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**The effect of gender, gender role, and weight training on
self-concept and body cathexis**

Lauffer, Patricia Louise, M.S.

The University of Arizona, 1987

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**THE EFFECT OF GENDER, GENDER ROLE, AND WEIGHT TRAINING
ON SELF-CONCEPT AND BODY CATHEXIS**

by

Patricia Louise Lauffer

**A Thesis Submitted to the Faculty of the
DEPARTMENT OF EXERCISE AND SPORT SCIENCES
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE
In the Graduate College
THE UNIVERSITY OF ARIZONA**

1987

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ACKNOWLEDGEMENTS

First I would like to thank Dr. Timothy Lohman and Dr. Scott Going regarding statistical analysis of the data. Their expertise was invaluable. I also want to express my deepest thanks to Scott for his unlimited patience. The understanding and friendship which evolved through this project will not be forgotten.

Also, I would like to express my deepest gratitude to Dr. Patricia Fairchild and Dr. Donna Mae Miller, my committee members. Dr. Fairchild's extensive knowledge within both the theoretical and the practicable aspects of psychology was priceless. Dr. Miller's ability to instill a personal philosophy in me in which I was able to keep everything in perspective was a truly personal triumph.

I would like to acknowledge Dr. Jean Williams. Her unwavering faith in my abilities was at times the motivating factor for completing this project. Her extensive knowledge and participation within the world of sports psychology was invaluable. However, above all she took the time to guarantee a quality learning experience. This will never be forgotten.

Lastly, I would like to acknowledge a special friend whose patience, support, and typing "expertise" was greatly appreciated.

Dedication

This project is dedicated to my parents who taught me the true meaning of "strength".

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ABSTRACT

The purpose of this study was to examine the self-concepts and body cathexis of both males and females engaged in an eleven week weight training course and to examine if differences in gender role would influence the relationship of strength to self-concept and body cathexis. Each group (weight trainers versus controls) was administered the Tennessee Self Concept Scale, Bem Sex-Role Inventory, Eysenck Personality Inventory, and the Body Cathexis Scale. Strength measures were obtained.

Group by gender ANOVA and ANCOVA examined differences between and among the groups and genders. Gender role by gender ANOVA and ANCOVA examined differences between and among the androgynous and masculine typed males and females. Multiple regression analyses were performed to examine the relationship of strength to body cathexis and self-concept.

Results indicated pre- and post differences between and among the groups and genders and the genders and the gender roles.

CHAPTER 1

INTRODUCTION

Nature and Scope of the Problem

In the last decade an exercise craze has swept through American society and has been associated with everything from increased longevity to a total wellness phenomenon. The physiological changes and benefits of exercise were under investigation long before this societal trend began. Not until more recently have researchers become interested in investigating the potential psychological changes and benefits of exercise. Most of the researchers who have investigated the psychological benefits of exercise have studied rhythmic, aerobic, endurance activities such as running, swimming, and aerobic dance. Minimal research has been conducted on the psychological effects of nonaerobic exercise.

Some of the psychological changes which have been reported with aerobic activity include the following: decreased depression, decreased anxiety, increased vigor, increased self-confidence, increased creativity and imaginativeness, improved general mood, improved self-esteem, increased work performance, improved sleeping patterns, feelings of control and feelings of self-sufficiency (Buffone, 1984; Collingwood, 1972; Collingwood & Willett, 1971; Folkins, 1976; Folkins, Lynch & Gardner, 1972; Harris, 1981a and 1981b; Kowal, Patton, & Vogel, 1978; McGowan, Jarman, & Pedersen, 1974; Sachs, 1984; Sharp & Reilley, 1975; Young & Ismail, 1976). Included in this list of reported psychological changes are both state and trait personality characteristics. According to Spielberger's state-trait model, state personality characteristics such as depression are transient

emotional states or conditions which fluctuate from day to day while trait personality characteristics have been defined as relatively stable and enduring mental structures which characterize an individual's personality (Spielberger, Gorsuch, & Lushene, 1970).

Although less extensive, there has been some research on the psychological effects of participation in anaerobic activities such as weight training. Tucker (1982a, 1983a, 1983f) reported improvement in self-concept and body cathexis of males enrolled in a weight training course. Tucker (1982b) also examined the relationship between body cathexis and weight training experience and between extraversion and weight training experience and reported a curvilinear relationship. Cause and effect obviously can not be determined from this correlational data, but the results tend to support the usefulness of pursuing the psychological effects of exercise from a state-trait personality perspective.

Investigations on the effects of weight training on the female are lacking. Can one generalize the results of weight training studies with males to female participants, or might one expect to find gender differences? A study done by Brown, Morrow, and Livingston (1982) which examined the self-concept changes of college-aged women enrolled in a physical conditioning program may shed some light on this question. The researchers reported that positive changes in self-concept occurred from the conditioning program, but unfortunately the program was primarily jogging and flexibility training, and only minimally weight training. If differences were to be found between the genders, can these differences be attributed to biological gender or might there be another mediating variable such as gender role?

Gender Role Socialization

Through the socialization process, the child learns to define the self and appropriate roles one is to play in that society, including gender role. Gender role socialization in American society is still very strong, yet perhaps not as restrictive as in prior decades. Traditional female characteristics have been submissiveness, demonstrativeness, sensitivity, nonathleticism, gentleness, and shyness; while the more traditional masculine characteristics have been assertiveness, aggressiveness, athleticism, analytical, nonemotional, and independence. Specific to the psychological effects of weight training is the issue of strength and how much it is valued. Strength has been a highly valued characteristic for the traditional male while it has been devalued for the traditional female.

In the past, typical feminine and masculine characteristics were viewed as bipolar opposites, that is, an individual could not possess both masculine and feminine characteristics. Now masculine and feminine characteristics are viewed as two separate continuums in that an individual can score high or low on both masculine and feminine qualities or high on one and low on the other. Individuals who score high on traditional masculine characteristics and low on feminine characteristics are considered to be masculine in their gender role. Individuals who score low on traditional masculine characteristics and high on traditional feminine characteristics are considered to be feminine in their gender role. This new concept towards possession of traditional masculine and feminine characteristics has resulted in an entire new terminology. Individuals can be sex-typed, that is a masculine male or a feminine female, or cross-sexed, that is a feminine male or a masculine female. Individuals who score high on both masculine and feminine qualities are viewed as androgynous in their gender role while individuals who score low on both are considered undifferentiated.

How does an individual come to obtain their gender role? A variety of sources contribute to the socialization process. One of these socializing agents is the parents and how they behave toward the child. Differential treatment of boys and girls, the personality characteristics of each parent, and the child's identification with one or other of the parents, or with both parents, have a major impact on the child's perception of appropriate behavior and resulting gender role characteristics.

One example of differential treatment in the home is that illustrated by the furnishings of the rooms of boys and girls (Rheingold & Cook, 1975). Rheingold and Cook reported more animal furnishings, educational art materials, spatial-temporal toys, sports equipment and toy animals in the boys' rooms as compared to the girls' rooms which contained more dolls and more "ruffles".

Another powerful socializing agency that begins to influence the child around the age of five or six is the school. In today's American society the influence of outside agencies may occur at even younger ages since the necessity of a two person income often dictates the use of day care centers. Differential gender role socialization also has been documented in the school, but no studies of day care centers are known. In 1977, Duquin documented sexism in the pictures included in elementary textbooks. Books were much more likely to portray boys and men to be physically active compared to girls and women. In Sadker and Sadker's recent article, "Sexism in the Schoolroom of the 80's", they state, "boys still get more attention, encouragement, and airtime than girls do" (1985, p. 54). Airtime was operationally defined as the amount of time an individual was engaged in verbal behavior. They reported differential treatment of boys and girls in all subject matters.

Gender role stereotypes are well-developed by the age of three. Kuhn, Nash, and Brucken (1978) reported that 3-year old boys and girls held some of the traditional stereotypes such as girls talk more and become nurses while boys help daddy and become bosses. They also reported that some of the stereotypes had declined. For example, both sexes were now equally likely to play ball and wash the dishes.

It has been proposed that gender role expectations influence the pattern of causal attribution for success and failure which mediate aspirations and achievement behavior (Brewer & Blum, 1979). Heath (1984) reported that masculine and androgynous subjects estimated higher scores and performed better on a tennis task than feminine-typed subjects. The present author, therefore, contends that gender role identity is an integral part of the self-concept and thus needs to be considered when investigating changes in self-concept.

In summary, the minimal research that has been done utilizing anaerobic activities such as weight training have indicated positive psychological benefits for the male college-aged individual. Further investigation needs to be conducted before the results can be generalized to the female. Any study comparing potential differences in male/female psychological reactions to weight training needs to consider gender role as well as gender when making comparisons.

Statement of the Problem

The purpose of this study is to examine whether or not there are gender and gender role differences in self-concept and body cathexis changes as a result of muscular strength increases from enrollment in a physical education weight training course. Changes in self-concept and body cathexis also will be examined

with respect to experience level. The relationship between several subscales of the Tennessee Self Concept Scale (TSCS) with a Modified Body Cathexis Scale and the Eysenck Personality Inventory (EPI) will be determined. Finally, the influence of strength changes on both extraversion and neuroticism will be examined.

Hypotheses

The following hypotheses were proposed and tested:

1. There would be no initial differences between the control and weight training groups and the genders on any variable except for males being stronger.
2. The beginning weight trainers compared to the control group would have significantly higher post training self-concepts, body cathexis, and strength; with equal changes occurring for males and females.
3. Experienced weight trainers would have statistically higher initial self-concept, body cathexis, and strength when compared to beginning weight trainers.
4. Self-concept and body cathexis would have curvilinear relationships to degree of experience in weight training.
5. No pre- to post difference would be found in the weight training group between the masculine and androgynous typed males and females with respect to all aspects of self-concept and body cathexis.
6. Within the weight training group, masculine-typed females would not differ on any variable from feminine-typed females on pretesting; however, masculine-typed females would possess significantly higher post testing self-concept, body cathexis, and strength.

7. No difference would be found for any group between pre- to post testing on extraversion and neuroticism.

Significance of the Study

It would be beneficial not only to physical educators and sport psychologists but also to counselors, recreational therapists, gerontologists, physicians, and clinical psychologists to determine if weight training can be used to enhance self-concept and other psychological variables such as body cathexis, extraversion, and emotional stability. From a practical standpoint, it is also desirable to know if these changes are moderated by variables such as gender and gender role identity.

Definition of Terms

Androgyny: the personality characteristic of possessing both traditional feminine and masculine qualities as assessed by the Bem Sex-Role Inventory.

Behavioral self: an aspect of self-concept that is the individual's perceptions of his/her own behavior or the way he/she functions as assessed by the Tennessee Self Concept Scale.

Body Cathexis: the concept of an individual's satisfaction with his/her body as assessed by the Body Cathexis Scale.

Experienced lifters: those individuals who had been continuously lifting three months or longer prior to this study.

Extraversion: a concept used to characterize an individual as outgoing, impulsive, uninhibited, having many social contacts and frequently taking part in group activities as assessed by the Eysenck Personality Inventory. It is at the opposite end of the continuum from introversion.

Family self: as aspect of the self-concept that is the individual's perception of self in reference to his/her closest and most immediate circle of associates as assessed by the Tennessee Self Concept Scale.

Feminine-typed: an individual which is characterized by the personality qualities typically associated with the female gender by the American society as assessed by the Bem Sex-Role Inventory.

Gender role: personality characteristics that have evolved as a result of the individual differentially internalizing "society's sex-typed standards of desirable behavior for men and women" (Bem, 1974, p. 155).

Identity self: an aspect of self-concept that is the individual's description of him/her self in terms of "what I am". The individual is describing his/her basic identity - what he/she is as he/she sees him/her self as assessed by the Tennessee Self Concept Scale.

Inexperienced lifter: those individuals who had never weight trained or who had not been continuously lifting during the three months prior to this study.

Introversion: a concept used to describe an individual who is quiet, introspective, distant, reserved, and who likes a well-ordered mode of life as assessed by the Eysenck Personality Inventory. It is at the opposite end of the continuum from extraversion.

Masculine-typed: an individual who is characterized by the personality qualities typically associated with the male gender by the American society as assessed by the Bem Sex-Role Inventory.

Moral-ethical self: an aspect of self-concept that is the individual's description of the self from a moral-ethical frame of reference, i.e., moral worth,

relationship to God, feelings of being a "good" or "bad" person, and satisfaction with one's religion or lack of it as assessed by the Tennessee Self Concept Scale.

Muscular strength: the capacity to exert force or the ability to do work against resistance (Klafs & Arnheim, 1981) as assessed by the summation of one repetition maximum of the bench press (free weights), the one arm bicep curl (dumbbell), and the leg press (Universal gym).

Neuroticism: a concept used to characterize an individual who is emotionally labile, overreactive and who experiences difficulty in returning to a normal state after an emotional experience as assessed by the Eysenck Personality Inventory. It is at the opposite end of the continuum from stability.

Personal self: an aspect of the self-concept that is a reflection of the individual's sense of personal worth, feelings of adequacy as a person, and his/her evaluation of his/her personality apart from his/her body or his/her relationship to others as assessed by the Tennessee Self Concept Scale.

Physical self: an aspect of self-concept that is the individual's view of his/her body, state of health, physical appearance, skills, and sexuality as assessed by the Tennessee Self Concept Scale.

Self-concept: a psychological construct which includes an internal, external, and global aspect. The internal aspect of self-concept includes how the individual perceives him/her self (identity self), how the individual accepts him/her self (self satisfaction), and how the individual acts (behavioral self). The external aspect of self-concept includes the physical self, the moral-ethical self, the personal self, the family self, and the social self as assessed by the Tennessee Self Concept Scale.

Self-satisfaction: an aspect of the self that is the individual's description of how he/she feels about the self he/she perceives. This is a reflection

of the self acceptance or self satisfaction of the individual as assessed by the Tennessee Self Concept Scale.

Social self: an aspect of self-concept that is the reflection of the individual's sense of adequacy and worth in his/her social interaction with other people as assessed by the Tennessee Self Concept Scale.

Stability: a concept used to characterize an individual who is not emotionally over-responsive and who does not experience difficulty in returning to a normal state after an emotional experience. It is at the opposite end of the continuum from neuroticism as assessed by the Eysenck Personality Inventory.

Undifferentiated: an individual who scores low on both masculine and feminine characteristics as assessed by the Bem Sex-Role Inventory.

Limitations of the Study

Generalizations from this study must be made with caution. The following factors should be taken into consideration when attempting to make generalizations: age and educational background of subjects, use of intact groups, volunteerism, and questionnaire completion.

The cluster sampling strategy poses a variety of questions such as why these individuals are there to begin with, what is their motivation? Such intact groups may have characteristics unique to that group which may influence the data.

Another factor involving subject selection is that those who participated were volunteers. Volunteers have been found to have unique characteristics such as being more extraverted, more willing to please, and possessing more socially desirable behavior. Perhaps the finding would be different for nonvolunteer samples.

The population employed was University of Arizona males and females which limits generalizing the findings to other populations of similar age and educational background. The present subjects were either enrolled in an elective physical education weight training class or an elective general student introductory psychology class.

The questionnaires were answered either after class during the third week of classes or taken home and answered sometime before the next class. Thus, the investigator can only conjecture as to the mental and physical states of the respondents at the time of completion of the questionnaires.

Another limiting factor is that the courses were taught by a total of seven different instructors thus not insuring the same knowledge level, course content, and educational objectives. Some standardization was attempted but could not be guaranteed. This limitation, however, does enhance the generalizability of the findings to similar populations.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The review of related literature will be divided into three major sections. The first section will expound some of the paradigms that have been proposed to explain personality and will examine the development of some of the psychological tools utilized in personality assessment and measurement. The second section will examine the literature with regard to exercise in general and its proposed psychological effects on the individual. The third section will review the literature that deals specifically with personality and muscular strength.

Psychological Theories and Measurements

According to Freud, the structure of personality is comprised of the id, ego, and superego and the development of personality proceeds through six psychosexual stages. Freud postulates the phenomena of psychic determinism in which all mental activity has been predetermined. This mental activity is "powered" or "fueled" by psychic energy, an abstract construct. This psychic energy is totally contained in the id, the amoral and illogical construct present at birth. About the age of six to eight months, the differentiation between self and not-self occurs resulting in the development of the ego (literal translation is the "I"). As the infant develops, he/she introjects the standards of the parents and between the ages of three to five the superego emerges. It is within the confines of these three constructs that personality develops and it is through

conflict that psychopathology occurs. Thus, according to Freud, the well-adjusted adult personality is a result of harmonious working of the id, ego, and superego (Ewen, 1980). Hence, psychoanalytic theory suggests that personality would not be susceptible to change or modification except through the resolution of underlying conflict.

In opposition to Freud, there are the behavioristic approaches which attempt to effect a rapprochement between behaviorism and personality theories. B.F. Skinner is the most well-known of these individuals and his theory is one of radical behaviorism. Skinner argues that "the goal of scientific psychology is to predict and control future behavior...that this objective cannot be achieved by any theory which attributes our actions to inner causes" (Ewen, 1980, pp. 394-395). The major assumption underlying Skinner's theory is that learning is a consequence of one's behavior. Thus, he would assert that no behavior is free and that man has no capacity or will; all behavior is determined by consequences that have followed the behavior in the past, i.e., operant conditioning.

This is wherein the difference lies between classical conditioning (Pavlov) and operant conditioning (Skinner). Pavlov posits that the environment elicits a behavior, whereas Skinner posits that a behavior is emitted which interacts with the environment to produce a reinforcer. Pavlov's theory operates on the notion of a passive learner while Skinner's theory operates on the notion of an active or instrumental learner (Hulse, Egeth, & Deeth, 1980).

Skinner's objection to other personality theories is in their faulty causal attributions, i.e., why something caused or resulted in a behavior, be it overt or covert. He believes that emotions, decision-making, remembering, forgetting,

problem-solving, self-control, traits, etcetera can be explained in operant conditioning terms. There are those who are not convinced of either of these extreme views and who have chosen to situate themselves somewhere along this continuum. One such individual is Carl Rogers, whose work and research has led to the development of the person-centered theory. This theory is based on the assumption that individuals have a need to actualize, "an innate tendency to develop our constructive capacities, and grow in ways that maintain or enhance our total organism" (Ewen, 1980, p. 325). Rogers postulates that the development of personality is a unique process for each individual and that each individual's existence can never be perfectly understood by anyone else. He states this because he believes that not only is experience subjective but most of it is noncognitive. One of the major criticisms of Rogers' theory is directed toward the construct of self-concept. Rogers believes self-concept to be entirely conscious hence resulting in a global self-concept responsible for the different behaviors exhibited by an individual.

Bandura takes exception to this and postulates that self-concept varies in strength in different areas, i.e., academic, athletic, social, etc.. Bandura hypothesizes a theory of reciprocal determinism or the interaction of internal personal factors and the environment to produce an individual's behavior. Bandura deviates from Skinner's theory by arguing that learning can occur as a result of observations and modeling (Ewen, 1980).

Development of the Tennessee Self Concept Scale

Fitts agrees with Bandura with regard to the multifacetedness of the self-concept. Fitts' development of the internal and external subscales on the Tennessee Self Concept Scale (TSCS) illustrates this view. Fitts hypothesized

three subselves of the internal self: self as object (identity self); self as doer (behavioral self); and self as observer/judge (judging self) (Fitts, Adams, Radford, Richard, Thomas, Thomas, & Thompson, 1971). The identity self subscale contains items pertaining to what or who the individual is. The behavioral self subscale contains items pertaining to what an individual does or how he/she acts. The judging self subscale contains items pertaining to self-satisfaction or how the person feels about him/her self (Thompson, 1972). These three major subselves dynamically interact resulting in self-enhancement or self-debilitation.

These are not the only aspects of the self that have been hypothesized. Fitts et. al., (1971) hypothesized five subscales for the external self: physical self, family self, moral-ethical self, personal self, and social self. Each of these subscales contain elements of the three internal self subscales and therefore lead to the conclusion that a consistency between and within these subscales should exist in a well-integrated person.

The physical self subscale contains items pertaining to "physical attributes or functioning, sexuality, state of health, and appearance" (Thompson, 1972, p. 2). The moral-ethical self subscale contains items pertaining to the moral, ethical, and religious aspects of the individual. The personal self subscale contains items pertaining to the individual's self-respect, self-confidence, and feelings of worth and adequacy. The family self subscale contains items pertaining to the individual's relationships with family and close friends as well as his/her feelings of adequacy as a family member. The social self subscale contains items pertaining to the individual's sense of adequacy or worth in relationships with people in general (Thompson, 1972).

Psychometric data analysis performed on the Tennessee Self Concept Scale supports the reliability of the scale, i.e., test-retest reliabilities range

from .60 to .92. Content validity was insured by the author in development of the scale in that an item could remain in the scale only if seven clinical psychologists judged the item to be appropriately classified and agreed upon the directionality of the item, i.e., positive or negative. Validity was also determined by correlations with other scales. Pearson product moment correlations between the TSCS and the Minnesota Multiphasic Personality Inventory and between the TSCS and the Edwards Personal Preference Schedule were in the predicted directions and tended to support the validity of the TSCS (Fitts, 1965, pp. 24-28).

Development of the Bem Sex-Role Inventory

Some researchers suggest that self-esteem, i.e., personal self, is enhanced as a result of psychological androgyny (Del Rey & Sheppard, 1981; O'Connor, Mann, & Bardwick, 1978; Spence, Helmreich, & Stapp, 1975). These studies have been correlational in nature and have utilized male and female athletes, female scientists, college students, and middle-aged (40-50 years old) upper-middle class (annual income ranged from \$50,000 to well over \$100,000) men and women as subjects. Gender role was assessed by The Personal Attributes Questionnaire.

Bem has developed a similar questionnaire assessing sex role based on the dualistic notion that masculinity and femininity are not bipolar ends of the same continuum but instead are separate dimensions (Bem, 1974). Bem developed her inventory by compiling a list of 200 adjectives that represented either positive masculine characteristics or positive female characteristics. In addition, another 200 item adjective list of neutral characteristics was assembled (half were positive, half were negative). All adjectives were judged on a seven point scale, ranging from 1, ("not at all desirable"), to 7, ("extremely desirable"), by 100 Stanford undergraduates (half male, half female) and qualified as being masculine if both males and females judged it to be more appropriate for males

than females. The same technique was employed for qualifying a characteristic to be feminine. An item which was judged to be neither more appropriate for males than for females was classified as neutral and hence was eligible for the social desirability scale. From the list of adjectives, 20 masculine items, 20 feminine items, and 20 neutral items were chosen. The internal consistency reliability of the Bem Sex-Role Inventory has been shown to range from .70 to .86 while test-retest reliability ranges from .89 to .93 (Bem, 1974).

The Relationship of Self-Concept and Body Cathexis

Another concept that has been proposed as being inextricably related to self-concept is body cathexis (Weinberg, 1960). In a survey by Psychology Today in 1973, it was noted that "women are generally less satisfied with their bodies than are men, and this difference does not dissipate with age. Physical appearance remains slightly more important for women throughout the life cycle" (Berscheid, Walster, & Borhnstedt, 1973, p. 122). One needs only to look at advertisements to realize the high value placed upon the female body. The female body is used to sell everything from soda pop and food to cars and vacations.

Kurtz (1969), just six year prior to the Psychology Today survey, found that women distinctly knew what they liked and disliked about their bodies. He attributed these findings to the fact that it is the females' role to be more aware of their body and that this is consistent with American standards.

Prior to Kurtz's study, Secord and Jourard (1953) had been investigating the relationship between body cathexis and the self. In their study, they examined the following hypotheses:

- (1) Feelings about the body are commensurate with feelings about the self, when both are comprised by similar scales.
- (2) Negative feelings about the body are associated with anxiety, in the form of undue autistic concern with pain, disease, or bodily injury.

- (3) Negative feelings about the body are associated with feelings of insecurity involving the self (p. 343).

Their results tended to support all three of the hypotheses. Secord and Jourard's body cathexis scale was comprised of 46 items rated on a five-point Likert scale ranging from 1 ("have strong feelings and wish change could somehow be made") to 5 ("consider myself fortunate").

Tucker (1981 and 1983e) reports that most of the research utilizing this scale has employed a modified 40-item version and that an internal factor analysis should be completed on the modified scale to "provide a better understanding of its structure". Following through on that suggestion, Tucker employed a factor analytic strategy with a varimax rotation to determine the internal consistency of this modified scale. Four orthogonal factors emerged: health and physical fitness, face and over-all appearance, subordinate and independent body features, and physique and muscular strength. A test-retest reliability coefficient of .87 was reported. Thus, one might conclude that body cathexis is a multidimensional concept that can be confidently assessed by the Body Cathexis Scale.

Development of the Eysenck Personality Inventory

The third hypothesis examined in Secord and Jourard's study dealt with the relationship between negative feelings or a negative body cathexis and feelings of psychological insecurity. Webster's New Collegiate Dictionary defines insecure as, "not highly stable or well-adjusted, deficient in assurance: beset by fear and anxiety." One can logically conclude that psychological insecurity and neuroticism, if not the same, are strongly correlated. These traits have been measured by various psychological tests. The two most frequently used are the Cattell Sixteen Personality Factor Questionnaire (16PF) and the Eysenck

Personality Inventory (EPI). While both of these tools have been developed from a substantial theoretical framework, the EPI is perhaps a better instrument for measuring neuroticism/stability because the only additional factor measured is introversion/extraversion rather than all the other personality factors included on the 16PF.

The EPI evolved from the Maudsley Personality Inventory (MPI). Reported advantages of the EPI include: simplicity of wording, reselection of items to eliminate small negative correlations, and the addition of a nine item response distortion scale (Saville & Blinkhorn, 1976). Test-retest reliabilities have been reported to range from .80 to .97 while inter-correlations between the two forms is reported to range from .75 to .91. Also, correlations between the MPI and the EPI have been found to be around .70 (Cline, 1972; Heim, 1972; Lanyon, 1972). Thus, one can conclude that the EPI is a valid and reliable tool to measure extraversion-introversion and neuroticism-stability.

In summary, as psychology has progressed from Freud to present day, the methods to investigate and answer questions have changed. Today's research has evolved into a variety of psychological inventories, each having a firm theoretical foundation depending on the paradigm/perspective with which one approaches a question, i.e., cognitive theory versus behavioristic theory, and so forth.

Exercise and Personality

As previously stated, most of the researchers who have investigated the effects of exercise on personality have utilized aerobic activities. A brief overview of some of the findings will be presented here.

Morgan, Roberts, Brand, and Feinerman (1970) investigated the effects of chronic physical activity upon depression. This study was completed in two phases. The first phase involved 67 normal adult males (professors) who completed

a structured recall form dealing with sleep, activities, and diet, and the Zung Self Rating Depression Scale. These males bicycled on a bicycle ergometer for several minutes until they attained the correct cadence (50 RPM at a resistance of 300 KPM). Height, weight, skinfolds, and dominant grip strength were recorded. Following this, an EKG of resting heart rate was taken. The subjects then bicycled until they reached a heart rate of 150 bpm. A five minute post exercise EKG was recorded. Results indicated no statistical influence of exercise on depression.

The second phase of this study included the sixty-four subjects from the first phase plus thirty-four more male professors. These subjects had their option of participating in circuit training, jogging outside, swimming, laboratory jogging or bicycling, or being in a control group that did not exercise. They were administered the Zung Self Rating Depression Scale prior to the beginning of exercise. Their treatments consisted of six weeks of submaximal exercise with three bouts per week. At the end of the six weeks the Zung Self Rating Depression Scale was administered and results indicated no statistical difference in depression for those subjects who scored in the normal limits of depression on the pretest. However, there was a significant reduction on depression for those who scored high on depression on the pretest.

In a similar study, Morgan, Roberts, and Feinerman (1971), randomly assigned 120 male professors participating in a faculty fitness program at the University of Missouri to either a treadmill or a bicycle ergometer task. Within each task, subjects were randomly assigned exercise heart rates of 150, 160, 170, or 180 bpm. Subjects completed the Depression Adjective Check List Form A after five minutes of recovery. No statistical difference was found between the groups. A Mann-Whitney U test was employed to examine the various exercise intensities and the results indicated that the bicycle ergometer group which

exercised at 150 bpm and the bicycle ergometer group which exercised at 160 bpm were more depressed than the treadmill group which exercised at 160 bpm. Morgan et. al., attributed this finding to task specificity, i.e., subjects preferred to be tested on the treadmill.

In the second part of this study, thirty-six University of Missouri students (18 female, 18 male) were randomly assigned to either a one-mile walk at 3.5 mph and zero percent grade, or a one-mile walk at 3.5 mph and five-percent grade, or supine rest for seventeen minutes. The treadmill walkers did not obtain exercise heart rates. They completed the IPAT 8-Parallel Anxiety Battery (Form A) and the Depression Adjective Check List immediately following treatment. No significance was found among the groups. Morgan et. al., posited that a significant reduction would not be expected on those individuals who scored within the normal limits of these tests. Also, one could postulate that the exercise intensities and durations were not sufficient in either of these studies to have an effect.

Alternatively, Morgan (1973) reported a reduction in state anxiety for both "normal" adult males and high anxious adult males following a 45 minute exercise bout. Morgan also reported a reduction in state anxiety for high anxious females but not for low anxious females.

More recently, Lion (1978) reported the reduction of anxiety, as measured by Spielberger's State-Trait Anxiety Scale, for discharged psychiatric patients through the use of a walk/jog program. These individuals participated three times a week for two months.

Kowal, Patton, and Vogel (1978) administered the Spielberger State-Trait Anxiety Inventory, the Profile of Mood States, the Eysenck Personality Inventory, the Physical Estimation and Attitude Scale, and a Personal History Inventory to 400 randomly selected Army recruits prior to basic training. Anthro

pometric measurements and aerobic fitness were also determined. The Army physical fitness test was also administered. Post testing indicated that the males had significantly increased their aerobic power and score on the Army physical fitness test and had significantly decreased their percent body fat. Accompanying these physiological changes, the following psychological changes occurred: decreased state anxiety, decreased tension, decreased depression, increased vigor, decreased fatigue, decreased confusion, improved attitude toward physical activity, and better estimation of physical ability. None of the physiological or psychological changes occurred in the female recruits although there was a significant decrease in the response distortion score of the EPI. None of the trait variables changed significantly for either gender.

Another approach to investigating the relationship between physical fitness and personality is to compare high fitness level groups to average fitness level groups to low fitness level groups. Tillman (1965) administered two items from the AAHPER Youth Fitness Test, Allport's A-S Reaction Study, Cattell's 16PF, and the Kuder Preference Record to 386 junior and senior high boys from Davenport, Iowa. The individuals who scored in the upper 15% on the physical fitness test were found to possess a significantly higher ascendance rating, more surgence (Factor F), greater social dependency, less tension, preferred outdoor activities, and scored higher on the scientific and mechanical scales than the individuals who scored in the lower 15% of the physical fitness test. The low fitness group was then divided into an experimental group (n=26) and a control group (n=24). The experimental group participated in a strenuous fitness program while the control group participated in a regular gym class. The experimental group improved significantly on fitness as compared to the control group but no statistical difference occurred with respect to personality (except the clerical score on the Kuder Preference Record).

Garvin (1972) utilizing the Fleishman Physical Fitness Test and Cattell's 16PF Questionnaire examined the relationship between fitness level and personality variables of 189 Mississippi Gulf Coast Junior College males enrolled in a required physical education class. Garvin reported the more physically fit the individuals were the more forthright, confident, suspicious, venturesome, dominant, tough-minded, happy-go-lucky, group dependant, and intelligent they were.

In summary, equivocal results have been presented regarding the influence of exercise on psychological variables. However, methodological considerations must be taken into account. One must remember what question is being investigated because each question requires a different approach, i.e., most of the studies were descriptive in nature and cause-effect conclusions can not be drawn from correlational data. Some of the studies investigated the effects of chronic physical activity whereas other studies examined the effects of acute physical activity upon the psychological constructs. Hence, more research in each of these areas is warranted before conclusions can be drawn.

Muscular Strength and Personality

In an extensive review of the literature, Folkins and Sime (1981), suggest, "fitness training as a treatment strategy may need to pay more attention to individual differences. Individuals will probably differ greatly in their ability to profit psychologically from fitness training because of differences in beliefs, expectations, preferred coping styles, and the like" (p. 386). Although most of their review focused on the studies examining cardiovascular fitness, their objection can be generalized to other types of exercise and should not be taken lightly. The potential psychological benefits of anaerobic exercise, as well

as aerobic exercise, needs to be investigated and factors identified which might account for individual differences.

One such alternative may be weight training. Gasser (1965) investigated the relationship between success in weight training and self-concept changes of 131 male students voluntarily enrolled in a beginning body conditioning course at the University of California at Los Angeles. Students completed a questionnaire (developed by Gasser) the first class meeting of the second week of school. After the seventh week of exercise, the subjects' weight training journals were evaluated by the experimenter who then divided the subjects into four groups. The classification of subjects into groups was based on their improvement in bench press, leg press, barbell curl, and the latissimus dorsi machine. The fourth group was comprised solely of those students who had taken the body conditioning course for two or more prior semesters. At the beginning of the eighth week of exercise, the questionnaire was re-administered. ANOVA was calculated and indicated that those individuals who increased the most in strength also increased the most in self-concept.

White (1973) studied the relationship between physical fitness, as defined by strength, flexibility, cardiovascular pulmonary endurance, and self-concept as measured by the TSCS. He also examined the effects of improved physical fitness measures on selected aspects of the self-concept scale. His groups consisted of a control group of 76 males enrolled in some type of physical education course and an experimental group of 76 males enrolled in an individualized physical fitness program of circuit training. His physiological measurements consisted of strength as assessed by grip strength, situps, vertical jump, pullups, and lower back strength; flexibility as assessed by a modified sit and reach test, extension of the trunk, shoulder elevation, and spine extension; and cardiovascular pulmonary

endurance as assessed by the Harvard Step Test Short Form. His results indicated that for the experimental group a significant positive relationship existed between pretest measures of strength and cardiovascular pulmonary endurance and pretest measures of the physical self and the social self. Strength was the most significant contributor for predictive value (prediction of certain self-concept subscales) having a .97 and .95 correlation for pretest and post test, respectively. This would tend to support the theory that muscular strength is a significant contributor to the self-concept of males at the college level.

A study done by Sorenson (1974) investigated the effects of a special strength training program on the self-concept and peer approval of 55 seventh grade boys in Provo, Utah. The experimental group and the control group consisted of those boys who scored 44 or lower on the total positive score of the TSCS and who were indicated as best friends by three or less peers on a Sociogram. The control group did not participate in any physical education courses while the experimental group participated in a power weight training class three days a week and regular gym class the other two days a week. Results indicated a significant increase in peer approval and strength for both the control group and the experimental group. Sorenson attributed the increase in peer popularity to the social change from elementary school to junior high school. Sorenson believed that maturation was the underlying cause for the increase in strength for both groups but assumed that maturation affected both groups equally and that the greater increases in strength for the experimental group were a result of the weight training program. The weight training group also had a significant increase in self-concept. Thus, Sorenson concluded that weight training was an effective means of increasing self-concept in seventh grade boys.

Sebold (1976) reported no significant relationship between positive self-concept scores and positive muscular strength scores for ten and eleven year old boys and girls. He utilized the TSCS as the measure for self-concept and the standing broad jump and pullups and flexed arm hang and grip strength as a measure of strength for boys and girls, respectively. He was attempting to predict that individuals with the highest muscular strength would also have the highest self-concept. It would appear that his lack of findings may be due to the fact that the physical self aspect on the self-concept undergoes a major change at puberty and thus muscular strength may not be a significant contributor to the self-concept at this age. The somatotype of the individual, and hence their body cathexis, may not be stable and significant at that age.

McGlenn (1976), also working with adolescent males, found no differences between pre- and post testing of self-image for those participating in either a ten week intramural football program, a hobbies and crafts program, a ceramics program, a horseback riding program, or a self-defense program. Utilizing the American Alliance of Health, Physical Education, and Recreation Youth Fitness Test, the EPI, and the Offer Self-Image Questionnaire for Adolescents, McGlenn did report that physical fitness and self-image were positively correlated to body image and to vocational and educational goals. He also reported a positive correlation between physical fitness and ego strength of coping ability, psychological well-being, and adjustment. No correlation was found between fitness and extraversion which is inversely related to psychopathology. His results were threatened by a high mortality rate, a small n (n=10) per treatment prior to mortality, and possible similarity of activities which resulted in insignificant variation to detect differences.

Tucker (1982a), employing a cluster-sampling strategy of 105 university males, assessed their self-concepts by using the TSCS. The experimental group (n=60) was enrolled in both a weight training class and an Ancient American History class while the control group (n=45) was enrolled in just the Ancient American History class. Pretest data was collected the first week of class and post test data was gathered the next to last week of classes for a total of 16 weeks of training. Final grades in the weight training class were the indicator of success for the experimental group. Results indicated that regardless of "success" in the weight training course, participants in the weight training, compared to the control, increased self-concept with regard to total positive/global self, identity self, behavioral self, physical self, and personal self subscales. Possible variables that may have influenced Tucker's results included prior weight training experience, different instructors, lack of operationalized definition of dependent variable (academic grade), and beginning strength levels.

In a related study, Tucker (1982b) employed a retrospective approach to the question regarding experience. He hypothesized that as experience increased, thus resulting in increased muscular strength and mesomorphic traits, that emotional health and satisfaction would increase. He had 113 experienced university male weight trainers complete the TSCS, the EPI, and the Body Cathexis Scale to assess self-concept, extraversion, neuroticism, and body satisfaction, respectively. Results indicated that as weight training experience increased, body cathexis and extraversion increased although after 24 to 36 months of experience a leveling off occurred and no increases were seen.

In an attempt to improve on his prior research, Tucker (1983c) administered the Body Cathexis Scale, the EPI, and the TSCS to 142 male university students enrolled in an undergraduate physical education class. Physiological

measures of strength were assessed by the sum of the maximum weight lifted for one repetition in the bench press and the squat. Data was analyzed with a Pearson product-moment correlation and results indicated that the more extraverted and stable and the higher the self-concept and body cathexis, the stronger the individual was. Tucker then proceeded to differentiate the subjects into groups by psychological scores and these resulting groups were compared, post hoc, to determine muscular strength differences. Tucker reported extraverts were significantly stronger than neurotic individuals and that those who possessed a high self-concept were stronger than those who possessed a low self-concept. The same trend existed with respect to body cathexis.

Tucker (1983b) reported that relative muscular strength was a significant predictor of body cathexis, neuroticism, extraversion, and global self-concept for college males. In this study, body weight was statistically controlled for in the 142 randomly selected male subjects who were enrolled in an undergraduate physical fitness class. Psychological tests, i.e., the EPI, the TSCS, and the Body Cathexis Scale, were administered the first week of classes. The following two weeks the subjects were oriented to weight training apparatus and techniques and were allowed to practice. The fourth week of classes, strength was assessed by summing the maximum amount of weight lifted for the bench press and for the squat. His findings indicated that relative muscular strength was a predictor of neuroticism and that this relationship was inverse. These findings tend to support Young and Ismail (1976).

In a related study done by Tucker (1983f), 272 males (130 in the control group and 142 in the weight training group) were administered the TSCS and the Body Cathexis Scale. The experimental group completed a 16 week weight training course which met twice a week for 50 minutes per session in which

the subjects were to complete a total-body workout. Only the experimental group was initially pretested and then post tested for strength (measures included the bench press, the squat, and the arm curl). Both the control and the experimental groups were pretested the first week of classes and then post tested the last week of classes on the self-concept and body cathexis scales. ANOVA indicated no pretest differences with respect to self-concept and body cathexis. Post test data demonstrated a significant difference between the two groups' self-concepts and body cathexis. One weakness of this study is the lack of physiological data on the control group. More confidence could have been placed in this data if these measures would have been taken.

One other study by this same author (Tucker, 1983d) examined, by a factor analytic approach, the relationships among obesity, exercise experience, somatotype, and psychological health. In addition to the scales used in his prior studies, the Perceived Somatotype Scale (developed by Tucker) was employed. Quetelet's index was calculated for each subject to determine body mass and obesity. His analysis indicated that self-confidence, body satisfaction, extraversion, and emotional stability were prominent with the experienced exercisers and the mesomorphs. Three orthogonal factors emerged lending support to the proposed "dynamic relationship between the psyche and the soma" (p. 131). The first orthogonal factor depicted a prototype reflecting a self-confident, satisfied, extraverted, stable mesomorph with a history of fitness-training experience. The second orthogonal factor depicted a prototype reflecting the neurotic, obese endomorph. The third orthogonal factor extracted a general demographic construct.

A study investigating the effects of weight training on the self-concept of women was done by Trujillo (1983) in which she compared three groups.

All groups were involved in a 16 week program. The running group (n=12) was physiologically assessed by initial resting heart rates and a timed mileage test. The weight training group (n=13) was physiologically assessed by body circumferences of the chest expanded, the chest relaxed, waist, and bicep. A timed, set poundage measurement on the bench press, arm curl, and behind the neck press was also taken. The control group (n=10) was not assessed physiologically and was comprised of females enrolled in racquetball, swimming, and ice dancing. Psychological assessment of all three groups included the TSCS, Bem Sex-Role Inventory, and an open ended survey developed by the author. The author reported significant increases in self-esteem for the weight training group and the running group while the control group decreased in self-esteem as analyzed by a matched pair t test. The only significant difference in self-concept was seen between the weight training group and the control group. She reported 75% of the women were classified as androgynous at the beginning of the study and were classified as androgynous at the termination of the study. No comparisons were made between gender role categories. Although no gender role conclusions can be drawn from this study, it does create another alternative path to investigate.

A descriptive study by Freedson, Mihevic, Loucks, and Girandola (1983), examined the physiological factors, i.e., body weight, height, circumferences, and percent body fat, and the psychological factors, i.e., profile of mood states, extraversion, neuroticism, self-motivation, and state-trait anxiety, of ten competitive female body builders. The body builders scored within the "normal" range on state and trait anxiety, were slightly more extraverted and slightly less neurotic, and exhibited an "iceberg" type mood profile similar to elite male runners, rowers, and wrestlers. One of the methodological concerns of this study is the small n (n=10). Generalization of this study to the general population of weight trainers

would be difficult due to the uniqueness of the subjects, i.e., elite female body builders.

In a recent study by Dr. Elizabeth Doyne (1986), as reported in American Health, forty "moderately to severely" depressed females were divided into three groups: running, weight lifting, and no exercise. The exercising groups worked out at least three times a week for 30 minutes for eight weeks. The results indicated significant improvements in mood for the exercisers. Since "physical conditions were barely affected", she concluded that it is the act of exercising not the result which effects the psychological constructs.

In summary, the previously presented studies support the need for more research in this field. In an attempt to answer questions and draw conclusions, more questions have arisen. Obviously, there is some interrelationship among self-concept, body cathexis, extraversion, neuroticism, and strength. Whether or not this relationship is the same for males and females or for individuals varying in gender role type remains to be seen.

It would appear that both aerobic and anaerobic exercise affect not only the fitness levels but also aspects of personality. No cause-effect relationships can be drawn from the research. More sophisticated methodologies and statistics are warranted. A longitudinal study would shed more light upon the relationship of fitness and mental health.

CHAPTER 3

METHODOLOGY

Subjects

There were 107 subjects of which 45 were males and 62 were females. Subjects in the control group (n=26) were enrolled in an introductory psychology course. Of the 26 control subjects, 11 were male and 15 were female. These subjects were not enrolled in a weight training class nor did they have prior weight training experience. Subjects in the experimental group (n=81) were volunteers from ten University of Arizona elective physical education weight training classes. Of the 81 experimental subjects, 34 were male and 47 were female.

The experimental group was also divided by gender role classification. There were 12 feminine-typed females, 13 near feminine-typed females, 14 androgynous-typed females, 5 near masculine-typed females, and 3 masculine-typed females. The near masculine-typed females and the masculine-typed females were combined into one group and are thus referred to as masculine-typed females (n=8). There was 1 feminine-typed male, 1 near feminine-typed male, 11 androgynous-typed males, 7 near masculine-typed males, and 14 masculine-typed males. The near masculine-typed males were combined with the masculine-typed males and will be referred to as masculine-typed males (n=21). The feminine-typed and near feminine-typed males were included in the study when gender role was not examined; however, they were deleted from analysis when gender role was examined. The weight trainers were also segregated by experience. Those

subjects who had been continuously weight training 13 weeks or more prior to the class were considered experienced weight trainers (n=7 for males and n=6 for females) while those who had never weight trained or who had just begun lifting (12 weeks or less) were considered beginning lifters (n=27 for males and n=41 for females). Subjects were recruited the third week of classes, i.e., fourth and fifth class days. Informed consent was obtained.

Questionnaires

Each subject received a package containing the Tennessee Self Concept Scale (Fitts, 1965), the Body Cathexis Scale (Secord and Jourard, 1953; Tucker, 1981), the Bem Sex-Role Inventory (Bem, 1974), and the Eysenck Personality Inventory (Eysenck & Eysenck, 1968). The Tennessee Self Concept Scale is a psychological measure developed by W.H. Fitts in 1965 to assess the different aspects of self-concept. It contains two forms - the counseling form which was utilized in this study and the clinical form. The counseling form contains the following subscales: the identity self, which reflects what the individual is; the self-satisfaction score, which reflects how the individual feels about him/her self; the behavioral self, which reflects how the individual behaves or acts; the physical self, which reflects how the individual perceives his/her body with respect to health, physical appearance, skills, and sexuality; the moral-ethical self, which reflects how the individual views his/her moral worth; the personal self, which reflects how the individual views his/her sense of personal worth; the family self, a reflection of the individual's perception of adequacy and worth as a family member; and the social self, a reflection of the individual's perception of his/her self in relation to others. The questionnaire also contains

a variability score, a distribution score, and a global self-concept score which is the summation of the subscales.

The Body Cathexis Scale is an instrument originally developed by P.F. Secord and S.M. Jourard in 1953 and revised by L. Tucker in 1981. It measures body attitude toward the self with respect to four dimensions: health and physical fitness (Factor 1), face and overall appearance (Factor 2), subordinate and independent body features (Factor 3) and physique and muscular strength (Factor 4). Each factor contains primary and ancillary items. The primary items of Factor 1 are health, resistance to illness, physical skills, energy, and legs. The secondary items of Factor 1 are physical stamina, coordination, appetite, weight, keenness of senses, and pain tolerance. The primary items of Factor 2 are face, facial complexion, and overall appearance. The secondary items are profile, teeth, hair, and sex organs (genitals). The primary items of Factor 3 are chin, ear, and hands. The secondary items are knees, back, waist, voice, and elimination. The primary items of Factor 4 are muscular strength, body build, chest, arms, and width of shoulders; while muscle tone and weight comprised the ancillary items. See Appendix A.

The Bem Sex-Role Inventory is a psychological inventory developed by Bem in 1974 to assess the degree to which an individual possesses masculine, feminine, androgynous, or undifferentiated gender role characteristics. A seven-point Likert type scale is used to evaluate 60 adjectives of which 20 are stereotypically masculine adjectives, 20 are stereotypically feminine adjectives, and 20 are neutral filler items.

The Eysenck Personality Inventory is a psychological inventory developed by H.J. Eysenck and S.B. Eysenck in 1963 to assess the constructs of extraversion-

introversion and neuroticism-stability. It also contains a response distortion scale that is utilized to determine if subjects were attempting to complete the questionnaire in a favorable manner. The scale consists of 57 statements which the respondent may answer yes or no. A high E score is indicative of extraverted behavior while a high N score is indicative of neurotic behavior.

A personal data sheet was also included. The sheet asked for information such as an identification number, age, weight training experience, and class, e.g., Tuesday/Thursday at 9:30 a.m..

Strength Measures

Strength measures included the bench press, one arm bicep curl and the leg press. The bench press and one arm bicep curl were accomplished using free weights. The bench press technique which the subjects used was that the hands were placed shoulder width apart, the shoulders and the buttocks remained in contact with the bench, and the feet remained in contact with the floor. To prevent the subjects from rebounding the weight off their chests, they were instructed to lower the bar, count to two, and then press the bar back to the starting position. The one arm bicep curl was done standing against a wall. The subjects were instructed to start the dumbbell at the thigh, raise it until the weight touched their shoulder, then lower it back down. Again, the shoulders and the buttocks were to remain in contact with the wall throughout the lift. The leg press was completed on the Universal gym. The leg press was utilized instead of the squat primarily for ease in standardizing technique since most beginning weight trainers do not know how to correctly perform a squat. Thus, strength was operationalized as the sum of the maximum amount of weight an individual could lift one time for the bench press, bicep curl, and leg press.

Procedure

The experimenter pretested subjects the third week of classes. Subjects were asked, by the experimenter, during the last ten minutes of their classes if they would be willing to participate in a study examining the relationship between participants in various activities and personality. An informed consent was read to them and any subsequent questions answered. Upon receiving the informed consent, subjects received a package containing the aforementioned questionnaires.

A latin square design was utilized to achieve randomization of the questionnaires within the packages. Subjects were instructed to answer the questionnaires in the order they took them out of the package. Each subject was instructed to find the answer sheet for the Tennessee Self Concept Scale. Attention to the order of the answers was emphasized. Subjects were either allowed to answer the questionnaires then or were allowed to take them home and return them the next class period. Strength measures were obtained from the instructors since this was an integral part of the weight training classes. Each instructor was informed of the proper lifting technique to be used for each lift.

The control group was recruited by the investigator in the same manner. Testing of the control group was scheduled one hour prior to class and/or one hour after class. Since these subjects had no weight training experience, the

investigator met them in the weight room at pre-scheduled times and instructed them in stretching, warm-ups, and the proper lifting techniques. Similarity in measurement to weight training class procedure was attempted in order to eliminate any possible differences due to varying social conditions and so forth. Control subjects recorded their maximal lifts on the back of their personal data sheet.

Post testing was done using equivalent procedures two weeks prior to the end of the semester. Hence, the effects of an eleven week training period were examined.

Data Analysis

To test the first hypothesis, that there would be no initial differences between the control and weight training groups and genders on any variable except for males being stronger, a group by gender (2x2) analysis of variance (ANOVA) was utilized. Because of the possibility that there could be differences among subjects in their pre-scores on the various dependent variables, group by gender analysis of covariance (ANCOVA) tests were utilized to test the second hypothesis. The beginning weight trainers compared to the control group would have significantly higher post training self-concepts, body cathexis, and strength with equal changes occurring for males and females, on each of the dependent variables was examined by the 2x2 ANCOVA. On this ANCOVA, and all other ANCOVAs, each dependent variable's pre-score was used as its covariate, e.g., the pre-score of extraversion was the covariate for the post extraversion score. So as not to violate any

theoretical assumptions, a Multiple Analysis of Variance test was utilized to examine the homogeneity of slopes when covarying across the genders. MANOVA also was utilized to calculate adjusted means for all dependent variables.

Hypothesis 3, experienced weight trainers would have statistically higher initial self-concepts, body cathexis, and strength when compared to beginning weight trainers, was examined by a one-way ANOVA with two levels (experienced versus beginner). A one-way ANOVA with two levels (masculine-typed female weight trainers versus feminine-typed female weight trainers) was utilized to examine the first part of hypothesis 6 that within the weight training group masculine-typed females would not differ on any variable from feminine-typed females on pretesting. A one-way ANCOVA with two levels was utilized in examining the second part of hypothesis 6 that masculine-typed females would possess significantly higher post testing self-concept, body cathexis, and strength.

A gender by gender role ANCOVA examined hypothesis 5: No pre- to post difference would be found in the weight training group between the masculine and androgynous typed males and females with respect to all aspects of self-concept and body cathexis. Due to the empty cell for feminine-typed males and near feminine-typed males, the feminine and near feminine-typed females were deleted from this analysis. A gender by gender role ANCOVA and a group by gender ANCOVA were utilized to examine hypothesis 7 that no difference would be found for any group between pre- to post testing on extraversion and neuroticism.

The relationship between experience and body cathexis (pre- score) and between experience and self-concept (pre- score) was examined with a multiple regression analysis. To examine hypothesis 4 that self-concept and body cathexis would have curvilinear relationships to degree of experience on

weight training, only the weight training group was examined and experience was mathematically squared. The same analysis was done for only male weight trainers and another analysis for only female weight trainers. A multiple regression analysis was performed to examine the relationship between strength (pre). Again, the analysis was performed for all the weight trainers and then separately for each gender.

Determination of the Level of Significance

The level of significance was set at .05 for this study prior to the data collection. However, recent discussions by Franks and Huck (1986) and by O'Brien and Israel (1987) have questioned the usage of the .05 criterion. Franks and Huck (1986) argue that the alpha level should be determined based upon several considerations: "sample size available, variability of the variables to be studied, desired effect size, and the relative importance of Type I and Type II errors" (p. 248). They also suggest that "the researcher who conducts several tests within the same study ought to set the significance level in light of the experiment-wise (not test-wise) Type I error rate..." (p. 246). Franks and Huck recommend that less rigorous significance levels be set for studies that are exploratory in nature, have limited size, and/or for which the relative cost of a Type II error is greater than that of a Type I error.

O'Brien and Israel (1987) support Franks and Huck but argue that the practice of increasing Type I error as an everyday rule is not acceptable. However, they readily point out that statistical significance is not the central aspect of data analysis and that consistency of trends within subgroups, or consistency of the data with previous results should be considered as important as statistical

significance. Therefore, the present study set the statistical significance at .05 and the practical significance at the .10 level. Thus, trends in the data in this study are reported as "approached significance".

CHAPTER 4

RESULTS

Group and Gender Differences on Pre-Dependent Variables

The means and standard deviations for the weight trainers and the control group on all dependent variables can be found in Appendix B. The group (control versus weight training) by gender ANOVA tests (see Table 1) on each of the pre-dependent variables indicated significant group differences on leg strength and total strength. The control group was stronger than the weight trainers on both leg strength and total strength. Significant gender differences were found to exist on social self, bicep strength, bench press strength, leg strength, and total strength. Additionally, body cathexis and behavioral self approached significance. The males were stronger than the females on all strength measures and possessed a higher body cathexis than the females; however, the females possessed a higher behavioral self than the males. There were no significant interaction effects, but social self approached significance. The female controls had higher social self scores than the female weight trainers while the male weight trainers had higher social self scores than the male controls.

Table 1

Group (weight trainers versus controls) by Gender ANOVA on the
Pre Dependent Variables

Variable	df	Mean Square	F	p
<u>Extraversion</u>				
Group	1	4.13	.29	.59
Gender	1	12.49	.87	.35
Group by Gender	1	.27	.02	.89
Residual	103	14.28		
<u>Neuroticism</u>				
Group	1	74.06	3.52	.06
Gender	1	2.88	.14	.71
Group by Gender	1	2.85	.14	.71
Residual	103	21.05		
<u>Response Distortion</u>				
Group	1	.01	.00	.97
Gender	1	.19	.06	.80
Group by Gender	1	1.23	.40	.53
Residual	103	3.11		
<u>Body Cathexis</u>				
Group	1	522.48	.99	.32
Gender	1	1871.50	3.53	.06
Group by Gender	1	159.81	.30	.58
Residual	103	529.81		
<u>Self-Concept Scales</u>				
<u>Physical Self</u>				
Group	1	.00	.00	.99
Gender	1	7.63	.59	.44
Group by Gender	1	1.89	.15	.70
Residual	103	12.87		
<u>Moral-Ethical Self</u>				
Group	1	2.06	.13	.72
Gender	1	27.89	1.75	.19
Group by Gender	1	16.21	1.02	.32
Residual	1	15.91		

Table 1 (cont)

Variable	df	Mean Square	F	p
<u>Personal Self</u>				
Group	1	3.27	.16	.69
Gender	1	.20	.01	.92
Group by Gender	1	3.97	.20	.66
Residual	103	20.24		
<u>Family Self</u>				
Group	1	17.07	1.45	.23
Gender	1	5.53	.47	.49
Group by Gender	1	6.39	.54	.46
Residual	103	11.74		
<u>Social Self</u>				
Group	1	1.64	.15	.70
Gender	1	96.27	8.83	.004
Group by Gender	1	32.93	3.02	.09
Residual	103	10.90		
<u>Identity Self</u>				
Group	1	56.60	2.99	.08
Gender	1	17.07	.90	.35
Group by Gender	1	48.43	2.56	.11
Residual	103	18.94		
<u>Self-Satisfaction</u>				
Group	1	46.26	2.53	.12
Gender	1	28.63	1.56	.21
Group by Gender	1	9.23	.51	.48
Residual	103	18.30		
<u>Behavioral Self</u>				
Group	1	.08	.00	.95
Gender	1	69.09	3.00	.09
Group by Gender	1	.37	.02	.90
Residual	103	23.02		
<u>Global Self-Concept</u>				
Group	1	.19	.00	.95
Gender	1	90.84	1.66	.20
Group by Gender	1	112.40	2.05	.16
Residual	103	54.86		

Table 1 (cont)

Variable	df	Mean Square	F	p
<u>Strength Measures</u>				
<u>Bicep Strength</u>				
Group	1	20.77	.42	.52
Gender	1	15832.80	316.28	.001
Group by Gender	1	34.39	.69	.41
Residual	103	50.06		
<u>Bench Press Strength</u>				
Group	1	575.57	.60	.44
Gender	1	292699.99	302.99	.001
Group by Gender	1	82.29	.09	.77
Residual	103	966.02		
<u>Leg Strength</u>				
Group	1	89322.65	6.58	.01
Gender	1	.11x10 ⁷	78.01	.001
Group by Gender	1	2676.46	.20	.66
Residual	103	13575.12		
<u>Total Strength</u>				
Group	1	77779.72	4.52	.036
Gender	1	.29x10 ⁷	166.86	.001
Group by Gender	1	2400.39	.14	.71
Residual	103	17220.12		

Group (Inexperienced Weight Trainers Versus Controls) by
Gender on Post Dependent Variable Differences

Group (inexperienced weight trainers versus controls) by gender ANCOVA tests were run on each of the dependent variables with the same pre- score as the dependent variable being used as the covariate. Adjusted means and standard deviations can be found in Appendix C. The ANCOVA analysis (see Table 2) revealed that group as a main effect was statistically significant for bicep strength, bench press strength, leg strength, and total strength. Group approached significance on body cathexis, social self, and self satisfaction. After the treatment, weight trainers were stronger than the control group on all strength measures and the lifters possessed or tended to possess higher body cathexis, higher social self, and higher self satisfaction. Gender was only statistically significant for the bench press variable, however, it approached significance on bicep strength. The males were stronger than the females. A significant two-way interaction was found for social self (see Figure 1). The male weight trainers possessed a higher social self score than the male controls, while the female weight trainers possessed a slightly higher social self score than the female controls.

The Relationship of Experience to Self-Concept and Body Cathexis

The hypothesis that experienced weight trainers would have higher initial self-concepts, body cathexis, and strength compared to beginning weight trainers was examined with a one-way ANOVA. Bicep strength, $F(1,79) = 5.87$, $p = .01$, bench press strength, $F(1,79) = 5.37$, $p = .02$, leg strength, $F(1,79) = 5.00$, $p = .02$, and total strength, $F(1,79) = 6.30$, $p = .01$ were significant. Body cathexis, $F(1,79) = 2.03$, $p = .16$, and self-concept, $F(1,79) = .32$, $p = .58$ were not significant.

Table 2

Group (Inexperienced Weight Trainers Versus Controls) by
Gender ANCOVA on Dependent Variables

Variable	df	Mean Square	F	p
<u>Extraversion</u>				
Group	1	.31	.06	.81
Gender	1	.54	.10	.75
Group by Gender	1	1.12	.22	.64
Residual	89	5.20		
<u>Neuroticism</u>				
Group	1	4.54	.43	.51
Gender	1	.95	.09	.76
Group by Gender	1	.00	.00	.98
Residual	89	10.54		
<u>Response Distortion</u>				
Group	1	2.83	1.73	.19
Gender	1	2.11	1.29	.26
Group by Gender	1	3.95	2.42	.13
Residual	89	1.63		
<u>Body Cathexis</u>				
Group	1	1827.33	3.57	.06
Gender	1	967.78	1.89	.17
Group by Gender	1	722.15	1.41	.24
Residual	89	511.63		
<u>Self-Concept Scales</u>				
<u>Physical Self</u>				
Group	1	6.50	.81	.37
Gender	1	.00	.00	.99
Group by Gender	1	1.13	.14	.71
Residual	89	8.07		
<u>Moral-Ethical Self</u>				
Group	1	5.24	.40	.53
Gender	1	.33	.03	.87
Group by Gender	1	5.97	.46	.50
Residual	89	12.95		

Table 2 (cont)

Variable	df	Mean Square	F	p
<u>Personal Self</u>				
Group	1	6.28	.70	.41
Gender	1	11.89	1.32	.25
Group by Gender	1	10.19	1.13	.29
Residual	1	9.00		
<u>Family Self</u>				
Group	1	.24	.02	.89
Gender	1	.11	.01	.93
Group by Gender	1	.07	.01	.94
Residual	89	12.87		
<u>Social Self</u>				
Group	1	28.94	3.34	.07
Gender	1	16.29	1.88	.17
Group by Gender	1	32.38	3.73	.05
Residual	89	8.68		
<u>Identity Self</u>				
Group	1	9.49	.55	.46
Gender	1	.52	.03	.86
Group by Gender	1	24.91	1.43	.24
Residual	89	17.40		
<u>Self-Satisfaction</u>				
Group	1	36.93	3.21	.08
Gender	1	15.01	1.30	.26
Group by Gender	1	.15	.01	.91
Residual	89	11.51		
<u>Behavioral Self</u>				
Group	1	4.82	.25	.62
Gender	1	9.96	.53	.47
Group by Gender	1	7.99	.42	.52
Residual	89	18.97		
<u>Global Self-Concept</u>				
Group	1	129.63	2.77	.10
Gender	1	58.42	1.25	.27
Group by Gender	1	29.92	.64	.43
Residual	89	46.80		

Table 2 (cont)

Variable	df	Mean Square	F	p
<u>Strength Measures</u>				
<u>Bicep Strength</u>				
Group	1	289.43	25.02	.001
Gender	1	33.81	2.92	.09
Group by Gender	1	12.10	1.05	.31
Residual	89	11.57		
<u>Bench Press Strength</u>				
Group	1	5549.94	21.32	.001
Gender	1	1605.80	6.17	.015
Group by Gender	1	87.87	.34	.56
Residual	89	260.34		
<u>Leg Strength</u>				
Group	1	23432.53	6.95	.01
Gender	1	4219.77	1.25	.27
Group by Gender	1	1761.00	.52	.47
Residual	89	3370.09		
<u>Total Strength</u>				
Group	1	62773.09	17.54	.001
Gender	1	6971.76	1.95	.17
Group by Gender	1	177.26	.05	.82
Residual	89	3578.86		

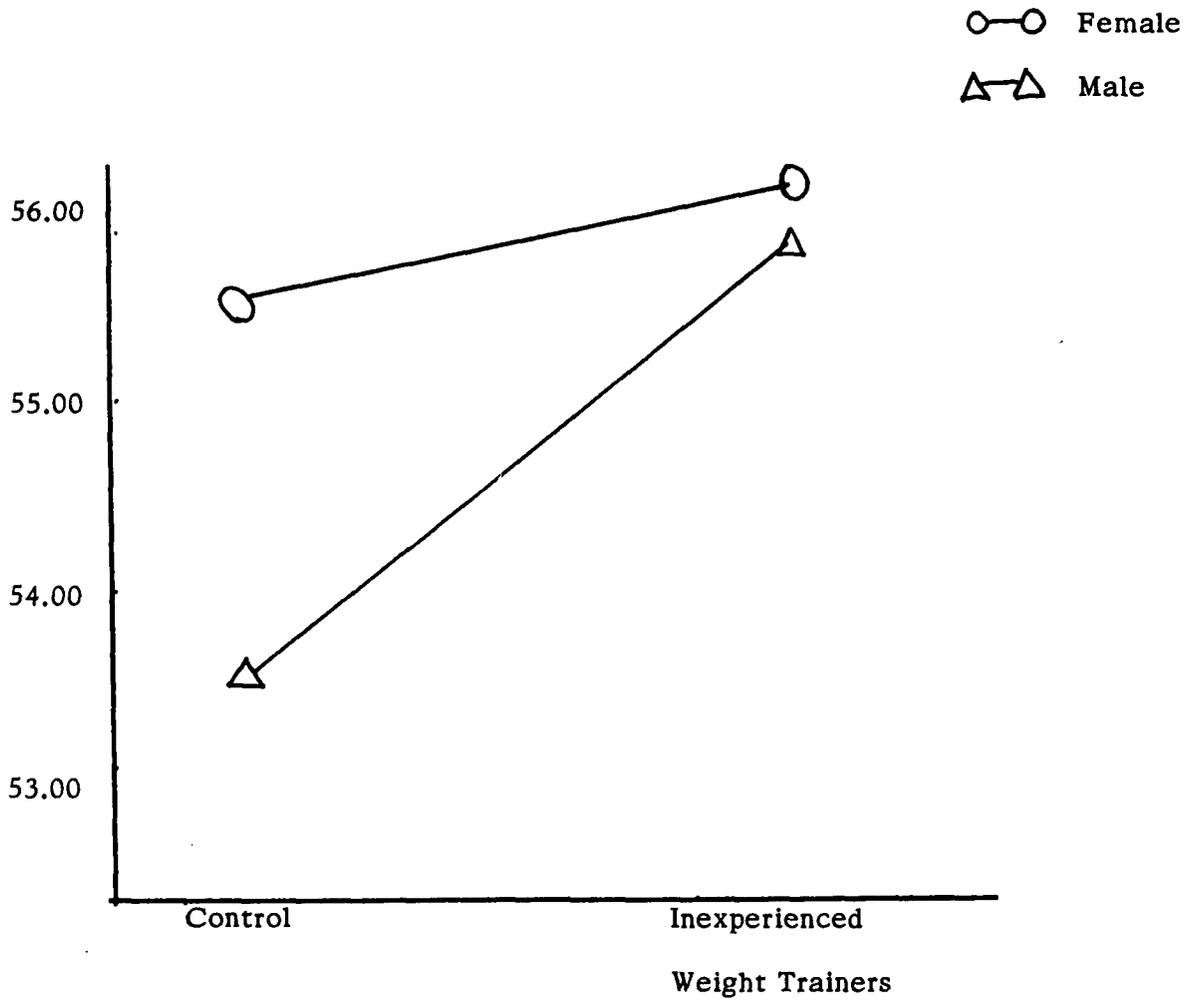


FIGURE 1: Group by Gender Interaction on Post Social Self

To examine for the curvilinear relationship between experience and self-concept (pre) and experience and body cathexis (pre), multiple regression analyses were performed. Experience as a predictor of body cathexis was not statistically significant, $F(1,79) = 2.24$, $p = .14$, nor was the curvilinear relationship significant, $F(2,78) = 1.20$, $p = .31$. Examination of the relationship between experience and self-concept was not significant, $F(1,79) = .86$, $p = .36$, nor was the curvilinear relationship, $F(2,78) = .43$, $p = .66$.

The Relationship of Strength to Self-Concept and Body Cathexis

A multiple regression analysis was performed to examine the relationship of strength to body cathexis. A linear relationship approached significance, $F(1,79) = 3.60$, $p = .06$, when pre total strength was used to predict pre body cathexis. The multiple r equals .21 and the standardized regression coefficient equals .0436. However, this relationship did not exist between strength and self-concept, $F(1,79) = 2.48$, $p = .12$, multiple $r = .13$ and standardized regression coefficient = .0164.

Post Differences of Androgynous and Masculine

Typed Weight Trainers

A gender by gender role ANCOVA (see Table 3) was performed to examine hypothesis 5. Adjusted means can be found in Appendix D. Gender as a main effect was not statistically significant for any variable. Gender role was statistically significant for only the response distortion score and approached significance for self-satisfaction. None of the gender by gender role interactions were significant but the body cathexis variable and physical self variable approached

Table 3

Post Difference of Androgynous and Masculine Typed Male and Female Weight Trainers on Dependent Variables

Variable	df	Mean Square	F	p
<u>Extraversion</u>				
Gender	1	1.73	.29	.59
Gender Role	1	9.16	1.54	.22
Gender by Gender Role	1	.10	.02	.90
Residual	49	5.94		
<u>Neuroticism</u>				
Gender	1	7.39	.62	.44
Gender Role	1	11.43	.95	.33
Gender by Gender Role	1	5.25	.44	.51
Residual	49	11.98		
<u>Response Distortion</u>				
Gender	1	.61	.38	.54
Gender Role	1	6.80	4.28	.04
Gender by Gender Role	1	.05	.03	.86
Residual	49			
<u>Body Cathexis</u>				
Gender	1	.02	.00	.99
Gender Role	1	13.50	.02	.89
Gender by Gender Role	1	2191.01	3.22	.08
Residual	49	680.83		
<u>Self-Concept Scales</u>				
<u>Physical Self</u>				
Gender	1	5.56	.64	.43
Gender Role	1	.19	.02	.88
Gender by Gender Role	1	26.19	3.00	.09
Residual	49	7.37		
<u>Moral-Ethical Self</u>				
Gender	1	.49	.03	.86
Gender Role	1	1.33	.08	.78
Gender by Gender Role	1	22.45	1.36	.25
Residual	49	16.48		

Table 3 (cont)

Variable	df	Mean Square	F	p
<u>Personal Self</u>				
Gender	1	.44	.06	.81
Gender Role	1	10.21	1.39	.25
Gender by Gender Role	1	8.84	1.20	.28
Residual	49	7.37		
<u>Family Self</u>				
Gender	1	.28	.02	.89
Gender Role	1	.42	.03	.87
Gender by Gender Role	1	.22	.01	.91
Residual	49	15.24		
<u>Social Self</u>				
Gender	1	7.79	.82	.37
Gender Role	1	.01	.00	.97
Gender by Gender Role	1	24.26	.26	.12
Residual	49	9.51		
<u>Identity Self</u>				
Gender	1	.06	.01	.95
Gender Role	1	22.82	1.70	.20
Gender by Gender Role	1	5.78	.43	.51
Residual	49	13.40		
<u>Self-Satisfaction</u>				
Gender	1	.09	.01	.94
Gender Role	1	44.15	3.38	.07
Gender by Gender Role	1	7.12	.55	.46
Residual	49	13.06		
<u>Behavioral Self</u>				
Gender	1	16.34	.78	.38
Gender Role	1	4.23	.20	.66
Gender by Gender Role	1	.00	.00	.99
Residual	49	21.03		
<u>Global Self-Concept</u>				
Gender	1	15.73	.31	.58
Gender Role	1	9.22	.18	.68
Gender by Gender Role	1	1.10	.02	.89
Residual	49	51.65		

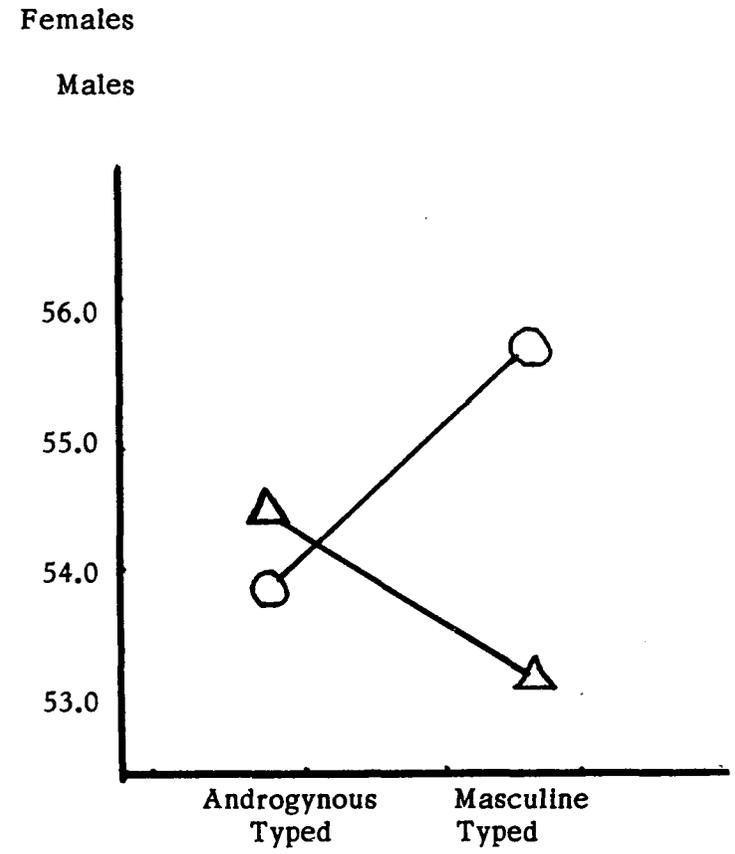
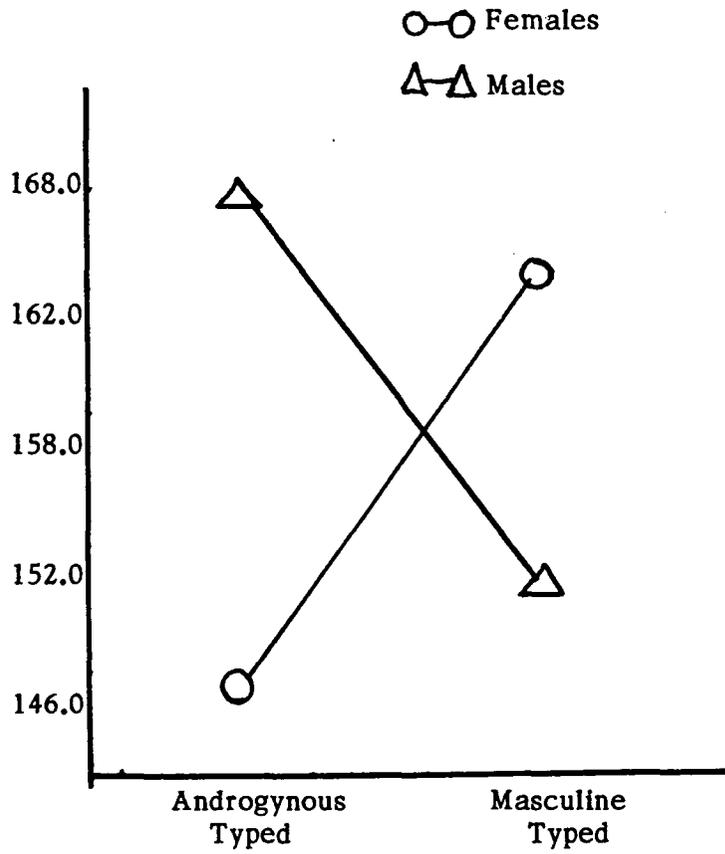
Table 3 (cont)

Variable	df	Mean Square	F	p
<u>Strength Measures</u>				
<u>Bicep Strength</u>				
Gender	1	16.32	.49	.49
Gender Role	1	11.06	.33	.57
Gender by Gender Role	1	.21	.01	.94
Residual	49	33.55		
<u>Bench Press Strength</u>				
Gender	1	237.21	.38	.54
Gender Role	1	310.17	.50	.48
Gender by Gender Role	1	23.69	.04	.85
Residual	49	616.98		
<u>Leg Press Strength</u>				
Gender	1	372.95	.10	.76
Gender Role	1	.15	.00	1.00
Gender by Gender Role	1	3872.68	1.00	.32
Residual	49	3892.70		
<u>Total Strength</u>				
Gender	1	917.10	.15	.70
Gender Role	1	402.95	.07	.80
Gender by Gender Role	1	1679.96	.27	.60
Residual	49	6175.33		

significance (see Figures 2 and 3). The masculine-typed males and females had higher response distortion scores than the androgynous-typed males and females. The androgynous-typed males had a higher body cathexis than the masculine-typed males; however, the androgynous-typed females had a lower body cathexis than the masculine-typed females. The same trend existed for the physical self variable.

Differences Between Feminine-Typed and Masculine-Typed Female Weight Trainers

A one-way ANOVA with two levels (feminine-typed and masculine-typed females) on the pre treatment variables was used to examine the first part of hypothesis 6. Results indicated significant differences on neuroticism, $F(1,18) = 4.37, p = .05$, body cathexis, $F(1,18) = 8.90, p = .008$, and bench press strength, $F(1,18) = 4.59, p = .04$. None of the other variables were significant, $F_s(1,18) < 2.89, p_s > .11$. The masculine-typed females were less neurotic, possessed a higher body cathexis, and were stronger. Means and standard deviations for masculine-typed and feminine-typed females on neuroticism were, $M = 7.38, S.D. = 4.24$, $M = 11.00, S.D. = 3.49$; on body cathexis were, $M = 155.25, S.D. = 21.61$, $M = 130.75, S.D. = 15.26$; and on bench press strength were, $M = 71.25, S.D. = 16.85$, $M = 57.50, S.D. = 11.97$, respectively. However, when post treatment scores were analyzed with initial scores covaried (a one-way ANCOVA with two levels), the results indicated significant post differences on leg press strength, $F(1,17) = 8.27, p = .01$, and total strength, $F(1,17) = 5.56, p = .03$. Significance was approached on extraversion, $F(1,17) = 3.72, p = .07$, and neuroticism, $F(1,17) = 3.17, p = .09$. The adjusted means for the masculine-typed females



Figures 2 and 3: Androgynous and masculine typed weight trainers by gender on post body cathexis and post physical self

and the feminine-typed females on leg press strength were, 355.93 and 237.72. The adjusted means for the masculine-typed females and the feminine-typed females on total strength were, 522.93 and 364.27. The adjusted means for the masculine-typed females and the feminine-typed females on extraversion were, 13.93 and 14.51. The adjusted means for the masculine-typed females and the feminine-typed females on neuroticism were, 6.66 and 11.96, respectively. Hence, the masculine-typed females were stronger, less extraverted, and less neurotic.

The Relationship of State Personality
Characteristics and Weight Training

Hypothesis 7 was examined with a group (control versus inexperienced weight trainers) by gender ANCOVA (see Table 2) which indicated that neither the group or gender main effects nor the interaction effect were significant for extraversion or neuroticism. Hypothesis 7 also was examined with a gender by gender role (androgynous versus masculine typed) ANCOVA (see Table 3) which indicated that neither the gender or gender role main effects nor the interaction effect were significant for extraversion or neuroticism.

CHAPTER 5

DISCUSSION

Changes in Strength, Self-Concept, and Body Cathexis by Group and Gender

The hypothesis that there would be no initial differences between the groups and the genders on any variable except males being stronger was not supported. Although the males were stronger on all strength measures, they also scored higher on body cathexis and lower on the social self aspect of self-concept while the females scored higher on the behavioral self aspect of self-concept. Biological differences, i.e., musculature and hormonal, may have accounted for a large part of the strength differences which were found (Clarke, 1986, pp. 144-149; Heyward, Johannes-Ellis, & Romer, 1986, pp. 154-159). It has been shown that when relative strength is examined, i.e., body composition and weight, there are no strength differences between males and females (Bond, Gresham, Tuckson, & Balkissoon, 1985). Socialization, however, can also account for part of the strength differences (Oglesby, 1984, pp. 387-399). The differences between the genders on social self probably can be attributed more to differences in the socialization process rather than biological differences (Deaux, 1985; Eagly, 1983). Mathes and Battista (1985) reported a significant difference in men's and women's motive for participation in physical activity. Both sexes rated health and fitness as the primary motive for participation; however, females possessed a more positive attitude toward physical activity if the activity was perceived as a social experience. Men possessed a more positive attitude toward

physical activity if the activity was perceived as fitness oriented and provided competition. Thus, it was surprising to have so few masculine-typed females and so many feminine-typed females. It would appear that gender role influences the female participant's choice of activity. However, it was not surprising to have so few feminine-typed males since weight training traditionally has been viewed as a masculine activity. Thus, feminine-typed males would choose not to participate since participation would result in role conflict or cognitive dissonance. Festinger (1957) proposed that a person strives to maintain a state of cognitive consonance. When a person maintains two inconsistent cognitions, such as a feminine-typed male participating in a masculine activity, cognitive dissonance occurs. The person must then reduce the level of dissonance. Thus, by not participating in weight training, feminine-typed males do not increase cognitive dissonance. However, the lack of feminine-typed males in the present study may not be just a consequence of lack of appeal of weight training but may be because very few feminine-typed males exist (Williams & Andersen, in press).

There were significant differences between the weight trainers and the control group on leg strength and on total strength. The significant difference found between leg strength can account for the significant difference found in total strength since the amount of weight lifted was a significantly larger part of total strength. Had bench press or bicep curl strength been significantly different between the groups, a significant difference in total strength may not have been found. The control group was stronger than the weight training group initially. A variety of explanations could account for this occurrence. One possible explanation is that the groups were self selected. The difference in populations can be seen by examining the statistics. The control group's

leg press strength was that which would be associated with a normal curve; however, the weight training group's curve was skewed and kurtotic thus leading one to question the "normalcy" of the weight training group.

The finding that the control group was initially stronger than the weight training group was surprising. The thirteen experienced lifters, plus those subjects who were considered novice lifters, yet who had been lifting less than three months prior to class, should have been stronger since a training effect would have occurred. A possible explanation for this finding is that the weight training group was strength tested as an integral part of their class. Even though the amount of weight lifted for the pretest and for the post test did not affect the grade in the class, the possibility that the subjects wanted to project greater strength increases may have led to a submaximal effort on the strength pretesting.

One other possible explanation for the group differences was the special environment in which the control group was tested. The control group was strength tested during open lifting hours and during weight training club hours. The influence of the other lifters can not be minimized. The control group interacted with the other lifters in the weight room while testing. Members of the control group may have been more motivated to test their limits because of a social facilitation effect. The weight training group also had a social facilitation effect within their class; however, the lack of experienced lifters for models may have been detrimental.

Partial support was found for the second hypothesis that the beginning weight trainers compared to the control group would have significantly higher post testing self-concepts, body cathexis, and strength. When initial differences between the weight training group and the control group were covaried out, the weight training group was strongest on all post strength measures. An increased

body cathexis was approached for the weight training group compared to the control group. The possibility that an eleven week weight training program is not enough time for a significant change in body cathexis to occur is one possible explanation. When Tucker (1982a, 1983f) found increased body cathexis with weight trainers, the study examined a sixteen week weight training program.

The failure to find significant self-concept changes over the eleven week weight training class is not consistent with previous studies. Again, the length of the weight training program may have been a contributing factor. Gasser (1965), however, reported increased self-concept changes after only an eight week course. Another possible explanation for the failure to support Tucker's findings may be attributed to the type of workout each study examined. Tucker's subjects completed two 50 minute total body workouts per week. The subjects in the present study also participated in two 50 minute classes per week, but lectures were scheduled during portions of some of the classes thus reducing subjects' lifting time. Also, the students designed their individual workouts as part of their curriculum. Thus, one subject may have done a total body workout and the next subject may have only done an arm and chest workout.

The potential influence of the shorter training session and the difference in type of workout between the present study and Tucker's 1982a study is supported when one compares the strength gains for Tucker's subjects (all men) and the men in the present study. Due to the different strength measures utilized in the two studies, comparison of lift for lift can not be accomplished. However, the similarity of the lifts allows one to compare percent change in strength with confidence. Tucker's subjects reported an overall increase in strength of 16.4% with increases of 14.7%, 19.7%, and 10.8%, respectively for the bench

press, squat, and arm curl. The total strength change for males in the present study was 7.48%. Bicep curl changed 9.42%, bench press changed 7.96%, and leg strength changed 6.48%. In contrast, females in this study approximated a similar pattern of change to Tucker's male subjects. Overall strength changes for the females were 16.78%; while bicep curl changed 13.56%, bench press changed 18.36%, and leg strength changed 17.33%. The females may have exhibited greater strength gains than the males since females are traditionally less likely to possess and value physical strength and hence had more room for improvement.

The Relationship of Experience

The hypothesis that experienced weight trainers would have significantly higher initial self-concepts, body cathexis, and strength when compared to beginning weight trainers was partially supported. All strength measures were higher, but self-concept and body cathexis were not statistically higher. The small number of experienced weight trainers (n=13) may have contributed to the failure to obtain significant differences.

The hypothesis that self-concept and body cathexis would have curvilinear relationships to experience was not supported in the present study. Initially, this appears to refute the findings of Tucker (1982b). Little confidence can be placed, however, in the present results due to the small number of experienced weight trainers.

Changes in Self-Concept and Body Cathexis
of Weight Trainers by Gender Role

The hypothesis that there would be no pre- to post differences in the weight training group between the masculine and androgynous typed males and females with respect to all aspects of self-concept and body cathexis was supported. There was, however, a trend for differences between the genders and gender roles on body cathexis and physical self. Long (1986) reports that women who possess more masculine-typed characteristics, i.e., ambition, forcefulness, and competitiveness, are the women who most value themselves. She suggests that these characteristics are no longer viewed as exclusively male but that they are characteristics found in well-adjusted people no matter which gender they happen to be. Thus, one may conclude that masculine-typed and androgynous-typed individuals may possess the same "amount" of masculine characteristics but that the androgynous-typed individuals possess more feminine-typed characteristics than the masculine-typed individuals. If one assumes that masculine characteristics are equal in masculine and androgynous typed individuals and that these characteristics are the ones which promote mental health, then one can conclude that there would be no difference between the androgynous and the masculine-typed individuals. The present findings support this.

If the aforementioned is true, then one might conclude that there should be differences in self-concept, body cathexis, and neuroticism between the feminine-typed females and the masculine-typed females. The hypothesis in the present study, however, was that masculine-typed females would not differ from feminine-typed females on any pretesting variable. The hypothesis

was rejected since there were significant differences between the gender roles on neuroticism, body cathexis, and bench press strength. The masculine-typed females were more stable, possessed a higher body cathexis, and were stronger; thus supporting Long's theory.

When initial differences were covaried, the masculine-typed females were stronger on leg press strength and overall strength; slightly less extraverted; and less neurotic (more stable). Again this would appear to support Long's theory and also suggest that weight training is a possible mode for enhancement of trait personality characteristics for the masculine-typed female. However, no casual relationship can be determined from these findings.

Changes in Trait Characteristics

The present study supports the hypothesis that both extraversion and neuroticism would not change for any group. These findings appear to support Cattell's theory of personality as well as Allport's. These psychologists propose traits as "psychological mental structures that are relatively stable and predictable, and characterize an individual's personality" (Ewen, 1980, p. 466). However, one can not conclude from this finding, or from other current studies, if extraversion and neuroticism can be altered through weight training. Presently, the studies have only determined a relationship between physical fitness and traits. Tucker (1982b) reports that the more weight training experience an individual had the more extraverted they were. Although this may appear to be suggestive of weight training leading to increases in extraversion, no causal relationship can be determined.

Major Findings

1. The hypothesis that there would be no initial differences between the groups and the genders on any variable except males being stronger was not supported.
2. The present study did not support the hypothesis that the beginning weight trainers compared to the control group would have significantly higher post training self-concepts, body cathexis, and strength; with equal changes occurring for males and females. Partial support was found for the hypothesis in that the beginning weight trainers were stronger than the control group on all strength measures. With regard to body cathexis, social self, and self satisfaction, a trend existed in which the beginning weight trainers scored higher.
3. The experienced weight trainers were stronger than the beginning weight trainers but there was no significant difference between them on self-concept or body cathexis.
4. No support was found for the prediction of a curvilinear relationship between self-concept and experience and between body cathexis and experience.
5. The results supported the hypothesis that there would be no pre- to post differences in the weight training group between the masculine and androgynous typed males and females with respect to all aspects of self-concept and body cathexis.
6. The hypothesis that within the weight training group, masculine-typed females would not differ on any variable from feminine-typed females on pretesting was not supported. Initial differences indicated the

masculine-typed females were less neurotic, possessed a higher body cathexis, and were stronger with respect to bench press strength.

Also not supported was the hypothesis that masculine-typed females would possess significantly higher post testing self-concept, body cathexis, and strength. The masculine-typed females were stronger than the feminine-typed females, however no differences between self-concept or body cathexis were found.

7. Support was found for the expectation that extraversion and neuroticism would not change from pre- to post testing for any group.

Conclusion

If the findings of this study may be generalized, it may be concluded that:

1. Weight training as a tool for improvement of selected aspects of the self-concept, i.e., physical self, self satisfaction, etc., and body cathexis may be useful for some individuals. Moreover, weight training seems to produce reliable training effects on the body in a relatively short amount of time.
2. The lifting process provides weight trainers with the opportunity to observe the need to increase the amount of weight lifted to watch the body's increasing strength. As a result feelings of competence, satisfaction, and success seem to be bolstered. The findings are in conformance with other findings (Tucker, 1983f).
3. Gender and gender roles seem to have a significant influence not only on the activity chosen but also on the "success" of the individual

in that activity. Gender and gender role may also account for the motivational aspect of participating in an activity or not participating, i.e., one activity is more "social" than another activity.

Recommendations for Future Research

Many directions for future research have been opened as a result of this study. As weight training becomes more popular and as females continue to pursue this new avenue of exercise, the consequences of such exercise need to be investigated. Not only is gender of interest to the investigation of these consequences, but gender role also has been shown to have an influence on the outcome. Further replication, as well as the use of more sophisticated designs and statistical methods, should be utilized in future research. Methodology should include randomized assignment of subjects to experimental and control groups as well as stratified sampling based on gender role, i.e., 20 masculine-typed subjects, ten subjects randomly assigned to each group.

Another recommendation is the need for revision of the Body Cathexis Scale. It presently does not account for the response acquiescence, i.e., a subject may easily fall into an answering pattern such as circling all the answers to the left. Also, the Body Cathexis Scale needs to include more relevant questions to weight training. The possibility of a sport specific scale may need to be considered.

Finally, the development of a Perceived Somatotype Scale for females is needed. Assessment of perceived somatotype and actual anthropometric evaluation may allow insight into the relationship between body build and psychological traits.

APPENDIX A
BODY CATHEXIS SCALE

Below are listed several body parts and body functions. The statements are to help you describe yourself as you see yourself. Judge each item carefully, then select one of the five responses listed below. Do not omit any item. Circle the letter according to the following scale:

- a - feel very positive about
- b - feel moderately positive about
- c - have no feelings one way or the other
- d - feel moderately negative about
- e - feel very negative about

Hair	a	b	c	d	e	Width of shoulders	a	b	c	d	e
Facial complexion	a	b	c	d	e	Arms	a	b	c	d	e
Appetite	a	b	c	d	e	Chest	a	b	c	d	e
Hands	a	b	c	d	e	Appearance of eyes	a	b	c	d	e
Distribution of hair (over body)	a	b	c	d	e	Coordination	a	b	c	d	e
Nose	a	b	c	d	e	Hips	a	b	c	d	e
Physical stamina	a	b	c	d	e	Resistance to illness	a	b	c	d	e
Elimination	a	b	c	d	e	Legs	a	b	c	d	e
Muscular strength	a	b	c	d	e	Appearance of teeth	a	b	c	d	e
Waist	a	b	c	d	e	Overall appearance	a	b	c	d	e
Energy level	a	b	c	d	e	Muscle tone	a	b	c	d	e
Back	a	b	c	d	e	Sleep	a	b	c	d	e
Ears	a	b	c	d	e	Voice	a	b	c	d	e
Age	a	b	c	d	e	Health	a	b	c	d	e
Chin	a	b	c	d	e	Physical skills	a	b	c	d	e
Body build	a	b	c	d	e	Knees	a	b	c	d	e
Profile	a	b	c	d	e	Flexibility	a	b	c	d	e
Height	a	b	c	d	e	Face	a	b	c	d	e
Keeness of senses	a	b	c	d	e	Weight	a	b	c	d	e
Tolerance for pain	a	b	c	d	e	Genitals	a	b	c	d	e

APPENDIX B

Means and Standard Deviations of Weight Trainers and Controls

	Extraversion				Neuroticism				Distortion Response			
	Pre		Post		Pre		Post		Pre		Post	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
<u>Females</u>												
Weight Trainers	13.96	3.98	14.40	3.91	9.53	4.10	9.49	4.42	2.70	1.64	2.62	1.57
Controls	13.60	4.032	14.07	3.11	7.27	5.65	8.13	6.08	2.93	1.53	1.93	1.80
<u>Males</u>												
Weight Trainers	13.32	3.47	13.71	3.83	9.68	5.01	9.50	4.99	2.91	2.01	2.85	1.73
Controls	12.73	3.41	13.91	3.70	8.18	3.68	8.64	3.70	2.64	1.75	2.73	1.68

APPENDIX B (cont)

	<u>Physical Self</u>				<u>Moral-Ethical Self</u>				<u>Personal Self</u>			
	<u>Pre</u>		<u>Post</u>		<u>Pre</u>		<u>Post</u>		<u>Pre</u>		<u>Post</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
<u>Females</u>												
Weight Trainers	52.66	3.35	54.06	3.27	50.23	4.21	49.94	4.10	54.81	4.79	54.89	4.56
Controls	52.93	3.97	53.33	2.53	51.33	4.53	49.47	1.92	55.60	3.44	55.60	4.29
<u>Males</u>												
Weight Trainers	53.35	3.93	53.79	3.27	49.65	3.85	48.97	4.24	55.12	4.75	55.21	4.04
Controls	53.00	2.79	53.91	3.21	48.91	2.21	49.00	3.58	55.00	3.46	53.36	4.25

APPENDIX B (cont)

	Family Self				Social Self				Global Self Concept			
	Pre		Post		Pre		Post		Pre		Post	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
<u>Females</u>												
Weight Trainers	55.09	3.81	55.26	3.41	55.87	2.91	56.04	3.13	268.66	7.15	270.19	7.56
Controls	53.67	3.24	55.13	3.58	57.27	2.55	56.47	2.85	270.80	7.16	270.20	6.45
<u>Males</u>												
Weight Trainers	55.26	3.30	55.15	3.97	54.59	3.60	55.26	3.05	267.97	7.81	268.38	8.20
Controls	55.00	1.90	55.27	2.80	53.36	4.63	52.36	4.06	265.27	7.51	263.91	9.60

APPENDIX B (cont)

	Identity Self				Self-Satisfaction				Behavioral Self			
	Pre		Post		Pre		Post		Pre		Post	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
<u>Females</u>												
Weight Trainers	89.83	4.47	90.81	4.89	90.68	4.09	90.57	3.29	88.15	4.93	88.81	4.70
Controls	92.87	3.25	92.27	3.86	89.73	3.67	88.93	4.18	88.20	4.95	89.00	5.04
<u>Males</u>												
Weight Trainers	91.41	4.65	91.68	3.59	89.97	4.88	89.47	4.09	86.59	4.62	87.24	5.13
Controls	91.27	4.10	89.91	4.87	87.64	3.75	87.55	3.62	86.36	4.52	86.45	4.32

APPENDIX B (cont)

	<u>Bicep Strength</u>				<u>Bench Press Strength</u>				<u>Leg Press Strength</u>			
	<u>Pre</u>		<u>Post</u>		<u>Pre</u>		<u>Post</u>		<u>Pre</u>		<u>Post</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
<u>Females</u>												
Weight Trainers	18.44	3.51	21.33	3.84	67.66	17.57	82.87	22.45	204.94	73.36	247.88	103.89
Controls	18.33	3.86	18.00	3.16	64.00	12.56	64.67	12.32	262.33	62.87	249.33	53.95
<u>Males</u>												
Weight Trainers	42.43	10.72	46.84	14.16	174.62	45.10	189.71	49.08	400.72	176.07	428.50	173.11
Controls	45.00	7.67	44.55	7.49	166.82	39.40	167.27	40.33	481.73	85.05	482.73	153.89

APPENDIX B (cont)

	Total Strength				Body Cathexis			
	Pre		Post		Pre		Post	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
<u>Females</u>								
Weight Trainers	291.24	81.84	349.96	113.30	143.21	21.63	147.49	24.53
Controls	344.67	74.21	332.00	63.59	150.80	13.60	136.80	24.08
<u>Males</u>								
Weight Trainers	617.76	194.30	667.69	199.32	153.09	27.70	154.76	30.68
Controls	693.55	119.43	694.55	180.54	154.91	22.70	154.91	18.49

APPENDIX C

Adjusted Means of Inexperienced Weight Trainers and Controls

Variable	Inexperienced Weight Trainers		Controls	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
Extraversion	14.25	14.23	14.24	13.73
Neuroticism	9.44	9.63	8.25	8.52
Distortion Response	2.65	2.60	2.82	1.84
Body Cathexis	152.63	149.37	153.42	138.29
Physical Self	54.19	54.33	53.89	53.55
Moral Ethical Self	49.37	49.82	49.36	49.10
Personal Self	55.08	55.37	53.60	55.36
Family Self	55.25	55.29	55.20	55.20
Social Self	55.70	56.06	53.45	55.38
Self-Concept	269.78	270.66	265.41	268.70
Identity Self	91.81	91.26	90.27	91.90
Self-Satisfaction	89.84	90.70	88.26	88.22
Behavioral Self	88.27	88.57	86.90	88.55
Bicep Strength	33.93	32.22	34.18	28.37
Bench Press Strength	145.51	122.68	119.47	112.47
Leg Strength	334.32	316.93	369.15	362.91
Total Strength	511.09	475.38	509.80	516.75

APPENDIX D

Adjusted Means of Weight Trainers by Gender Role

<u>Variable</u>	<u>Androgynous-Typed</u>		<u>Masculine-Typed</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
Extraversion	14.03	13.48	14.05	13.93
Neuroticism	9.23	9.05	8.09	6.66
Distortion Response	2.20	2.53	3.34	3.50
Body Cathexis	167.19	146.50	151.15	163.96
Physical Self	54.35	53.90	53.11	55.44
Moral Ethical Self	48.14	49.79	49.00	47.86
Personal Self	56.86	56.01	55.12	54.04
Family Self	55.16	55.15	55.26	54.92
Social Self	56.30	55.76	54.97	57.34
Self Concept	269.23	270.72	268.19	268.86
Identity Self	91.26	90.71	91.47	92.42
Self Satisfaction	90.63	91.29	89.43	87.99
Behavioral Self	87.43	88.63	87.33	88.42
Bicep Strength	35.80	29.31	33.31	37.07
Bench Press Strength	154.47	131.38	138.27	135.81
Leg Press Strength	329.90	325.88	363.06	355.93
Total Strength	520.03	487.75	541.24	522.20

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