasoning for the Chance scale flows from the belief that:

...people who believe the world is unordered should logically be expected to behave differently from those who feel that powerful others are in control [Levenson, 1973a, p. 6].

Levenson's scales were selected for this study based on the fact that the scales are multidimensional in nature and therefore provide a broader base to analyze data when applying treatment to effect an attitudinal or locus of control score change.

Predictions and Attitudinal Changes

It is valuable to understand the information that may be derived from I-E scales. As a construct for personality analysis, I-E scales can be beneficial for upgrading treatment modalities. Incarcerated offenders who are found to be externally oriented by the I-E scales, may be exposed to a specific treatment method to arrange their beliefs or expectancies in such a manner as to effect an internal orientation, or simply an attitude change.

As the locus of control concept broadens, implications for change in other theories become more complex. Phares (1976) aptly acknowledges this fact and posits:

Locus of control, although it started in the context of one clinical case, touches a series of social phenomena that were and are very much

a part of our society. It may be no accident that scientific interest has shifted from the achievement motive to locus of control just as many people in our society abandoned the achievement strivings of their parents and shifted to a form of alienated beliefs and attitudes [Phares, 1976, pp. 171-172].

If I-E scales can make such predictions and analysis of personality, then it should be wise to consider the treatment implications of those who are deemed, by the I-E scales, as being external. Responsiveness to specific programs of treatment may be a function of the individual's perceptions of the world. A treatment method may be devised to work specifically with the I-E scales for optimum responsiveness of the client.

Other Control Versus Self-Control

The major point of controversy in the concept of control has been in the theories of other induced control versus self-control. Skinnerian and Rogerian theorists have verbally fought this point for years. Instrumental, operant, or classical conditioning have been consistently on one side while responsibility of choice is promulgated by the other hand.

Classical and instrumental conditioning calls for an experimenter desired response and therefore is based on an involuntary concept. Such conditioning literally programs man into a predetermined behavior pattern developed by others.

This study does not take issue with the concepts of reinforcement or conditioning [however] control of reinforcements and conditioning, in this study, will be placed in the hands of the subjects themselves. Before reinforcements can be given for an operant, the subject needs to perform. Reinforcements are messages that relate to the subject some information about his behavior. This process can be viewed as feedback. In classical or instrumental conditioning, the experimenter controls the reinforcement or feedback. In the present study, the subject himself controlled the feedback.

Feedback

Norbert Wiener, a founding father of research in feedback, properly defined it as "...a method of controlling a system by reinserting into it the results of its past performance" [Wiener, 1970, p. 111]. Of the various kinds of feedback, this present study will only be concerned with a type of feedback that gives the subject contiguous information with his biological functions; specifically, brain waves. This type of feedback is referred to as biofeedback. Biofeedback is concerned with the behavioral change of biological functions. The electroencephelograph (EEG) is a type of biofeedback equipment which deals only with brain waves.

The next section is devoted to the concept and development of the electroencephelograph.

EEG Development

Over a hundred years ago, an Englishman named Canton wrote in the British Medical Journal of experiments and findings performed by him through the use of a galvanometer and electric sensors. These sensors were placed directly on the brains of monkeys and rabbits to detect reactions to external stimuli. Canton used flashes of light and arousal from sleep as stimulants and found that electrical current waves from within the brain responded to this external stimulation (Lawrence, 1972).

Darwinian theories, in the latter part of the nineteenth century, repressed any new experimental discoveries and through the years, very little was done in the area of brain waves until the 1920's.

Hans Berger is credited with having discovered the existence of brain waves in 1924 (Brown, 1974). Although Canton perceived electrical activity in the brains of animals, Berger went further to monitor, chart, and investigate this activity.

In one of his early studies, Berger implanted sensors in the scalp of mental patients. Berger's crude galvanometer registered electrical impulses which confirmed his theory. Through the next several years, he established that certain impulses were dominant when his subjects were in certain psychological moods and physical states. The two dominant brain impulses he noticed, he termed "alpha"

and "beta" waves. Berger's studies were phased out when prominence and recognition failed to attach to his discoveries.

After many years of slow progress in experimental studies and stiff resistance of other theories to this concept, Barbara Brown succeeded in making prominent the concept of brain waves. She astounded the scientific community when ideas of the last century became reality and were challenging the accepted theories of control and learning. Brown has conducted a multitude of experiments involving different biofeedback equipment. She used electromyographic equipment, which measured muscle tension, to enable her subjects to learn to relax and reduce tension. This, she claimed was the beginning of the elimination of emotional tension which precipitated what is called psychosomatic disorders (Brown, 1974).

Definition of EEG

The electroencephelograph measures the production of "...complex electrical...neural activity in the brain" [Engstrom, 1970, p. 1262]. Of the twenty billion nerve cells that is called the brain, (Brown, 1974) each cell has a potential electrical charge (voltage). By placing EEG electrodes on the scalp of a subject, it is possible to monitor these electrical charges. Brain wave activity is measured and recorded by the EEG as a "...continuous

flow of changing frequencies of electrical waves" [Green, 1970, p. 11]. The brain produces electrical impulses that the electrodes detect and the monitor provides observable indications, i.e. auditory, visual or both.

There are four known brain wave patterns that can be detected through monitoring. At any given moment, of the twenty billion nerve cells which produce electrical impulses, thousands of cells must be in harmony to produce an amplitude and frequency which correspond to specific brain wave patterns (Brown, 1974).

To define frequency adequately, Brown (1974) states that:

...frequency means the incidence of occurrence per second when there are enough similar waves present to ensure that they are all of approximately similar wave duration [Brown, 1974, p. 349].

As an explanation of amplitude, Brown suggests that the brain's electrical energy is measured in units just as an ordinary house current is measured in volts. Where normal house current is between 110 and 120 volts, the brain produces energy between the range of one and 150 microvolts. A microvolt is one millionth of one volt (Brown, 1974).

On a progressive continuum, beta frequency is one extreme of the scale and delta frequency is the other extreme of the EEG brain wave scale. Beta represents an awake, concentration state and they occur between the

frequencies of fourteen and thirty cycles per second (cps). Alpha is associated with a passive awareness state and occurs between eight and thirteen cps. Theta, four to seven cps in frequency, is related to drowsiness and is a prelude to sleep. Finally delta, with a frequency from .05 to 3.5 cps, is associated with sleep and unconsciousness.

What biofeedback has done and is doing today, changes, perhaps, the concept of control. Karlins (1972) relates the enthusiasm of those experimenting in biofeedback stating:

The excitement of biofeedback training is not simply its power to alter behavior. Much of what it accomplishes can also be achieved through drugs, surgery, operant conditioning and electrical stimulation of the brain. Biofeedback training is important because it places the power for change and control in the hands of the individual, not with an external authority. Of all the technologies for altering behavior, this is the first to rely on the individual's ability to guide his own destiny [Karlins, 1972, p. 74].

Recently, a study using biofeedback training and locus of control scales produced a little, if any, results that would tend to support evidence that attitudinal change can result through training (Woodward, 1976). This present study used the basics of Woodward's study and design but implemented another variable. This variable was "expectancy" measured alone and measured with the treatment (biofeedback training). The measuring tool used in the present study was Levenson's Multidimensional locus of control scales. The next section will explain the concept of expectancy and how

it influences behavior.

Expectancy

Expectancy has been defined as a subjective probability or contingency held by an individual that any reinforcement or group of reinforcements specifically will occur in any given situation(s) (Rotter, 1972).

Later in this section, a formula will be presented to explain expectancy as a function of subject exposure to tasks and generalized expectancies. It is important now to develop the concepts of subject exposure and generalized expectancies.

Expectation as a Cognitive Variable

Just as success begets success, failure begets failure. As an individual succeeds on one task, his expectancy of success with other similar tasks increases (Stotland, 1969). In White's terms (1959), he will have developed a sense of competence. Murphy [1962, p. 27] writes: "We can summarize this (concept) by saying that each experience of mastery and triumph sets the stage for better efforts in the next experience."

On the reverse side of this concept lies an inverse relationship to success. Stotland (1969) implies that if an individual fails an initial task, he avoids tasks similar in nature because of his own expectation of failure. If forced to perform, he fails because of his own expectation of failure. This vicious circle may eventually lead

to a higher order plan or schema--"I'm a failure at any task." Rotter (1954) regards this higher order schema, concerning the degree of success in various situations, as a type of cognitive structure he calls "generalized expectancies."

Other's Expectations

An individual's own expectations of performance, his actual performance level, his persistence in the face of failure, even his own existence parallels the effects of his self-perception (Stotland, 1969). The converse is also a truism; perceptions of others' expectations influence the individual's expectancies, performance, and anxiety. Stotland's theory predicts that people strive harder for successful task completion that others expect them to attain than they do for successful task completion where no such expectation is present.

Three qualifications follow this theory. First, where there is minimal influence from an individual's own previous experience with a task, there is a maximum effect of expectations communicated by others to them.

Second, credibility of the experimenter's communicated expectancy depends on the subject's past performance. If, for example, a subject performs a task and succeeds at that task then the credibility of the experimenter's communicated expectancy, if it is expected that the subject

will fail, is almost non-existent. While reviewing this present qualification, it may be noted that, in many cases as in the present study, subjects have no other method to evaluate their own performance on tasks except through the experimenter's own evaluation of "success" or "failure." This precludes, or at least minimizes, the subject's "...direct knowledge of their efficacy on these tests" (Stotland, 1969).

To emphasize this second qualification, Hertzman and Festinger (1940) sensitized a group of college students to the level of expected performance on a test. Other college students set the level of performance. Findings explicitly noted were that the sensitized students shifted their predictions of their performance level toward that expected by other students. This shift took place regardless of whether it was above or below their own expectations.

In a similar study, Festinger (1942) told a group of undergraduate students their performance was either above or below the level of performance of graduate students, other college students, and high school students. Prior to the next trial of a task, the undergraduate students were asked to make predictions of their level of performance. These students' predictions were up if they were below high school students, down if they were above graduate students, down if they were above other college students, and up if they were below other college students. In essence,

these students shifted their expectations closer to the levels of performance of a group most like themselves.

The third qualification of Stotland's theory (1969) involves the variables "expertness" and "status." The degree of credibility and influence in communicating expectancies is a function of "expertness." The "status" variable can be explained in terms of a hierarchy of prestige. Summarily, these variables can be described by who you are (status) and what you know (expertness).

Now that the concepts of the subjects' previous exposure to tasks and generalized expectancies have been presented, a formula will be implemented as a tool to help shorten the complexity of these variables when put to use.

$$E_{s1} = f(E'_{s1} \text{ \& } GE)$$

This formula states: Expectancy (E_{s1}) is a function of probability of occurrence based on past experience in situations perceived by S as the same (E'_{s1}) and his generalization of expectancies for the same or similar reinforcements to occur in other situations for the same or functionally related behaviors (GE) [Rotter, 1972, p. 24].

This formula, therefore, accounts for expectancy as a function of previous exposure of a task to a subject and his generalized expectancies as related to a specific task.

In the present study, previous exposure to the task (increasing self-control) by the subject is unknown. Thus, to account for this extraneous variable, this formula will suffice. Also, generalized expectancies of the subject's

were measured and accounted for by Levenson's Multidimensional locus of control scales. (See locus of control section).

Self-Fulfilling Prophecy

Although in the 1950's Merton developed the concept of the self-fulfilling prophecy in sociology, Albert Moll as early as 1898 referred to a clinical phenomena in which the prophecy causes its own fulfillment. He believed that subjects behaved as they believed they were expected to behave.

In the area of psychotherapy, Frieda-Fromm-Reichmann (1950) spoke of the therapist's own beliefs. The therapist's own belief about the patient's prognosis might be a determinant of that prognosis.

In order to determine the affects on performance of communicated expectations, Sarason and Sarason (1957) ran subjects through a standard expectancy. They communicated to the subjects, after a preliminary trial using nonsense syllables as a paired associate task, that their performance was inferior to other subjects who did quite well. Sarason and Sarason also stated to the subjects that their performance was the lowest in all groups and asked if there was something wrong. This group of subjects in fact did no worse than the control group. They were only told they did worse. On the second trial, the experimental group's

performance level was worse than their first trial. It must be noted first that the task was new to the subjects and therefore maximized the experimenters influence; and second, indications to the experimental group subjects that success was expected on a second trial, was not present.

Conclusion

Should locus of control scales provide for the possibility of accurate personality prediction and analysis, it will not be difficult to assess the personality of those presently in penal institutions and differentiate internals from externals. Those who are deemed external and their externality a contributing factor to their criminality, may be exposed to a specific treatment modality which will impact their locus of control towards internal.

Theoretically, any form of therapy which increases an individual's sense of self control should impact his or her locus of control orientation in an internal direction. Biofeedback training appears to offer just such a therapeutic potential [Woodward, 1976, p. 39].

Expectancy communicated by the therapist to the subject may further enhance this potential of therapy. The following chapter will discuss the methodology that was used in the present study.

CHAPTER III

METHODOLOGY

Introduction

The locus of control construct is rapidly gaining widespread use in the correctional field. Of those institutions presently implementing this diagnostic tool, Lefcourt (1966) notes that there are a disproportionate number of inmates who are classified as "external." Many types of treatment modalities have been used to effect a change from "external" to "internal." Evocative psychotherapy, relationship counseling, and behavior modification are just three of the various types of modalities.

One might conclude that "expectancy", communicated by the therapist, does have a therapeutic value in many of the treatment modalities. Stotland (1969) suggests that "expectancy" communicated to a client supersedes that client's own expectancy concerning his performance. Further, if a client has had no previous exposure to a task, the communicated "expectancy" by the therapist is maximized. As a function of recent development and minimal use in the correctional treatment environment, it may be assumed that an inmate's exposure to biofeedback training is minimal to nonexistent thereby maximizing the therapist's degree of "expectancy" credibility.

The purpose of the present study was to determine

whether or not any appreciable locus of control score change could be effected using experimenter communicated expectancy, biofeedback training, and communicated expectancy concurrently with biofeedback training.

Statement of Research Hypotheses

Each hypothesis, to be accepted, must reach level of significance ($p < .05$).

- 1) Internal subjects' performance on the Internal scale will be affected by Alpha biofeedback treatment.
- 2) Non-Internal subjects' performance on the Internal scale will be affected by Alpha biofeedback treatment.
- 3) Powerful Other subjects' performance on the Powerful Other scale will be affected by Alpha biofeedback treatment.
- 4) Non-Powerful Other subjects' performance on the Powerful Other scale will be affected by Alpha biofeedback treatment.
- 5) Chance subjects' performance on the Chance scale will be affected by Alpha biofeedback treatment.
- 6) Non-Chance subjects' performance on the Chance scale will be affected by Alpha biofeedback treatment.
- 7) Internal subjects' performance on the Internal scale will be affected by Alpha biofeedback and Expectancy treatment.

18) Non-Chance subjects' performance on the Chance scale will be affected by Expectancy treatment.

Sample

The sample was drawn from volunteer students from Sam Houston State University. The total sample size consisted of sixty subjects; thirty-six females and twenty-four males. Equal proportions of males and females, which reflect the total sample size, were randomly assigned to each of three conditions; group 1 received biofeedback training; group 2 received experimenter communicated expectancy; and group 3 received biofeedback training and experimenter communicated expectancy.

After pre-testing all subjects, those who fell above the grand mean on Levenson's scales were grouped according to their mean scores. This process presented a group mean score for all subjects whose scores fell above I, P, and C. The same process was used to devise a group mean for those scores which fell below the grand mean on all scales (I, P, C). Formulation of the hypotheses and analysis of the data was based on these divisions.

In a companion study, placebo, experimenter communicated expectancy, and placebo plus experimenter communicated expectancy were the treatment conditions. The experimenter communicated expectancy group was shared by the instant and companion study. See Appendix B for a

8) Non-Internal subjects' performance on the Internal scale will be affected by Alpha biofeedback and expectancy treatment.

9) Powerful Other subjects' performance on the Powerful Other scale will be affected by Alpha biofeedback and Expectancy treatment.

10) Non-Powerful Other subjects' performance on the Powerful Other scale will be affected by Alpha biofeedback and Expectancy treatment.

11) Chance subjects' performance on the Chance scale will be affected by Alpha biofeedback and Expectancy treatment.

12) Non-Chance subjects' performance on the Chance scale will be affected by Alpha biofeedback and Expectancy treatment.

13) Internal subjects' performance on the Internal scale will be affected by Expectancy treatment.

14) Non-Internal subjects' performance on the Internal scale will be affected by Expectancy treatment.

15) Powerful Other subjects' performance on the Powerful Other scale will be affected by Expectancy treatment.

16) Non-Powerful Other subjects' performance on the Powerful Other scale will be affected by Expectancy treatment.

17) Chance subjects' performance on the Chance scale will be affected by Expectancy treatment.

brief discussion of these treatment conditions.

Design

Biofeedback Group Treatment

The twenty subjects randomly assigned to the biofeedback training group, completed Levenson's locus of control scales as a pre-test. A period of ten to fifteen days elapsed between pre-testing and treatment to reduce test sensitization effects on the subjects; post-test performance. Prior to the biofeedback training, a brief set of instructions were given to the subjects concerning their task; alpha production. Immediately following these instructions, each subject, was given one fifteen minute session of audio biofeedback training. At the conclusion of this training, the subject was instructed to complete Levenson's locus of control scales as a post-test. The Alpha Scan 400 (see Instrumentation section) was fixed at a digital filter setting (frequency) of ten cycles per second, and threshold (amplitude) setting of ten microvolts. As the positive reinforcement, a normal mode setting for audio was used.

Expectancy Group Treatment

The twenty subjects randomly assigned to the experimenter communicated expectancy group, completed Levenson's locus of control scales as a pre-test. Immediately following the scoring of the pre-test, each subject was administered

experimenter communicated expectancy. After a period of ten to fifteen days each individual in the expectancy group treatment completed Levenson's locus of control scales as a post-test.

Experimental Group Treatment

The twenty subjects randomly assigned to the experimental group, completed Levenson's locus of control scales as a pre-test (see Appendix A). A period of ten to fifteen days elapsed between pre-testing and treatment to control for test sensitization on post-test performance. Prior to the biofeedback training, each subject read instructions which were designed to fulfill the expectancy requirements (see Instructions section). A brief set of instructions were also given to the subjects concerning their task; alpha production. Immediately following these instructions, the subject, on an individual basis, was given one fifteen minute session of audio biofeedback training. At the conclusion of this training, the subject was instructed to complete Levenson's locus of control scales as a post-test. The Alpha Scan 400 (see Instrumentation section) was fixed at a digital filter setting (frequency) of ten cycles per second, and a threshold (amplitude) setting of ten microvolts. As the positive reinforcement, a normal mode setting for audio was used.

Instructions

Each subject in groups 1 and 3 was instructed that the more "beeps" they heard, the more alpha they were producing. The subjects in groups 1 and 3 were given a card which read:

You will now receive Alpha Biofeedback training. The more "beeps" you hear, the more Alpha you are producing. Try to increase the number of "beeps" you hear. No information can be given regarding the production of Alpha with the Exceptions:

1. The ability to produce Alpha is enhanced when you are relaxed.
2. Try to clear your mind and reduce your level of concentration.

Once the subject had read the instructions and proceeded to be connected to the Alpha Scan, he was verbally instructed on the following:

1. Alpha is most prevalent when the eyes are closed and the room is darkened.
2. This training will last fifteen minutes.
3. Please do not tamper with the electrodes or earphones.

Each subject in group 3 was given additional instructions. The card they read, on an individual basis, is as follows:

We have found that, based on your pre-test score, you are experiencing a period of increasing self-control. We have also found, through research, that when biofeedback training is administered to people who are in this period of increasing self-control, this training greatly enhances any power of self-control. Be aware of any changes in yourself that will indicate this increasing self-control while producing alpha.

Each subject in group 2 was given a card which read:

We have found that, based on your test scores, you are performing like people who are currently going through a period of increasing self-control. Based on this, be aware of any changes in yourself that will indicate increasing self-control within the next 10 to 15 days. We would like to have you meet with us at the end of this period and discuss any changes.

The cards read as they did because a parallel study was ongoing at the same time as the present study (see Appendix B for details and references).

Scheduling

A period of ten to fifteen days was allotted between pre-testing or instructions and treatment or post-testing to accomodate those subjects who had difficulties in making the appointment times scheduled.

Setting

The treatment room was approximately twelve feet wide, twenty feet long, and nine feet from the floor to the ceiling. The walls were beige in color. During biofeedback training, the ceiling lights were off and a small reading lamp of forty watts was turned on. A room divider separated one-third of the room to conceal the lamp, tape recording device, which provided a pre-amplifyer for the amplification of the "beeps" (see Instrumentation section), and a chair for the experimenter who was in the room during the training sessions. A cushioned chair with a pillow was used for the subject to sit in while the training was given.

After the training session was completed, the experimenter turned on the ceiling lights, disconnected the subject, turned the equipment off, and led the subject into another room for the post-testing. A lab coat was worn by the experimenter throughout the study to enhance the treatment credibility.

Instrumentation

Levenson's (1972) locus of control scales were used to determine "internals" from "externals" and to detect any changes as a function of biofeedback training and expectancy. This test was chosen due to its breakdown of variables of the locus of control. The scales were: Internal, Powerful Others, and Chance. The test consisted of twenty-eight items to be answered with a response from negative three to positive three with no zero point. To control for test sensitization on the post-test, the first fifty items from the MMPI masculinity-femininity scale were integrated into Levenson's scales. Every third item was a locus of control item. A total of seventy-four items comprised the test. A copy of Levenson's locus of control test integrated with the MMPI m-f scale and scoring keys are located in Appendix A.

The biofeedback equipment used in this study was an electroencephelogram. The produce name, as developed by BioScan Corporation, was Alpha Scan 400 Alpha/Theta Brain-

wave Analyzer. The equipment has the following specifications:

Analog Section

Equivalent input noise: less than 1 microvolt peak (0.7 microvolts RMS), measured with grounded inputs, referred to input.
 Input impedance: greater than 2 Megohms.
 Input bias current: less than 10 nanoamps.
 Common mode rejection ratio at 10Hz.: 1,000,000 to 1 (120dB.) measured at differential stage only.
 Common mode rejection ratio at 60Hz.: 100,000,000 to 1 (160dB.) measured through analog filters.
 Analog filters: Differential section--single pole high frequency filter, 6dB./octave roll-off (20dB./decade), -3 dB. point at 25Hz.
 Low frequency--3 pole active Butterworth type, 18 dB./octave roll-off (60 dB./decade), -3 dB. point at 4 Hz.
 High frequency--3 pole active Butterworth type, 18 dB./octave roll-off (60 dB./decade), -3 dB. point at 16 Hz.

Digital Analysis

Type of analog-to-digital conversion: frequency to time conversion.
 Type of digital frequency analysis: pulse width comparison.

Feedback

Audio: built-in speaker, normal or reverse model.
 Visual: built in red LED (light emitting diode).

Controls

Electrode input plug.
 Power off/on switch.
 Amplitude threshold, continuously variable, calibrated 5-150 microvolts peak.
 Digital filter, high frequency cutoff, calibrated 5-16 Hz. in 1 Hz. increments.
 Speaker off/normal mode/reverse mode switch.
 Speaker volume.
 Light off/on switch.

Outputs (standard; others available on request)

Ground: Provides ground reference for accessories.
 Analog filter: Filtered EEG, 1 millivolt per microvolt (gain-1,000).
 Audio: Gated 450 Hz. sine wave feedback signal.
 A/C/D: Digital pulse whose width is equivalent to EEG frequency. TTL compatible.
 A/D Converter: Digital pulse whose width is equivalent to EEG frequency; present only when amplitude parameter is met. TTL compatible.
 Digital filter: Digital pulse whose width is equivalent to EEG frequency; present only when amplitude and frequency parameters are met. TTL compatible.

Components

15 integrated circuits (IC's) containing the equivalent of 345 transistors, 261 resistors, 62 diodes, and 8 capacitors.
 Discrete Components: 8 transistors, 50 resistors, 6 diodes, and 22 capacitors.

Physical

Power: Four nine volt alkaline batteries (NEDA #16040A) and four 1.5 volt alkaline "C" cells (NEDA #14A).
 Cabinet: Painted aluminum and simulated wood finishing.
 Size: 8" long x 4 1/2" tall x 6 1/4" deep.
 Accessories included: Electrode assembly with headband and 2 silver/silver chloride electrodes.

Specific Calibration

Common Mode rejection ratio (CMRR) at 10 Hz 7×10^6
 Equivalent input noise, measured with grounded inputs, referred to the input .3 UVPK

Analog Filters:

High Frequency - 3dB. point	15.1 Hz
Low Frequency - 3dB. point	3.2 Hz

All subjects were asked which hand they wrote with in order to determine the dominant side of the brain. The electrodes were then placed on the side of the brain which was opposite the hand they wrote with. For training purposes, the dominant side of the brain was used for electrode placement.

A tape recorder was used as a device which would provide a pre-amplifier for the signal which the subject was producing. Since the Alpha Scan has a power source which consists of dry cell batteries, headphones could not be used from this power source. Headphones were used to filter extraneous noise from outside of the training room and to insure that the subject did not tamper with the electrodes. The TEAC A-1500 has the following specifications:

Heads	Four, 4 track 2 channel Erase, Record, Forward playback and Reverse playback
Reel Size	7" maximum
Tape Speed	7 1/2 and 3 3/4 ips (\pm 0.5%)
Motors	1-dual speed hysteresis motor for capstan drive 2-eddy current type outer rotor motors for reel turntables
Wow and Flutter	7 1/2 ips 0.12% 3 3/4 ips 0.15%
Fast Winding Time	Approximately 100 seconds for 1,200 feet

Frequency Response	7 1/2 ips 30 to 20,000Hz (± 3 dB 50 to 15,000Hz) 3 3/4 ips 30 to 15,000Hz (± 3 dB 50 to 10,000Hz)
Equalization	50 microseconds (NAB) for 7 1/2 ips 90 microseconds (NAB) for 3 3/4 ips
Signal to Noise Ratio	50 dB
Crosstalk	Microphone: 10,000 ohms, 1mV minimum Line: 100,000 ohms, 0.1v minimum
Output	1v for a load impedance of 100,000 ohms or more
Power Requirements	100/117/200/220 v Ac 50/60Hz 110w nominal
Dimensions and Weight	17" X 15 1/2" X 9 3/4" 46 lbs

The outputs, audio and ground, from the Alpha Scan 400 were connected to the input jacks of the TEAC A-1500. The headphones, which were of 10,000 ohms, minimum, were then plugged into the phone jack of the TEAC A-1500. Volume control was pre-adjusted for a comfortable setting prior to the subject's training. Volume was constant for all subjects.

Procedures for Analysis

Before discussing statistical methods used in the present study, it is imperative that a discussion, concerning the breakdown of treatment groups by pre-test scores and test variables, be presented.

After randomization of subjects to treatment conditions, all subjects completed a pre-test. This pre-test served as a control group for comparison to post-test. All subjects were then administered that appropriate treatment. Following the treatment, a post-test was administered to all subjects. The post-test scores were then divided into those subjects who fell above the mean and those who fell below the mean as given by Levenson (1972). Levenson's scales are as follows: Internal (I), Powerful Others (P), and Chance (C). Each subject was ranked either above or below the mean on each of these scales.

Statistics

An analysis of variance was utilized to determine if a significant statistical difference existed among the group means. The companion and instant study data were analyzed together thereby comparing five treatment conditions ($u_1=u_2=u_3=u_4=u_5$ at $p < .05$).

Following this analysis, Dunnett's procedure (1955) was implemented to determine which of the treatment means were significantly greater than the mean of the control group. Since the number of subjects above and below the mean in each test variable were uneven, Dunnett's formula reads:

$$t_D = \frac{C_j(X_j) + C_{j'}(X_{j'})}{MS_{\text{error}} (1/n_j + 1/n_{j'})} .$$

or

$$tD = \frac{G \text{ mean} - \text{Control mean}}{\frac{\text{Mean square error}}{\frac{1}{(\text{Group Size} + \text{Control Group})}}}$$

Results and implications of significance will be discussed in the next chapter.

CHAPTER IV

RESULTS

In Chapter Three two statistical methods were presented by which the data of this study was analyzed. Before analysis can be discussed, however, it is imperative to present how the data was broken down for analysis.

Breakdown of Data

Subjects' pre- and post-test scores were divided by the grand mean of each dependent variable scale: Internal, Powerful Other, and Chance. Those subjects' whose score fell on the mean and above were Internals and those subjects' whose scores fell below the mean were Non-Internals on the Internal scale. Those subjects' whose scores fell on the mean and above were Powerful Other oriented and those subjects' whose scores fell below the mean were Non-Powerful Other on the Powerful Other scale. Those subjects' whose scores fell on the mean and above were Chance oriented and those subjects' whose scores fell below the mean were Non-Chance on the Chance scale.

After treatment, post-test Internal, Powerful Other, and Chance scores were compared to pre-test Internal, Powerful Other, and Chance scores respectively. Post-test Non-Internal, Non-Powerful Other, and Non-Chance scores were compared to pre-test Non-Internal, Non-Powerful Other, and

analysis of variance, significance was found ($p=.001$). Implementing the multiple comparison analysis, the minimum requirement for significance in this comparison (2.57 at the $p=.05$) was met. The treatment conditions which produced this significance were Alpha (2.90) and Expectancy (3.36). On the basis of these findings, the first research hypothesis was supported. Table 1 provides data which support these findings (see page 45).

Findings With Respect to the Second Hypothesis

It was stated in the second hypothesis that Non-Internal subjects' performance on the I scale will be affected by Alpha biofeedback treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 2 provides the data for the second hypothesis (see page 46).

Findings With Respect to the Third Hypothesis

It was stated in the third hypothesis that Powerful Other subjects' performance on the Powerful Other (P) scale will be affected by Alpha biofeedback treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 3 provides the data for the third hypothesis (see page 47).

Non-Chance scores. Throughout the study, pre-test scores were used for comparison (control group).

Analysis

An analysis of variance was used to determine significance between the following groups and their respective control group: Internals, Non-Internals; Powerful Others, Non-Powerful Others; Chance, and Non-Chance. Dunnett's multiple comparison method was then utilized to determine significance of each treatment condition.

In a comparison study, three treatment conditions (Placebo, Placebo and Expectancy, and Expectancy) were used as Independent Variables. The Expectancy treatment condition was shared by the companion and the instant study. All tables presented in the instant study will include the treatment conditions of the companion study as well as those of the instant study. On each table, one asterisk indicates treatment conditions of the companion study while two asterisks signify the shared treatment condition. For a brief discussion of the treatment conditions utilized in the companion, see Appendix B. A detailed presentation of the companion study is available by reviewing Mitchell (1976).

Findings With Respect to the First Hypothesis

It was stated in the first hypothesis that Internal subjects' performance on the Internal (I) scale will be affected by Alpha biofeedback treatment. By the use of

TABLE 1

Subjects of Internal Group Presented by Treatment
Group Providing the N-Size and Mean of Each
Respective Group and Analysis of Variance
Source Table and Areas of Significance
for These Group Comparisons

Group	Size	Mean
1 - Alpha	20	36.54+
2 - Placebo	12	*40.25
3 - Alpha and Expectancy	11	39.82
4 - Placebo and Expectancy	8	*42.00+
5 - Expectancy	10	**42.30+
6 - Control	61	39.05

Analysis

Mean Square	D.F.	F-Ratio	P
52.48	5.	6.54	.0001

*The Companion Study

**The Shared Group

+Dunnett's Significance (p .05)

TABLE 2

Subjects of Non-Internal Group Presented by Treatment
Group Providing the N-Size and Mean of Each
Respective Group and Analysis of Variance
Source Table and Areas of Significance
for These Group Comparisons

Group	Size	Mean
1 - Alpha	7	28.57
2 - Placebo	8	*27.38
3 - Alpha and Expectancy	9	28.89
4 - Placebo and Expectancy	12	*31.25
5 - Expectancy	10	**32.50
6 - Control	39	28.51

Analysis

Mean Square	D.F.	F-Ratio	P
41.41	5.	1.95	.0945

*The Companion Study
**The Shared Group

TABLE 3

Subjects of Powerful Other Group Presented by Treatment
Group Providing the N-Size and Mean of Each
Respective Group and Analysis of Variance
Source Table and Areas of Significance
for These Group Comparisons

Group	Size	Mean
1 - Alpha	9	24.33
2 - Placebo	11	*26.73
3 - Alpha and Expectancy	10	25.00
4 - Placebo and Expectancy	12	*26.33
5 - Expectancy	8	**26.50
6 - Control	48	26.27

Analysis

Mean Square	D.F.	F-Ratio	P
9.50	5.	.397	.850

*The Companion Study

**The Shared Group

Findings With Respect to the Fourth Hypothesis

It was stated in the fourth hypothesis that Non-Powerful Other subjects' performance on the P scale will be affected by Alpha biofeedback treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 2 provides the data for the second hypothesis (see page 46).

Findings With Respect to the Fifth Hypothesis

It was stated in the fifth hypothesis that Chance subjects' performance on the Chance (C) scale will be affected by Alpha biofeedback treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 5 provides the data for the fifth hypothesis (see page 50).

Findings With Respect to the Sixth Hypothesis

It was stated in the sixth hypothesis that Non-Chance subjects' performance on the C scale will be affected by Alpha biofeedback treatment. Through the use of analysis of variance, significance was found ($p=.028$) which supports the sixth hypothesis. Implementing multiple comparison analysis, the minimum requirement for significance in this comparison (2.57 at the $p=.05$) was met. The treatment condition which produced this significance was Alpha (2.75).

TABLE 4

Subjects of Non-Powerful Other Group Presented by Treatment
Group Providing the N-Size and Mean of Each
Respective Group and Analysis of Variance
Source Table and Areas of Significance
for These Group Comparisons

Group	Size	Mean
1 - Alpha	11	12.55
2 - Placebo	9	*11.66
3 - Alpha and Expectancy	10	12.40
4 - Placebo and Expectancy	8	*13.75
5 - Expectancy	12	**14.00
6 - Control	52	12.38

Analysis

Mean Square	D. F.	F-Ratio	P
8.93	5.	.389	.855

*The Companion Study

**The Shared Group

TABLE 5

Subjects of Chance Group Presented by Treatment
Group Providing the N-Size and Mean of Each
Respective Group and Analysis of Variance
Source Table and Areas of Significance
for These Group Comparisons

Group	Size	Mean
1 - Alpha	12	22.83
2 - Placebo	10	*21.30
3 - Alpha and Expectancy	8	23.62
4 - Placebo and Expectancy	11	*23.81
5 - Expectancy	9	**22.77
6 - Control	46	23.73

Analysis

Mean Square	D.F.	F-Ratio	P
11.54	5.	.496	.780

*The Companion Study
**The Shared Group

On the basis of this finding, the hypothesis was supported. Table 6 provides the data which supports this finding (see page 52).

Findings With Respect to the Seventh Hypothesis

It was stated in the seventh hypothesis that Internal subjects' performance on the I scale will be affected by Alpha biofeedback and Expectancy treatment. Through the use of analysis of variance and multiple comparison analysis, significance was found ($p=.001$ and 2.57 at the $p=.05$ level, respectively). The treatment conditions that produced significance were Alpha (2.90) and Expectancy (3.36). Therefore, on the basis of these findings, the experimenter must not reject the null hypothesis concerning this treatment condition. Table 1 provides the data which supports these findings (see page 45).

Findings With Respect to the Eighth Hypothesis

It was stated in the eighth hypothesis that Non-Internal subjects' performance on the I scale will be affected by Alpha biofeedback and Expectancy treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 2 provides the data which supports these findings (see page 46).

TABLE 6

Subjects of Non-Chance Group Presented by Treatment
Group Providing the N-Size and Mean of Each
Respective Group and Analysis of Variance
Source Table and Areas of Significance
for These Group Comparisons

Group	Size	Mean
1 - Alpha	8	7.13+
2 - Placebo	10	* 8.50
3 - Alpha and Expectancy	12	11.92
4 - Placebo and Expectancy	9	* 9.77
5 - Expectancy	11	** 9.27
6 - Control	54	11.05

Analysis

Mean Square	D.F.	F-Ratio	P
37.86	5.	2.62	.028

*The Companion Study
 **The Shared Group
 +Dunnett's Significance

Findings With Respect to the Ninth Hypothesis

It was stated in the ninth hypothesis that Powerful Other subjects' performance on the P scale will be affected by Alpha biofeedback and Expectancy treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 3 provides the data which supports these findings (see page 47).

Findings With Respect to the Tenth Hypothesis

It was stated in the tenth hypothesis that Non-Powerful Other subjects' performance on the P scale will be affected by Alpha biofeedback and Expectancy treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 4 provides the data which supports these findings (see page 49).

Findings With Respect to the Eleventh Hypothesis

It was stated in the eleventh hypothesis that Chance subjects' performance on the C scale will be affected by Alpha biofeedback and Expectancy treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 5 provides the data which supports these findings (see page 50).

Findings With Respect to the Twelfth Hypothesis

It was stated in the twelfth hypothesis that Non-Chance subjects' performance on the C scale will be affected by Alpha biofeedback and Expectancy treatment. Through the use of analysis of variance and multiple comparison analysis, significance was found ($p=.028$ and 2.57 at the $p=.05$ level, respectively). The treatment condition that produced significance was Alpha (2.75). On the basis of these findings, the null hypothesis should not be rejected. Table 6 provides data which will support these findings (see page 52).

Findings With Respect to the Thirteenth Hypothesis

It was stated in the thirteenth hypothesis that Internal subjects' performance on the I scale will be affected by Expectancy treatment. Through the use of analysis of variance and multiple comparison analysis, significance was found ($p=.001$ and 2.57 at the $p=.05$ level, respectively). The treatment conditions that produced significance were Alpha (2.90) and Expectancy (3.36). Therefore, on the basis of these findings, the research hypothesis was supported. Table 1 provides data which supports these findings (see page 45).

Findings With Respect to the Fourteenth Hypothesis

It was stated in the fourteenth hypothesis that Non-Internal subjects' performance on the I scale will be affected by Expectancy. Through the use of analysis of

variance no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 2 provides data which support these findings (see page 46).

Findings With Respect to the Fifteenth Hypothesis

It was stated in the fifteenth hypothesis that Powerful Other subjects' performance on the P scale will be affected by Expectancy treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 3 provides data which supports these findings (see page 47).

Findings With Respect to the Sixteenth Hypothesis

It was stated in the sixteenth hypothesis that Non-Powerful Other subjects' performance on the P scale will be affected by Expectancy treatment. Through the use of analysis of variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 4 provides data which supports these findings (see page 49).

Findings With Respect to the Seventeenth Hypothesis

It was stated in the seventeenth hypothesis that Chance subjects' performance on the C scale will be affected by Expectancy treatment. Through the use of analysis of

variance, no significance was found at the specified level indicating that the experimenter should not reject the null hypothesis. Table 5 provides data which support these findings (see page 50).

Findings With Respect to the Eighteenth Hypothesis

It was stated in the eighteenth hypothesis that Non-Chance subjects' performance on the C scale will be affected by Expectancy treatment. Through the use of analysis of variance and multiple comparison analysis, significance was found ($p=.028$ and 2.57 at the $p=.05$ level, respectively). The treatment condition that produced significance was Alpha (2.75). Therefore, on the basis of these findings, the null hypothesis should not be rejected.

Implications

Several main conclusions can be offered concerning the research hypotheses which were supported. Briefly, the hypotheses which were supported by significant findings were: 1) Internal subjects' performance on the Internal scale will be affected by Alpha biofeedback treatment 2) Non-Chance subjects' performance on the Chance scale will be affected by Alpha biofeedback treatment 3) Internal subjects' performance on the Internal scale will be affected by Expectancy treatment.

The first hypothesis was affirmed without surprise, based on theoretical grounds. As presented in Chapter Two

Davis and Phares (1967) confirmed their belief that internals should more actively seek information that is relevant to their behavior in order to be more prepared to deal effectively with their world. Internals, characteristically, possess a great concern with personal achievement and usually they are more aggressive than externals. This knowledge seeking activity combined with the aggressiveness of Internals may have precipitated a shift to increased internality as a function of Alpha biofeedback treatment. These subjects may have believed in the Alpha biofeedback treatment and therefore performed in accordance to theory: any organism which receives contiguous biological feedback concerning the function of a specific biological part, learns to control the functioning of that part. The control of a biological part or process may tacitly imply to an organism that it has the ability to control other processes internally and externally, i.e. situational events. The performance of the Internal group seems to affirm this theoretical observation.

The support of the sixth research hypothesis, Non-Chance subjects' performance on the Chance scale will be affected by Alpha biofeedback treatment, which was the second of three hypotheses supported, may be explained by reference to the specific group these subjects were in. Since the subjects' scores fell below the Grand Mean on the

increase their level of self-control. The two week period may have given the subjects the appropriate time for the perception of increased self-control. Since significance reached a relatively high level (.01), it may be assumed that Expectancy treatment has an undeniable impact on subjects who are already Internal.

A trend (2.44) was found implementing Dunnett's multiple comparison analysis on Non-Internal subjects in the Expectancy group. This trend carries several implications. First, the subjects had two weeks to manipulate their power of self-control and therefore score changes almost reached the level of significance (2.57). The problem with this assertion is that not all changes may have occurred as a function of the two week orientation period. Other independent variable groups, Alpha biofeedback and Alpha biofeedback plus Expectancy, had the same time period to process and act on the Expectancy treatment instructions but no group, excluding the Non-Internal Expectancy group, produced a trend. This groups' behavior was, theoretically, the antithesis of the characteristics ascribed to Internals. Non-Internals should be less aggressive and exhibit less knowledge seeking activity. It is speculated that either Alpha biofeedback treatment did provide this trend which implies that on Non-Internals, control of Alpha brain waves tend to extend or manipulate their power of self-control in an internal direction or

Chance scale, it may be assumed that these subjects were skeptical of events happening under the guise of chance. Explanations of events is more necessary to these subjects than to subjects who believe in chance. The mere fact that those subjects do indeed desire a logical, legitimate explanation for events, may have initiated exploration and manipulation of those faculties which produce Alpha brain waves. The subjects' own production and control of Alpha may have reinforced his belief that consequences that occur by chance are minimal. In other words, the subject's own manipulation of his Alpha production increased his belief that events do have a precipitating cause and these events are not caused by Chance but by other explainable influences.

It was stated in the thirteenth hypothesis (see page 54) that Internal subjects' performance on the Internal scale will be affected by Expectancy treatment. Analysis of the data confirmed this hypothesis. One of the explanations for the significance that supported this hypothesis is that these subjects were of a caliber that actively sought new avenues to explore their potential. As a function of treatment, the subjects may have taken a passive behavior of just being aware of their power of self-control or they have have actively tried to exhibit behavior consistent with increasing their potential of self-control or both being passively aware of their power then actively proceeded to

simply, the trend was a function of the regression phenomena combined with Alpha biofeedback treatment.

For groups not achieving significant post-test score changes, several suggestions are offered. First, Alpha and Expectancy group subjects had a dual task. Since the subjects in these groups were instructed that their task was to produce Alpha brain waves and to be cognizant of any change in their ability to produce Alpha, signifying a change in self-control, each task may not have received their full attention. Furthermore, cognitive confusion may have surfaced as a result of not being fully aware of their task. Some subjects may have concentrated on the production of Alpha while others directed their cognitive abilities to the task of being aware of changes in self-control.

Second, subjects in the Expectancy treatment groups did not achieve significant score changes perhaps as a function of their locus of control. Non-Powerful Other subjects, Powerful Other subjects, Non-Internal subjects, Chance subjects, and Non-Chance subjects orientations may have precluded any significant score change as a function of their lack of belief in the experimenters instructions. Skepticism, even though these subjects were sensitized to their power of self-control and the time period in which they had to manipulate this power, may be characteristic of these subjects. The Internal subject group was the only group that produced significance as a result of

Expectancy treatment. It may be inferred that the Non-Powerful Other subjects' and the Non-Chance subjects' orientations are characteristic of Non-Internal subjects orientation at least on one variable: non-aggressiveness.

Third, groups exposed to the Alpha biofeedback treatment which did not produce significant score changes were Non-Internal, Non-Powerful Other, Powerful Other, and Chance oriented. Alpha biofeedback treatment failed to produce significant score changes in the Non-Internal, Powerful Other, and Chance groups as a speculated function of non-aggressiveness and a low level of knowledge seeking activity. This speculation is the antithesis of Internal characteristics and, as previously mentioned, Internal subjects achieved significant score changes as a result of Alpha biofeedback treatment. These speculated characteristics inhibited generalization of Alpha brain wave control to situational events, therefore the subjects did not feel their power of self-control, as measured by their post-test was influenced by the treatment. Non-Internal subjects' scores revealed a trend toward significance for the assumptions previously stated. Non-Powerful Other subjects failed to produce significant score changes due, perhaps, to their dis-belief in the treatment. The Alpha biofeedback treatment group, which includes the Non-Powerful Other group, received no instructions concerning self-control. Intuitive generalization of Alpha brain wave production to

situational self-control may have failed to attach to the Non-Powerful Other group due to their belief that the treatment could not facilitate such changes.

It is easy to speculate reasons for the Non-Powerful Other group not producing significance based on their Chance or Internal orientations. However, no valid assumptions can be made concerning this group. Further research should be directed to this group as well as the groups exposed to Alpha biofeedback and Expectancy treatment, and Expectancy treatment. A study utilizing only Non-Internal, Non-Chance, and Non-Powerful Other subjects may provide support that would imply that Alpha biofeedback or Expectancy or Alpha biofeedback and Expectancy treatments produce significant changes in a subject's locus of control.

CHAPTER V

SUMMARY AND CONCLUSIONS

Chapter One was an attempt to present, historically, the cyclical manner in which the correctional process perpetuates ineffectiveness and inefficiency when adopting rehabilitative measures. With the concept of rehabilitation, as the primary mandate, came a multitude of treatment modalities, many of which were short-lived fads. The implementation of long-term use of theoretical treatment concepts was born out of the vicissitudes concerning thoughts of the nature of man. These changing thoughts not only gave rise to long-term use of treatment modalities but also established a pattern from which the correctional process has ineffectively operated. This cyclical pattern has done nothing more than eliminate, after many years of use, treatment modalities that were not effective and under the guise of progressiveness, invest scarce resources into short-lived fads. While the most effective treatment modality, behavior modification, exists in few correctional institutions today, it was suggested that a specific sub-set of behavior modification be used more extensively: biofeedback. Of the several state and federal correctional institutions presently utilizing this treatment technique, results so far have indicated that this technique surpasses other treatments previously implemented.

In Chapter Two, the focus was on concepts utilized in the present study: biofeedback, locus of control, and expectancy. Documentation of the creation and implementation of these concepts was presented. Each concept was presented with development and research implications which provided relevance to the present study.

Conclusive analysis of Chapters One and Two resulted in the formulation of the problem of which the present study developed hypotheses concerning the implementation of the biofeedback, locus of control, and expectancy concepts.

Chapter Three was concerned with the description of the methodology used in the present study. The research design, which included the selection of the sample, sample size, instrumentation, and specific presentation of the research hypotheses was stated as well as the specific statistical methods used to determine significance.

Chapter Four related the results of using biofeedback and expectancy to change the subject groups' locus of control as measured by Levenson's multidimensional locus of control scales (1972). Using analysis of variance and Dunnett's (1955) multiple comparison analysis, experimental findings supported three hypotheses: 1) Internal subjects' performance on the Internal scale will be affected by Alpha biofeedback treatment, 2) Non-Chance subjects' performance on the Chance scale will be affected by Alpha biofeedback treatment, and 3) Internal subjects' performance on the

Internal scale will be affected by Expectancy treatment. Explanations were offered to theoretically interpret those hypotheses which were supported as well as to account for the null hypotheses which were not rejected based on obtained results.

Suggestions for Future Research

Further research is recommended in those areas suggested by the research hypotheses that were not rejected. Research application of biofeedback and expectancy should be directed to those groups which fell below the grand mean on Levenson's scales. Variations of sample selection as well as sample size should be investigated. For example, prison inmates could be used as well as probationers and parolees. The length of the treatment application should also be varied to determine if the full potential of these treatment conditions can be efficiently attained without harm to effectiveness. Also, the subject's maximum potential, theoretically, will be attained through habituation to the treatment condition. Therefore, the length of the treatment should not only be varied to determine efficiency but also to maximize the subject's potential responsiveness to the treatment.

In conclusion, biofeedback training to enhance self-control cannot be overlooked because of the infancy of this technique. With proper management and implementation, the

potential of biofeedback can be utilized in the initial treatment of offenders, in the pre-release programs for inmates, in the field of probation and parole, and in the field of mental health to facilitate development of all individuals in their strivings to attain their maximum potential of self-control.

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APPENDIX A

Levenson's Multidimensional Locus of Control Scales Integrated With First Fifty MMPI M-F Items	Strongly Disagree	Disagree Somewhat	Slightly Disagree	Slightly Agree	Agree Somewhat	Strongly Agree
	-3	-2	-1	+1	+2	+3
1. I like mechanics magazines.	-3	-2	-1	+1	+2	+3
2. I think I would like the work of a librarian.	-3	-2	-1	+1	+2	+3
3. Whether or not I get to be a leader depends mostly on my ability.	-3	-2	-1	+1	+2	+3
4. When I take a new job, I like to be tipped off on who should be gotten next to.	-3	-2	-1	+1	+2	+3
5. I would like to be a singer.	-3	-2	-1	+1	+2	+3
6. To a great extent my life is controlled by accidental happenings.	-3	-2	-1	+1	+2	+3
7. I feel that it is certainly best to keep my mouth shut when I'm in trouble.	-3	-2	-1	+1	+2	+3
8. I am very strongly attracted by members of my own sex.	-3	-2	-1	+1	+2	+3
9. I feel like what happened in my life is mostly deter- mined by powerful people.	-3	-2	-1	+1	+2	+3
10. I used to like drop-the- handkerchief.	-3	-2	-1	+1	+2	+3
11. When someone does me wrong, I feel I should pay him back if I can, just for the principle of the thing.	-3	-2	-1	+1	+2	+3

	Strongly Disagree	Disagree Somewhat	Slightly Disagree	Slightly Agree	Agree Somewhat	Strongly Agree
12. Whether or not I get into a car accident depends mostly on how good a driver I am.	-3	-2	-1	+1	+2	+1
13. I have often wished I were a girl. (Or if you are a girl) I have never been sorry that I am a girl.	-3	-2	-1	+1	+2	+3
14. My feelings are not hurt easily.	-3	-2	-1	+1	+2	+3
15. When I make plans, I am almost certain to make them work.	-3	-2	-1	+1	+2	+3
16. I enjoy reading love stories.	-3	-2	-1	+1	+2	+3
17. I sometimes tease animals.	-3	-2	-1	+1	+2	+3
18. Often there is no chance of protecting my personal interest from bad luck happenings.	-3	-2	-1	+1	+2	+3
19. I like poetry.	-3	-2	-1	+1	+2	+3
20. I think I would like the type of work a forest ranger does.	-3	-2	-1	+1	+2	+3
21. When I get what I want, it's usually because I'm lucky.	-3	-2	-1	+1	+2	+3
22. I would like to be a florist.	-3	-2	-1	+1	+2	+3

	Strongly Disagree	Disagree Somewhat	Slightly Disagree	Slightly Agree	Agree Somewhat	Strongly Agree
23. It takes a lot of argument to convince most people of the truth.	-3	-2	-1	+1	+2	+3
24. Although I might have good ability, I will not be given leadership responsibility without appealing to those in positions of power.	-3	-2	-1	+1	+2	+3
25. I would like to be a nurse.	-3	-2	-1	+1	+2	+3
26. I like to go to parties and other affairs where there is lost of loud fund .	-3	-2	-1	+1	+2	+3
27. How many friends I have depends on how nice a person I am.	-3	-2	-1	+1	+2	+3
28. I frequently find it necessary to stand up for what I think is right.	-3	-2	-1	+1	+2	+3
29. I like dramatics.	-3	-2	-1	+1	+2	+3
30. I have often found that what is going to happen will happen.	-3	-2	-1	+1	+2	+3
31. I believe in a life hereafter.	-3	-2	-1	+1	+2	+3
32. I like collecting flowers or growing house-plants.	-3	-2	-1	+1	+2	+3
33. My life is chiefly controlled by powerful others.	-3	-2	-1	+1	+2	+3

	Strongly Disagree	Disagree Somewhat	Slightly Disagree	Slightly Agree	Agree Somewhat	Strongly Agree
34. I enjoy a race or game better when I bet on it.	-3	-2	-1	+1	+2	+3
35. I have never indulged in any unusual sex practices.	-3	-2	-1	+1	+2	+3
36. Whether or not I get into a car accident is mostly a matter of luck.	-3	-2	-1	+1	+2	+3
37. Most people are honest chiefly through fear of being caught.	-3	-2	-1	+1	+2	+3
38. At times my thoughts have raced ahead faster than I could speak them.	-3	-2	-1	+1	+2	+3
39. People like myself have very little chance of protecting our personal interests when they conflict with those of strong pressure groups.	-3	-2	-1	+1	+2	+3
40. I like to cook.	-3	-2	-1	+1	+2	+3
41. My table manners are not quite as good at home as when I am out in company.	-3	-2	-1	+1	+2	+3
42. It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune.	-3	-2	-1	+1	+2	+3
43. I used to keep a diary.	-3	-2	-1	+1	+2	+3
44. I am worried about sex matters.	-3	-2	-1	+1	+2	+3
45. Getting what I want requires pleasing those people above me.	-3	-2	-1	+1	+2	+3

	Strongly Disagree	Disagree Somewhat	Slightly Disagree	Slightly Agree	Agree Somewhat	Strongly Agree
46. My hands have not become clumsy or awkward.	-3	-2	-1	+1	+2	+3
47. I would like to be a soldier.	-3	-2	-1	+1	+2	+3
48. Whether or not I get to be a leader depends on whether I'm lucky enough to be in the right place at the right time.	-3	-2	-1	+1	+2	+3
49. I do not have a great fear of snakes.	-3	-2	-1	+1	+2	+3
50. If I were a reporter I would very much like to report news of the theater.	-3	-2	-1	+1	+2	+3
51. If important people were to decide they didn't like me, I probably wouldn't make many friends.	-3	-2	-1	+1	+2	+3
52. I daydream very little.	-3	-2	-1	+1	+2	+3
53. I would like to be a journalist.	-3	-2	-1	+1	+2	+3
54. I can pretty much determine what will happen in my life.	-3	-2	-1	+1	+2	+3
55. In walking I am very careful to step over sidewalk cracks.	-3	-2	-1	+1	+2	+3
56. I frequently find myself worrying about something.	-3	-2	-1	+1	+2	+3
57. I am usually able to protect my personal interests.	-3	-2	-1	+1	+2	+3

	Strongly Disagree	Disagree Somewhat	Slightly Disagree	Slightly Agree	Agree Somewhat	Strongly Agree
58. I have never had any breaking out on my skin that has worried me.	-3	-2	-1	+1	+2	+3
59. Some of my family have habits that bother and annoy me very much.	-3	-2	-1	+1	+2	+3
60. Whether or not I get into a car accident depends mostly on the other driver.	-3	-2	-1	+1	+2	+3
61. I like to talk about sex.	-3	-2	-1	+1	+2	+3
62. I think I would like the work of a building contractor.	-3	-2	-1	+1	+2	+3
63. When I get what I want, it's usually because I worked hard for it.	-3	-2	-1	+1	+2	+3
64. I have been disappointed in love.	-3	-2	-1	+1	+2	+3
65. If I were an artist I would like to draw flowers.	-3	-2	-1	+1	+2	+3
66. In order to have my plans work, I make sure that they fit in with the desires of people who have power over me.	-3	-2	-1	+1	+2	+3
67. I like science.	-3	-2	-1	+1	+2	+3
68. I have often felt that strangers were looking at me critically.	-3	-2	-1	+1	+2	+3
69. My life is determined by my own actions.	-3	-2	-1	+1	+2	+3

	Strongly Disagree	Disagree Somewhat	Slightly Disagree	Slightly Agree	Agree Somewhat	Strongly Agree
70. I very much like hunting.	-3	-2	-1	+1	+2	+3
71. Once in a while I feel hate toward members of my family whom I usually love.	-3	-2	-1	+1	+2	+3
72. It's chiefly a matter of fate whether or not I have a few friends or many friends.	-3	-2	-1	+1	+2	+3
73. I should like to belong to several clubs or lodges.	-3	-2	-1	+1	+2	+3
74. I liked "Alice in Wonderland" by Lewis Carroll.	-3	-2	-1	+1	+2	+3

Scoring Keys

Internal Items	Powerful Other Items
3, 12, 15, 27, 54, 57, 63, 69	9, 24, 33, 39, 45, 51, 60, 66
Chance Items	
6, 18, 21, 30, 36, 42, 48, 72	

Reliability and Validity

Kuder-Richardson (student group)	Internal $r=.64$	Powerful Other $r=.77$	Chance $r=.78$
Spearman- Brown (adult group)	Internal $r=.62$	Powerful Other $r=.66$	Chance $r=.64$

ANSWER SHEET

1. $-3 -2 -1 +1 +2 +3$

2. $-3 -2 -1 +1 +2 +3$

3. $-3 -2 -1 +1 +2 +3$

4. $-3 -2 -1 +1 +2 +3$

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7. $-3 -2 -1 +1 +2 +3$

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50. $-3 -2 -1 +1 +2 +3$

51.-3 -2 -1 +1 +2 +3
52.-3 -2 -1 +1 +2 +3
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69.-3 -2 -1 +1 +2 +3
70.-3 -2 -1 +1 +2 +3
71.-3 -2 -1 +1 +2 +3
72.-3 -2 -1 +1 +2 +3
73.-3 -2 -1 +1 +2 +3
74.-3 -2 -1 +1 +2 +3

APPENDIX B

Purpose

The objective of this study is to determine if audio placebo feedback (in place of actual alpha feedback) and/or audio placebo feedback plus experimenter injected expectancy and/or the expectancy factor alone would differentially change locus of control orientation.

Methods

Student volunteers were pretested with Levenson's Locus of Control Scale and the first fifth questions from the MMPI scale measuring masculinity-femininity. The pre-test contained seventy-four questions and was organized in such a way that every third question was a selection from Levenson's scale. Only the items from Levenson's scale were of interest in this study. After the completion of the pre-testing, only those persons scoring within two standard deviations of the mean as defined by Levenson on the Adult Scale were selected to participate. Of those there were several drop-outs and deletions resulting in a population of sixty subjects. Before assignment to the groups a tape recording was made from an individual who was experienced in the production of alpha. After this taping was completed, the sixty subjects were randomly assigned, without regard to their score, to one of the three groups. After a period of 10-15 days, Groups One and Two were asked to return for placebo alpha training.

In addition to the placebo alpha training, Group Two also receive an expectancy statement. After the administration of the treatment (placebo alpha training), the students were asked to complete a post test. Group Three received their expectancy statement (treatment) immediately following the randomization of the groups. Group Three was asked to return within 10-15 days to take a post test. The post test did not differ from the pre test, although if asked, the subjects were told it was similar but contained different items.

Vita was removed during scanning