

South Dakota State University

Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange

Electronic Theses and Dissertations

1975

Effects of Self-Hypnosis Training Sessions on Pre-Competition Anxiety Levels of Collegiate Wrestlers

Michael Ernest Engels

Follow this and additional works at: <https://openprairie.sdstate.edu/etd>

Recommended Citation

Engels, Michael Ernest, "Effects of Self-Hypnosis Training Sessions on Pre-Competition Anxiety Levels of Collegiate Wrestlers" (1975). *Electronic Theses and Dissertations*. 4875.
<https://openprairie.sdstate.edu/etd/4875>

This Thesis - Open Access is brought to you for free and open access by Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

EFFECTS OF SELF-HYPNOSIS TRAINING
SESSIONS ON PRE-COMPETITION ANXIETY
LEVELS OF COLLEGIATE WRESTLERS

BY

MICHAEL ERNEST ENGELS

A thesis submitted
in partial fulfillment of the requirements
for the degree Master of Science, Major in Health,
Physical Education and Recreation
South Dakota State University

1975

204

EFFECTS OF SELF-HYPNOSIS TRAINING
SESSIONS ON PRE-COMPETITION ANXIETY
LEVELS OF COLLEGIATE WRESTLERS

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

1 Thesis Adviser

Date

Head, Department of Health, Date
Physical Education, and
Recreation

ACKNOWLEDGEMENTS

CHAPTER The writer wishes to express his sincere thanks to Dr. Neil Hattestad for his assistance in developing and writing this thesis, and to Professor Glenn E. Robinson for his help and moral support throughout the project. Appreciation is extended to Dr. Lee Tucker for his expert statistical assistance. The author also wishes to express his gratitude to the subjects whose cooperation made this study possible.

A special thanks is due the writer's wife, Dana, for her patience and cooperation throughout the study.

M.E.E.

TABLE OF CONTENTS

CHAPTER	PAGE
I. INTRODUCTION.	1
Significance of the Study	1
Statement of the Problem	2
Hypotheses	2
Limitations and Delimitations	3
Definition of Terms	3
II. REVIEW OF THE RELATED LITERATURE	5
Literature Related to Anxiety	5
Literature Related to Hypnosis	9
Summary of Related Literature	14
III. METHODS AND PROCEDURES	15
Source of the Data	15
Organization of the Study	15
Collection of Data	16
Measurement of Group I Pulse Rates	17
Measurement of Pre-Competition Pulse Rates	18
IV. ANALYSIS AND DISCUSSION OF RESULTS	21
Organization of the Data for Analysis	21
Analysis of the Data	23
Discussion of Results	26
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	30
Summary	30
Conclusions	31
Recommendations	31

LIST OF TABLES

TABLE	DESCRIPTION	PAGE
I.	SDSU Wrestling Schedule	15
II.	Group Means For Pulse Rates Recorded Prior to Competition	22
III.	Experimental Group Means for Data Collected During Self-Hypnosis	23
IV.	One-Way Analysis of Variance for Data From First Two Matches	24
V.	One-Way Analysis of Variance for Data From Last Two Matches	25
VI.	3-Way Factorial Design of Data Collected During Self-Hypnosis Training Sessions	26

CHAPTER I

INTRODUCTION

Significance of the Study

Members of the athletic coaching profession have long been concerned with obtaining the maximum physical and mental performance from their athletes. This concern has been evidenced through the many studies that have been completed involving methods of enhancing motor performance. Research findings from these studies have influenced changes in training programs and ways of preparing for athletic competition, but these changes have been concerned primarily with physical development. Although being ready physically is very important for maximum performance, it is not the only factor to be considered. Mental conditioning also plays an important role in the success of any athletic event.

Wrestling is a highly competitive, individualized sport in which participants often experience high levels of anxiety. Johnson found that strong pre-contest emotions were prominent in wrestlers and attributed this to the individuality of competition.¹ Although a certain amount of anxiety may help to stimulate athletic performance, it is commonly agreed that extremely high levels of anxiety are often detrimental to the performance of wrestlers. It is in these situations, involving high levels of anxiety, that mental conditioning may be very important in

¹Warren R. Johnson, "A Study of Emotion Revealed in Two Types of Athletic Sports Contests," Research Quarterly, 20:76-78, March, 1949.

enhancing athletic performance.

Self-hypnosis is one method which has been successfully used in controlling high levels of apprehensiveness experienced by students and athletes.² However, research directly related to the use of self-hypnosis in controlling anxiety levels has been very limited, especially in the sport of wrestling. An attempt was made in this study, therefore, to determine the effects of training sessions involving self-hypnosis on the anxiety levels of varsity wrestlers.

Statement of the Problem

The purpose of this study was to determine the effects of training sessions involving self-hypnosis on the anxiety levels of varsity wrestlers, as measured by pulse rates recorded at selected intervals prior to competition.

Hypotheses

1. There is no significant difference in anxiety levels between subjects who were exposed to training sessions involving self-hypnosis and subjects who had no training sessions.
2. There is no significant change in heart rates of subjects while concentrating on information presented on an induction tape on self-hypnosis.

²R. Leo Sprinkle, Wells A. McInelly, and Bryce R. Newman, "A Student Guide to Self-Hypnosis," (University of Wyoming, Laramie: Division of Counseling and Testing, October, 1966), pp. 18-37. (Mimeographed.)

Limitations and Delimitations of the Problem

1. Subjects were ten male, varsity wrestlers who volunteered for the study.
2. The findings are confined to a specific group (i.e. varsity wrestlers) and may not be generalized beyond the laboratory situation.
3. Outside factors which may have affected the study such as diet, rest or emotional set could not be controlled.
4. The amount of warm-up prior to competition varied among individuals and could not be controlled.
5. Levels of anxiety may have varied with the ability of different opponents or teams.

Definitions

Anxiety. A state of apprehensiveness, as determined by heart rate, where the subject experienced feelings of apprehension and heightened physiological reactivity much or all of the time when confronted with athletic competition.³

Self-hypnosis. A self-induced state during which time the subject experienced a period of heightened suggestibility.⁴

Stress. A term used to represent efforts of the body to recover from an imbalance in its normal equilibrium or homeostasis.⁵

³Eugene E. Levitt, The Psychology of Anxiety (New York: The Bobbs-Merrill Co., Inc., 1968), p. 6.

⁴Statement by Richard M. Ritter, Associate Professor of Psychology, personal interview, Brookings, South Dakota, January 23, 1975.

⁵John D. Lawther, The Learning of Physical Skills (Englewood Cliffs, N. J.: Prentice-Hall Inc., 1968), p. 121.

Suggestion. A group of statements presented to subjects while in a trance state, designed to influence anxiety levels at a later time.⁶

Induction Tape. A recorded presentation based upon a script used by clinical psychologists to facilitate the development of a trance state.

Trance State. A condition in which the subject experienced a period of heightened suggestibility, as well as feelings of relaxation, listlessness and heaviness, particularly in the arms and legs.⁷

⁶Leslie M. LeCron, Self Hypnotism: The Technique and Its Use in Daily Living (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1964), p. 66-67.

⁷Ibid., p. 48.

CHAPTER II

REVIEW OF RELATED LITERATURE

The review of related literature is divided into two sections. The first section discusses the nature of anxiety and stress, causes of anxiety and stress, and how these factors may be measured by both motor and non-motor performances. The second section discusses hypnosis and its effects of physiological responses as measured in a variety of studies.

Literature Related to Anxiety

The research on the effects of psychological stress on performance has been quite extensive. In a study measuring anxiety levels of students in a speech class and using pulse rates as the criterion for their conclusions, Behnke and Carlile suggested that the degree of association between the physiological and psychological measures of anxiety is related to the level of autonomic arousal. The results of the study indicated that a physiological variable (pulse rate), when measured continuously during public speaking, is related to at least one measure of anxiety. The significant correlations between scores indicated that subjects who displayed a higher average heart rate during their speeches also reported higher levels of manifest anxiety.¹

¹Ralph R. Behnke and Larry W. Carlile, "Heart Rate As an Index of Speech Anxiety," Speech Monographs, 38:68-69, March, 1971.

An investigation conducted by Gordon and Sarason concluded that anxiety in a testing atmosphere is significantly associated with anxiety in a great variety of situations. They reported a significant correlation was found between test anxiety and general anxiety.² Suinn came to a similar conclusion that subjects who experience anxiety in testing situations were likely to experience anxiety in other settings as well.³

Johnson used psychogalvanic responses to determine pre-competition stress levels in athletes. He investigated the emotional intensity of pre-competition experience by using critical word stimuli in a word association test and measured emotional responses by means of a psychogalvanometer. Johnson found that a stress situation will result in a greater emotional response than will an undisturbed condition.⁴

After exposing subjects to different stressor conditions, Kurz concluded that some stressors have unique characteristics which may affect performance either positively or negatively, and that the particular effects of stressors probably vary with the prescribed task, and the manner in which they are presented.⁵ Similarly, Courts indicated that

²Edward M. Gordon and Seymour B. Sarason, "The Relationship Between 'Test Anxieties and Other Anxieties'," Journal of Personality, 23:317-23, March, 1955.

³Richard M. Suinn, "Susceptibility to Anxieties: A Generalized Trait," The Journal of General Psychology, 73:317-19, October, 1965.

⁴Warren R. Johnson, "Psychogalvanic and Word Association Studies of Athletics," Research Quarterly, 22:427, December, 1951.

⁵Ronald B. Kurz, "The Effects of Three Kinds of Stressors on Human Learning and Performance," Psychological Reports, 14:162, January, 1964.

some types of performances were enhanced, while others were inhibited by tension resulting from physiological stress. Generally, the more complex the task, the more inhibiting the stress will become.⁶

Burke and Ulrich found that motivational stressors indicating failure by the subjects may cause emotional reactions which result in less gross motor efficiency than do motivational stressors that indicate success on the part of the subjects. They also reported that significant cardiorespiratory changes occurred when organized motivational stressors were employed.⁷

Hennis and Ulrich found that there were significant differences in responses where a psychic stressor was employed in testing freshman college women. Their results are in agreement with studies reported by Grollman and others who have indicated that psychic stressors increase cardiac output, pulse rate, and blood pressure.⁸

Wells concluded that the mere thought of a contest is enough to set the heart racing. Therefore, performances are inextricably involved with emotion and anxiety. He also summarizes that much can be done to induce the athlete to relax, and this is evidence that circulatory

*⁶Fredrick A. Courts, "Relations Between Muscular Tension and Performance," Psychological Bulletin, 39:347, June, 1942.

*⁷Roger K. Burke and Celeste Ulrich, "Effect of Motivational Stress Upon Physical Performance," Research Quarterly, 28:410-12, December, 1957.

⁸Gail M. Hennis and Celeste Ulrich, "A Study of Psychic Stress in Freshman College Women," Research Quarterly, 29:172-73, December, 1953.

responses are largely due to the emotional state of the performer.⁹

Olmedo and Kirk found that the mean motor reaction times for a sample of low-anxious subjects were superior to those of high-anxious subjects. These findings support the hypothesis derived from the Hull-Spence theory that an increase in drive leads to poorer performance on a complex task. However, the difference between the mean total reaction times of the two groups were not statistically significant. In this example, total reaction time was partitioned into a premotor component, which is defined as the interval between stimulus onset and response initiation, and a motor component, which is the interval between response initiation and response completion.¹⁰

In a study designed to measure psychological and physiological responses of students in situations of test anxiety, the findings of Chambers and others revealed that psychological anxiety was unrelated to the physiological measures. It was also reported that the physiological measures were essentially unrelated, and neither the psychological nor the physiological measures correlated significantly with performance on either the mathematics or the verbal tests administered, nor was an optimal combination of all anxiety measures significantly related to ability

*⁹Philip V. Wells, "Emotion on Fitness Tests," Research Quarterly, 26:362, October, 1955.

*¹⁰Estaban L. Olmedo and Roger K. Kirk, "The Effects of Manifest Anxiety and Practice on Performance of a Complex Reaction Time Task," Journal of Psychology, 79:155-61, November, 1971.

test performances.¹¹ Their findings, which were not in agreement with those of many other studies, indicated that anxiety has no significant effect on performance of subjects on certain selected tests.

Literature Related To Hypnosis

Most of the research that has been done relating to hypnosis and performance has concentrated mainly on the relationship of hypnosis to nonmotor types of learning. However, some studies more directly related to this area have been completed. Arnold, for example, reported that positive involving suggestion, whether administered post-hypnotically or in the waking state, did not significantly affect the learning of motor skills in a mirror tracing test or a ball bouncing test. He also concluded that positive involving suggestion had no significant effect on the learning of individuals at either end of the trance state scale.¹²

Johnson and others reported that the mean performance after suggestion did not differ significantly from the mean performance after no suggestion, to warrant the claim that either performance was superior. Subjective reactions of the subjects as to how they felt after their performance were consistently more favorable when hypnotic suggestions were given, even though the subjects were not consciously aware that

¹¹ Alma Chambers, Kenneth D. Hopkins, and B. R. Hopkins, "Anxiety, Physiologically and Psychologically Measured: Its Effects on Mental Test Performance," Psychology in the Schools, 9:204-05, April, 1972.

*¹² Jay Arnold, "Effects of Hypnosis on the Learning of Two Selected Motor Skills," Research Quarterly, 42:5-6, March, 1971.

suggestions had been given.¹³ Because the subjects in this study were well conditioned, they were used to the pain and discomfort experienced in the endurance test which was administered, and therefore, the post-hypnotic suggestions given to disregard the pain and discomfort were simply redundant.¹⁴

London and Fuhrer conducted a study which measured performances using three selected tests. Their results indicated that exhortation improved performances significantly in all tasks. In no case did hypnotized performance differ significantly from un hypnotized performance as a variable independent of the other experimental variables. However, it was revealed that unsusceptible subjects tended to do best when un hypnotized and susceptible subjects did best when hypnotized. The conclusions were that hypnosis adds nothing magical to performance. Motivational instructions were clearly more important than the hypnotic trance itself.¹⁵

Young found no noticeable difference between the normal and hypnotic states in the ability of normal persons in the fields of sensation, perception, finer discriminations, present memory, or physical work,

*¹³ Warren R. Johnson, Benjamin H. Massey, and George F. Kramer, "Effects of Post-hypnotic Suggestions on All-out Effort of Short Duration," Research Quarterly, 31:145-46, May, 1960.

¹⁴ Ibid., p. 146.

¹⁵ Perry London and Marcus Fuhrer, "Hypnosis, Motivation, and Performance," Journal of Personality, 29:331-32, September, 1961.

which did not involve fatigue.¹⁶ In reporting on a similar study done in 1961, Johnson seemed to disagree. He reported that a baseball player who voluntarily underwent hypnosis was able, while hypnotized, to clearly verbalize certain defects in his hitting techniques that were causing him to experience a batting slump. The player had been unable to do this in the waking state. Upon returning to a waking state, his batting performance improved markedly, even though the subject could not consciously remember what went on during his trance. It was concluded that the subject's analysis must have been correct, as evidenced by his subsequently improved hitting performance. Since the hypnotist had never seen the subject play, there was no possibility that he could have suggested corrections to influence the player's analysis.¹⁷

In reporting on work completed by Hammer, Treloar related that Hammer found post-hypnotic suggestion served to increase psychomotor speed and endurance, while decreasing fatigue. It was also found to increase the speed of nonmotor learning, as well as to increase mental alertness and concentration.¹⁸ Similarly, VanPelt, studying the effects of suggestions while the subject was hypnotized, concluded that the heart

¹⁶ Paul Campbell Young, "An Experimental Study of Mental and Physical Functions in the Normal and Hypnotic State," American Journal of Psychology, 36:214-33, April, 1925.

¹⁷ Warren R. Johnson, "Body Movement Awareness in the Non-hypnotic and Hypnotic States," Research Quarterly, 32:264-65, May, 1961.

¹⁸ William Treloar, "Review of Recent Research on Hypnotic Learning," Psychological Reports, 20:723-32, June, 1967.

rate can be influenced under hypnosis by both direct and indirect suggestions.¹⁹ Although O'Donnell reported fear reduction by hypnosis in experiments conducted by Naruse, Rosenthal and Larsen, there was no significant fear reduction in his beginning swimmers. He did, however, report significant reduction in anxiety and improved psychological stress, suggesting that hypnosis was indeed beneficial to learning skills.²⁰

In a test measuring muscle performance by suspending a weight from subjects' outstretched arms, Slotnick and others found that involving instructions, when added to exhortive instructions, led to significantly higher scores in both waking and hypnotic conditions, but the hypnotized subjects increased their scores significantly more than did the waking subjects. Although the authors did not make any conclusions, they were in agreement that involving instructions under hypnosis appear to enhance performance.²¹

Ikai and Steinhaus support the idea that the expression of human strength is generally limited by psychologically introduced inhibitions.

¹⁹S. J. VanPelt, "The Control of the Heart Rate by Hypnotic Suggestion," Experimental Hypnosis, ed. Leslie M. LeCron (New York: The MacMillan Company, 1965), pp. 273-74.

²⁰Leo Eugene O'Donnell, "The Effects of Post-Hypnotic Suggestion on the Learning of Aquatic Skills and the Degree of Fear Among Beginning Swimmers," (unpublished Doctoral dissertation, Temple University, 1970), pp. 19-45.

²¹Robert S. Slotnick, Robert M. Liebert, and Ernest R. Hilgard, "The Enhancement of Muscle Performance in Hypnosis Through Exhortion and Involving Suggestions," Journal of Personality, 33:43-44, March, 1965.

They found a highly significant difference in strength was displayed while under hypnosis and while post-hypnotic suggestion was employed. Suggestions of strength increased the average forearm pull by 18.3 pounds under hypnosis and 15.5 pounds in the case of post-hypnotic suggestion. In one example, they identified a woman who exceeded her best pre-hypnosis strength by fifty percent while under hypnosis.²² These findings, Ikai and Steinhaus related, are in agreement with those published by Roush in 1951. Roush found that forearm strength, hand grip and hanging time were significantly increased under hypnosis. She suggested that this improvement was probably due to "removal of inhibitory factors during the hypnotic state."²³

O'Donnell reported that in an investigation conducted by Naruse, involving athletes who experienced a high level of stress or anxiety before competition, results indicated that self-induced hypnosis had an excellent effect on reducing pre-competition tension. Mordey, in a similar study with a female soprano singer, used a series of post-hypnotic suggestions to eliminate her fear that she would forget her lines.²⁴

Johnson and Kramer performed an investigation using different types of suggestions on male athletes. They found that verbalization of failure had a more significant effect on their performance than

²² Michio Ikai and Arthur H. Steinhaus, "Some Factors Modifying the Expression of Human Strength," Journal of Applied Physiology, 16:159-163, April, 1961.

²³ Ibid., p. 163.

²⁴ O'Donnell, op. cit., p. 19.

verbalization of success. They claimed the depth of the trances, kinds and manners of presentation of suggestions and certain factors related to the specific skill all determine the effects of hypnosis to an extent.²⁵

Summary of Related Literature

There has been extensive research completed dealing with different anxiety levels and how to control them. Similarly, a substantial amount of research related to hypnosis and improvement of performance has also been observed. In many cases, it was reported that anxiety and stress situations cause increases in pulse rates, cardiac output and blood pressure and decreases in mean motor reaction time. Most of the reports dealing with hypnosis and post-hypnotic suggestion were favorable to its use. Many of the studies related that hypnosis and post-hypnotic suggestion enhanced motor performance in a variety of situations.

*²⁵W. R. Johnson and George F. Kramer, "Effects of Different Types of Hypnotic Suggestions Upon Physical Performance," Research Quarterly, 31:469, October, 1960.

CHAPTER III

METHODS AND PROCEDURES

Source of the Data

The subjects for this study were ten members of the South Dakota State University varsity wrestling team for the 1974-75 season. The subjects were selected because they were frequently confronted with competition throughout the season, and therefore, had experienced different levels of pre-contest anxiety.

Organization of the Study

Data were collected over a 3-week period beginning February 1, 1975 and ending February 21, 1975. During this period seven dual matches were completed, with each subject competing in at least four of the seven matches. Table I indicates all wrestling matches from which data were collected.

TABLE I

SDSU WRESTLING SCHEDULE
1975

Date	Opponent	Site
February 1, 1975	Western Illinois	Mankato, Minn.
February 7, 1975	U. of North Dakota	Grand Forks, N.D.
February 8, 1975	North Dakota State	Fargo, N.D.
February 12, 1975	Mankato State	Brookings, S.D.
February 15, 1975	Winona State	Brookings, S.D.
February 20, 1975	Augustana	Sioux Falls, S.D.
February 21, 1975	U. of Neb., Omaha	Brookings, S.D.

The purpose of the study and the procedures to be followed were explained to all subjects. Those who were interested in self-hypnosis and were willing to spend the additional time necessary for training sessions were asked to volunteer to be members of the experimental group. The first five subjects to volunteer were designated as Group I, the experimental group, and the remaining five subjects were designated as Group II, the control group. Subjects in Group I participated in training sessions involving self-hypnosis, while subjects in Group II did not. The treatments administered to Group I consisted of six training sessions in which the subjects listened to an induction tape involving self-hypnosis. The tape was prepared by Dr. Neil Hattlestad, Associate Professor of Health, Physical Education and Recreation at South Dakota State University, and followed a format prescribed by Dr. Leo Sprinkle, Director of the Division of Testing and Counseling at the University of Wyoming.¹ One section of the script was altered to present subjects with specific suggestions pertaining to wrestling competition.

Collection of Data

Two different sets of data were collected for analysis. One set of data was collected from subjects in Group I as they concentrated on information presented on the twenty-three minute induction tape on self-hypnosis. The other set of data involved subjects from both groups

¹R. Leo Sprinkle, Wells A. McInelly, and Bryce R. Newman, "A Student Guide to Self-Hypnosis---Tape Recording Number One" (University of Wyoming, Laramie: Division of Counseling and Testing, October, 1966), pp. 1-6. (Mimeographed.)

and was collected at each of the seven dual matches, just prior to competition.

Measurement of Group I Pulse Rates

The treatments administered to Group I consisted of six training sessions in which the subjects concentrated on a twenty-three minute induction tape on self-hypnosis. These training sessions took place in the office of the Human Performance Laboratory in the Health, Physical Education and Recreation building. All subjects received the same instructions during each of the six training sessions. They were told to sit relaxed in the chair, keep their feet flat on the floor, rest their arms comfortably on the top of the desk and close their eyes while concentrating on what was being said in the tape. The lights in the office were then switched off, and the recording was played without any disturbances or interruptions.

On three occasions (training sessions one, three and six) heart rates of all subjects were monitored on a Narco physiograph. In order to eliminate distractions caused by the sound of the physiograph, this machine was positioned away from the office and received pulse rate information through the use of a FM-1100-E2 radio telemetry transmitter. A dual sensor system consisting of a positive lead at the V_5 position and a negative lead at the xiphoid process of the sternum were attached to the subjects. Pulse rates were monitored for one minute periods during five selected intervals of the three training sessions. This procedure was followed to determine what possible effects the material presented on the tape might have had on the pulse rates of subjects

during the training sessions. The five intervals to be monitored were selected by the present writer and were based on the different periods of the tape that were thought most likely to influence pulse rates.

The first one-minute interval monitored was during the introduction of the tape, between 2-minutes and 3-minutes. The second interval was from 7-minutes and 50-seconds to 8-minutes and 50-seconds. The third interval came between 14-minutes and 15-minutes of the tape. During the third one-minute period, the subject imagined himself on an escalator, and with each floor the escalator passed going down, the subject experienced a deepening of the trance state and a heightened level of suggestibility. In the fourth interval, heart rates were monitored from 17-minutes and 15-seconds to 18-minutes and 15-seconds. It was during this interval that a suggestion was given to the subjects. They were told to imagine their opponent warming up across the mat and their own teammates shouting encouragement as the warm-up began. The suggestion stated that the subjects, when confronted with this situation under game conditions, would be relaxed, confident and very ready for competition. The fifth and final minute that heart rates were monitored was from 21-minutes and 15-seconds to 22-minutes and 15-seconds. In this interval subjects were instructed to awaken from the trance state relaxed, refreshed and feeling exceptionally well.

Measurement of Pre-Competition Heart Rates

The second set of data was collected prior to competition in each of the seven dual matches wrestled from February 1 through February 21. The heart rates of all subjects in Group I and Group II were recorded at three selected intervals prior to competition. In each

instance, the present writer was responsible for measuring and recording heart rates, which were taken at the carotid artery. Each pulse was taken for thirty seconds and doubled to give the heart rate per minute.

The first time the heart rates were recorded prior to competition was when each subject reported to the locker room to pick up his wrestling uniform. This procedure usually took place between sixty and ninety minutes before the dual meet began, while subjects were still dressed in their street clothes. The second time heart rates were recorded was fifteen minutes after the first recording was completed. Subjects were dressed in their wrestling uniforms at this time. The third recording of heart rates was taken during the contest and two matches prior to actual competition for each of the subjects. This length of time varied occasionally, because some matches were shorter than others when one wrestler lost by a fall. In the case of the first two weight classes, 118 lbs. and 126 lbs., the length of time considered to be two matches before actual competition was estimated by the present author to the best of his ability.

All subjects were given the same instructions before data were taken. They were told to sit relaxed for one minute before their pulse was measured. The third recording of heart rates prior to competition was always done while the subjects were out of view of the match already in progress.

In all cases only the data collected from the first two dual matches and the last two dual matches in which each subject competed were used in the analysis. This procedure was followed as all subjects were not able to wrestle in the seven dual matches. All subjects did,

however, wrestle in at least four of the seven contests.

In Group I, all subjects wrestled in their first two dual matches before having had more than one training session. In all cases, with one exception, subjects in Group I had completed six training sessions before competing in their last two matches. Actual pulse rates are presented in Appendix B.

A 3-way factorial statistical treatment using a $5 \times 3 \times 5$ design was employed in analyzing the data collected during the training sessions.

CHAPTER IV

ANALYSIS AND DISCUSSION OF RESULTS

Organization of the Data for Analysis

The data collected in this study were analyzed using two statistical procedures. The first analysis was performed to determine whether any significant changes had occurred in pre-contest anxiety levels between subjects in Group I and Group II. Table II indicates the mean score for the pulse rates recorded prior to competition. A One-Way Analysis of Variance, as suggested by the Experiment Station Statistician at South Dakota State University, was used to conduct this investigation.

In the second analysis, a 3-Way Factorial Design was applied to the data obtained from Group I to determine what relationship, if any, might have existed between and among subjects, training sessions, and time intervals. Table III indicates the mean scores for subjects, training sessions and intervals. The factors considered in the 3-Way Factorial Design were the subjects (student), training sessions (sets), and the five pulse rate recording intervals (time). To facilitate speed and accuracy, an electronic computer was used for analysis. The .05 level of confidence was accepted as the minimum level needed in order for a difference to be considered significant, except in the time interval analysis, where the .01 level was used.

It was noted that pulse rate changes were comparable for all subjects prior to competition, and for all members of Group I during the five intervals in which pulse rates were monitored. It was also noted that in interval four pulse rates were consistently higher than in

TABLE II

GROUP MEANS FOR PULSE RATES
RECORDED PRIOR TO COMPETITION

Matches	Group	Test I	Test II	Test III
First Two	1	67.27	75.07	90.80
	2	64.64	65.64	80.18
Total Mean		65.96	70.36	85.49
Last Two	1	67.78	70.00	92.00
	2	65.00	66.80	83.60
Total Mean		66.39	68.40	87.80

any other interval. To determine whether pulse rates in interval four were significantly different from pulse rates in the other intervals, Dunnett's test was applied.¹ This analysis consisted of a series of comparisons between the treatment means and the control mean (mean of interval four). Dunnett's test is a more conservative statistical procedure as compared with similar tests such as Duncan's new multiple-range or the least significant difference approach.² Therefore, if a difference was significant when Dunnett's test was applied, the difference would be significant by standards in similar tests as well. The

¹Robert G. D. Steel and James H. Torrie, Principles and Procedures of Statistics (New York: McGraw-Hill Book Company, Inc., 1960), pp. 111-12.

²Chauncy A. Morehouse and G. Alan Stull, Statistical Principles and Procedures with Applications for Physical Education (Philadelphia, Penn.: Lea and Febiger, 1975), pp. 293-95.

TABLE III

EXPERIMENTAL GROUP
MEANS FOR DATA COLLECTED
DURING SELF-HYPNOSIS TRAINING SESSIONS

Independent Variable		Number of Observations	Mean
Subject	1	15	74.13
	2	15	52.27
	3	15	63.33
	4	15	48.67
	5	15	78.73
Training Session	1	25	67.48
	3	25	58.04
	6	25	64.76
Interval	1	15	63.07
	2	15	63.20
	3	15	62.80
	4	15	66.27
	5	15	61.80

.01 level of confidence was accepted as the minimum level needed for a difference to be considered significant for this test.

Analysis of the Data

Table IV shows the One-Way Analysis of Variance for the pulse rates which were recorded prior to competition in the first two matches in which each subject competed. None of the F ratios for pulse rates between the experimental and control groups, which were recorded during the first two dual matches, were found to be significant.

Table V shows the One-Way Analysis of Variance for the pulse rates which were recorded at three different times prior to competition

TABLE IV

ONE-WAY ANALYSIS OF VARIANCE FOR
DATA FROM FIRST TWO MATCHES

Time	Source of Variance	df	SS	MS	F*
Checkout	Group	1	43.91	43.91	0.29
	Remainder	24	3661.48	152.56	
	Total	25	3705.38		
15-Minutes Later	Group	1	564.37	564.37	3.57
	Remainder	24	3797.48	158.23	
	Total	25	4361.85		
Two Matches Prior to Competition	Group	1	715.50	715.50	2.66
	Remainder	24	6466.04	269.42	
	Total	25	7181.54		

*F .05 (1/24) = 4.26

in each subject's two final matches of the season. None of the F ratios for pulse rates between the experimental and control groups, which were recorded during the last two dual matches, were found to be significant.

Table VI shows the 3-Way Factorial Design for the analysis of data collected from Group I. The F ratios computed for students, sets, times, and student x set were all significant at the .05 level of confidence. The F ratios for student x time and set x time were not significant.

TABLE V

ONE-WAY ANALYSIS OF VARIANCE FOR
DATA FROM LAST TWO MATCHES OF SEASON

Time	Source of Variance	df	SS	MS	F*
Equipment Checkout	Group	1	36.55	36.55	0.24
	Remainder	17	2565.55	150.92	
	Total	18	2602.11		
15-Minutes Later	Group	1	48.51	48.51	0.29
	Remainder	17	2881.60	169.51	
	Total	18	2930.11		
Two Matches (Prior) To Competition	Group	1	334.23	334.23	1.15
	Remainder	17	4934.40	290.26	
	Total	18	5268.63		

*F .05 (1/17) = 4.45

At value of 3.458 was calculated through the use of Dunnett's test. This value, when subtracted from the control mean of 66.27, left a mean value of 62.81. All of the compared mean pulse rates below 62.81 were significant at the .01 level of confidence.³ This analysis revealed that the mean values of 62.80 for interval three and 61.80 for interval five were significantly different from the mean pulse rate of 66.27 found in interval four.

³Ibid., pp. 381-82.

TABLE VI

EXPERIMENTAL GROUP
3-WAY FACTORIAL DESIGN OF DATA
COLLECTED DURING SELF-HYPNOSIS TRAINING SESSIONS

Source of Variance	df	SS	MS	F*
Student	4	10370.08	2592.52	305.24
Set	2	1180.59	590.29	69.50
Time	4	169.28	42.32	4.98
Student x Set	8	2239.68	279.96	32.96
Student x Time	16	257.65	16.10	1.89
Set x Time	8	113.28	14.16	1.67
Remainder	32	271.77	8.49	
Total	74	316323.00		

$$*F .05 (16/32) = 1.99$$

$$F .05 (8/32) = 2.25$$

$$F .05 (4/32) = 2.68$$

$$F .05 (2/32) = 2.30$$

Discussion of the Results

Within the limitations of this study and from the statistical findings, it can be concluded that self-hypnosis had no significant effects in reducing the anxiety levels of varsity wrestlers. Although the present investigation was limited to a study of the effects of self-hypnosis on wrestlers, the findings are not in agreement with those of similar research in other sports. O'Donnell, for example, found that hypnosis had a significant effect in reducing the anxiety levels of

beginning swimmers.⁴ He also reported that Naruse, in conducting a study with athletes who experienced a high level of stress and anxiety before competition, found that self-hypnosis had an excellent effect in reducing pre-competition tension.⁵

Results of the use of the 3-Way Factorial Design indicated that a highly significant difference existed among subjects. This difference may have been caused by a number of factors. First, the level of physical conditioning of each subject was not determined, and this factor, if different for each subject, would have had an influence on pulse rates. Secondly, some subjects naturally have a higher pulse rate than others, simply due to inheritance. Another reason for the difference could have been the amount of stress each subject experienced, whether created by competition, tests, or other factors.⁶

There was also a significant difference among the three training sessions (sets). The mean pulse rate of 67.48 found in set one was much higher than the mean of 58.04 found in set two, and slightly higher than the mean of 64.76 found in set three. The difference in means may have been caused by the time of day that pulse rates were monitored. Training sessions usually took place during the evening hours, after the wrestling practice and after the subjects had at least one hour of rest. If subjects worked harder in practice on the day of a training session, their

⁴Leo Eugene O'Donnell, "The Effects of Post-Hypnotic Suggestion on the Learning of Aquatic Skills and the Degree of Fear Among Beginning Swimmers" (unpublished Doctoral dissertation, Temple University, 1970), pp. 19-45.

⁵Ibid., p. 19.

⁶Herbert A. deVries, Physiology of Exercise (Second Edition; Dubuque, Iowa: Wm. C. Brown Co. Publishers, 1966), pp.104-105.

pulse rates may not have had sufficient time to recover to their normal resting state by the time the training session began. Thus, the pulse rates may have been different from one set to the next, due to the intensity of the wrestling practice on a given day.

Dunnett's test revealed that the mean pulse rate of 66.27 found in interval four was significantly different from the mean pulse rates of 62.80 found in interval three and 61.80 found in interval five. It was during interval four that the subjects received the suggestion to picture their opponent preparing for competition across the mat. From the results of Dunnett's test, which demonstrated a significant difference in the mean pulse rates among intervals, it can be concluded that pulse rates may be influenced by suggestion, while subjects are in a trance state. This conclusion is in agreement with results reported by VanPelt in an experiment involving a hypnotized subject. After his subject was in a trance state, VanPelt gave a suggestion that the subject's heart was beginning to beat faster and faster. As the suggestion was being repeated a few times, the subject's heart rate rose rapidly from 78 to 135. The heart continued to beat at this rate until suggestions were made for it to return to normal. At that time, the heart rate began to decline, taking a little longer to reach normal than it had to increase in rate. VanPelt concluded that, without a doubt, heart rates can be influenced under hypnosis by both direct and indirect suggestion.⁷

⁷S. J. VanPelt, "The Control of the Heart Rate by Hypnotic Suggestion," Experimental Hypnosis, ed. Leslie M. LeCron (New York: The MacMillan Company, 1965), pp. 273-74.

There was no significant relationship between the variables of student and time (student x time) or set and time (set x time). In each training session, subjects performed comparably for the intervals in which pulse rates were monitored. There was a significant relationship, however, between the two variables of student and time (student x time). This statistically significant interaction also may have been caused by the time of day pulse rates were monitored, as was suggested for the significant difference found among sets.

There are several different scripts available for use in self-hypnosis. These scripts, which use a variety of techniques, are recommended by highly qualified authorities in the field of hypnosis. The tape recording used in this study was developed from a script frequently recommended for use by inexperienced subjects in the development of a trance state. It is not known whether the same results would have been found if a different script had been utilized.

Due to the results of this study and within its limitations, the investigator failed to reject the null hypothesis, which stated that there is no significant difference in anxiety levels between subjects who received training sessions involving self-hypnosis and subjects who had no training sessions. It can be concluded that there was a significant change in the pulse rates of subjects while they listened to material presented on the induction tape. This enabled the present researcher to reject the second hypothesis which stated that there is no significant change in pulse rates of subjects while concentrating on information presented on an induction tape on self-hypnosis.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the effects of training sessions involving self-hypnosis on the anxiety levels of varsity wrestlers, as measured by pulse rates recorded at selected intervals prior to competition.

Ten members of the South Dakota State University wrestling team served as subjects. Subjects in Group I received training sessions in which they listened to an induction tape on self-hypnosis. In three of the six training sessions, pulse rates were monitored on a physiograph during five one-minute intervals. Subjects in Group II received no training sessions. Pulse rates of all subjects were recorded prior to competition in seven dual matches from February 1 through February 21.

A One-Way Analysis of Variance was used to conduct a statistical analysis of the data collected prior to competition. The data collected from Group I were analyzed by using a 3-Way Factorial Design. In both statistical procedures, the .05 level of confidence was accepted as the minimum level needed in order for a difference to be significant. Dunnett's test was used to determine if interval four was significantly different from the other intervals. The .01 level of confidence was accepted as the minimum level required in order for a difference to be significant in this analysis. Results of the One-Way Analysis of Variance revealed that training sessions involving self-hypnosis did not reduce anxiety levels significantly. Through the use of Dunnett's test,

it was discovered that pulse rates could be influenced by suggestion while the subjects were in a trance state. The results of the 3-Way Factorial Design indicated that a significant difference existed among subjects, training sessions and intervals, as well as between the two variables, subjects and training sessions.

Conclusions

Under the conditions of the present study, and within the limitations described, the following conclusions were drawn:

1. Training sessions involving self-hypnosis had no significant effects on the anxiety levels of varsity wrestlers.
2. Pulse rates can be influenced by suggestion while subjects are in a trance state.

Recommendations

In consideration of the results of this study the following recommendations are made:

1. That a similar study be conducted over a complete wrestling season using more self-hypnosis training sessions and a greater number of matches.
2. That a similar study be conducted using a different induction tape.
3. That training sessions be conducted in the morning while pulse rates are near their resting state.
4. That additional research involving self-hypnosis be conducted on athletes in a variety of sport events.

BIBLIOGRAPHY

A. BOOKS

- deVries, Herbert A. Physiology of Exercise. 3d ed. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1966.
- Lawther, John D. The Learning of Physical Skills. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1968.
- LeCron, Leslie M. ed. Experimental Hypnosis. New York: The MacMillan Company, 1965.
- LeCron, Leslie M. Self-Hypnotism: The Technique and Its Use in Daily Living. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964.
- Levitt, Eugene E. The Psychology of Anxiety. New York: The Bobbs-Merrill Company, Inc., 1966.
- Morehouse, Chauncy A. and G. Alan Stull. Statistical Principles and Procedures with Applications for Physical Education. Philadelphia, Pennsylvania: Lea and Febiger, 1975.
- Steel, Robert G. D. and James H. Torrie. Principles and Procedures of Statistics. New York: McGraw-Hill Book Company, Inc., 1960.

B. PERIODICALS

- Arnold, Jay. "Effects of Hypnosis on the Learning of Two Selected Motor Skills," Research Quarterly, 42:1-6, March, 1971.
- Behnke, Ralph R. and Larry W. Carlile. "Heart Rate as an Index of Speech Anxiety," Speech Monographs, 38:68-69, March, 1971.
- Burke, Roger K. and Celeste Ulrich. "Effect of Motivational Stress Upon Physical Performance," Research Quarterly, 28:410-12, December, 1957.
- Chambers, Alma, Kenneth D. Hopkins, and B. R. Hopkins. "Anxiety, Physiologically Measured: Its Effects on Mental Test Performance," Psychology in the Schools, 9:204-205, April, 1972.
- Courts, Fredrick A. "Relations Between Muscular Tensions and Performance," Psychological Bulletin, 39:347-49, June, 1942.

- Gordon, Edward M. and Seymour B. Sarason. "The Relationship Between 'Test Anxieties and Other Anxieties'," Journal of Personality, 23:317-23, March, 1955.
- Hennis, Gail M. and Celeste Ulrich. "Study of Psychic Stress in Freshman College Women," Research Quarterly, 29:172-73, December, 1953.
- Howell, Maxwell L. "Influence of Emotional Tension on Speed of Reaction and Movement," Research Quarterly, 24:22-23, March, 1953.
- ✓Ikai, Michio and Arthur H. Steinhaus. "Some Factors Modifying the Expression of Human Strength," Journal of Applied Physiology, 16:159-163, April, 1961.
- ✓Johnson, Warren R. "Body Movement Awareness in the Non-hypnotic and Hypnotic States," Research Quarterly, 32:264-65, May, 1961.
- Johnson, Warren R. "A Study of Emotion Revealed in Two Types of Athletic Sports Contests," Research Quarterly, 20:76-80, March, 1949.
- Johnson, Warren R. "Psychogalvanic and Word Association Studies of Athletes," Research Quarterly, 22:245-47, December, 1951.
- X Johnson, Warren R. and George F. Kramer. "Effects of Different Types of Hypnotic Suggestions Upon Physical Performance," Research Quarterly, 31:467-69, October, 1960.
- X Johnson, Warren R., Benjamin H. Massey, and George F. Kramer. "Effects of Post-hypnotic Suggestions on All-out Effort of Short Duration," Research Quarterly, 31:145-46, May, 1960.
- Kurz, Ronald B. "The Effects of Three Kinds of Stressors on Human Learning and Performance," Psychological Reports, 14:162, January, 1964.
- ✓London, Perry and Marcus Fuhrer. "Hypnosis, Motivation, and Performance," Journal of Personality, 29:331-32, September, 1961.
- Olmedo, Estaban L. and Roger K. Kirk. "The Effects of Manifest Anxiety and Practice on Performance of a Complex Reaction Time Task," Journal of Psychology, 79:155-61, November, 1971.
- ✓Slotnick, Robert S., Robert M. Liebert, and Ernest R. Hilgard. "The Enhancement of Muscle Performance in Hypnosis Through Exhortation and Involving Instructions," Journal of Personality, 33:43-44, March, 1965.
- Suinn, Richard M. "Susceptibility to Anxieties: A Generalized Trait," The Journal of General Psychology, 73:317-19, October, 1965.

✓Treloar, William. "Review of Recent Research of Hypnotic Learning," Psychological Reports, 20:723-32, June, 1967.

Wells, Phillip V. "Emotions on Fitness Tests," Research Quarterly, 26:362, October, 1955.

✓Young, Paul Campbell. "An Experimental Study of Mental and Physical Functions in the Normal and Hypnotic State," American Journal of Psychology, 36:214-33, April, 1925.

C. UNPUBLISHED MATERIALS

O'Donnell, Leo Eugene. "The Effects of Post-Hypnotic Suggestion on the Learning of Aquatic Skills and the Degree of Fear Among Beginning Swimmers." Unpublished Doctoral dissertation, Temple University, 1970.

Sprinkle, Leo R., Wells A. McInelly, and Bryce R. Newman. "A Student Guide To Self-Hypnosis." University of Wyoming, Laramie: Division of Counseling and Testing, October, 1966. (Mimeographed.)

D. OTHER SOURCES

Ritter, Richard M. Personal interview. Brookings, South Dakota, January, 23, 1975.

APPENDIX A

TRANSCRIPT OF THE TWENTY-THREE MINUTE INDUCTION TAPE ON SELF-HYPNOSIS

The purpose of this recording is to help you begin to learn the process of self-hypnosis. By learning the process and practicing it until you can do it well and automatically, you will have a tool which will help you in many ways. You will be able to use it to help yourself relax when you are tense, to help yourself get a good night's sleep even when you are concerned about something, to help yourself concentrate on your studies, to pay attention in class, to gain more knowledge about your feelings and attitudes, and to be a better athlete.

Some people may resist hypnosis because they feel it to be a sign of a weak mind. Actually, it is more an indication of strength. It is the strength to focus your attention and awareness on one thing and to hold it there. You have this ability, and you can learn to develop it even further. For example, as you have been listening here, you have been completely unaware of the shoes on your feet, but now that it is called to your attention, you can be very much aware of them. You can feel your feet pressing against them, and if you wanted to, you could remain aware of this sensation for sometime.

Just as you can focus your attention on your feet and follow the suggestion to experience the resulting sensations, you can concentrate on other things. This is part of hypnosis and is called, "the law of concentrated attention." The principle states that when spontaneous attention is concentrated on an idea, that idea tends to realize itself. You will observe this principle many times in hypnotic phenomena. As you learn more about hypnosis, you will become more confident in your ability to experience it and to use it for self-improvement. You should know, for example, that no one can hypnotize anyone else. I cannot hypnotize you. All that is possible for me is to lead or guide you into hypnosis. If you are unwilling, there can be no hypnosis. This means, essentially, that all hypnosis is really self-hypnosis, the only difference being that you are allowing the operator to lead you into the trance state instead of doing it yourself. This is a good way to learn self-hypnosis and is easy to do, because you do not have to think of what to say and what suggestions to make to yourself. You can just relax and concentrate on following my suggestions. Once you have experienced hypnosis a few times with my help, you will be quite capable of producing the same effect in yourself.

You need not concern yourself with self-hypnosis, because in self-hypnosis, even in the deepest trance state, no one is unconscious. You can always terminate the situation whenever you desire to do so.

Let us begin the process by making sure that you are in a position where you are relaxed and can give full concentration to the

suggestions that I am going to offer you. Make yourself comfortable in your chair and remove as much tension from your body as possible. It will help if you put both of your feet flat on the floor. In this way your leg muscles will be under less tension. Now close your eyes and picture, as vividly as you can in your mind, the following scenes that I am going to describe for you. You will find this easy to do because you want to, and it will be a very pleasant experience for you. You will be able to experience and feel vividly each of the sensations which are suggested by concentrating all of your attention upon them.

First of all, now with your eyes closed, I want you to picture for yourself a warm spring day, and a scene in the countryside. The sun is shining warmly, very warmly upon you, but it is not too hot for comfort. Feel the warm sun. Notice the beautiful scenery around you. There is just a whisper of a breeze. It is a very pleasant day.

As you continue to listen to my voice and pay attention to it, you can picture a scene in the country. Notice how green everything is becoming. It is late spring. The landscape is beginning to blossom with flowers. Perhaps there are some trees, and if you look closely you might see the leaves being shaken gently by the soft breeze. Possibly you can even smell the odor of the flowers faintly in the air. You may be able to see a stream winding its way down the countryside and perhaps you can even hear the sounds of the water. Now that you are picturing this scene in your mind and listening to my voice, you may allow yourself to enter even more completely into a feeling of relaxation that you are now beginning to experience. No matter how relaxed you become, you will always be able to hear my voice and respond to the suggestions that are offered.

Now picture yourself lying on your back near this stream on this very nice, warm day. Feel the warm sun on you. If you think about it you can be aware of the warmth of the sun on your closed eyelids. It is very warm and relaxing. You can feel the tension just seemingly drain right out of your body as you relax more and more. I am sure you have had the experience of lying on your back as a child, on a warm day, and looking up into the blue sky. Now you can see in your mind just how the sky looked to you on such occasions. You may notice a cloud floating along, and as you relax more and more it may seem as if you are floating along too, relaxing more and more, always hearing my voice, although it may seem to you as though it is coming from a greater distance.

Now you should be comfortably relaxed, and you will find it even easier to follow suggestions while in this relaxed state. In a few moments, I will arouse you or awaken you from this relaxed state, but before I do, I will suggest a few things to you which you will find interesting.

First of all, remember this: every time you wish, you will be able to relax as much as you are relaxed now. Every time you begin hypnosis, you will be able to do it more quickly. You will be able to do it better and better, and relax more and more deeply. In a few moments, after I

awaken you, I will tell you how to induce self-hypnosis. To do this, I will lead you through a hypnotic induction technique which you can later use by yourself. As I lead you through the technique, you will be able to enter quickly and deeply into a relaxed state--perhaps even more relaxed than you are right now. When I begin to talk again and tell you to be comfortable in your chair, you will be able to go quickly and deeply into a trance state.

Now I will arouse you by counting from one to five. When I reach the count of five, you will open your eyes and feel fine. You will be relaxed and alert, and your mind will be clear. You will feel very good, very good. One, two; your eyelids are becoming lighter now; three; almost awake; four, five. You are now wide awake, and your mind is clear, and you are feeling fine. You are feeling very good.

Now, close your eyes and this time take two or three deep breaths. Make yourself comfortable in your chair with your feet flat on the floor, and listen closely to my voice, and follow all the suggestions given. This will teach you how to enter hypnosis and how to produce it yourself. I want you to begin to imagine now that these instructions are those which you are giving to yourself.

Now that my eyes are closed, I can take another deep breath and hold it for a few seconds and let it all out. I say to myself: relax deeply, relax deeply, relax deeply. The more I can relax, the deeper I will be able to go into hypnosis. Let all my muscles go as loose and limp as possible. To do this, I start with my right leg. I tighten the muscles first, making the leg very, very rigid and stiff; then I relax them beginning at the toes and moving up to the hip. Then I tighten the muscles of the left leg, using the same procedure, getting it very, very rigid and tight and then letting that leg relax from the toes up to the hip.

Next I let the stomach and abdominal area relax, then my chest and breathing muscles. The muscles of my back can loosen with my shoulders and neck muscles relaxing. You may want to slowly roll your head in a small circle a couple of times. Often there is tension in this area, and this can help to relieve it. Let all of these muscles loosen. Now my arms relax from my shoulders right down to my finger tips. Even my facial muscles will relax. Relaxation is so pleasant and comfortable. I let go completely and just enjoy the relaxation. All tension seems to drain away, and soon I find a listlessness creeping over me with the sense of comfort, warmth and well-being.

As I relax more and more, I will slip deeper and deeper into hypnosis. My arms and legs may develop a feeling of heaviness, or instead, I may find my whole body feeling very light, as though I am floating on a soft cloud. And now, for a few moments, I can enjoy this feeling of relaxation, this warm glow, this sense of well being.

Whenever I am deeply relaxed, I can say mentally to myself; this time I can go deeper and faster than the last time; next time I can go deeper into the trance state and faster than this time; and each time I can go deeper and faster than the time before.

Now I can imagine that I am standing at the top of an escalator such as those in some department stores. Notice the steps moving down in front of me and see the hand railings. And now I am going to imagine that I will move from the upper level to the lower level using the escalator. I am going to count from ten to zero. As I begin to count, I imagine that I am stepping on the escalator, standing there with my hands on the railing while the steps move down in front of me, taking them with me. Each time I hear a count, I will be going further down to the lower level, and I will be moving deeper and deeper into hypnosis.

Ten--now I step on and start going down. Nine--eight--seven--six. Going deeper and deeper with each count. Five--four--three. Still deeper. Two--one--zero. Now I step off at the bottom and will continue to go deeper still with each breath I take. Deeper and deeper with each breath. I am so relaxed and so comfortable. Let go still more. Notice my breathing. It is now slower, and I am breathing more from the bottom of my lungs.

In a moment I will notice something else happening to me. I will observe that my hand and arm are beginning to lose any feeling of heaviness and are now becoming very, very light. If I am right-handed, it will be my right arm, and if I am left-handed, it will be the left. That arm is getting lighter and it will begin to lift. Perhaps just the fingers will move first, or the whole hand will start to float up. It will float up toward my face, as though my face was a magnet pulling it up until the fingers touch my face at some location. Let's see where that will be. The arm begins to bend at the elbow. It is floating upward. If it has not started of its own accord, I can lift it voluntarily a few inches to give it a start. It will continue to go up on its own accord with no further effort. It floats on up toward my face, higher and higher.

I notice something else beginning to happen. The higher my hand goes, the deeper into hypnosis I will go. The deeper I go, the higher the hand will go. Lifting, lifting, floating up higher and higher. Going higher and higher. Now if it has not touched yet, it can continue to float up till it does touch. Now I can forget about the arm and concentrate on something with which I am very familiar.

Picture in your mind your next wrestling competition. Many things associated with that are very familiar to you. You notice the wrestling mat, the gymnasium or field house and your opponent preparing to step out on the mat, just as you are. The next time you approach this situation, you will feel very much at ease, confident and relaxed. Although you will be relaxed and more at ease than you have been in your last match, you will also be able to react even more quickly to the moves of your opponent, and this will help you in the improvement of your

APPENDIX B

TABLE VII

EXPERIMENTAL GROUP
RAW DATA FOR PULSE RATES
MONITORED ON PHYSIOGRAPH

Subject	Training Session	Interval I	Interval II	Interval III	Interval IV	Interval V
R.J.	1	54	52	52	54	52
	3	44	48	48	50	46
	6	56	60	56	56	56
R.M.	1	74	72	70	70	68
	3	56	54	54	58	57
	6	66	64	60	66	61
A.N.	1	78	80	72	82	74
	3	54	54	64	70	55
	6	80	84	90	96	79
T.H.	1	48	50	50	50	47
	3	46	50	48	48	52
	6	50	48	46	50	47
J.M.	1	88	88	84	90	88
	3	76	76	78	88	77
	6	76	68	70	66	68
Mean		63.07	63.20	62.80	66.27	61.80

APPENDIX B

TABLE VIII

EXPERIMENTAL GROUP
 RAW DATA FOR PRE-CONTEST PULSE
 RATES FROM FIRST TWO MATCHES

Subject	Opponent	Test I	Test II	Test III	Training Sessions Completed
R.J.	W. III.	64	96	106	0
	UND	62	76	110	1
R.M.	W. III.	74	78	84	0
	UND	68	72	76	1
A.N.	W. III.	72	78	100	0
	UND	72	80	92	0
T.H.	W. III.	57	56	66	0
	UND	58	64	70	1
J.M.	W. III.	68	80	90	0
	NDSU	70	84	106	0
Mean		66.50	76.40	90.00	

APPENDIX B

TABLE IX

EXPERIMENTAL GROUP
RAW DATA FOR PRE-CONTEST PULSE
RATES FROM LAST TWO MATCHES

Subject	Opponent	Test 1	Test 11	Test 111	Training Sessions Completed
R. J.	Winona	76	78	116	3
	UNO	68	82	112	6
R. M.	Augustana	78	76	98	6
	UNO	76	74	90	6
A. N.	Augustana	82	74	96	6
	UNO	66	72	106	6
T. H.	Augustana	56	56	64	6
	UNO	52	58	62	6
J. M.	Augustana	68	74	102	6
	UNO	64	64	98	6
Mean		68.6	70.8	94.4	6

APPENDIX B

TABLE X

CONTROL GROUP
 RAW DATA FOR PRE-CONTEST PULSE
 RATES FROM FIRST TWO MATCHES

Subject	Opponent	Test I	Test II	Test III
J.R.	Mankato	84	86	108
	Winona	80	84	102
K.O.	Mankato	98	82	98
	Winona	60	56	82
D.K.	Mankato	58	68	74
	Winona	66	68	70
R.P.	W. III.	51	48	54
	UND	46	50	88
M.N.	W. III.	60	64	66
	Mankato	64	70	74
Mean		66.70	67.60	81.6

APPENDIX B

TABLE XI

CONTROL GROUP
 RAW DATA FOR PRE-CONTEST PULSE
 RATES FROM LAST TWO MATCHES

Subject	Opponent	Test 1	Test 11	Test 111
J.R.	Augustana UNO	84 76	92 74	100 98
K.O.	Augustana UNO	72 82	76 84	104 100
D.K.	Augustana UNO	66 54	60 58	82 62
R.P.	Augustana UNO	48 42	46 42	68 60
M.N.	Augustana UNO	66 60	72 64	78 84
Mean		65.00	66.80	83.6