

**THE EFFECTS OF A PROGRAM OF REGULAR EXERCISE  
ON SELF-ESTEEM AND ANXIETY**

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The Requirements for the Degree  
Master of Arts

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by  
Gayle S. Wyatt

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To the Graduate Council:

I am submitting herewith a Research Paper written by Gayle S. Wyatt entitled "The Effects of a Program of Regular Exercise on Self-Esteem and Anxiety." I recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Arts, with a major in Psychology.

  
Major Professor

Accepted for the  
Graduate Council:

  
Dean of the Graduate School

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## TABLE OF CONTENTS

CHAPTER	PAGE
1. HISTORY . . . . .	1
2. PURPOSE . . . . .	4
3. REVIEW OF THE LITERATURE . . . . .	7
Effects of Exercise on Self-Esteem . . . . .	7
The Effect of Exercise on Anxiety . . . . .	18
4. DISCUSSION . . . . .	25
REFERENCES . . . . .	29

## CHAPTER 1

### History

Interest in physical fitness as a way of life had its beginnings in the early 1960's when the Office of the Surgeon General reported on the generally poor state of physical health of the people of the United States. As a result of that report, President John F. Kennedy established the President's Council on Physical Fitness and Sports, a national program to promote general fitness. Interest in incorporating physical fitness into one's daily life was intensified by the publishing of the book Aerobic's by Kenneth Cooper, an Air Force physician and public health researcher, and Americans became motivated to explore the benefits of regular exercise (Leer, 1980). There followed prolific literature, mostly unscientific, extolling the benefits of daily exercise. That profusion of unscientific information has prompted this author to study current literature in an effort to determine which claims are supported by actual scientific experimentation.

That physical activity or, more precisely, consciously executed physical exercise is "good for you" has long been a matter of common knowledge. Intuition prompted that belief long before scientific methods of study were developed. With the development of scientific measurements

and such procedures as a reliable method of determining blood pressure came attempts to study the effects of exercise on a specific bodily function. Warner (1933) cites studies conducted by McCurdy in 1901, Bowen in 1904, and Lowsley in 1911 to determine the effects of various forms of exercise on blood pressure and heart rate. The effect of training or physical exercise on adolescent girls was studied by Warner (1933) who found after an eight-week training period a decrease in blood pressure, decrease in pulse rate, and pulse rate that returned more rapidly to normal after exercise.

This study of the effects of physical activity or the lack of it on blood pressure and heart rate is but a small segment of past and ongoing research pertaining to physical fitness. Kraus and associates reported the following information:

Coronary heart disease is twice as frequent in the sedentary as in the active; other diseases more frequent in the sedentary than in the active are diabetes, duodenal ulcer, and other internal and surgical conditions, 80 per cent of low back pain is due to lack of adequate physical activity; lack of physical fitness goes parallel with emotional difficulties; the physically active show better adaptability to stress, less neuromuscular tension, and lesser fatigability; and active individuals age later, do not tend to absolute and relative overweight, have lower blood



pressure, are stronger and more flexible, and have greater capacity and lower pulse rate. (Clarke, 1958, p. 461-462)

The foregoing would indicate that research involving the effects of exercise has been conducted with respect to a wide range of functions, both physical and mental.

Much of the earlier research involving exercise and its effects on the individual was conducted by those involved in physical education activities or by comparing athletes with non-athletes (Sperling, 1942; Johnson & Harmon, 1952; Henry, 1954; Werner & Gottheil, 1966). Other early researchers studied the relationship of physical fitness and achievement or success in high school or college (Ray, 1940; Weber, 1953). Exercise and its effects with regard to the general population did not become a subject of much study until the middle 1960's with the growth of interest in physical fitness and its integration into one's daily life. During the past twenty years, researchers have studied with seemingly increasing interest both the physiological and psychological effects of exercise.

## CHAPTER 2

### Purpose

Mens sana in corpore sano--a healthy mind in a healthy body.

As far back as the Ancient Greeks, the ideal of "a healthy mind in a healthy body" has been the goal of those who have desired to excel (Sachs, 1982). The condition of one's body affects the condition of one's mind and the processes of one's mind affect the processes of one's body. The approach of viewing the health of mind and body as one has been termed as the holistic model of health. Gross (1980) defines holistic health as "an approach to the well-being of people that includes the prevention of illness, alternative ways of treating illness, and the means by which good health and the full enjoyment of life can be achieved" (Gross, 1980, p. 96). He suggests a concept of "positive wellness" to replace the notion of health as an absence of disease (Gross, 1980).

According to Gross (1980), fitness refers to a level of physical activity at which one experiences an active rather than a sedentary life-style. The body needs exercise vigorous enough to cause perspiration and deep breathing. Vigorous exercise, Gross continues, strengthens the heart, increases muscle mass and energy reserves,

and restores and maintains the elasticity of tissues and the functioning of joints. Carlson and Ardell (1981) state that:

Physical exercise and activity aid blood circulation and increase the number of red corpuscles; stabilize blood pressure; aid digestion and elimination; help clear the skin; improve muscle tone and strength; help relieve internal congestion; strengthen and develop the lungs; strengthen the heart (which is a muscle) and reduce coronary heart disease; improve the body's regulatory mechanism; facilitate the loss of body weight and body fat; help redistribute body weight for a more balanced shape; combat obesity; facilitate physical endurance; improve posture; increase resistance to illness; and improve the threshold and tolerance of pain. (p. 2)

In viewing the mind and body as one, it would follow that a change in one would effect a change in the other and further that improvements in physical functioning would effect improvements in overall functioning (Carlson & Ardell, 1981). The suggestion is made that physical fitness accomplished by regular exercise is a key factor in the healthy functioning of the body and the mind.

Results of some studies conducted over the past twenty years indicate that fitness of body results in enhanced psychological functioning and positive change in affective behavior. Some of those positive changes



reported have included increased self-confidence (Young & Ismail, 1977), more positive self-concept (Collingwood & Willett, 1971), greater emotional stability (Ismail & Trachtman, 1973), higher self-esteem (Tucker, 1983), and decrease in anxiety and depression (McCann & Holmes, 1984).

The present review will concentrate on changes in psychological functioning as a result of physical activity. Much of the literature uses concepts such as increased confidence, increased optimism, more sociability, less tension, happier, more control, less excitable, less anxious, better outlook on life, and greater sense of well-being to describe improved psychological health. Self-esteem and anxiety appear to be two measures of psychological functioning used most frequently in experimental studies to determine psychological health. The present review will investigate the effects of exercise on self-esteem and anxiety.

## CHAPTER 3

### Review of the Literature

Exercise has been found to affect one psychologically as well as physiologically. Studies have been conducted to investigate the effect of exercise upon various psychological factors and conditions including self-esteem, self-concept, self-acceptance, self-confidence, self-sufficiency, emotional stability, anxiety, and depression.

#### The Effect of Exercise on Self-Esteem

Self-esteem can be defined as a personal judgment of one's own worth (Fleming & Watts, 1980). The definition reflects the ideas of Coopersmith (1967) who states self-esteem is:

The evaluation which the individual makes and customarily maintains with regard to himself; it expresses an attitude of approval or disapproval, and indicates the extent to which the individual believes himself to be capable, significant, successful and worthy. In short, self-esteem is a personal judgment of worthiness that is expressed in the attitudes the individual holds toward himself. (p. 4-5)

The relationship between physical fitness and self-esteem has not been clearly established in the literature; however, Irvin (1967) contends that "It may well be that a positive conception of one's self as a person

is not only more important than striving to get ahead and enthusiasm . . . but that it is a central factor when considering optimal . . . performance" (p. 271). Collingwood and Willett (1971) found that obese teenagers developed more positive self-concepts after a program of physical training. Similarly, Collingwood (1972) reported that twenty-five young male rehabilitation clients who participated in a four-week physical training program demonstrated significant increases in body attitude, positive self-attitude, and self-acceptance..

Hilyer and Mitchell (1979) noted that individuals with lower self-concepts before a fitness program made more positive and significant changes after the fitness program than those whose self-concepts were higher at the beginning of the program. The authors suggest that the program of running provided a means for the low self-concept subjects to learn that they are adequate and capable. The authors further suggest that meeting the challenge of becoming more proficient in running longer distances in shorter times gave the subjects a sense of mastery or control over self and the environment.

That sense of control or mastery was discussed also by Leer (1980). In an article exploring the psychological benefits of running he states, "The exercise session has a well-defined beginning and end; and it represents an activity that is compact and complete in itself . . . . Regular exercise provides an opportunity to anticipate



and successfully carry out a complete and constructive activity" (p. 21). Successful completion of an exercise activity can convince people that they can successfully master a skill. Greist and associates "indicated that runners often experience feelings of mastery leading to increased self-confidence" (Leer, 1980, p. 22).

The sense of control one gains upon successfully completing a form of exercise may be due to the positive feedback received in terms of physical functioning of one's body. Tucker (1983) investigated the relationship between muscular strength and mental health. He conducted an experiment in which he chose as subjects 142 male students from five undergraduate physical education classes (mean age 21.76 years). The subjects were administered the Tennessee Self-Concept Scale, Body Cathexis Scale, and Eysenck Personality Inventory. Muscular strength was assessed by using weight training apparatus. The author concluded that stronger individuals were more extroverted and stable, had a higher self-concept, and obtained higher body cathexis scores.

Positive feedback with related increased measures of self-concept, body satisfaction and extroversion was observed in two previous experiments by Tucker (1982a, 1982b). Tucker (1982a) used as subjects 105 university students, of whom 60 were enrolled in a weight-training course and an Ancient American History course. These 60 served as the experimental group. Forty-five students were enrolled

in Ancient American History only and served as the control group. Both groups were administered the Tennessee Self-Concept Scale at the beginning and end of the experiment. The experimental group participated in a sixteen-week weight-training program. The control group received no treatment. Findings of increased self-concept in the weight-training group led Tucker to conclude that the positive feedback of a stronger and more muscular body was instrumental in promoting a more positive image of self.

Similarly, in another experiment involving body image and fitness, Tucker (1982b) concluded that "the more weight-training reported by the subjects the more confident and satisfied they tended to be" (p. 554). This would seem to indicate that satisfaction with one's body may lead to a more positive perception of one's self and that one's self-concept would increase with perception of a strong, fit body.

That perception of physical fitness is related to self-concept was indicated by Leonardson (1977), who administered self-concept measures and had subjects rate themselves on how physically fit they perceived themselves. Those who perceived themselves to be fit had higher self-concept scores. In another study Leonardson and Gargiulo (1978) found no significant gains in self-concepts of subjects after a ten-week physical training session, and while physical performance actually improved, perceived

physical fitness did not. This finding would tend to support the earlier findings of Leonardson (1977) that perception of fitness is related to self-concept.

Heaps (1978) contends that "cognitions about one's physical functioning develop and change through exposure to either physical or social standards of comparison, and that these cognitions influence psychological behavior (p. 400). He conducted an experiment to study the effect of social and physical feedback on subjects' perceptions of their fitness level. A measure of each subject's actual physical fitness was taken using Cooper's 12-minute running test. Then a confederate ran with each subject and supplied either high or low social feedback. To give high social feedback, the confederate acted exhausted and ran a shorter distance than the subject and told the subject, "I had trouble keeping up with you. You must be in good shape." To supply low social feedback, the confederate ran farther and faster than the subject and told the subject, "You had trouble keeping up with me. You must be out of shape" (p. 401). Physical feedback was given by attaching telectrodes to each subject and having the subject participate in a running test. After the running test, recordings were interpreted for each subject. For higher physical feedback, the subject was told, "This means you're in good shape;" for low physical feedback, the subject was told, "This means you're out of shape" (p. 402). The subjects were then asked to



complete attitude questionnaires. The results indicated that a person's perception of physical fitness is subject to significant change following exposure to social and physiological feedback. The author concludes that improved psychological functioning following consistent exercise may result not from the physical improvement per se, but from the individual's perception of physical improvement as determined by interpretation of feedback received by the individual.

However, increase in physical fitness was not accompanied by more positive body image in a study by Folkins (1976). Forty middle-aged males were assigned to an exercise or control group. Physical fitness was assessed, and the Multiple Affect Adjective Checklist and the Secord and Jourard body cathexis scale were administered. The exercise group participated in a twelve-week exercise program, while the control group received no treatment; then both groups were retested. Though significant improvement in physical fitness was observed, more positive body image was not observed. Also, no changes in self-confidence or adjustment were observed.

In another study, high-fit adolescent boys had higher estimates of their physical abilities than low-fit boys. There was no difference in the self-esteem scores of the two groups (Neale, Sonstroem & Metz, 1970).

Psychological status at the beginning of the program may be a factor in whether or not a change is observed

after a program of exercise according to McPherson, Paivio, Yuhasz, Rechnitzer, Pickard and Lefcoe (1967). These researchers studied eighteen males who had experienced and recovered from heart attacks. Those eighteen were classified as cardiac exercisers or cardiac controls. Three other groups were added: normal exercisers, normal controls, and experienced exercisers. They were administered several personality tests, including Cattell's Sixteen Personality Factor Questionnaire, participated in a twenty-four week exercise program, and were then retested. The cardiac exercisers made favorable changes in a greater number of personality characteristics than the other four groups. The authors suggest that the feelings of increased self-confidence and well-being experienced by the cardiac exercisers may be due to their more negative personality condition at the beginning of the program. In many instances, the victim of a heart attack experiences a collapse of the image of self as a strong and successful person and suffers from anxiety, depression, and decreased self-confidence. According to the authors, the subjects typically viewed the exercise program to be a changing point in their lives. They reported feeling younger, more self-confident and having a better outlook on life. Experiencing physical improvements as a changing point with a resulting improved outlook on life may be a factor in psychological improvements observed in several studies of middle-aged males (Ismail & Trachtman, 1973; Young

& Ismail, 1976, 1977; Hartung & Farge, 1977).

Ismail and Trachtman (1973) chose "men who had literally and figuratively let themselves go to pot" to serve as subjects for their study (p. 80). The Cattell 16 Personality Factor Questionnaire was given to sixty middle-aged men before they began a four-month physical fitness program and again at the end of four months. During the four months, the group met for one and one-half hours three times a week. Each daily program consisted of ten minutes of warm-up jogging, thirty minutes of group calisthenics, running an average of two to three miles, then ended with playing basketball, squash, or volleyball or swimming for one-half an hour. Before beginning the program, the men had been divided into two groups--most physically fit and least physically fit. At the end of the program, the low fitness group showed large increases on scores indicating more self-sufficiency. The high fit group showed high levels of self-assurance and emotional stability.

Young and Ismail (1977) studied and retested that same group of men four years later. This time, they were divided into three groups: long-time, regularly active (active before and after 1971); inactive before 1971, participated in the four-month program, then inactive again; inactive before 1971, participated in the four-month program and remained active. After four years, the physical fitness status of the two active groups had increased. The long-time, regular exercisers scored



significantly lower on anxiety and indicated greater self-confidence and emotional stability. Young and Ismail conclude from those results that the relationship between physical fitness and self-confidence is stable.

Results validating those previously found were obtained from two similar studies conducted by Young and Ismail (1976a, 1976b). Again, the authors found the high-fit groups were significantly more emotionally stable than the low-fit groups. Young and Ismail point out that though distinct personality differences between fitness groups were observed, very few pre- to post-test differences were observed for the four-month period indicating, according to the authors, the need for a longer and/or more intensified period of habitual exercise.

In another study observing middle-aged men, Hartung and Farge (1977) tested healthy male, 40- to 50-year old runners and joggers using various physiological tests to determine fitness and the Cattell 16 Personality Factor Questionnaire. The subjects were found to be significantly more intelligent, imaginative, reserved, self-sufficient, sober, shy and forthright than the general population. Hartung and Farge observe that joggers and runners tend to be more introverted, and raise a question as to whether or not an initial tendency to be introverted causes the individual to take up jogging as a sport rather than participating in a team sport. However, they point out that the high levels of self-sufficiency could be attributed



to running since self-sufficiency previously has been found to be correlated with improvements in fitness (Ismail & Trachtman, 1973; Young & Ismail, 1976a, 1976b; Young & Ismail, 1977).

The observation of Hartung and Farge (1977) that runners tend to be more introverted is in opposition to the conclusion of Brunner (1969) who found that individuals who exercised regularly possess more traits characteristic of extroverts. In an effort to determine if individuals who regularly participate in vigorous exercise activities possess unique personality traits as compared to those individuals who do not participate in such activities, Bruner had members of an exercise participant group and a non-participant group complete the Adjective Checklist. Brunner concluded that regular exercisers as compared to non-exercisers tend to be more self-controlled, confident, strong-willed and outgoing and, as noted earlier, tend to possess more traits characteristic of an extroverted individual.

Similar studies using various checklists, surveys, and self-report measures of attitude have been conducted by other researchers. Those types of measures of attitude have been used particularly by researchers investigating the psychological and physiological benefits of running (Joesting, 1981a, 1981b; Jorgenson & Jorgenson, 1979; Harris, 1981a, 1981b).

Jorgenson and Jorgenson (1979) designed a questionnaire to record the respondent's perception of change produced

by running on a regular basis which was sent to 984 people affiliated with three running clubs. Of the 497 responses, Jorgenson and Jorgenson (1979) report, "Ninety-two percent . . . perceived increased emotional well-being as a result of running. Ninety-seven percent indicated an increase in their physical well-being" (p. 242). Joesting (1981a) used the Multiple Affect Adjective Checklist to compare affective scores before, during, and after a 50-mile run on a quarter-mile track. Only one subject, the author, was considered. She self-administered the test before, every hour during and after the race. No significant differences in depression, anxiety or hostility were found. In another investigation, Joesting (1981b) administered the Depression Adjective Checklist to 100 runners competing in the Gasparilla Distance Classic in Florida. The results indicated the runners were less depressed than the sample of non-psychiatric patients on whom the Depression Adjective Checklist was standardized. Joesting (1981b) acknowledges the need for additional research since these data cannot indicate whether one who is less depressed chooses running as a sport or running causes one to be less depressed. In a survey, Harris (1981a) found women felt more relaxed, more energetic and better about themselves as a result of running. In another survey of 411 runners, Harris (1981b) found improved physical and psychological well-being, greater relaxation, and less depression. The author acknowledges the limitations

imposed by a self-report questionnaire and volunteer sample from a limited geographical area.

Harris (1981) states that "for many runners, it appears that running is . . . an important facet of their lives" (p. 154). Other authors have supported the concept that for many individuals exercise holds an important place in their lives (Fixx, 1977; McCullagh, 1978; Getchell, 1979). For some people, the need to exercise regularly has been likened to the need for play (Scott, 1960; McCullagh, 1978). McCullagh (1978) states "perhaps people run to be playful, to be like little children" (p. 257). Fixx (1977) observes that regardless of what initially prompts one to begin a program of running "one thing that almost always happens is that your sense of self-worth improves. You accept yourself a little better" (p. 15).

#### The Effect of Exercise on Anxiety

Anxiety has been defined by Sachs (1982) as "foreboding about some upcoming event which is either real or imaginary, or even unknown" (p. 44). Anxiety may be related to low self-esteem, according to Epstein (cited in May, 1977). Feelings of anxiety result when failures or perceived weaknesses threaten to reveal inadequacies (Coopersmith, 1967). Epstein observed that threats to the wholeness or soundness of one's self-theory can produce acute anxiety (cited in May, 1977). Anxiety can be the result of a specific situation, in which case it is seen as transit



and may be relieved by taking away the threatening situation. This type of anxiety is referred to as state anxiety. Trait anxiety is a more permanent, longer lasting condition which could be described as anxiety proneness (Sachs, 1982).

Anxiety and depression can decrease work effectiveness and can be major contributors to personal unhappiness. Very little research has been conducted to determine the effects of exercise on anxiety and depression, but evidence points toward the possibility that exercise may decrease anxiety and depression not only in people who are clinically depressed and anxious but in "normal" populations as well (Blue, 1979; Berger, 1982). Morgan (1978), who conducted some of the earlier studies on "normal" populations, noted that marathon runners score lower than the norm group on anxiety measures and depression scales. Morgan also found long-distance runners to be "looser and happier than other people" (p. 41).

Ten marathon runners, ten joggers, and ten non-exercisers were compared by Wilson, Morley and Bird (1980) by having them complete the Profile of Mood States Adjective Checklist. The marathon runners and joggers were found to experience less depression, less tension, and more vigor than the non-exercisers. The marathon runners also experienced less depression and more vigor than the joggers, leading the authors to conclude that the amount of physical activity is an important consideration when exercising for psychological benefits.



Folkins and Sime (1981) have observed that exercise may be effective in improving mood states and that effect is more pronounced with subjects who are more distressed or physically unfit at the outset. Several researchers have investigated the effect of exercise on depression in older adults. Garner and Hendricks and Hendricks point out that depression in older adults can become serious because it tends to worsen and become chronic with time when relief from causative agents is not forthcoming (cited in Bennett, Carmack, & Gardner, 1982). Bennett, Carmack, and Gardner (1982) conducted a study with thirty-five female and three male subjects ranging in age from 50 to 98. Half were residents of a nursing home and half were participants at a drop-in community senior center. Each was assigned to one of two groups, exercise group and control group. The Zung Self-Rating Depression Scale was administered to each subject before and after the exercise group participated in an eight-week program. The results indicated a significant improvement between pre- and post-test scores of depressed subjects who participated in the exercise program.

In a similar study, McCan and Holmes (1984) randomly assigned forty-three depressed women to either an aerobic exercise treatment condition in which they participated in strenuous exercises, a placebo treatment in which they practiced relaxation exercises, or a no-treatment condition. Aerobic capacity was assessed before and

after the ten-week treatment program. Depression as self-reported was assessed before, during, and after the treatment program. Results indicated that subjects in the aerobic exercise treatment group showed significantly greater decreases in depression than subjects in the placebo or no-treatment groups.

Middle-aged females who were classified as mildly depressed and tense could benefit from a walking-jogging program as reported by Penny and Rust (1980). Further, Murphy, Bennett, Hagen and Russell found lower levels of depression and anxiety as measured by the MMPI in their study of 93 alcoholics after the subjects participated in a 12-month physical fitness program (cited in Folkins, 1976).

Decreases in anxiety and depression were also found by Folkins (1976) who studied 40 males classified as high risk for multiple coronary risk factors. As mentioned earlier, those at high risk for coronary artery disease may be more anxious and depressed due to their condition. The group that exercised showed significant decreases in anxiety and depression but no change for any other variables. Folkins (1976) comments that "a plausible explanation may lie with the specific feedback cues from the body, which may be more reassuring when a person becomes more physically fit" (p. 387).

Exercise has been suggested as treatment or as an adjunct to psychotherapy for those more anxious than

the normal population who are classified as "depressed" or even severely depressed (Doyne, Chambless, & Beutler, 1983; McCann & Holmes, 1984). Greist, Klein, Eichens and Faris found a ten-week running program to be as effective as psychotherapy for depressed clients (cited in Doyne, Chambless, & Beutler, 1983; McCann & Holmes, 1984). DeVries and Adams (1972) found that moderate exercise was as effective in reducing muscle action potential as a dose of 400 mg. of meprobamate which is a commonly used tranquilizer.

That exercise therapy may be useful in treating those who are clinically depressed has been further supported by the results of a study by Doyne, Chambless and Beutler (1983). The subjects were four clinically depressed women who were paired in either exercise treatment or attention-placebo treatment. A significant reduction in depression after exercise was observed and led the authors to conclude that exercise may be a viable treatment for depression.

Harper (1978) has suggested that exercise may minimize anxiety and depression and that it may be a useful tool for counselors. He cites as evidence a study in which a group jogged every day Monday through Friday and participated in a two-hour group discussion once a week. Significant positive changes in state anxiety were observed.

One theory offered to explain the effect of exercise on anxiety is that of biochemical changes in the body



as a result of exercise. However, very little research has been conducted in that area. Leer (1980) contends that exercise produces an effect in depressed persons that is similar to the effect caused by tricyclic antidepressants, namely, it increases the body's production of neurotransmitter norepinephrine. It is noteworthy that exercise does not cause an increase in the volume of norepinephrine in persons who are well adjusted and free of depression (p. 21).

Dimsdale and Moss (1980) monitored adrenalin produced in the form of norepinephrine and epinephrine under the stress of public speaking and vigorous physical exercise. They found norepinephrine levels increased threefold during vigorous physical exercise while epinephrine levels increased approximately 50%. During the stress of public speaking, epinephrine levels more than doubled and norepinephrine levels increased by 50%. Increased adrenalin may be linked with increased vigor experienced by some exercisers (Gondola & Tuckman, 1982). Whether or not these findings can be linked to anxiety reduction is not clear and the authors suggest further study is necessary.

Other researchers speculate the production of a morphine-like chemical called endorphin is responsible for the feeling of increased well-being and the "runner's high" reported by some exercisers (Gendola & Tuckman, 1982). Endorphin is synthesized in the brain and pituitary gland according to Stein and Belluzzi (cited in Folkins



& Sime, 1981). Study of biochemical production and exercise is just beginning and very little is known to support that theory at the present time.

## CHAPTER 4

### Discussion

The purpose of the present study was to investigate the effects of regular exercise on self-esteem and anxiety. A search of relevant literature reveals that a program of regular exercise may positively affect a person physiologically and psychologically, and specifically may cause significant reduction in anxiety and depression (Lion, 1978; Bennett, Carmack & Gardner, 1982; Doyne, Chambliss & Beutler, 1983; McCann & Holmes, 1984).

Many doctors have reported that they regularly prescribe or advise moderate exercise for patients with tension (Byrd, 1963). In a survey of psychiatrists in San Francisco, Byrd reports that of those responding to the survey, 91 percent stated that they "believe that moderate exercise helps to give relief from tension" (p. 426). Byrd further states that "better than 8 out of 10 of the psychiatrists were prescribing exercise for patients suffering from tension and anxiety" (p. 427).

It appears that the results of experiments investigating the effects of exercise on self-esteem are less consistent. Studies reveal that though regular exercise may have a positive effect on self-esteem, significant changes are not always observed (Neale, Sonstroem, & Metz, 1970; Collingwood & Willett, 1971; Hilyer & Mitchell, 1979).

That apparent resistance to change may be due to the more constant nature of self-esteem. Coopersmith (1967) states the self-esteem of an individual remains constant for at least several years . . . . At sometime preceding middle childhood, the individual arrives at a general appraisal of his worth, which remains relatively stable and enduring over a period of several years. This appraisal can presumably be affected by specific incidents and environmental changes but apparently it reverts to its customary level when conditions resume their "normal" and typical course (p. 5). This would indicate that self-esteem may not lend itself to change and may not be readily influenced by external happenings.

More study into the measurement of self-esteem is indicated. It was observed over the course of this research that some ambiguity exists between feelings as reported by the individual and that individual's psychological condition as indicated by a personality test. Penny and Rust (1980) conducted a study in which middle-aged females were administered the Minnesota Multiphasic Personality Inventory before and after a fifteen-week exercise program. Post-test scores did not indicate a significant psychological improvement though some scales indicated changes in the direction of a healthier personality. The author noted that the subjects commented during the course of the study that they felt better and enjoyed participating in social functions and activities more.



There seems to be disagreement between test scores and psychological condition as reported by the subjects. In a similar study Folkins (1976) compared an exercise group with a control group that did not exercise and observed that though the exercise group improved significantly in physical fitness and reported that they felt better and happier, no change was found on measures of adjustment, self-confidence and body image. Perhaps exercise that makes one feel better and happier does not necessarily change personality. Or, as pointed out by Carter (1977), who found increased happiness to be related to exercise, perhaps people who have a greater tendency toward happiness are more likely to participate in an exercise program, and there may be no cause and effect.

The "feel better feeling" reported by many researchers may be difficult to measure adequately using personality tests. In discussing possible controversy concerning the merits of personality testing, Hagan, DeSoto, and Solano (1977) comment on the view of some that human personality may be too complex to describe in terms of a number of concepts or dimensions by stating "anyone who has thought for long about human affairs knows that they are complex, the question is what to do next" (p. 262). Those authors further point out that the use of personality measures should be continued; however, they acknowledge that existing tests are far from perfect

and suggest that the time may have come to begin work on improving those assessment devices. A possibility for future research could be study to develop additional, perhaps more sensitive, measures for self-esteem.

Also indicated is the need for further study into the chemical and biochemical changes which some have theorized may occur as a result of exercise. A review of the literature indicates very little research has been conducted regarding those newly formed theories, and this would seem to be a fertile area for future study.

Finally, it appears that exercise therapy may be a useful counseling tool. Hilyer and Mitchell have demonstrated that an exercise program together with counseling can be effective in helping persons with low self-concepts gain better opinions of themselves. Running has been found to be at least as effective as traditional forms of psychotherapy in the treatment of depression (Greist et al. in Hilyer & Mitchell, 1979). Further investigation is needed as to the effectiveness of programs of exercise as aids to counseling but, as the present study indicates, physical exercise would seem to be an appropriate strategy for those in the helping professions.

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