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THE EFFECTS OF BOGUS AMOUNTS OF PERCEIVED SUCCESS ON  
ACHIEVING A DESIRED PHYSIOLOGICAL STATE

A Thesis Submitted to the Graduate Division in Partial  
Fulfillment of the Requirements for the  
Degree of Master of Science

By

Randall Brian Hicks

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KANSAS STATE COLLEGE OF PITTSBURG

Pittsburg, Kansas

July, 1976

## ABSTRACT

Thirty incarcerated juveniles underwent thermometric bio-feedback training. The subjects were divided into three groups; (1) Inflated, in which information was doubled, (2) Actual, in which no alterations were made, and (3) Deflated, in which information was half of the true temperature rise. No significant difference was found among these groups. A self-report rating on various attitudes, primarily success feelings, were correlated with achievement. The only factor statistically significant was an indication of locus of control. Cognitive potentialities are discussed as well as emotion.

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## CHAPTER I

### INTRODUCTION

In the quest to more fully understand human beings, therapists and researchers have continually confronted the problem of measuring and defining the dynamic element called emotion. Some have appeared to ignore this factor, however, man's autonomous characteristics such as free will, rationality, and decision making abilities must be considered when evaluating emotion. Human emotions are not merely products of a stimulus response reaction.

Philosophical basis and contemporary results. As early as the time of Spinoza, philosophical controversies have dealt with man and that aspect of him which was named the soul and the body. Spinoza believed that soul and body are ultimately one--that is, merely two aspects of one reality, while Descartes, desiring an answer for the working relationship between the two found an anatomical answer in the pineal gland (Murphy, 1972). The philosophical differences between dualists, who accept a distinction between bodily and mental realities, and monists, who believe that soul and body are one, must be bypassed until more information is gathered. The answer most likely lies between the two, or maybe the distinction is irrelevant.

Many people feel that each individual is the most responsible agent in his own life. Skinner contends that the autonomous human

being is a myth. Gevarter (1975) attempts to resolve this dichotomy by utilizing knowledge of the brain. The brain is viewed as a computer by Gevarter, which is programmed biologically, socially, and via trial and error. The distinction between the "old" brain and the "new" brain is emphasized. Rationality is believed to exist in the new brain, the cerebral cortex, while what one really believes is centered in the old brain. The old brain contains the basic value system, rules for survival, upon which one acts automatically and which gives rise to actions and emotions. The models of reality centered in the old brain are relatively coarse and undetailed. The new brain evolves its ideas and value system primarily by the use of consciousness and intuitive thought processes. The old brain evolves its value system primarily by direct consciously uninterpreted experience, that which has emotional impact. Gevarter contends that the old brain programming becomes permanent as the individual matures. There may exist, however, a slow transference of ideas and values accepted by the rational faculty from the new brain to the old brain. The new brain programs can be changed with new perceptions. No control may be directly exercised over the old brain. However, we can exercise free will to gather and order information which, in turn, is evaluated by the old brain before action is taken. Gevarter's middle of the road position may be easily seen in his following statements:

People are not completely free; in a large measure we are

a product of our programming. When we act, we are acting in response to stimuli in our environment. How we respond to them is determined by our past experiences, our values, our models, and our behavior patterns.

Although an environmental restriction is noted upon man, the environment does not have total control in developing a healthy emotional status. The ideal "program", as Gevarter views it, is when old brain values and relationships are in line with new brain programs, which in turn are congruent with reality.

The environment and perception. Recognizing the influence that the environment does play in emotional elements in the human being, the next step must logically be investigations as to perception of the external world. The degree to which an individual is internally or externally oriented was studied by Finch, Pezzuti, and Nelson (1975). Here, the locus of control was studied. Individuals who perceive reinforcement to be a result of luck, chance, fate, or other people are said to have an external locus of control, while those who perceive reinforcement as being contingent on their own behavior have an internal locus of control. This may be viewed as a difference between one who believes that he is totally subjected to and at the mercy of his environment and one who believes that he may, to a certain extent, exercise free will. Finch, Pezzuti, and Nelson gave the Nowicki and Strickland Locus of Control Scale for Children and a standard achievement test to forty eight emotionally disturbed children. Results showed that those who perceive a relationship between

their own behavior and the resulting consequences obtain higher achievement scores than those who do not. This study is certainly an example of how people perceive their environment and its possible effect on how effectively they are able to deal with it.

Therapeutic concepts and research on physiology and emotion.

The belief that man can have control over his emotions and the resulting influence on the old brain and physiological signs of emotion is the foundation on which new modes of therapy are built. Rational Emotive Therapy attempts to utilize that part of man which is more able to objectively view situations and alter self-verbalizations and thus thinking processes accordingly. Russell and Brandsma (1974) support Rational - Emotive theory and its hypothesis that emotions are largely determined by cognition. They recast the theory into a developmental conditioning framework which has been the basic criticism for previous studies of the assumptions. The Rational - Emotive theory was supported by galvanic skin response measure on three of the five hypotheses under investigation. Responsibility is a great element in Glasser's Reality Therapy. This therapy professes that one may better deal with the world when one takes responsibility for his behavior, an internal locus of control. The author wishes to expand this to the point where one may take the responsibility for his emotions and feelings.

Not only does internalization and externalization of the locus of control make a great difference in ability to deal with the environment, but the internalization or externalization of emotions

apparently makes differences in perception of others and their emotions. "Senders" viewed twenty five emotionally loaded color slides in a study by Buck, Miller, and Caul (1974). Their facial expressions were observed via a hidden television camera by "observers" who made judgments about the nature of each slide and the sender's reaction to it. Statistically significant communication was demonstrated. More accurate senders tended to show a smaller skin conductance and heart rate response to the slides and a more "personal" verbal report of their emotional reaction to the slides. Several personality measures were related to communication accuracy and physiological responding. Apparently internalizers are less likely to acknowledge to others, either verbally or nonverbally, that they are affected by an emotional stimulus. Possibly they themselves do not know they are affected. However, their larger physiological response testifies that they are aroused.

Harriman (1974) defines emotion as "any departure from the calm and normal condition of the organism." This definition of emotion as related to the findings of the above study imply that the externalization of emotion benefit individuals by more closely maintaining a physiological homeostasis. According to Fryer (1965) Gestalt psychology was spearheaded by Max Wertheimer in the 1930's as a revolt against the psychoanalytic introspectionists. This revolt was based on the difficulty, if not the impossibility, of analyzing a consciousness into its component parts when the perception was

demonstrably different from the known nature of the stimulus situation. Current Gestalt therapy encourages expression, externalization, of emotions.

At this point, evidence clearly suggests that the relationship between emotion, its physiological counterparts, the psyche, and the body is an extremely complex and interwoven marriage. Countless studies may be sighted in which psychological or "mind" states are altered by changing physiological or "body" states. Ehrensing and his associates (1974) have found injections of the hypothalamic peptide TRA (pyroglutamyl-histidyl proline-amide) has diagnostic value in different types of depressive patients. MSH (melanocyte-stimulating hormone), another hypothalamic peptide, could possibly have therapeutic value above and beyond TRA's diagnostic value. By placing electrodes in precise areas of the septal region, amygdala, hippocampus and other "old" brain areas in a severely depressed human patient, Heath, Cox, and Lustick (1974) are able to effectively alter emotional states. They contend that their data suggests that at many levels--behavioral, physiologic, anatomic, and chemical perception and emotionality are intricately interrelated and indeed are a reflection of one phenomenon. Apparently, the reverse is also a truth, that an individual may cognitively control physiological processes. Blanchard, Young, and Edmundson (1974) studied the effects of knowledge of response in self-control of heart rate by correctly informing the response to one group and giving no response to

another group. Between group comparisons generally supported the proposition that correct knowledge of responses facilitates learning to lower one's heart rate when given external feedback. The subjects who knew the correct response and received feedback of it achieved control of their heart rates.

A number of relationships between cognitive style and mood characteristics was found by Gorman and Wessman (1974). Eleven hypotheses were made with regard to the characteristics of mood level, mood variability, and mood differentiation. For example, field articulation or field independence should be related to steadiness of moods, and, similarly, cognitive differentiation might be expected to relate to measures of mood differentiation and affective complexity. The two strongest sets of findings were (1) the association of sensation-seeking with higher "peak" and "average" mood levels; and (2) the inverse relationship of field independence with day-to-day variability in "average" moods. Somewhat weaker relationships between cognitive styles and mood were found for the factors of external locus of control and defensiveness. Subjects with external locus of control beliefs reported greater fatigue, anger, and interpersonal isolation. Defensive subjects were shown to avow higher "trough" mood levels, indicating fatigue, anger, and isolation, and were less variable in their peak moods. Gorman and Wessman (1974) compile their feelings toward their findings in the following statement:

The enormous complexity and variability of human subjective experience develops in an organism gifted and burdened with open and highly differentiated conceptual and emotional capacities. The individual's assessment of his world and its personal significance is an ongoing cognitive and affective process--a union of thinking and feeling.

Fehr and Stern (1974) feel that such theories as the James-Lange theory of emotion need to be "revisited" and have studied peripheral physiological variables and emotion in relation to the theory. The James-Lange theory was one of the first attempts to explain physiological changes in emotion. Emotion is defined by James as the feeling of bodily changes which follow the perception of an exciting event. This definition implied that the "emotion felt" was the reverberation of bodily changes on the cortex. The "primary feelings" and "immediate reflexes" to an exciting object might be associated in present day accounts of emotion as the initial upward and downward discharge from the hypothalamus, whereas, the "secondary feelings" would be related to the afferent feedback from the excited muscles, glands, and other peripheral structures. Fehr and Stern cover several studies, both confirming and disconfirming the James-Lange theory. Research is sighted which suggests that the peripheral autonomic nervous system has effects on the reticular activating formation and the central nervous system itself.

The relationship between the physical and the mental. Other than an individual giving a verbal report of what he is experiencing emotionally and considering the great connection between mental and

bodily functions, physiological readings are a great indication of what emotional state an individual is in. In this study, the author wishes to examine what effect a perceived physiological state has upon reaching that state and its emotional counterpart. Hirschman (1975) found support for the contention that perceived arousal would increase cross modal (heart rate and galvanic skin response) physiological responding to emotionally laden stimuli. Subjects simultaneously exposed to bogus heart rate feedback and noxious slides responded to the slides with increased electrodermal activity as compared to subjects exposed to identical auditory feedback labeled as extraneous noise. These data lend credence to the idea that one's self-perception of being aroused is capable of influencing the physiological component of reactions to anticipated emotionally laden stimuli. The initial perception of being aroused could sufficiently increase actual physiological activity so that this activity, in turn, could provide feedback cues to reinforce the initial perception.

The desired physiological/emotional state. It is reasonable to assume that some emotional and/or physiological states are desired over others. Millions of dollars are spent yearly on medications and therapy to help people achieve relaxed states. Alcohol could even be included in this category. By utilizing man's cognitive abilities, however, it also seems reasonable that individuals could learn, through the use of biofeedback equipment, how to reach emotional and physiological relaxation.

That emotion plays a part in learning is generally accepted, possibly due to the great similarity between motivation and emotion. The extent to which the individual may autonomously control emotion is, however, in question. Sadalla and Loftness (1972) instructed subjects to construct images with positive, negative, or neutral emotional content for use as mnemonic aids in a paired-associate learning task. Positive and negative images were found to be superior to neutral images in facilitating recall for associated word pairs. No differences were found between the relative utility of positive and negative images. This study seems to imply a physiological equality of emotions, even though the content, negative or positive, may be quite different.

Perhaps it is difficult for an individual to establish whether a relaxed state is being achieved. If the individual were able to take note of success in achieving relaxation, the individual would then be able to recognize the internal physiological reverberation and in turn learn to more easily achieve it. Marston (1969) found and emphasized the fact that external feedback must be present for subjects to develop self-reinforcement and external reinforcement must ultimately be internalized. The experience of success and the expectancy of achievement were studied by Hinton, Hammer, and Pohlen (1974) as well as Crumbaugh (1975). Both studies revealed that the expectancy of being positively rewarded motivates subjects' performance to the extent that the magnitude of the potential reinforcement is secondary as a motivating factor.

It appears, however, that success, in itself would be a positive reward. A study altering reward magnitudes carried out by McHewitt (1974) found a high correlation between amount of reward and performance of albino rats in a nonchoice brightness discrimination apparatus. A high positive correlation was discovered supporting the hypothesis that as the magnitude or amount of reward increases, the amount of achievement does also.

Problem. The problem of this research was to attempt to determine experimentally whether inflated information of progress in thermometric biofeedback training affects levels of achievement in raising temperature significantly from actual or deflated information. Internalized feeling of success, achievement and positive reinforcement, implying a cognitive manipulation of reaching a physiological and emotional state of relaxation, are investigated as major factors in the research.

Hypothesis. The author hypothesized that individuals who did receive inflated information of progress would demonstrate higher achievement levels in raising their temperature, and those who received actual or deflated information of progress would achieve levels significantly lower than those with inflated information.

## CHAPTER II

## METHOD

Subjects. The subjects in this experiment were thirty incarcerated juveniles, twenty-one boys and nine girls, at the Children's Court Center in Pittsburg, Kansas, ranging from ages thirteen to seventeen. The subjects were divided equally, ten in each of the three groups. The subjects were assigned randomly other than according to sex, seven boys and three girls in each group.

Equipment and apparatus. A temperature feedback machine was used, consisting of one temperature sensitive electrode worn on the middle finger of the right hand of each subject during their training. The basic machine, The T2-P model, produced by Systec, Inc., of Lawrence, Kansas, was altered. Rex Hartzell of Systec placed two components and a three stop switch inside the machine so that no visible alterations were made. The three settings were: 1) actual, in which the machine functioned normally and the information received by the subject was correct, 2) deflated, in which the machine was half as sensitive and any increase or decrease in temperature was viewed accordingly, and 3) inflated, in which the machine was twice as sensitive and any increase or decrease in temperature was viewed accordingly. A relaxation

tape, recorded by the author and lasting the length of a session, was played in a tape recorder.

General procedure. The training and testing of subjects was done within a time period beginning May 3, 1976, and ending June 16, 1976. The subjects were given three, twenty-five minute sessions. A session was given to each subject on three consecutive days during this time period, one session per day at approximately the same time of day. The bio-feedback training and/or testing sessions occurred in private offices at the Children's Court Center. The author selected the contemporary field of bio-feedback due to its definite measurability and a monistic philosophy, the belief that the physiological and mental or emotional are similar aspects of one, "whole" organism. Since 1965, investigators at The Menninger Foundation have been researching the potentials of biofeedback training. The work of Dr. Elmer Green on biofeedback training methods and on voluntary control of states of consciousness, along with the work of Dr. Joseph Sargent on biofeedback treatment in migraine headache, has attracted national attention (Menninger Foundation pamphlet). The experimental design involved three conditions: 1) a group individually trained by receiving actual feedback information, 2) a group individually trained by receiving inflated feedback information, and 3) a group individually trained by receiving deflated information.

The subjects were given a general overview of the principles of bio-feedback and instructed to refer to the gauge of the T2-P

for information of their progress. (See Appendix C for general overview.) The goal of the subjects in bio-feedback thermometric training was to raise the temperature of their hands. To assist the subjects in relaxing and concentrating on raising their temperature, a list of tape recorded phrases was played throughout all sessions for each individual. (See Appendix B for list of phrases.) Following each session, a self-rating questionnaire was filled out by the subject. (See Appendix D for questionnaire.) The questionnaire dealt with four areas: 1) amount of success experienced, 2) degree of relaxation achieved, 3) general feelings about the experiment, and 4) general mood during the session.

Techniques and measurement. Achievement or progress of the subjects was determined by recording the true difference or rise in temperature between the beginning of the session and the highest temperature achieved during the session. Numerical values were assigned to the self-reports, such that the scale graduated from 1 to 5.

## CHAPTER III

## RESULTS

Achievement scores. To determine whether a statistical null hypothesis of no significant difference between information groups was supported, an analysis of variance was used. The mean temperature changes for each subject were gathered and the mean for each group was obtained. (See Appendix A for Table 1.) A summary table for the analysis of variance was then constructed and appropriate computations were made. (See Appendix A for Table 2.) Although the mean scores differed as projected, the results of the study showed that there was not a significant difference in temperature change between subjects in the actual, inflated, and deflated groups at the .05 level. The F score was less than 3.35 and a statistical null hypothesis of no difference was supported.

Self-report ratings. Self-report ratings, between 1 and 5, were accumulated for all subjects after all sessions. Each subjects' mean rating was recorded for feelings of success, feelings of relaxation, general feeling toward experiment, and general mood during the session. (See Appendix A for Tables 3, 4, 5, and 6, respectively.) Pearson's Correlation was run individually for inflated, actual, and deflated mean scores and mean self-report of feelings of success. (See Appendix A for Table 7.) Inflated, actual, and deflated groups had correlation coefficients of  $-.19$ ,  $+.05$ , and

+0.03, respectively, indicating no correlation between self-reported feelings of success and achievement.

Self-reported feelings of relaxation, general feeling toward the experiment, and general mood during the session were thought to be only secondary influences upon achievement. For this reason the correlation was not divided into inflated, actual, and deflated, but evaluated as the correlation between each of the remaining three self-reported elements and all subjects. (See Appendix A for Table 8.) A non-expected correlation coefficient between self-reported feelings of relaxation and achievement scores was  $-.32$ . Between self-reported general feelings toward the experiment and achievement scores, a correlation of  $-.03$  was found indicating no relationship between the two variables. Self-reported general moods during the sessions also had a non-expected correlation coefficient of  $-.20$  when correlated with achievement scores.

Mood fluctuation and locus of control. Although a test was not administered to the subjects to determine locus of control, information received from the self-report was utilized. High fluctuation of moods being an indication of external locus of control, scores were derived by finding the greatest difference between self-reported ratings of mood for each subject. (See Appendix A for Table 9.) Pearson's Correlation was run individually for each of the three groups. (See Appendix A for Table 10.) In the inflated group, a correlation of  $-.58$  between mood fluctuations and achievement scores suggests the presence of an internal locus

of control. The actual group had a correlation of  $-.10$ . A  $+.42$  correlation was found in the deflated group, suggesting the presence of an external locus of control.

## CHAPTER IV

## DISCUSSION

According to the hypothesis of this study, achieving a physiological state of relaxation could be enhanced or inhibited by altering external bio-feedback information. It was the belief of the author that this might be possible by striving to produce internal feelings of success from false degrees of perceived success. This, however, was not found to be true. Beyond the difference of achievement of the groups being non-significant, the correlation between achievement and self-reported feelings of success for all groups was extremely low. There may have existed a great variability in how the subjects viewed their altered information. An individual in the deflated group may still have perceived his achievement level as very progressive and vice-versa. Each subject's criteria for what was successful was totally self-created, and no comparison factor existed. Subjective attitudes of the subjects were an uncontrolled variable. Positive attitudes or negative feelings, which to a certain extent were being measured and studied, may have been due to factors other than their success feelings toward the information with which they were supplied. The arbitrary alterations of the information may not have been significant within itself, thus throwing question upon the non-significance of differences in performance between the different groups. The age,

educational level, and socio-economic status of the sample must certainly be considered factors in limiting the scope of this investigation.

Even though this study did not indicate that the perception of a physiological state effects achieving it, other studies have. Mansueto (1973) found that physiological indications and subjective reports of fear were found to be induced by false feedback of increased heartbeat in expectation of shock. The reduction of arousal was achieved by Kindas (1973) in utilizing Alpha Rhythm bio-feedback training. The purpose of the study was to determine the degree to which feedback training induces change in Alpha activity, and the effect increased and decreased Alpha activity have on arousal. Subjects underwent either facilitation or blocking of Alpha activity. Significant differences in arousal was seen on four separate scales during Alpha facilitation. On the other hand, the prediction that blocking Alpha would increase arousal was not supported. The latter finding suggests to the author that increases in arousal states may be independent of brain activity in itself. This supports a more cognitive theory of arousal or a decision or perception on the individual's part to become aroused.

Bracco (1972) found support for his hypothesis that the form of stress reaction exhibited by an individual is related to various characteristics of his personality. He also found that the more threatening an individual perceived situations, the more defensive the individual's behavior becomes. Viewing these findings and an

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attempt on the author's part to stress internal cognitive factors, a near psychotic state is implied in order for an individual to most effectively deal with his environment. This is best exemplified by Lewin's graphical definition of the schizophrenic (Hall, 1970). Lewin contends that each individual owns a "life space." The life space contains the person and his psychological reality. Outside and adjacent to the boundary of life space is what Lewin terms "foreign hull." The resistance of a boundary, or its permeability, is displayed by the width of the boundary line. A thin line represents a weak boundary and a thick line represents a resistant boundary. This is Lewin's "firmness-weakness" dimension. Lewin's figure (see Appendix E for Figure 1) "depicts a situation in which the outside world has little influence on the life space." This is the optimum situation, an internal locus of control! However, there exist two major differences between the schizophrenic and an individual with an internal locus of control. The schizophrenic's "contacts with physical reality are slight," and "the life space has little influence on the outside world." A study by Seal (1972) supports these differences. Seal found that the reality-oriented child is less affected autonomically by vicarious threat than the child who typically denies reality. Without careful consideration, it would seem that the reality-oriented child would be most fearful.

In studying the techniques of controlling an internal response, heartrate, Barrick (1973) used three basic treatments. Focused Attention and Relaxation, maximized a subjective, cognitive pro-

cedure. The third treatment, utilizing bio-feedback, used an objective, externally validated procedure to control heart rate. Personality variables, eg., Extraversion-Introversion, Neuroticism, Locus of Control, and Social Desirability, were measured in an attempt to develop a predictive model of internal response. Results showed that both Focused Attention and External Feedback treatments were equally more desirable in reducing heart rate than the Relaxation treatment which differed from Focused Attention due to the degree of somatic activation required by subjects during training. Moreover, only Locus of Control was significantly related to heart rate reduction.

In an attempt to eliminate self-defeating behavior and change locus of control, Parks (1975) found that through treatment both can be achieved. Internality is cited as being positively related to perserverance, creativity, achievement, information seeking, self-esteem, and a favorable outlook toward the future. As measured by the Rotter I-E Scale, the subjects in Park's study did become more internally controlled. These findings suggest that an internal locus of control can be learned or developed. The author of the present study contends that a similar phenomena occurred here.

## CHAPTER V

## SUMMARY

It was the contention of the author that the alterations in bio-feedback information, rather than creating feelings of success, created knowledge of responsibility. This responsibility refers to the greater realization of subjects in the inflated group that the information was created by them. The apparatus, while set on inflated information, increased and decreased twice that of the true fluctuations, and the impact of temperature fluctuations were certainly greater. The author further hypothesizes that the subjects took responsibility for the increase or decrease in temperature. It is through taking this responsibility that an internal locus of control, as indicated by mood fluctuations, was enhanced in the inflated group and inhibited in the deflated group.

It is the taking of responsibility which is needed by mankind to more closely approach full potentiality as individuals and a species. To ignore innate tendencies of animalistic aggression and hostility is to view man unrealistically. However, mankind, by capitalizing on his cognitive abilities, is able to take responsibility for not only his overt behavior, but underlying emotions and possibly physiological counterparts which take the form of physical illness. In taking these responsibilities man is more able to direct one's instinctive hostile energy into constructive

channels. In referring to reason and passion, Gibran (1973) poetically describes the consolidation of these two human elements:

"Your reason and your passion are the rudder and the sails of your seafaring soul.

If either your sails or your rudder be broken, you can but toss and drift, or else be held at a standstill in mid-seas.

For reason, ruling alone, is a force confining; and passion, unattended, is a flame that burns to its own destruction.

Therefore let your soul exalt your reason to the height of passion, that it may sing;

And let it direct your passion with reason, that your passion may live through its own daily resurrection, and like the phoenix rise above its own ashes."

## APPENDIXES

## APPENDIX A

### TABLES

Table 1

Mean Scores for Individual Subjects and  
Group Means in Inflated, Actual, and Deflated Groups

<u>Subject Number</u>	<u>Inflated</u>	<u>Actual</u>	<u>Deflated</u>
1	5.93	8.10	6.07
2	6.17	7.33	6.00
3	5.50	7.47	8.27
4	7.40	3.77	3.43
5	5.83	10.50	3.73
6	6.87	6.40	5.13
7	4.93	5.80	6.00
8	6.17	3.67	5.80
9	6.02	5.07	4.47
10	<u>8.62</u>	<u>4.50</u>	<u>7.93</u>
Total	63.44	62.61	56.83
Group Mean	6.344	6.261	5.683

Table 2

Analysis of Variance For

Actual, Inflated and Deflated Information

Source	SS	df	Ms	F
Between Groups	2.59	2	1.296	0.471
Within Groups	74.28	27	2.751	

Total: 76.88

SS for total= 76.88

SS for difference between groups= 2.59

SS for difference within groups= 74.28

df between groups= 3 conditions - 1 = 2

df within groups = 30 - 1 for each condition = 30 - 3 = 27

Ms between groups= 1.296

Ms within groups= 2.751

F= 0.471

Table 3

Mean Rating of Self-Reported  
Feelings of Success

<u>Subject Number</u>	<u>Inflated</u>	<u>Actual</u>	<u>Deflated</u>
1	4.667	4.667	3.000
2	2.000	4.000	2.667
3	3.333	3.000	3.667
4	4.333	3.333	4.333
5	4.333	3.667	3.667
6	4.333	3.333	3.333
7	4.000	2.667	5.000
8	4.333	4.333	3.000
9	4.667	4.000	4.000
10	3.000	3.667	4.667

Table 4

Mean Rating of Self-Reported  
Feelings of Relaxation

<u>Subject Number</u>	<u>Inflated</u>	<u>Actual</u>	<u>Deflated</u>
1	4.667	3.667	4.667
2	4.000	3.000	1.667
3	4.333	3.667	4.333
4	4.333	4.667	4.667
5	5.000	2.333	3.667
6	4.667	3.000	3.000
7	2.667	3.333	5.000
8	5.000	5.000	3.000
9	4.667	4.333	3.667
10	3.667	4.000	3.000

Table 5

Mean Rating of Self-Reported  
General Feelings Toward Experiment

<u>Subject Number</u>	<u>Inflated</u>	<u>Actual</u>	<u>Deflated</u>
1	5.000	5.000	3.333
2	5.000	5.000	2.333
3	4.000	5.000	5.000
4	4.333	3.667	4.667
5	3.333	4.000	5.000
6	5.000	2.000	3.000
7	5.000	3.000	5.000
8	5.000	5.000	5.000
9	5.000	5.000	4.667
10	3.667	5.000	5.000

Table 6

Mean Rating of Self-Reported  
General Mood During Session

<u>Subject Number</u>	<u>Inflated</u>	<u>Actual</u>	<u>Deflated</u>
1	4.667	5.000	3.667
2	2.333	3.333	2.333
3	3.000	5.000	3.333
4	2.667	3.667	4.333
5	3.333	3.333	4.667
6	4.667	3.000	3.667
7	3.667	3.667	5.000
8	4.333	5.000	2.333
9	4.333	4.333	3.667
10	4.000	4.333	3.000

Table 7

Pearson's Correlation Between  
Feelings of Success and Achievement  
Scores of Inflated, Actual, and Deflated Groups

<u>Inflated Group</u>		
	Achievement Scores	Self-Report Ratings
	<u>X</u>	<u>Y</u>
Sum of Squares	9.88	6.67
Mean	6.34	3.89
SD	1.05	.86
Corrected Products -1.56		
Coefficient of Correlation -.19		

<u>Actual Group</u>		
	<u>X</u>	<u>Y</u>
Sum of Squares	41.62	3.33
Mean	6.26	3.67
SD	2.15	.61
Corrected Products - .51		
Coefficient of Correlation +.05		

<u>Deflated Group</u>		
	<u>X</u>	<u>Y</u>
Sum of Squares	22.77	5.29
Mean	5.68	3.73
SD	1.59	.77
Corrected Products - .30		
Coefficient of Correlation +.03		

Table 8

Pearson's Correlation Between All Subject's Achievement and Self-Reported Feelings of Relaxation, General Feeling Toward the Experiment, and General Mood During the Session

<u>Self-Reported Feelings of Relaxation</u>		
	Self-Reported Ratings	Achievement Scores
	<u>X</u>	<u>Y</u>
Sum of Squares	22.74	76.88
Mean	3.89	6.10
SD	.86	1.63
Corrected Products -13.20		
Coefficient of Correlation -.32		

<u>Self-Reported General Feeling Toward Experiment</u>		
	<u>X</u>	<u>Y</u>
Sum of Squares	23.80	76.88
Mean	4.37	6.10
SD	.91	1.63
Corrected Products -1.16		
Coefficient of Correlation -.03		

<u>Self-Reported General Mood During the Session</u>		
	<u>X</u>	<u>Y</u>
Sum of Squares	20.11	76.88
Mean	3.79	6.10
SD	.83	1.63
Corrected Products -7.73		
Coefficient of Correlation -.20		

Table 9

Fluctuation of Mood  
Derived from Self-Report

<u>Subject Number</u>	<u>Inflated</u>	<u>Actual</u>	<u>Deflated</u>
1	1	0	1
2	2	3	1
3	3	0	3
4	1	2	2
5	1	1	1
6	1	0	1
7	1	1	0
8	2	0	1
9	2	2	2
10	0	1	3

Table 10

Pearson's Correlation Between Mood Fluctuation  
and Achievement Scores of Inflated,  
Actual and Deflated Groups

<u>Inflated Group</u>		
	Mood Fluctuation	Achievement Scores
	<u>X</u>	<u>Y</u>
Sum of Squares	6.40	9.89
Mean	1.40	6.34
SD	.84	1.05
	Corrected Products	-4.64
	Coefficient of Correlation	-.58
<u>Actual Group</u>		
	<u>X</u>	<u>Y</u>
Sum of Squares	9.99	41.62
Mean	1.00	6.26
SD	1.05	2.15
	Corrected Products	-2.14
	Coefficient of Correlation	-.10
<u>Deflated Group</u>		
	<u>X</u>	<u>Y</u>
Sum of Squares	8.50	22.77
Mean	1.50	5.68
SD	.97	1.59
	Corrected Products	5.89
	Coefficient of Correlation	+.42

## APPENDIX B

### LIST OF TAPE RECORDED RELAXATION PHRASES

## LIST OF TAPE RECORDED RELAXATION PHRASES

Concentrate on slow, deep breathing throughout this entire section.

Slowly repeat each of these phrases to yourself as you hear them.

I feel very calm and quiet.

I feel very comfortable and quiet.

I am beginning to feel quite relaxed.

I am beginning to feel quite relaxed.

My feet feel heavy and relaxed.

My feet feel heavy and relaxed.

My ankles feel heavy and relaxed.

My ankles feel heavy and relaxed.

My knees feel heavy and relaxed.

My knees feel heavy and relaxed.

My hips feel heavy and relaxed.

My hips feel heavy and relaxed.

My feet, my ankles, my knees and my hips all feel heavy and relaxed.

My feet, my ankles, my knees and my hips all feel heavy and relaxed.

My stomach and the whole center portion of my body feel heavy and relaxed.

My stomach and the whole center portion of my body feel heavy and relaxed.

My hands feel heavy and relaxed.

My hands feel heavy and relaxed.

My arms feel heavy and relaxed.

My arms feel heavy and relaxed.

My shoulders feel heavy and relaxed.

My shoulders feel heavy and relaxed.

My hands, my arms and my shoulders all feel heavy and relaxed.

My hands, my arms and my shoulders all feel heavy and relaxed.

My neck feels heavy and relaxed.

My neck feels heavy and relaxed.

My jaws feel heavy and relaxed.

My jaws feel heavy and relaxed.

My forehead feels heavy and relaxed.

My forehead feels heavy and relaxed.

My neck, my jaws and my forehead all feel heavy and relaxed.

My neck, my jaws and my forehead all feel heavy and relaxed.

My whole body feels heavy and relaxed.

My whole body feels heavy and relaxed.

My breathing is getting deeper and deeper.

My breathing is getting deeper and deeper.

I can feel the sun shining down on me warming the top of my head.

The top of my head feels warm and heavy.

The top of my head feels warm and heavy.

The relaxing warmth flows into my right shoulder.

My right shoulder feels warm and heavy.

My right shoulder feels warm and heavy.

My breathing is getting deeper and deeper.

The relaxing warmth flows down to my right hand.

My right hand feels warm and heavy.

My right hand feels warm and heavy.

The relaxing warmth flows back up to my right arm.

My right arm feels warm and heavy.

My right arm feels warm and heavy.

The relaxing warmth spreads up through my right elbow into my right shoulder.

My right elbow, my right shoulder feels warm and heavy.

My right elbow, my right shoulder feels warm and heavy.

The relaxing warmth flows slowly throughout my whole back.

I feel the warmth relaxing my back.

My back feels warm and heavy.

My back feels warm and heavy.

The relaxing warmth flows up my back and into my neck.

My neck feels warm and heavy.

My neck feels warm and heavy.

The relaxing warmth flows into my left shoulder.

My left shoulder feels warm and heavy.

My left shoulder feels warm and heavy.

My breathing is getting deeper and deeper.

The relaxing warmth flows down to my left hand.

My left hand feels warm and heavy.

My left hand feels warm and heavy.

The relaxing warmth flows back up to my left arm.

My left arm feels warm and heavy.

My left arm feels warm and heavy.

The relaxing warmth spreads up through my left elbow into my left shoulder.

My left elbow, my left shoulder feel warm and heavy.

My left elbow, my left shoulder feel warm and heavy.

The relaxing warmth flows to my heart.  
My heart feels warm and easy.  
My heart feels warm and easy.  
My heartbeat is slow and regular.  
My heartbeat is slow and regular.  
The relaxing warmth flows down into my stomach.  
My stomach feels warm and quiet.  
My stomach feels warm and quiet.  
My breathing is deeper and deeper.  
My breathing is deeper and deeper.  
The relaxing warmth flows down into my right thigh.  
My right thigh feels warm and heavy.  
My right thigh feels warm and heavy.  
The relaxing warmth flows down into my right foot.  
My right foot feels warm and heavy.  
My right foot feels warm and heavy.  
The relaxing warmth flows slowly up through my right calf, to my  
right knee, to my right thigh.  
My right leg feels warm and heavy.  
My right leg feels warm and heavy.  
My breathing is deeper and deeper.  
My breathing is deeper and deeper.  
The relaxing warmth flows down into my left thigh.  
My left thigh feels warm and heavy.  
My left thigh feels warm and heavy.  
The relaxing warmth flows down into my left foot.  
My left foot feels warm and heavy.

My left foot feels warm and heavy.

The relaxing warmth flows slowly up through my left calf, to my left knee, to my left thigh.

My left leg feels warm and heavy.

My left leg feels warm and heavy.

My breathing is deeper and deeper.

My breathing is deeper and deeper.

The relaxing warmth flows up through my abdomen, through my stomach and into my heart.

My heart feels warm and easy.

My heart feels warm and easy.

My heart pumps relaxing warmth throughout my entire body.

My whole body is heavy, warm, relaxed.

My whole body is heavy, warm, relaxed.

My whole body is heavy, warm, relaxed.

I am breathing deeper and deeper.

I am breathing deeper and deeper.

My whole body feels very quiet and very serene.

My whole body feels very comfortable and very relaxed.

My mind is still.

My mind is quiet.

My mind is easy.

I withdraw my thoughts from my surroundings.

Nothing exists around me.

I feel serene, secure, still.

My thoughts are all turned inward.

I am at ease, completely at ease.

Deep within my mind I can visualize and experience myself as relaxed.

I am comfortable and still.

My mind is calm and quiet.

I feel an inward peace.

I feel a new sense of well being.

I am breathing more and more deeply.

## APPENDIX C

### GENERAL OVERVIEW

A GENERAL OVERVIEW OF THE PRINCIPLE OF BIOFEEDBACK

AS READ TO SUBJECTS BEFORE FIRST TRAINING SESSION

Biofeedback training is the procedure that allows one to tune into bodily functions and, eventually, to control them by hooking up with equipment that can amplify one or a number of one's body signals and translate them into readily observable signals. You will be training in thermometric biofeedback and will be attempting to raise the temperature of your hands. Feel free to look at the gauge to receive information of how you are doing at any time during the sessions. For this session and the following two sessions, I will be reading you a series of statements that should assist in your relaxation and the raising of your temperature.

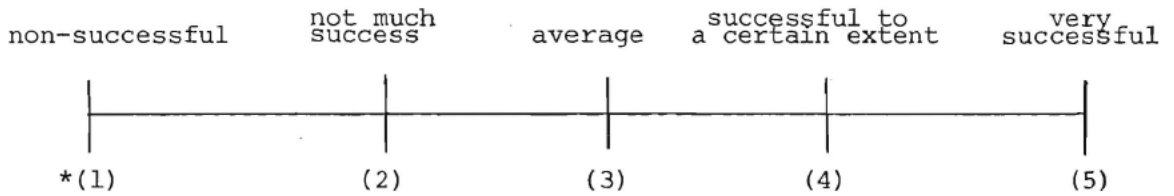
APPENDIX D

SELF-REPORT QUESTIONNAIRE

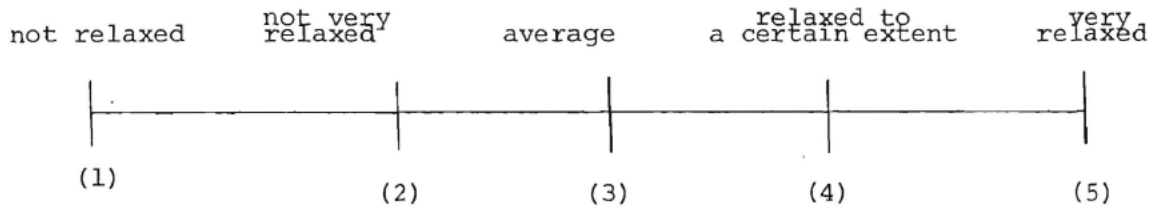
# SELF-RATING QUESTIONNAIRE

Date \_\_\_\_\_ Name \_\_\_\_\_ Session \_\_\_\_\_

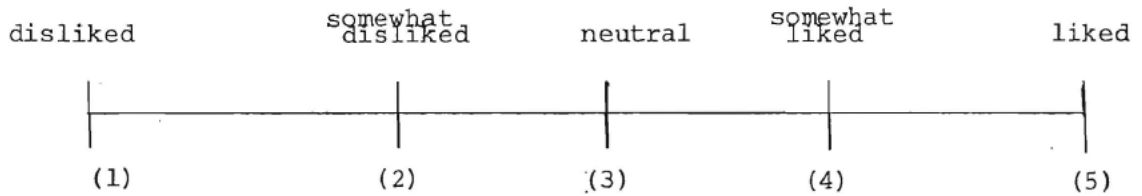
Did you feel successful in raising your temperature?



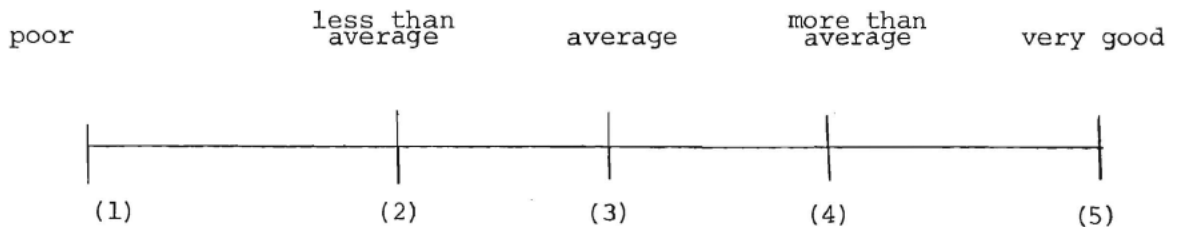
Do you feel that you did become more relaxed?



How do you feel about doing this experiment?



What kind of mood would you say you were in when you were here today?



Additional comments:

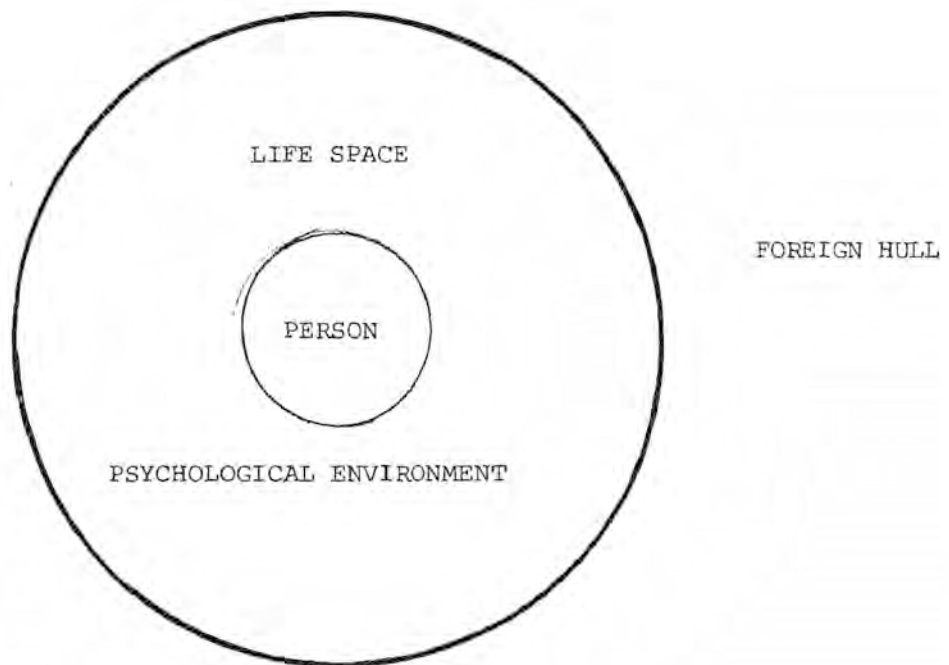
\*The original forms administered to the subjects did not have numerical values. They appear on this form to display what values went with what ratings.

APPENDIX E

FIGURE 1

FIGURE I

LEWIN'S REPRESENTATION OF THE SCHIZOPHRENIC



## APPENDIX F

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