

An Abstract of the Thesis of

JIMMIE LEE PAGE for the Degree of MASTER OF SCIENCE in Physical Education presented on July 13, 1993.

**THE DIFFERENCE BETWEEN BODY CATHEXIS SCORES
IN BODYBUILDERS WHO USE ANABOLIC STEROIDS AND
BODYBUILDERS WHO DO NOT USE ANABOLIC STEROIDS**

Abstract Approved: _____

The purpose of this study was to determine if anabolic steroid use affected an individual's level of body cathexis (body satisfaction). The subjects of this study were members of Moffett's Gym in Lenexa, Kansas (N=40) ages 17-42, who had either competed in a bodybuilding contest in the previous 18 months or planned to compete in a bodybuilding contest in the next 18 months. Subjects were selected from an intact group of competitive bodybuilders who trained at the gym specified. Each subject was contacted by the researcher to complete a Body Cathexis Scale. The Body Cathexis Scale identified was D.B. Rogers Body Cathexis Scale form A (1977). Data was analyzed through the use of a One-Way Analysis of Variance to determine the difference in body cathexis levels between bodybuilders who use anabolic steroids and bodybuilders who do not use anabolic steroids. One-Way Analysis of Variance was used to determine the differences in body cathexis levels between gender and anabolic steroid use and the differences in body cathexis levels between gender and non-anabolic steroid use. All data was analyzed at the $p < .05$ level of significance. No significant difference was found in body cathexis levels between bodybuilders who use anabolic steroids and bodybuilders who do not use anabolic steroids. No significant difference in body cathexis levels was found between male bodybuilders who use anabolic steroids and female bodybuilders who use anabolic steroids. A significant difference was found between male bodybuilders who do not use anabolic steroids and female bodybuilders who do not use anabolic steroids. No significant difference in body cathexis levels was found between male

bodybuilders who use anabolic steroids and male bodybuilders who do not use anabolic steroids. A significant difference in body cathexis levels was found between female bodybuilders who use anabolic steroids and female bodybuilders who do not use anabolic steroids.

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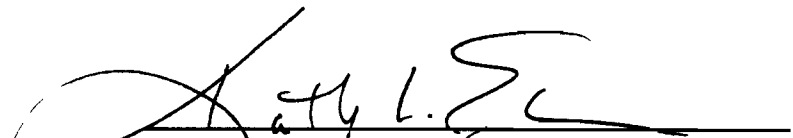
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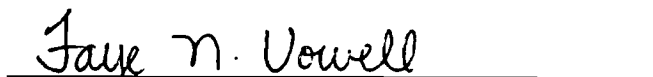
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THE RELATIONSHIP BETWEEN ANABOLIC STEROID USE AND
BODY CATHEXIS LEVELS IN BODYBUILDERS

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CHAPTER I

INTRODUCTION

Weight training is one of the few modes of exercise that can elicit overt physiological and psychological changes over a relatively brief period of time. The physiological changes associated with a weight training program take place within the skeletal muscle and connective tissue. The most visible changes occur in the muscle, which increases in size. This muscle hypertrophy is due to raised levels of protein synthesis which repairs and builds the smaller structures of the muscle; the myosin, actin, myofibrils, and sarcomere. The enlargement of these structures make the muscle larger and give the weight trainer a firmer, more developed body. If the weight trainer is consistent with his/her training and increases weight resistance gradually, he/she can expect changes in the size of the muscle within six to eight weeks after initiation of a training program (Thomas, 1986).

At the same time these physiological changes occur, certain psychological parameters are changing. As a person becomes physically stronger, he/she experiences increased levels of self-confidence and positive feelings of well-being and self-esteem (Hilyer, 1979; Jeffers, 1977; McNamara, 1978). These psychological changes are intrinsically rewarding and may, in part, be a factor in a person's continuation of the weight training program.

Often anabolic steroids are associated with the weight training environment. The weight trainer who uses anabolic steroids experiences many positive physical and psychological changes. Physically, a person becomes bigger, stronger, and is able to recover from workouts faster (Hatfield, 1984; Perry, 1990). Psychologically, a person becomes more aggressive, has wide mood swings, and has a raised level of self-esteem. However, anabolic steroid users can also experience more severe and permanent negative psychological changes. These changes include manic depression and schizophrenic episodes (Daigle,

1990). Although there are both positive and negative psychological changes that occur with anabolic steroid use, the changes are intrinsically motivating and satisfying. This increase in intrinsic motivation may be a significant factor in a person's continued use of anabolic steroids.

Increased positive self-esteem and improved self-concept are significant psychological changes that occur as a result of weight training programs and anabolic steroid use. Self-concept is a multidimensional psychological construct composed of emotional, psychological, intellectual and behavioral beliefs about one's self (Tucker, 1983). One factor that is important to and integrally related with the development of self-concept is body cathexis (Secord & Jourard, 1953). Body cathexis is the degree of satisfaction or dissatisfaction an individual has with various parts or processes of the body (Secord & Jourard, 1953).

Research by Secord and Jourard (1953), Tucker (1982), Hilyer and Mitchell (1979), and Jeffers (1977), indicated that as feelings of satisfaction with the body increase, a person's self-concept improves. While studies have shown that both weight training programs and anabolic steroid use can alter the self-concept, few, if any studies, have examined the differences between weight training programs and anabolic steroid use on changes in body cathexis.

Statement of Problem

Since the 1950's, increasing numbers of men and women have begun using anabolic steroids to enhance their physiques and increase muscle mass, strength and power. However, along with these desired physical changes, these individuals are also getting some undesirable physical and psychological changes. The physical changes include increased cancer risk to all cells and all organs of the body, hypertension, atherosclerosis, heart disease and other circulatory dysfunctions, kidney failure, stroke, anaphylactic shock, and sterility. The psychological changes include libido changes, psychotic episodes, wide mood swings, hallucinations, euphoria, uncontrolled aggression, and depression

(Goldman, 1984; Tricker & Cook, 1990; Wright & Cowart, 1990; Olinekova, 1988; Perry, 1990; Daigle, 1990; Choi, 1990). Even with all of these negative side effects people continue to use anabolic steroids. This continued use may be due to the internal satisfaction that is associated with anabolic steroid use.

The purpose of this study was to determine if bodybuilders who use anabolic steroids have higher degrees of satisfaction with their body than bodybuilders who do not use anabolic steroids. A subproblem of this study was to determine if there is a difference in levels of body satisfaction between men and women bodybuilders.

Hypotheses

The following hypotheses served as a basis for this investigation:

1. There is no significant difference between bodybuilders who use anabolic steroids and bodybuilders who do not use anabolic steroids on scores of a Body Cathexis Scale.
2. There is no significant difference between male bodybuilders who use anabolic steroids and female bodybuilders who use anabolic steroids on scores of a Body Cathexis Scale.
3. There is no significant difference between male bodybuilders who do not use anabolic steroids and female bodybuilders who do not use anabolic steroids on scores of a Body Cathexis Scale.
4. There is no significant difference between male bodybuilders who use anabolic steroids and male bodybuilders who do not use anabolic steroids on scores of a Body Cathexis Scale.
5. There is no significant difference between female bodybuilders who use anabolic steroids and female bodybuilders who do not use anabolic steroids on scores of a Body Cathexis Scale.

Definitions

The following definitions are provided in order to clarify terms used throughout this study:

Anabolic Steroids -

Anabolic steroids are synthetic variants of the strongest male hormone, testosterone. Anabolic refers to the growth or build-up of tissues in the human body and steroid refers to the characteristic carbon-atom ring structure of solid, cyclic unsaturated alcohols found in plants and animals (sterols).

Anabolic Steroid User -

An individual who is currently using anabolic steroids to increase muscle mass and strength and is weight training for bodybuilding purposes. To be classified as a steroid user, a person must be taking 100 or more milligrams of anabolic steroids per week for a period of at least six weeks.

Body Cathexis -

The degree of satisfaction or dissatisfaction an individual has with his/her body, its individual parts and its processes (Secord & Jourard, 1953).

Bodybuilder -

An individual who has been involved in a regular weight training program for a minimum of one year and who has competed in a bodybuilding contest in the last 18 months, or plans to compete in a bodybuilding contest in the next 18 months.

Non-Anabolic Steroid User - An individual who is not currently using or has not used anabolic steroids for the last two years and is involved in a regular weight training program for bodybuilding purposes.

Significance of Study

The recent death of former professional football player Lyle Alzado emphasizes the health risks of anabolic steroid usage. However, despite the recent widespread publicity about these risks, anabolic steroid use continues to reach epidemic proportions. It has been estimated that some 250,000 adolescents have used anabolic steroids and that the total number of current users is over one million people (Wright & Cowart, 1990).

Why do individuals continue to use anabolic steroids? Few research studies have examined the factors that help perpetuate this high risk activity. This study will investigate the degree of satisfaction a person has with his/her body as one possible factor in the continued use of anabolic steroids by bodybuilders. It is believed that the more satisfied an individual is with his/her body, the more likely that individual is to continue the practices that developed that body. It is also an opportunity to study, in a field setting, athletes who self-administer large dosages of anabolic steroids. The data from this study will provide additional information on the psychological effects of anabolic steroids, an area of research that is still in its infancy.

Delimitations

The subjects of this study were members of Moffett's Gym in Lenexa, Kansas, (N=40) ages 17-42, who were involved in a regular weight training program. All subjects either competed in a bodybuilding contest in the last 18 months or were planning to compete in a bodybuilding contest in the next 18 months and have weight trained for at least one year.

Limitations

The findings of this study were limited by the following:

1. The subjects for the study were all volunteers.
2. The subjects were all from the same gym in Lenexa, Kansas.
3. There was no drug testing done to identify the anabolic steroid users and the non-steroid users.
4. The amounts of anabolic steroids used were not regulated among bodybuilders; subjects self-administered various levels of anabolic steroids.
5. There were few female subjects included in the study so gender comparisons or generalization may be weak.

Assumptions

This study is based on the assumption that subjects were honest and candid in their responses to the Body Cathexis Scale and accurately portrayed their use or non-use of anabolic steroids.

Summary

The purpose of this study was to determine if bodybuilders who use anabolic steroids have higher degrees of satisfaction with their bodies than bodybuilders who do not use anabolic steroids. This chapter included a brief review of weight training and its effects on the muscle growth, a brief review of the psychological changes that occur and a review of anabolic steroids and their psychological effects. By investigating body satisfaction and its relationship to anabolic steroid usage, additional information on the reasons some bodybuilders continue to use anabolic steroids despite the known dangers of continued usage may be uncovered.

Chapter II, Review of Literature, focuses on self-concept, body cathexis, weight training and anabolic steroid usage. Chapter III, Methodology, explains the procedures of the study, the selection of subjects, the instrumentation, collection and treatment of data. Chapter IV, Results, discusses the results of the

statistical analysis in order to determine if a difference in body cathexis scores exists between anabolic steroid users and non-anabolic steroid users. Chapter V, Discussion and Recommendations, offers an interpretation of the results and makes recommendations for future studies in the area of body cathexis and anabolic steroids. The appendices include copies of the Body Cathexis Scale, permission to use the scale, informed consent form and permission from the Human Subjects Committee to implement study.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Chapter II, Review of Literature, examines the research related to the psychological effects of exercise, weight training, and anabolic steroids.

Exercise and Psychological Well-Being

The theory that a healthy body and a healthy mind are closely related, dates back to the time of the Ancient Greeks (Stein & Motta, 1992). Today, many lay organizations such as the Young Men's Christian Association (YMCA), Boy Scouts, and Outward Bound emphasize the importance of "sound body-sound mind". Numerous studies have shown that improved physical fitness is related to and critical in the development of a positive mental attitude (Hilyer & Mitchell, 1979; Folkins, 1976; Ossip & Klein, 1989). Additional studies have noted that physical training can help people make friends more easily, relieve tension, increase levels of energy, improve self-concept, decrease depression and anxiety among alcoholics, and elevate mood in coronary heart disease patients (Cureton, 1963; Gary, 1972; Johnson, 1968; Murphy, 1972).

Research has examined the effects of aerobic activities on psychological well-being. Jogging, running, and walking vigorously have had marked positive psychological effects on the participant (Morgan, 1985). These psychological effects have been attributed to the hormone secretion of morphine-like substances called endorphins. These pain killing substances of the body are 200 times more powerful than morphine and can produce a "natural high" feeling of euphoria and an enhanced sense of well-being that can last from one to one and a half hours after the activity is complete (Cooper, 1982).

During the last decade, the idea that regular exercise can be a therapeutic means of enhancing well-being and self-concept has gained scientific support (Collingwood, 1971; Tucker, 1987). Collingwood (1972) found that physical training altered behavior and self-concept. Subjects in this study were rehabilitation clients. Based on a rehabilitation counselor's judgement, subjects were partner matched by emotional functioning. The experimental group participated in a physical training program in addition to their regular rehabilitation services. The control group continued only to participate in rehabilitation services. The physical training program included endurance/ cardiovascular work, strength exercises, and agility drills. The subjects trained one hour a day, five days a week, for four weeks. Both pairs of subjects were measured before and after the program on intellectual and emotional-interpersonal behavior, behavioral changes, body attitude, and self-concept. Only the experimental group was measured on physical fitness tests at the end of the four weeks.

Collingwood's study found that the experimental group experienced significantly greater positive changes in self-concept and self-acceptance than the control group. The counselors and vocational instructors reported that the experimental group had positive changes in all areas of intellectual and emotional-interpersonal measures. Based on this study it appears that physical activity can make positive psychological changes in individuals and that a healthy attitude about one's self progresses through the physical self.

Although aerobic exercise has been accepted as the standard for testing psychological parameters related to exercise, it is only one form of exercise that is vital to overall physical conditioning. Another form of exercise that is also vital to physical conditioning is weight training. A study by Stein and Motta (1992) measured and compared the effects of an aerobic activity (swimming) and a non-aerobic activity (weight training) on depression and self-concept. Subjects were undergraduate college students (N=89). Subjects were asked to complete two measures of depression (Beck Depression Inventory, Depression Adjective Check

Lists) and a self-concept scale (Tennessee Self-Concept Scale). Subjects were randomly assigned to three groups; aerobic (swimming for fitness), non-aerobic (weight training), and a control group (no exercise/general education class). All groups met two times per week for 90 minutes, over a 7 week period.

The aerobic (swimming) group swam for approximately 60 minutes, two times a week, and attempted to keep their heart rate in the aerobic zone ($220 - \text{age} = \text{maximum exercise heart rate}$, 60-80% of maximum heart rate is the aerobic zone). The non-aerobic (weight training) group performed a full body workout and were encouraged to increase resistance gradually. The control group attended an introduction to psychology class. Data indicated that both the aerobic (swimming) and the non-aerobic (weight training) groups were equally affective in reducing depression compared to the control group, but the non-aerobic (weight training) group showed superior improvements in self-concept over the aerobic group (Stein & Motta, 1992).

Weight training may influence self-concept more than any other type of exercise for several reasons. Weight training works the muscles directly and elicits noticeable, overt changes in a person's body in approximately 8 to 12 weeks. Few modes of exercise produce such direct and observable gains. Significant gains in strength and muscular size may occur if the individual follows a regular progressive weight training program. Another positive influence of weight training is that it requires few physical skills or athletic talents to succeed. Additionally, the weight training environment/gym includes a strong social support system (Tucker, 1987). Further research indicated that the participants involved in a weight training regiment gained success and mastery of a task and this success increased their sensed self-worth and self-efficacy; provided positive feedback, and challenged self-defeating cognitions of helplessness, hopelessness, and worthlessness (Stein & Motta, 1992).

Brown and Harrison (1986) examined the relationship between strength training and self-concept in females. Subjects were randomly assigned to one of four groups; young experimental group (ages 17-26); young control group (ages

17-26); mature experimental group (ages 40-49); and mature control group (ages 40-49). All subjects completed a self-concept inventory (Tennessee Self-Concept Scale) during the first week of the study and at the completion of the study. The experimental groups performed their strength testing on a universal multi-station machine (leg press and lat pulldown) and on a standard free-weight bench with an Olympic bar. The control groups maintained their sedentary lifestyle.

Strength and self-concept measures were assessed at the sixth week and at the 12th week. There were significant gains in strength for both experimental groups on all strength tests; (young experimental group 13% in leg press and 31% in the bench press; mature experimental group 18% in latissimus pulldown and 28% in the bench press). Also the experimental groups had a more positive view of their physical bodies (physical self) and were more self-satisfied than the subjects in the control groups. While both the experimental and control groups had similar scores on the pretest, the experimental subjects showed significantly improved scores on the Tennessee Self-Concept Scale compared to scores of the control group (Brown & Harrison, 1986).

Research by Jeffers (1977), Hilyer and Mitchell (1979), and Tucker (1982), determined that self-concept and body cathexis were related and enhanced by physical training. Body cathexis is the degree of satisfaction or dissatisfaction individuals have with their body, its parts, and processes (Secord & Jourard, 1953). Tucker (1987) examined the difference between weight training groups and non weight training groups and scores on a body cathexis scale. Subjects for this study were randomly selected from five sections of beginning weight training and five sections of personal health (N=272, university males). Subjects from the weight training class were placed in the experimental group (N=142) and subjects from the health class were placed in the control group (N=130). The average age of all subjects was 21 years. The Tennessee Self-Concept Scale and the Body Cathexis Scale was administered to all subjects during the first week of school and at the end of 16 weeks. The experimental group performed a total body

weight training program, using free weights and universal machine equipment, (50 minutes a day, twice a week for 16 weeks). The control group was taught general health concepts twice a week. There were no significant differences in the pretest scores of self-concept and body cathexis between the two groups. After the 16 week testing program, the experimental group had significantly higher scores on the Tennessee Self-Concept Scale and Body Cathexis Scale than the control group (Tucker, 1987).

A more recent study by Melnick and Mookerjee (1991), had similar results to the Tucker (1987) study. Subjects were separated into two groups based on their class enrollment. The experimental group was enrolled in an advanced weight training class that trained three times a week for one hour each day for a total of 16 weeks; using free weights, Nautilus and Universal equipment, and calisthenic exercises (N=27; mean age 23.6 years). The control group was enrolled in a physiological perspective of sport and exercise class that met twice a week for a one hour lecture for 16 weeks (N=30; mean age 23.9 years) (Melnick & Mookerjee, 1991).

During the second and sixteenth week of the semester both groups were administered the Rosenberg Self-Esteem and Body Cathexis Scales. There was no significant difference between scores for the two groups on either measure prior to the start of the weight training program. After the weight training program the experimental (weight training) group had significantly higher scores on the Rosenberg Self-Esteem Scale. They were more satisfied and pleased with themselves, felt more important and had better feelings about themselves than the subjects in the control group. Similarly, the experimental (weight training) group again showed significantly higher scores than the control group on the Body Cathexis Scale (Melnick & Mookerjee, 1991).

Results suggested that weight training has a positive effect on an individual's self-concept. A partial explanation for this effect is that in today's society, a healthy, well-developed physique is considered to be a highly desirable

feature and that acceptance by others may be dependent on a person's physical appearance. In addition, the overt, tangible and measureable increases in muscle size and strength, as a result of weight training can alter an individual's feeling about his/her body which, in turn, influences a person's self-concept.

Anabolic Steroids and Psychological Changes

In recent years, men and women, in ever increasing numbers, are taking anabolic steroids to enhance their athletic performance and improve their physiques by increasing strength and muscle mass. The number of steroid users has escalated steadily since the 1950's when anabolic steroids were reportedly first introduced in the sporting arena (Daigle, 1990; Perry, 1990). Today it is estimated that some 250,000 adolescents and over a million men and women use anabolic steroids in the United States (Wright & Cowart, 1990).

Anabolic steroids are the synthetic variant of the most powerful male hormone testosterone. Testosterone is a four ring carbon chemical that produces both anabolic (building, protein sparing) and androgenic (masculinizing) effects. In males, it is produced primarily by the testes, with small amounts of the hormone being produced by the adrenal glands. In females, testosterone is produced in minute quantities mainly by the adrenal glands. As males reach puberty, there is a large increase in the testosterone production. This increase is responsible for the development of body and facial hair, deeper voices, increased genital size and sexual interest, and strong powerful physiques (Wright & Cowart, 1990).

Anabolic steroids used by bodybuilders are chemically altered variants of testosterone. Anabolic steroids have been designed to increase the anabolic effects and decrease the androgenic effects; i.e., increase tissue and protein building effects and decrease the masculinizing effects. This increased muscle and protein building is responsible for enhanced athletic performance (Perry, 1990; Olinekova, 1988; Hatfield, 1984).

Unfortunately, along with these desirable physiological changes there are also dangerous physical and psychological changes that occur with anabolic steroid usage. The effects of anabolic steroids take place throughout the entire body. The places and effects of the steroids depend on the receptors that are set up to receive the steroid. Since all of the systems of the body have receptors, all systems (muscular, skeletal, respiratory, digestive, circulatory, nervous) can be affected. Recently, it has been discovered that testosterone affects deoxyribonucleic acid (DNA) replication (MacDougall, 1983). The receptors in the muscle receive the anabolic steroid which results in tissue building. The receptors in the brain receive the anabolic steroid which results in behavioral and psychological changes (Wright & Cowart, 1990).

The psychological effects and the degree and diversity that occur with anabolic steroid use are dependent on the characteristics of the individual and the dose level the person is utilizing. The most common psychological changes that occur include: an increase in aggressiveness, changes in sexual drive, an increase in energy, mood swings, and an increase in self-concept. More often than not, these changes will end with the cessation of anabolic steroid use (Choi, 1990; Perry, 1990; Daigle, 1990).

Few studies have been conducted on the psychological effects of anabolic steroids due to the moral and ethical issues involved in this research. These issues include administering the large dosages taken by athletes and introducing drugs to healthy individuals. Studies that have been conducted involve volunteers and no control of dose levels of the anabolic steroids used.

In a study by Pope and Katz (1988), football players and bodybuilders who used anabolic steroids were interviewed. Subjects were solicited by sending a letter to 38 gymnasiums (26 in eastern Massachusetts and 12 in Los Angeles). The researchers offered a \$25 incentive to individuals who agreed to participate in a confidential interview. Forty-one subjects volunteered, thirty-nine men and two women, ages 17-51 (Pope & Katz, 1988).

Each subject was administered the axis I portion of the Structural Clinical Interview (SCI), a measurement for psychiatric disorders, during his/her periods of anabolic steroid exposure. Additional information was gathered from each subject regarding his/her medical history, the specific dates, types, dosages and lengths of anabolic steroid usage. The subjects were also observed during times of anabolic steroid usage. No subjects reported any previous effects from anabolic steroid use that required medical attention (Pope & Katz, 1988).

Results from the study indicated that five subjects (12.2%) met the criteria for psychotic symptoms during anabolic steroid use. One subject had auditory hallucinations, a second subject developed paranoid delusions that friends were stealing from him, two subjects developed delusions of reference, and a fifth subject developed delusions of grandeur. Four additional subjects reported mild or equivocal psychotic symptoms, two others developed paranoid jealousy of girlfriends, one had referential thinking and one other expressed grandiose beliefs. Five other subjects (12.2%) met the criteria for manic episodes, eight others (19.9%) only narrowly missed the diagnosis for manic episodes. Five subjects (12.2%) developed major depression when they withdrew from anabolic steroid use. All subjects reported remission of these symptoms within a few weeks of stopping anabolic steroid use and no subjects indicated even subthreshold psychotic symptoms during time of non-anabolic steroid use (Pope & Katz, 1988).

Few other studies dealing with anabolic steroid usage and side effects have focused on the psychological parameters. Most studies have been conducted to collect evidence and incidences of anabolic steroid use. There are many anecdotal cases reported to doctors in which individuals expressed extensive psychiatric symptoms. One of the most highly published cases involving anabolic steroid psychosis involved a 30 year old prison security guard (Pope & Katz, 1990). Before anabolic steroid use the subject reported no symptoms of psychiatric disorders and had an entirely unremarkable psychiatric history. He had been happily married for several years and was described as being mild-mannered, eager-to-please, and somewhat shy. During times of anabolic steroid

usage he became irritable and aggressive and had a heightened sense of self confidence.

During the subject's fifth week of anabolic steroid use, the subject's car broke down and he went to a convenience store to use the phone. Jokingly, the female clerk said that she should start charging employees of the prison to use the phone because they did it so much. The subject left the store in anger. The next morning the subject returned to the convenience store with a gun and forced the clerk into his car. He had only intended to scare her. But several blocks from the store the clerk jumped from the car and attempted an escape. The guard drew his revolver and fired it at the clerk striking her in the back and paralyzing her from the waist down.

Following the subject's arrest and incarceration, the subject experienced an abrupt withdrawal from anabolic steroids. At this time the subject developed major depression, anhedonia, fatigue, prominent guilt, psychomotor agitation, and daily suicidal ideation. The bout with depression lasted for one month following his incarceration. During the subject's three year incarceration he returned to his previous mild-mannered self. Prior to anabolic steroid use the subject had not experienced any psychological disorders or had any reoccurrence of symptoms after cessation of anabolic steroid use (Pope & Katz, 1990).

Other cases reported by Pope and Katz (1990), suggested that the psychological effects of anabolic steroids may be more common than originally thought. Pope and Katz have administered psychological tests and interviewed subjects, families and friends of anabolic steroid users which indicate that users have symptoms of psychotic disorders which have principally been caused by anabolic steroids (Pope & Katz, 1990).

Other psychological/behavioral changes associated with anabolic steroid use include: hallucinations (auditory and visual), psychotic episodes, manic-like symptoms, dysphoria, anorexia, depression, addiction, paranoia, violent episodes or "roid rages", and even criminal actions. These changes are unpredictable and

may not end with the cessation of anabolic steroid use (Choi, 1990; Perry, 1990; Daigle, 1990).

Similar to the changes experienced by weight trainers, anabolic steroid users have an increase in self-esteem/self-concept (Daigle, 1990). Even though the improved self-concept that occurs with steroid use is, possibly, chemically related, it does seem to parallel that of weight training. The increases in self-confidence and muscle mass create positive feedback, both internally and externally. Positive feedback from the weight training environment, (acceptance, social support and noticeable muscular gains) is regarded as the most important element in generating increases in self-concept (Sonstroem, 1982; Tucker, 1987). This internal motivation and increased self-concept may be key reasons for continued use of anabolic steroids even though health risks are associated with continued use.

Summary

Exercise is an important factor in raising levels of self-concept and body cathexis. With exercise individuals become stronger physically and are able to improve their physiques. These changes result in positive feedback from peers and feeling competent about their ability to master a task. As a result their intrinsic motivation increases and they are more likely to continue the activity (Tucker, 1982, 1983, 1987; Hilyer & Mitchell, 1979; Jeffers, 1977; McNamara, 1978). Unfortunately, the same changes occur with anabolic steroid usage. Anabolic steroids raise self-concept and provide marked physique gains. These gains result in positive feedback from peers and increased intrinsic motivation. This intrinsic motivation may be a key factor in the individuals continued use of the drug. It appears that a "snowball" effect takes place with both weight training and anabolic steroid use, one snowball leads to continued drug usage, the other snowball leads to continued weight training.

CHAPTER III

METHODOLOGY

Subjects

Subjects were individuals who held a current membership to Moffett's Gym in Lenexa, Kansas (March 1993), who had either competed in a bodybuilding contest in the last 18 months, or planned to compete in a bodybuilding contest in the next 18 months. The subjects were self administered anabolic steroid users, men (N=17), women (N=3), (ages 21-40), and non anabolic steroid users, men (N=17), women (N=3), (ages 21-40).

Procedures

Permission to conduct this study was obtained from the institutional Review Board for Treatment of Human Subjects of Emporia State University (see Appendix A). Additional permission to conduct the study was obtained from the manager of Moffett's Gym.

As members of Moffett's Gym entered they were asked if they would be willing to participate in a research project on bodybuilders. If they expressed a willingness to participate they were taken to an office area in the gym. All subjects were told the purpose of the study and the procedures that would be followed in the study. Subjects were asked to sign an informed consent form if they would be willing to take part in the study.

All subjects who signed the informed consent form were assigned a code number to be used when filling out the data sheets. This number was used to assure the confidentiality of the subject's responses. Subjects were asked to complete a brief biographical data sheet and the Body Cathexis Scale. The researcher then left the office while the subject completed these forms. After completion of these forms, the subject was instructed to place the sheets in

a manila envelope, write the code number on the envelope, seal and return it to the researcher.

Based on the information received on the biographical histories of each individual, subjects were then placed into two groups; anabolic steroid users and non-anabolic steroid users. Anabolic steroid use was confirmed by the biographical history information and by the familiarity the researcher had previously established with the subjects.

Instrumentation

Rogers (1977) Body Cathexis Scale (Appendix B), was used as a measure of a person's degree of satisfaction with his/her body. The scale was a modification of Secord and Jourard's (1953) original Body Cathexis Scale. Rogers (1977) felt revision of the original scale was necessary to negate practice effects in measuring body cathexis levels and to provide a shorter, alternate body cathexis scale. The scale consists of a list of body parts and body processes. Each item is rated on a 5-point Likert like scale ranging from "very dissatisfied" to "very satisfied".

Secord and Jourard's original scale included 46 items. Other studies have added items and have used scales that have included 24 and 12 items (Shim, Kotsiopulus, & Knoll, 1990; Hamilton & Chowdhary, 1989). In constructing scales to test for parallelism, the previous scales used in the other studies were pooled to make 50 items that were placed into two broad categories. Most items from each ranked category were assigned alternately to one of two lists. Items were in the original form. However, some items were changed to combine certain items that described the same feature. The final total of items was 30.

All items were then combined on a random basis to make up a 30-item list of body cathexis measures. This list was then divided to make up two 15-item scales designated "A" and "B" (Rogers, 1977).

Testing for parallelism was done by combining forms "A" and "B" to make up a 30-item body cathexis scale. This scale was completed anonymously by 187 Exeter University undergraduate students, 83 males (mean age 19.73; SD 1.59) and 104 females (mean age 19.44; SD 1.35). Items from forms "A" and "B" were then again separated and analyzed separately (Roger, 1977).

The results for males on form "A" were, (mean 3.58; SD .414; and ranged from 2.80 to 4.67); and for males on form "B" were, (mean 3.57; SD .397; and ranged from 2.80 to 4.53). The Pearson product correlation coefficient between forms was .953 ($p < .005$), (Roger, 1977).

The results for females on form "A" were, (mean 3.29; SD .441; and ranged from 2.13 to 4.67); and for females on form "B" were, (mean 3.31; and ranged from 2.06 to 4.67). The Pearson product correlation coefficient between forms was .952 ($p < .005$). Mean scores for both male and female groups were similar to results gotten in previous research studies, and the results indicated that forms "A" and "B" are parallel to original/other Body Cathexis Scales. It was determined that forms "A" and "B" were a valid and reliable measure of Body Cathexis (Roger, 1977).

Although considerable research has been conducted utilizing the Body Cathexis Scale, few studies have attempted to analyze the scales internal structure. A recent study by Tucker, 1981, investigated the internal structure, factor satisfaction, and reliability of the Body Cathexis Scale. Results from this study indicated test-retest reliability coefficient was .87, suggesting the Body Cathexis Scale is stable overtime (Tucker, 1981).

Analysis of Data

The differences in the scores on the Body Cathexis Scale between bodybuilders who use anabolic steroids and bodybuilders who do not use anabolic steroids was analyzed by One-Way Analysis of Variance (Hypothesis 1). The differences in the scores on the Body Cathexis Scale between male

bodybuilders who use anabolic steroids and female bodybuilders who use anabolic steroids was analyzed by One-Way Analysis of Variance (Hypothesis 2). The differences in the scores on the Body Cathexis Scale between male bodybuilders who do not use anabolic steroids and female bodybuilders who do not use anabolic steroids was analyzed by One-Way Analysis of Variance (Hypothesis 3). The differences in the scores on the Body Cathexis Scale between male bodybuilders who use anabolic steroids and male bodybuilders who do not use anabolic steroids was analyzed by One-Way Analysis of Variance (Hypothesis 4). The differences in the scores on the Body Cathexis Scale between female bodybuilders who use anabolic steroids and female bodybuilders who do not use anabolic steroids was analyzed by One-Way Analysis of Variance (Hypothesis 5). All data were analyzed at the $p < .05$ level of significance.

Summary

The purpose of this study was to determine the differences in body cathexis levels between bodybuilders who use anabolic steroids and bodybuilders who do not use anabolic steroids. A subproblem of this study was to determine if there is a difference in levels of body satisfaction between male and female bodybuilder. Subjects were members of Moffett's Gym who had either competed in a bodybuilding contest in the last 18 months or planned to compete in a bodybuilding contest in the next 18 months. Data was analyzed using One-Way Analysis of Variance.

CHAPTER IV

ANALYSIS OF DATA

The differences in Body Cathexis levels between bodybuilders who use anabolic steroids and bodybuilders who do not use anabolic steroids was analyzed by a One-Way Analysis of Variance. The difference between male bodybuilders and female bodybuilders who use anabolic steroids on scores of a Body Cathexis scale was analyzed by One-Way Analysis of Variance. The difference in Body Cathexis levels between male and female bodybuilders who do not use anabolic steroids was analyzed by One-Way Analysis of Variance. The differences in Body Cathexis levels between male bodybuilders who use anabolic steroids and male bodybuilders who do not use anabolic steroids was analyzed by One-Way Analysis of Variance. The differences in Body Cathexis levels between female bodybuilders who use anabolic steroids and female bodybuilders who do not use anabolic steroids was analyzed by One-Way Analysis of Variance. All data was analyzed at the $p < .05$ level.

Hypothesis number one stated that there is no significant difference between bodybuilders who use anabolic steroids and bodybuilders who do not use anabolic steroids on scores of a body cathexis scale. This hypothesis was not rejected at the .05 level of significance. The Body Cathexis Scores for anabolic steroid users and non-anabolic steroid users were not significantly different (Table 1).

Hypothesis number two stated that there is no significant difference between male bodybuilders who use anabolic steroids and female bodybuilders who use anabolic steroids on scores of a body cathexis scale. This hypothesis was not rejected at the .05 level of significance. The Body Cathexis Scores for male bodybuilders who use anabolic steroids and female bodybuilders who use anabolic steroids were not significantly different (Table 2).

Hypothesis number three stated that there is no significant difference between male bodybuilders who do not use anabolic steroids and female bodybuilders who do not use anabolic steroids. This hypothesis was rejected at the .05 level of significance. The Body Cathexis Scores for male bodybuilders who do not use anabolic steroids and female bodybuilders who do not use anabolic steroids was significantly different (Table 3).

Hypothesis number four stated that there is no significant difference between male bodybuilders who use anabolic steroids and male bodybuilders who do not use anabolic steroids. This hypothesis was not rejected at the .05 level of significance. The Body Cathexis Scores for male bodybuilders who use anabolic steroids and male bodybuilders who do not use anabolic steroids were not significantly different (Table 4).

Hypothesis number five stated that there is no significant difference between female bodybuilders who use anabolic steroids and female bodybuilders who do not use anabolic steroids. This hypothesis was rejected at the .05 level of significance. The Body Cathexis Score for female bodybuilders who use anabolic steroids and female bodybuilders who do not use anabolic steroids were significantly different (Table 5).

Additional tables have been added to provide information on the description of means for several subpopulations of the study.

Table 1:

Analysis of Variance for Mean Body CathexisScore and Anabolic Steroid Usage

Source of Variation	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Value</u>	<u>Prob.</u>
Between Subjects	1	1.4213	1.4213	2.8767	.0981
Within Subjects	38	18.7749	.941		
Total	39	20.1962			

$p < .05$

Table 2:

Analysis of Variance for Mean Body CathexisScore Male and Female BodybuildersWho use Anabolic Steroids

Source of Variation	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Value</u>	<u>F Prob.</u>
Between Groups	1	1.2544	1.2544	2.2813	.1483
Within Groups	18	9.8975	.5499		
Total	19	11.1519			

$p < .05$

Table 3:

Analysis of Variance for Mean Body CathexisScore of Male and Female BodybuildersWho Do Not Take Anabolic Steroids

Source of Variation	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Value</u>	<u>F Prob.</u>
Between Groups	1	1.6733	1.6733	5.063	.0372*
Within Groups	18	5.9497	.3305		
Total	19	7.6231			

*p < .05

Table 4:

Analysis of Variance for Body Cathexis ScoresMale Bodybuilders Who Use Anabolic Steroidsand Male Bodybuilders Who Do Not Use Anabolic Steroids

Source of Variation	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Value</u>	<u>F Prob.</u>
Between Groups	1	.1333	.1333	.2713	.6061
Within Groups	31	15.2299	.4913		
Total	32	15.3632			

*p < .05

Table 5:

Analysis of Variance for Body Cathexis Scores
of Female Bodybuilders Who Use Anabolic Steroids
and Female Bodybuilders Who Do Not Use Anabolic Steroids

Source of Variation	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Value</u>	<u>F Prob.</u>
Between Groups	1	4.1274	4.1274	33.4277	.0022*
Within Groups	5	.6174	.1235		
Total	6	4.7448			

*p < .05

Table 6:

Description of Means of Body Cathexis Score
Differences between the Total Populations
of Bodybuilders who use Anabolic Steroids
versus Bodybuilders who do not use Anabolic Steroids

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Cases</u>
Total Population	3.9100	.8893	6
No Users	3.2450	.4400	3
Users	4.7967	.1350	3

*total cases = 7

Table 7:

Description of Means of Body Cathexis Score
Differences between the Total Populations
of Male Bodybuilders Who Do Not Use Anabolic Steroids
versus Female Bodybuilders Who Do Not Use Anabolic Steroids

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Cases</u>
Total Population	3.8235	.6334	20
No Users	3.9681	.5983	17
Users	3.2450	.4400	3

*total cases = 20

CHAPTER V

DISCUSSION AND RECOMMENDATIONS

The purpose of this study was to determine if bodybuilders who used anabolic steroids would score higher on a body cathexis scale than bodybuilders who do not use anabolic steroids. Based on the results of the study, it appears that anabolic steroid use in bodybuilders has no significant effect on scores of a body cathexis scale. In addition, the study attempted to determine if there were any differences in body cathexis scores between male and female bodybuilders who use anabolic steroids. Hypothesis number one showed no significant differences between anabolic steroid users and non-anabolic steroid users on Body Cathexis Scores. However, there appears to be a gender difference in effect for anabolic steroid use and Body Cathexis Scores. This later conclusion is somewhat weak due to the small number of female subjects.

Discussion

Although these results may indicate that a person's body cathexis is not significantly affected by anabolic steroid use, several factors may have influenced the results of this study. These factors include the unregulated quantities of anabolic steroids taken by the subjects, years of weight training and bodybuilding body perception.

The quantities of anabolic steroids used by the subjects were not regulated by the researcher. It may be that subjects in this group only used small quantities of anabolic steroids; quantities that were not great enough to have any effect on body cathexis levels. Also, since quantities were not regulated, subjects taking either excessively high or low amounts of anabolic steroids may reduce the effect indicated in the mean scores of body cathexis.

Weight training has been shown to have a positive influence on self-esteem, mood, and body cathexis (Tucker, 1987; Melnick & Mookerjee, 1991). This finding could explain why there was no significant difference found

between the groups. Since both groups were extremely involved in weight training, they already have elevated body cathexis levels.

Another factor that may have influenced the results of this study is the self-confidence a person needs to have to be a competitive bodybuilder. Competitive bodybuilders may have a high level of body cathexis. Bodybuilders have to be satisfied with their body to enter competitions and display it to judges and audiences.

Hypothesis three, there is no significant difference between male bodybuilders who do not use anabolic steroids and female bodybuilders who do not use anabolic steroids; and hypothesis five, there is no significant difference between female bodybuilders who use anabolic steroids and female bodybuilders who do not use the substance, were rejected.

Two reasons for these differences may be that the number of female subjects in each group was small. This reduced number may have skewed the results. Also, female non-anabolic steroid users may have a lower body cathexis score because they are elevating their bodies above the ideal body image for females. Males have higher muscular expectations, so they are approaching the ideal body image for males and thus body cathexis levels are elevated. Another explanation may be that female bodybuilders were introducing a somewhat foreign substance (the male hormone testosterone, in the form of anabolic steroids) into their bodies. This substance is found naturally in small quantities in females. The introduction of unusually large amounts may escalate the positive psychological effects (euphoria, increased self-concept) of anabolic steroids that are related to body cathexis and consequently produce higher body cathexis scores for female bodybuilders who use anabolic steroids than female bodybuilders who do not use anabolic steroids.

Recommendations for Future Research

Recommendations for future research related to Body Cathexis:

1. The testing of an increased number of bodybuilders, both anabolic steroid users and non-anabolic steroid users.
2. The testing of athletes in different sports (track & field, bicyclists, football players, etc.) who may use anabolic steroids.
3. The testing of bodybuilders (anabolic steroid using and non-anabolic steroid using) in a controlled environment (anabolic steroid dosages, diet, workouts, etc.).
4. The testing of body cathexis at the beginning of each workout over an extended period of time.
5. The testing of body cathexis over a long period of time with anabolic steroid using bodybuilders. This will allow body cathexis data to be collected during times of anabolic steroid use and during times of non-anabolic steroid use.
6. The testing of the effect of anabolic steroids on body cathexis in non-athletic anabolic steroid use situations (medical, rehabilitative, etc.).

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APPLICATION FOR APPROVAL TO USE HUMAN SUBJECTS

1. Name of Principal Investigator: Jimmie Lee Page
2. Department Affiliation: Physical Education, Health, Recreation and Dance
3. Person to whom notification should be sent: Jimmie L. Page
Box 206B
Alma, KS 66401
4. Title of Project: THE DIFFERENCE BETWEEN BODY CATHEXIS SCORES IN BODYBUILDERS WHO USE ANABOLIC STEROIDS AND BODYBUILDERS WHO DO NOT USE ANABOLIC STEROIDS.
5. Funding Agency: None
6. Project Purpose: The purpose of this project is to research the relationship between anabolic steroid use and levels of body cathexis. The researcher hopes to find that raised levels of body cathexis are a factor in continued anabolic steroid use among bodybuilders.
7. Describe the proposed subjects: Each subject will be a member of Moffett's Gym in Overland Park, KS. They will be between the ages of 22 and 45 years of age, of both genders (male and female), and of mixed races (white and black).
8. Describe how the subjects will be selected: Each subject will be selected on the following criteria; each subject will have competed in a bodybuilding contest in the last 18 months, each subject will be personally known by the researcher, so the researcher will have historical and present knowledge of their steroid use or non-use.
9. Describe the proposed procedures in the project: Each subject will answer the Body Cathexis Scale, based on a forced choice 5-point Likert Scale. The scale will be provided to each subject in person. Each subject will be given information on why the study is being performed, and instructions on how to fill out the scale.
10. Will questionnaires, tests, or related research instruments not explained in question #9 be used? NO

11. Will electrical or mechanical devices be used? NO
12. Do the benefits of the research outweigh the risks to human subjects?
YES
13. Are there any possible emergencies which might arise in utilization of human subjects in this project? NO
14. What provisions will you take for keeping research data private? Each subject will receive an envelope with their questionnaires. They will be instructed to put the answer sheet in this envelope and seal it. Anabolic steroid users will be identified with a "U" on the outside of their envelope, and non-users will be identified with an "N" on the outside of their envelope. No other means of identification will be used.
15. Attach a copy of the informed consent document, as it will be used for your subjects.

STATEMENT OF AGREEMENT: I have acquainted myself with the Federal Regulations and University policy regarding the use of human subjects in research and related activities and will conduct this project in accordance with those requirements. Any changes in procedures will be cleared through the Institutional Review Board for Treatment of Human Subjects.

Signature of Principal Investigator

Date

Signature of Responsible Individual

Date



EMPORIA STATE UNIVERSITY

1200 COMMERCIAL EMPORIA, KANSAS 66801-5087 316/341-5351

RESEARCH AND GRANTS CENTER - BOX 48

February 19, 1993

Jimmie Lee Page
Box 206B
Alma, KS 66401

Dear Mr. Page:

The Institutional Review Board for Treatment of Human Subjects has evaluated your application for approval of human subject research entitled, "The Relationship Between Anabolic Steroids and Body Cathexis in Bodybuilders." The review board approved your application which will allow you to begin your research with subjects as outlined in your application materials.

Best of luck in your proposed research project. If the review board can help you in any other way, don't hesitate to contact us.

Sincerely,

Faye N. Vowell, Dean
Office of Graduate Studies
and Research

FV:pf

cc: Kathy Ermler

INFORMED CONSENT FORM

The Department/Division of Physical Education, Health, Recreation and Dance supports the practice of protection for human subjects participating in research and related activities. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time, and that if you do withdraw from the study, you will not be subjected to reprimand or any other form of reproach.

1. Procedures to be followed in the study, as well as identification of any procedures which are experimental.

Each subject will be provided with a Body Cathexis Scale and instructions on how to complete it. After completing the scale each subject will be instructed to place the answer sheet in an envelope provided, seal the envelope and return the contents to the researcher. The researcher will then score each questionnaire and compare the results: anabolic steroid using bodybuilders to non-anabolic steroid using bodybuilders; male subjects will be compared to male subject and female subjects will be compared to female subjects.

2. Description of any attendant discomforts or other forms of risk involved for subjects taking part in the study. N/A
3. Description of benefits to be expected from the study or research.

Anabolic steroid use in America has reached epidemic proportions. Any person involved in athletics, participating or coaching, has probably been exposed to anabolic steroids or their use in some way.

The benefits of this study will be that it will not only add to the current knowledge of anabolic steroid use, but it will also open a new area of research, the relationship of anabolic steroid use to body cathexis (body satisfaction).

4. Appropriate alternative procedures that would be advantageous for the subjects. N/A

"I have read the above statement and have been fully advised of the procedures to be used in this project. I have been given sufficient opportunity to ask any questions I had concerning the procedures and possible risks involved. I understand the potential risks involved and I assume them voluntarily. I likewise understand that I can withdraw from the study at any time without being subjected to reproach."

Subject and/or authorized representative

Date

BODY SATISFACTION QUESTIONNAIRE

Age: Gender/sex: Years training:
 Ever used anabolic steroids: yes____ no____

In the left hand column of this page is a list of words describing various aspects of the body. I would like you to rate the degree of satisfaction or dissatisfaction you feel about these aspects of you body. Indicate degree of satisfaction or dissatisfaction with each item by marking an "X" in the appropriate column.

	1 very dissatisfied	2 quite dissatisfied	3 neither satisfied nor dissatisfied	4 quite satisfied	5 very satisfied
1. General appearance					
2. Facial complexion					
3. Bodybuild					
4. Profile					
5. Waist					
6. Chest					
7. Mouth					
8. Hips					
9. Neck					
10. Thighs					
11. Ankles					
12. Sex organs					
13. Hair distribution					
14. Hands					
15. Voice					

Jim L. Page
RR#1 Box 206
Alma, MS 38840
United States

Dr. D.B. Roger
Department of Psychology
University of York
Heslington, York, YO1 5dd
England

Dear Dr. Roger,

I am contacting you in regards to permission to use your Body Cathexis Scale for my thesis project, THE RELATIONSHIP BETWEEN ANABOLIC STEROID USE AND BODY CATHEXIS LEVELS IN BODYBUILDERS.

Thank you for your time and work in the field of Body Cathexis

Sincerely,

Jim L. Page

HESLINGTON, YORK, YO1 5DD

Telephone (0904) 430000

Telex 57933 YORKUL Fax (0904) 433433

DEPARTMENT OF PSYCHOLOGY

Direct line (0904) 4331

8th February 1993

Mr. Jim Page,
Box 206B,
Alma, Kansas 66401,
U.S.A.

Dear Mr. Page,

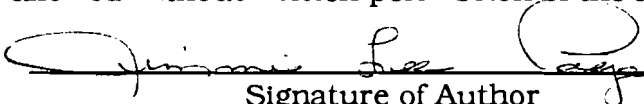
Thank you for your enquiry about the body-cathexis scale. This is a research area which I've long since moved out of, but checking my records I found copies of each of the forms. These are enclosed, together with a copy of the paper; you are welcome to use the scales in your project.

Yours sincerely,



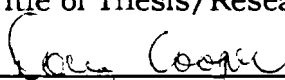
DR. D. ROGER

I, Jimmie L. Page, hereby submit this thesis/report to Emporia State University as partial fulfillment of the requirements for an advanced degree. I agree that the Library of the University may make it available for use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, or other reproduction of this document is allowed for private study, scholarship (including teaching) and research purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author.


Signature of Author

7 - 29 - 93
Date

THE DIFFERENCE BETWEEN BODY CATHEXIS
SCORES IN BODYBUILDERS WHO USE
ANABOLIC STEROIDS AND BODYBUILDERS
WHO DO NOT USE ANABOLIC STEROIDS.

Title of Thesis/Research Project

Signature of Graduate Office Staff Member

7-29-93
Date Received