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The Effects of Anabolic Steroids on Measured Personality Traits of Male Weight Trainers

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THE EFFECTS OF ANABOLIC STEROIDS ON MEASURED PERSONALITY
TRAITS OF MALE WEIGHT TRAINERS

by

Kraig Libstag

A Dissertation
Submitted to the
Faculty of the Graduate College
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requirements for the
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and Counseling Psychology

Western Michigan University
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THE EFFECTS OF ANABOLIC STEROIDS ON MEASURED PERSONALITY TRAITS OF MALE WEIGHT TRAINERS

Kraig Libstag, Ed.D.
Western Michigan University, 1990

This research was undertaken to explore the effects of anabolic steroid use on the measured personality traits of male weight trainers. The use of these drugs by competitive and non-competitive athletes worldwide has grown to enormous proportions. Anecdotal case reports that discuss various psychological manifestations associated with the use of anabolic steroids by athletes have been presented in professional journals and in the popular press in recent years. However, there have been few studies that systematically examine the psychological consequences of steroid utilization.

The underlying assumption of this study was that anabolic steroids would affect the measured personality characteristics of male weight trainers who use these drugs and that the specific personality traits affected could be identified.

Thirty research subjects were recruited from various gyms and fitness centers in the upper midwestern United States. Fifteen male weight trainers who used anabolic steroids as part of their training regimen comprised the
experimental group and 15 male weight trainers who have never used the drugs comprised the comparison group. The subjects completed the Millon Clinical Multiaxial Inventory-II ([MCMI-II], Millon, 1987) on two different occasions; once while the experimental group subjects were administering anabolic steroids and again after they had ceased. The comparison group subjects completed the MCMI-II concurrently with the experimental group. The Mann-Whitney U test for ordinal data was used to test statistical significance of the null hypotheses.

The results supported the research hypotheses that there is a statistically significant difference: (a) in the measured personality traits of male weight trainers when using and not using anabolic steroids, (b) between the measured personality traits of male weight trainers using anabolic steroids and the traits of a comparable group of male weight trainers who have never used the drugs, and (c) between the measured personality traits of male weight trainers when not using anabolic steroids and the traits of a comparable group of male weight trainers who have never used the drugs.

Conclusions and explanations of the results were offered and recommendations for further research were proposed.
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The effects of anabolic steroids on measured personality traits of male weight trainers

Libstag, Kraig, Ed.D.
Western Michigan University, 1990
DEDICATION

This culmination of my doctoral studies is dedicated to some very special people:

--To my parents Murray and Harriet Libstag, who throughout the years of my own personal struggle, while letting me find my own path, were always there to nurture and support me in so many ways, so many times;

--To my sister Gwen, who along with my parents was always available when needed emotionally, spiritually, and also financially to ease the burden of graduate work;

--To my dearly departed brother Mark who was a source of inspiration to me, more than he will ever know, to gain a better understanding of what it means to be human;

--And to my wife-to-be, Margo Adler, whose love and inspiration provided a guiding light towards a wonderful future.

I thank you all.
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Throughout the course of my doctoral studies, I have become indebted to some people who have guided me along this path and who have given so generously their time and effort in support of my goal.

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My deepest thanks go to Steve Sanders without whom
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Thanks also go to Lori, Heidi, Ron, Tom, Dan, Paul, and Eileen; your friendships were invaluable.

And, I extend a special thank you to a most important person, my sensei-bro Rick Siefert, whose path crossed mine at a time in my life when I was struggling to find answers. He helped me realize that The Original Sin is to Limit the Is. Don’t.

Kraig Libstag
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CHAPTER I

INTRODUCTION

The use of anabolic steroids by athletes has proliferated worldwide in what some might consider alarming proportions. Many well publicized events during recent years have vividly demonstrated the spread of use. At the 1983 Pan American Games in Venezuela, for example, 19 participants were disqualified when their steroid use was detected (Zurer, 1984). During the 1986 college football bowl games, 16 football players from various universities were prohibited from playing because of steroid use (Libstag, 1987). The 1988 Summer Olympics highlighted the steroid problem when a number of athletes from various events chose not to participate in their competitions after submitting to the International Olympic Committee's drug screening procedures. In perhaps the most publicized incident, Ben Johnson, the Canadian presumed to have won the gold medal in the 100 meters dash in world record time, was stripped of his award after being detected for anabolic steroid use.

Differences between the average and superior athlete may often be attributed to steroid use. Both physical and mental advantages afforded by these drugs have contributed to many outstanding performances in sport which would not
have occurred without chemical aid (Taylor, 1985).

The use of anabolic steroids by athletes has been a source of controversy and important questions about the consequences of steroid use remain to be answered. These include questions about the alleged harmful effects of these drugs and whether or not there are lasting physiological and psychological changes that occur in the user. The studies that have attempted to answer these questions have focused predominantly on physiological side effects which can be verified through various medical tests. Assessments of psychological side effects have been few in number. In the majority of these studies psychological side effects were reported subjectively, were not confirmed through objective observation, and were primarily simple anecdotal case reports (Libstag, 1987).

Judging by articles in the popular press it is increasingly apparent that the use of anabolic steroids by athletes and others is becoming a more serious and perplexing problem. Typical of these anecdotal reports is that of a former football player from the University of South Carolina, Charleston, who reported his use of anabolic steroids for the purpose of gaining bodyweight and strength. Over a period of four years, along with his weight and strength increases, this athlete admitted to becoming excessively irritable and aggressive. At one point he actually threatened a pizza delivery boy with a
gun without serious provocation. He also discussed his experience of suicidal ideation.

In Detroit, Michigan, reportedly steroid use was implicated in the suicide of a male high school senior. His parents stated that their son's personality was altered while using anabolic steroids for the purpose of muscle building and contended that it was the drugs that were responsible for the suicide.

Lubell (1989) reported that a bodybuilder who was using anabolic steroids for over a year was accused of participating in the brutal murder of a hitchhiker. His defense attorney argued that the bodybuilder was legally insane due to his drug use. The jury was not convinced and handed down a guilty verdict.

In another case (cited in Taylor, 1987) a Navy aircraft mechanic committed burglary and arson after taking heavy dosages of anabolic steroids for a bodybuilding competition. At his criminal trial the judge concluded that "toxic levels of anabolic steroids impaired his ability to appreciate the criminality of his acts" (p. 146). Taylor (1987) concluded that "although definitive studies have not been published, it is clear that a high serum androgen level can stimulate verbal and physical aggression and create a potential for violence, especially in response to provocation and threat" (p. 146).

The permanence of these drug effects are in question,
however. Athletes who use steroids claim that any physiological and psychological side effects are no longer experienced upon cessation of use.

Throughout the past 17 years this researcher, who has been a former weight lifting competitor, has had an opportunity to observe many athletes who used anabolic steroids as part of their training regimen. The only behavioral manifestations observed or reported by all the athletes interviewed were a decrease or increase in libido, enhanced motivation for training, and a tendency to become more aggressive. This aggressiveness was subjectively expressed by the weight trainers themselves and also evidenced via various aggression assessments in studies by Libstag (1987) and Rozenek (1986). In fact, in actual conversations with some of these same weight-trained athletes who use anabolic steroids, many voiced their concerns about the more dramatic cases that have made their way into the popular press. These weight trainers question whether the drugs could be the direct cause of some of the more bizarre behaviors presented in these reports. From their own experiences they deny experiencing symptoms such as aberrant thoughts, feelings, or behaviors. Many of these weight trainers are powerlifting competitors at the state and national level who use what would be considered exceedingly high dosages of anabolic steroids. Yet not one of these athletes reported that
they experienced or knew of any competitors who had suffered serious psychiatric symptoms (i.e., suicidal ideation, delusions, hallucinations, paranoid ideation) which had been reported in the professional journals and the popular press.

Frankle, Cicero, and Payne (1984) stated that the use of anabolic steroids by noncompetitive athletes has increased significantly. Of even greater concern is the widespread use among high school youth. For example Buckley et al. (1988) report that possibly 500,000 male high school seniors have used or are currently using anabolic steroids, and that 27% of this group used them for cosmetic reasons only. The ultimate consequence of the proliferation of steroid use on the part of the number of competitive and noncompetitive athletes in a variety of sports remains to be seen.

Justification for the Study

The empirical evidence points to anabolic steroids as impacting personality and may lead to alteration in brain chemistry. There have been a number of relevant observations mentioned in the literature by physicians. According to Goldman (1984) electroencephalographic research has indicated that the human response to anabolic steroids replicates states of rage, uncontrollable
aggression, and almost schizophrenic behavior. During steroid use there may be an indirect increase in the number of neurotransmitters in the central nervous system that may result in behavioral changes such as insomnia, irritability, excitability, and increased sexual drive. Mood swings from depression to psychotic behavior may result if there is an increase in cortisol level and hypercalcemia can result in depression, fatigue, listlessness, and drowsiness. Combinations of these symptoms are also possible.

Taking a firm stand as to whether anabolic steroids can induce psychological alterations in men, Taylor (1985) stated the following:

There is no doubt that use of anabolic steroids, even in low dosages, potentiates certain psychological behavior patterns in men. And, with men athletes who are using moderate and larger dosages of anabolic steroids, total personality changes may take place, both while on the anabolics and after the anabolics are stopped. They definitely upset the man's mental network and psyche in a variety of sometimes unpredictable fashions. And, in many ways, the man athlete who cycles on and off of anabolic steroids may begin to possess two distinct personalities, both of which differ from the presteroid self. (p. 16)

An immediate problem in research of this nature is the secretiveness of subjects. Pope and Katz (1988) stated that athletes are reluctant to disclose their steroid use to physicians, hence the psychiatric effects of steroids, although perhaps often witnessed, may rarely be mentioned by the users or identified by physicians and
other professionals.

Another problem is recruitment of research subjects. According to Pope and Katz (1988) "it is our impression that, despite our considerable efforts at recruitment, only a minority of steroids users were willing to be interviewed. Thus we suspect that we were getting only a glimpse of a large underground subculture" (p. 489). The recruitment problem was overcome by this researcher who had, over the years, developed personal contacts with persons in various parts of the country who were acquainted with steroid using athletes and were willing to participate in this research.

Persons who use these drugs tend to do so covertly and the likelihood of their participating in research of this nature is quite limited. Overcoming the recruitment problem makes it possible to increase public knowledge and awareness of the possible psychological manifestations of anabolic steroid use. Furthermore, if a sufficient number of studies of this genre can be conducted in the future, even with a small number of subjects, doctors and athletes will be enabled to make more informed decisions with respect to the administration and use of anabolic steroids.

Purpose of the Study

In response to the lack of established systematic
research that focuses on the context of these discordant views reported above, new research in the effects of anabolic steroids on human beings is needed. It is essential that the medical community and the athletic world have as much knowledge about steroid effects as possible. Many of the self administering athletes who use anabolic steroids are taking more than the recommended clinical dosages. Burkett and Falduto (1984) found that most athletes they questioned took 400-800% of the recommended medical dosage of combined anabolic steroids. A review of the literature revealed that there is a paucity of research on the concomitant psychological consequences of anabolic steroid utilization.

The purpose of this study was to examine the psychological effects, if any, of anabolic steroids on the personality traits of male weight trainers as measured by the Millon Clinical Multiaxial Inventory-II ([MCMI-II], Millon, 1987). The measured personality traits of steroid using weight trainers will also be compared to weight trainers who have never used anabolic steroids.

Definition of Terms

The following definitions are offered:

**Anabolic steroids** are "artificial synthetic derivatives of the natural male steroid hormone, testosterone" (Taylor, 1982, p. 4). Also referred to as steroids
and androgens. "Anabolic relates to nitrogen retention and protein building, while androgenic refers to the production of masculine characteristics" (Darden, 1972, p. 25). Generic names of steroids referred to include methandrostolone, methyltestosterone, oxandrolone, and oxymetholone.

Catabolism is "any destructive process by which complex substances are converted by living cells into more simple compounds, with release of energy" (Dorland's Pocket Medical Dictionary, 1982, p. 127).

Corticosteroid is "any of the steroids elaborated by the adrenal cortex (excluding the sex hormones) or any synthetic equivalent" (Dorland's Pocket Medical Dictionary, 1982, p. 170).

Cortisol is "the major natural glucocorticoid elaborated by the adrenal cortex" (Dorland's Pocket Medical Dictionary, 1982, p. 170).

Erythrocyte is a "red blood cell or corpuscle" (Dorland's Pocket Medical Dictionary, 1982, p. 253).

Glucocorticoid is "predominantly involved in carbohydrate metabolism, and also in fat and protein metabolism and many other activities (e.g., alteration of connective tissue response to injury and inhibition of inflammatory and allergic reactions)" (Dorland's Pocket Medical Dictionary, 1982, p. 300).

Hypercalcemia is "an excess of calcium in the blood"
Hyperlipidemia is "a general term for elevated concentrations of any or all of the lipids in the plasma" (Dorland’s Pocket Medical Dictionary, 1982, p. 337).

Hypogonadal is decreased function of the gonads.

Myopathy is "any disease of muscle" (Dorland’s Pocket Medical Dictionary, 1982, p. 455).

Osteoporosis is "abnormal rarefaction of bone (Dorland’s Pocket Medical Dictionary, 1982, p. 508).

Personality trait is "some hypothesized underlying disposition or characteristic of a person that, in principle, can be used as an explanation of the regularities and consistencies of behavior" (Reber, 1985, p. 537).

SGOT refers to serum glutamic oxaloacetic transaminase, a liver function test.

Supertherapeutic refers to athletes ingesting exceedingly high dosages of anabolic steroids as compared to the suggested clinical dosages.

Objectives

The objectives of this study are as follows:

1. To determine if there is a difference between the measured personality traits of male weight trainers when using anabolic steroids and when not using anabolic steroids.

2. To determine if there is a difference between the
measured personality traits of male weight trainers when using anabolic steroids and male weight trainers who have never used anabolic steroids.

3. To determine if there is a difference between the measured personality traits of male weight trainers when not using anabolic steroids and male weight trainers who have never used anabolic steroids.

4. To provide information to psychologists, psychiatrists, physicians, athletes, and to the general public about the psychological effects of anabolic steroid use.

Specific Research Hypotheses

The following research hypotheses will be investigated (statistical hypotheses will be stated in Chapter III):

1. There is a difference in the measured personality traits of male weight trainers when using and not using anabolic steroids.

2. There is a difference between the measured personality traits of male weight trainers when using anabolic steroids and the traits of a comparable group of male weight trainers who have never used anabolic steroids.

3. There is a difference between the measured personality traits of male weight trainers when not using anabolic steroids and the traits of a comparable group of male weight trainers who have never used anabolic steroids.
CHAPTER II

REVIEW OF THE SELECTED LITERATURE

Although anabolic steroids became available in the 1930s, until recently interest in these drugs by scientists and clinicians was very limited. One of the initial medical uses of anabolic steroids occurred during the second world war when these drugs were used with starving concentration camp victims, in an effort to restore positive nitrogen balance (Hill, Suker, Sachs, & Brigham, 1983). In the early 1950s as the derivatives of testosterone became available for laboratory use and study, therapeutic trials in animals and man soon followed (Taylor, 1982).

Ultimately anabolic agents were used for osteoporosis, healing of fractures, severe burns, muscular dystrophy, patients recovering from illness and surgery, and for protein tissue building (Johnson & O'Shea, 1969). Kibble and Ross (1987) reported that the uses of anabolic steroids "include the treatment of anemia, hereditary angioedema, senile and post-menopausal osteoporosis, corticosteroid catabolism, and promotion of weight gain" (p. 686). Other medical applications of these drugs were discussed by Taylor (1982). These uses included using anabolic steroids: (a) during nutritional support for
patients suffering debilitating diseases, (b) as a
treatment for rheumatoid arthritis, (c) "following trauma
or major surgery ...[when there are] increased bodily
demands for protein and calories for use in wound healing
and energy production" (p. 57), (d) with patients with
primary bone marrow failure receiving chemotherapy, and
(e) with certain types of chronic anemias. Anabolic
steroids have also been used in boys with short stature to
promote skeletal maturation, in patients with hyperlipi-
demia, and as replacement therapy in men deficient in
androgens.

Use of Anabolic Steroids by Athletes

Limbird (1985) stated that man has always sought
ingredients to become the superior athlete and gain
advantage over competitors. The use of drugs among ath-
etes has become universal in the quest to improve
athletic performance particularly in light of the expand-
ing social and economic rewards associated with sporting
achievement. Greek athletes in the third century B.C.
ingested mushrooms and as early as the 19th century,
athletes the world over were using various substances such
as caffeine, alcohol, nitroglycerin, ethyl ether, strych-
nine, and opium for performance enhancement.

The first use of male steroids to improve performance
is said to have been in World War II, when German
troops took them before battle to enhance aggres-
siveness. The first use in athletes seems to have
been the Russians in 1954. (Wade, 1972, p. 1400)

During that time a team doctor from the United States recognized steroid use and began conducting tests on American athletes (Wade, cited in Haupt & Rovere, 1984). Since then steroid utilization has become increasingly popular among athletes (Haupt & Rovere, 1984). In fact anabolic steroid use by athletes desiring to enhance athletic performance has increased dramatically in the last two decades (Kibble & Ross, 1987). Using athletes believe that by taking anabolic steroids, muscle development and athletic performance will improve (Wilson & Griffin, 1980). Initially anabolic steroids were ingested only by weightlifters and bodybuilders but soon after participants in other sports began using the drugs (Wade, 1972).

Athletes having personal experience with steroid use state emphatically that their performance on the field or in the gym is improved. Most members of the medical and scientific communities are skeptical about steroid effects on athletic performance (Haupt & Rovere, 1984); however a leading physician and researcher in this area stated, "In order to determine the effects of these drugs, it is necessary...to understand this point: anabolic steroids do in fact enhance the performance, and alter the appearance, size and psychological make-up of the athletes who use them" (Taylor, 1985, p. 8).
There are inconsistencies throughout the literature that examine these effects. The American College of Sports Medicine (1977) reported the following: "There is no conclusive evidence that extremely large dosages of anabolic-androgenic steroids either aid or hinder athletic performance" (p. xi). Casner, Early, and Carlson (1971); Crist, Stackpole, and Peake (1983); Fahey and Brown (1973); Loughton and Ruhling (1977); and Stromme, Meen, and Aakvaag (1974) reported no increase in strength with anabolic steroid use.

Taking a different position, Taylor (1982) asserted that with anabolic steroid use, muscular strength and body size is enhanced, and that there is a concomitant reduction in the percentage of body fat, provided that weight training is intense and the diet is adequate especially in regard to the ingestion of protein and calories. Statistically significant increases in strength, body size or bodyweight was reported by Alen and Hakkinen (1985); Ariel (1972); Ariel (1974); Bowers and Reardon (1972); Freed, Banks, and Longson (1976); Johnson, Fisher, Silvester, and Hofheins (1972); Johnson and O'Shea (1969); O'Shea and Winkler (1970); Stamford and Moffatt (1974); and Ward (1973). Athletes using these drugs state unequivocally that their strength and performance is improved. Goldman (1984) suggested the possibility of placebo effect resulting in the athlete's self-perceived
improvement on the field and in the gym.

Physiological Consequences

The literature has also dealt with the side effects of anabolic steroid usage. These studies have focused predominantly on physiological side effects that can be substantiated through various medical tests. Many of the athletes who have used these drugs feel that the side effects are neither serious nor permanent (Haupt & Rovere, 1984).

Doctors and scientists point to reports of abnormal liver function, changes in the reproductive system as well as other physiological symptoms as evidence of the deleterious effects of anabolic steroids in chronic users (American College of Sports Medicine, 1977; Strauss, Wright, & Finerman, 1982). "The administration of anabolic-androgenic steroids to male humans may result in a decrease in testicular size and function and a decrease in sperm production" (American College of Sports Medicine, 1977, p. xi). Strauss et al. (1982) mentioned the effects of steroids on liver function resulted in abnormally high SGOT levels and also 40% testicular atrophy. Some of the other physiological side effects that have been reported include acne, headache, nausea, and dizziness (Freed et al., 1975) increased urine output, decreased and increased libido, muscle spasm (Johnson et al., 1972), and edema and
skin rash (Fahey & Brown, 1973).

In studies where side effects and changes were found, these effects disappeared once the steroids were discontinued. It should be noted that the side effects were reported on only a small number of athletes in each of the aforementioned studies.

Psychological Consequences

Published studies which address any psychological side effects have been few in number. Although there has been ample documentation of adverse medical effects resulting from anabolic steroid use by athletes, their psychiatric effects have rarely been investigated (Pope & Katz, 1988). It is suggested that the psychological effects of anabolic steroids should be given top priority in research funding and time (Cowart, 1989).

Taylor (1985) proposed that athletes using anabolic steroids have "potential mental advantages [which] include increases in: desire to train and excel; tolerance to pain; energy level; aggressive behavior; mental intensity—all adding up to a psychological high" (p.12). "Hormones clearly energize the individual and alter the mind" (Goldman, 1984, p. 80). Athletes taking anabolic steroids experience a state of euphoria which is motivational and enhances training and may lead to psychologically induced
improvements (Dyment, 1987; Lamb, 1984). Initially, the athlete using anabolic steroids feels exhilarated and strong but eventually a constant, tired feeling becomes prominent. This fatigue often results in users increasing the amount of steroids ingested. Amphetamines are used frequently to combat the lethargy (Goldman, 1984). Taylor (1987) suggested that athletes who self prescribe supertherapeutic doses of steroids frequently reported euphoria. However this euphoria can yield to depression upon cessation of the drugs.

All of a sudden the hormone flow stops, and with it goes all the synthetic energy and power. The artificial steroids have cut off the body supply by inhibiting normal secretions. Normal body testosterone has dropped below normal....All gains disappear within weeks....You see your body shrinking and growing weaker before your very eyes....Depression sets in as those around you comment that you do not look too good. (Goldman, 1984, p. 138)

Stamford and Moffatt (1974) reported irritability as a side effect of steroid use and Johnson et al. (1972) noted an increase in nervous tension. Strauss, Wright, Finerman and Catlin (1983) stated that a subjective increase in aggression was indicated by 56% of the athletes using steroids. In their review of the literature, Haupt and Rovere (1984) summarized that while utilizing anabolic steroids, approximately one third of the questioned athletes indicated subjective side effects and that upon cessation of the drugs the side effects
disappeared. Two of the most frequently reported side effects were changes in libido and increased aggressiveness.

Testosterone and Aggression

One topic that has been researched is the correlation between plasma testosterone levels and various aspects of aggressive and criminal behavior. Conflicting results have been obtained in recent studies that examined the relationship between plasma testosterone levels and aggressive and criminal behavior in the human male (Olweus, Mattsson, Schalling, & Low, 1980). Persky, Smith, and Basu (1971) found in normal young men (average age of 22 years old) a highly significant relationship between the production rate of testosterone and hostility and aggression indicators on the Buss-Durkee Hostility Inventory (1957). This relationship was not significant in a group of older men (average age of 45.1 years old).

In studies by Persky et al. (1971); Kreuz and Rose; Ehrenkrantz, Bliss, and Sheard; Doering, Brodie, Kraemer, Moos, Becker, and Hamburg; and Rada, Laws, and Kellbner (all cited in Olweus et al., 1980), positive relationships were found on certain dimensions of aggressive and criminal behavior and testosterone levels, yet in some of those same studies and in Monti, Brown, and Corriveau and Meyer-Bahlburg, Boon, Sharma, and Edwards (all cited
in Olweus et al., 1980) negative results on other aggression dimensions were obtained. Olweus et al. (1980) stated, "There may be a positive relationship between plasma testosterone levels and one or more aspects of aggression, assertiveness, and impulsivity" (p. 253). Their study revealed that in normal 16-year-old males, plasma testosterone levels were clearly related with aggression on dimensions reflecting intensity and/or frequency of aggressive responses to provocation and threat. Lack of frustration tolerance in adolescent males was also positively correlated with testosterone levels.

"Although definitive studies have yet been published, ...high serum androgen level can stimulate verbal and physical aggression and create a potential for violence....Unregulated use of steroids can raise serum androgen levels and thus create a potential for aggression" (Taylor, 1987, p. 146). Pope (cited in Lubell, 1989) stated that using anabolic steroids may contribute to violent acts being committed by people who would not have been violent if they were not using these drugs. In some instances, persons who became uncharacteristically aggressive had no self knowledge of how they changed.

A bodybuilder convicted of second-degree murder of his common-law wife had been using anabolic steroids for three months before the crime. Testimony at the trial indicated that he had become a changed man prior to the
fatal beating. The defendant had no prior psychiatric and/or criminal history (Conacher & Workman, D.G., 1989). Taylor and Black (cited in Taylor, 1987) found that in health club athletes using anabolic steroids, 90% of the subjects reported episodic overaggressiveness and violent behavior and attributed this behavior to the drugs.

Libstag (1987) measured aggression among steroid users with the Buss-Durkee Hostility Index (1957). Differences between control (drug-free weight trainers) and experimental groups (weight trainers who were self-administering anabolic steroids) indicated higher levels of aggressiveness for the steroid administered groups. In a similar vein, Rozenek (1986) found significant differences in anger-hostility scores (based on the Profile of Mood States questionnaire) between self administering steroid athletes and non-steroid lifters, runners, and sedentary controls.

**Anabolic Steroids and Other Psychological Side Effects**

Pope and Katz (1988) asserted that, "Although some studies have noted euphoria and irritability in association with anabolic steroid use, only four reports, to our knowledge, have described more serious psychiatric syndromes" (p. 487). Two patients requiring hospitalization for psychotic affective syndromes were described in Pope and Katz's 1987 letter (cited in Pope & Katz, 1988).
Within two weeks of ingesting methyltestosterone, 10 mg. b.i.d., for idiopathic impotence, a 40-year-old salesman experienced multiple psychiatric symptoms including hallucinations, delusions, severe depression, feelings of guilt, anorexia, sleep disorder, and psychomotor retardation. A 22-year-old man taking methandrostolone, 5 mg. t.i.d., for bodybuilding experienced irritability, confusion, and difficulty sleeping. Symptoms lasting four months following cessation of the anabolic steroid included depression, trouble sleeping, nightmares, chronic anxiety, and moderate agoraphobia. The authors contended that the ingestion of anabolic steroids may lead to affective and/or psychotic symptoms.

In a response to Pope and Katz, O'Carroll (1987) reported no observed differences on the ratings of ten mood scales when testosterone treatment was compared to a placebo in hypogonadal men. He suggested that additional controlled studies are needed to determine and clarify the relationship between steroid administration and effect.

Deciding to pursue this further Pope and Katz (1988) interviewed 41 bodybuilders and football players who had used steroids. *Diagnostic and Statistical Manual of Mental Disorders-Third Edition-Revised* (DSM-III-R, American Psychiatric Association, 1987) criteria for psychotic symptoms occurred in five subjects during steroid administration. Of these five, one subject experienced
auditory hallucinations for five weeks. Another developed paranoid delusions, and two experienced delusions of reference. The last subject developed the grandiose delusion that he could pick up a car and tip it over. During steroid exposure five subjects met DSM-III-R criteria for a manic episode, excluding the criteria regarding the organic etiology for the symptoms. One of these subjects purchased a $17,000 sports car he could not afford. Upon withdrawing from the drugs, five subjects developed major depression.

Research conducted by Rozenek (1986) revealed that self-administering steroid athletes had higher scores in total mood disturbance and confusion-bewilderment when compared to runners and sedentary control groups.

In three case reports, Pope and Katz (1990) described male weightlifters, with unremarkable psychiatric histories, who were involved with the legal system. The first subject, a prison security officer, "described himself, and presented on interview as mild-mannered, eager-to-please, and somewhat shy" (p. 28). While using steroids he experienced increasing self-confidence, irritability, aggressiveness, and near delusional grandiosity. Other symptoms included ideas of reference, paranoia, and occasional auditory and tactile hallucinations. This man was subsequently arrested and sentenced for forcing a woman into his car and shooting her in the spine when she
attempted to flee. Withdrawal of the steroids was abrupt after the arrest and the subject developed major depression, psychomotor agitation, and suicidal ideation. Another weightlifter without psychiatric history experienced severe mood changes while using anabolic steroids. Once infrequent arguments with his parents became common. "He reported that he would bite chunks out of aluminum cans and tear telephones off the wall to intimidate observers" (p. 29). At this time he met the DSM-III-R diagnostic criteria for a manic episode. This subject violently beat a hitchhiker to death. The third case report describes a 24-year-old weightlifter, also without psychiatric history, who had been using the steroid drugs intermittently since the age of 20. Described as a model citizen, this athlete became irritable and grandiose. While taking steroids "on two occasions he took a shotgun out with him in his car and shot at moving trucks or at lights" (p. 30). This subject was arrested for setting off a homemade explosive under his ex-fiancée's car. The authors asserted that the above cases suggest that the utilization of anabolic steroids may cause law-abiding individuals, without prior psychiatric histories, to develop psychiatric symptoms which may occasionally lead to violent crimes.

Annitto and Laymen (1980) described a 17-year-old male bodybuilder whose first and only acute schizophrenic
episode appeared to be associated with the use of illicitly obtained anabolic steroids. Six months after self-administering these drugs he felt uncomfortable, had difficulty sleeping, became confused, experienced ruminations, paranoid ideation, and audible thoughts. The authors postulated that there is no definite correlation between the use of anabolic steroids and the onset of psychiatric illness. However they conceded that the symptomology began six months after the bodybuilder began using the drugs and subsided with cessation. "We feel that the widespread use of illicit anabolic steroids by athletes, and their unwillingness to offer this information to consulting physicians, the possibility of such an exogenous etiology for severe psychic disturbances going unnoticed is very high" (p. 144).

A case report of anabolic steroid induced hypomania in a probable cyclothymic personality was presented by Freinhar and Alvarez (1985). They described a 27-year-old professional, Mr. A., who the previous year began a bodybuilding program. When he embarked on the exercise regimen he was given physical and psychiatric evaluations. All laboratory examinations were within normal limits. Psychiatric examination indicated a tendency towards the cycling of depression and hyperactivity without psychosis or severe dysfunction. Two weeks prior to his visit, Mr. A. decided to self administer anabolic
steroids (oxandrolone, 6 mg. b.i.d.). Within two days he began to feel irritable and hyperactive and experienced a decreasing need for sleep. The following week Mr. A began to feel euphoric and experienced racing thoughts. He was given an initial diagnosis of steroid-induced hypomania. All the symptoms abated within three to four days once the drug was discontinued. Mr. A., a week later, began ingesting a different type of anabolic steroid (oxymetholone) and the hypomanic symptoms returned. The authors believed that the patient experienced a true case of steroid-induced hypomania. Although Mr. A had an underlying predisposition towards cyclothymia, upon cessation of the drugs all the symptoms were alleviated. After reintroducing the steroids the symptoms reappeared.

Wilson, Prange, and Lara (1974) found in previous studies that men responded to the anti-depressant imipramine in less time than women. Along these lines they investigated whether being "more male" (p. 21) could possibly increase the response to this anti-depressant. Treating five consecutive unipolar depressed men with imipramine, they also added methyltestosterone, a synthetic form of the male hormone testosterone. The authors reported that their patients did appear to recover from depression more quickly but other complications occurred. Four of the five men became acutely delusional. Upon cessation of treatment with the hormone, the delusional
ideation rapidly subsided. The authors admitted that paranoid trends can be seen in severe depression. However they believed that the synthetic testosterone was a significant factor as the paranoid symptoms halted with the cessation of the drug.

Psychological disturbances are probably the most common adverse effects of anabolic steroid usage by association. They usually take the form of aggressiveness, changes in mood (elevations and depressions), and rarely, actual psychotic illness. The incidence of these disturbances is difficult to determine, and many athletes tend to deny that they may be afflicted in this manner. Usually these disturbances are reversible and revert to a normal state after stopping an anabolic steroid regimen. (Taylor, 1982, p. 68)

Taylor (1987) considered years of bodybuilding and steroid abuse as representing a task-oriented (weight training) addiction. "Mechanisms that contribute to steroid habituation and addiction include several physiological and psychological influences and associated withdrawal phenomena" (p. 142). He confirms his beliefs to reclassify anabolic steroids as a control substance by proposing that these drugs can cause withdrawal depression and other withdrawal phenomena, and can induce aggressive, violent, and criminal behavior.

Goldman (1984) suggested that athletes may become psychologically addicted to anabolic steroids in the belief that if their competitors are using these drugs they must also. After deciding to use these drugs athletes may become convinced they cannot perform drug-
free. Any athletic success is attributed to the steroids and continuance of usage with higher dosages may occur.

After using steroids for three years, a 23 year old bodybuilder reported being addicted to the drugs "experiencing withdrawal symptoms, depression, and disabling fatigue" (Tennant, Black, and Voy, 1988, p. 578) when trying to abstain from using them. Uncontrollable violence, paranoia, and suicidal feelings were also experienced.

Brower, Blow, Beresford, and Fuelling (1989) discussed a case report where a 24-year-old noncompetitive weightlifter, complaining of depression and increased anger outbursts, also experienced fleeting suicidal thoughts. Using a number of different steroids simultaneously, other symptoms included mood swings of elation and irritability. He and his wife separated due to his uncontrolled temperamental outbursts. This young man presented himself to a psychiatric emergency room requesting professional help due to his inability to stop using the drugs on his own. Any attempts at stopping or reducing the dosage would result in depression, feeling unenergetic, fatigued, and weak. While using the drugs his energy level was high, he needed less sleep, and he believed his appearance and performance were enhanced. The authors stated that this patient met six of the nine DSM-III-R criteria for a diagnosis of psychoactive
A 22-year-old male weightlifter was admitted to a chemical dependency clinic because he was unable to stop using steroids. During drug usage he complained of depression, low energy, and sleeplessness, irritability, and problems in family relations due to temper outbursts. When off the drugs he experienced a craving for the steroids and lower self-esteem. After one week in treatment his mood improved (Hays, Littleton, & Stillner, 1990).

Kashkin and Kleber (1989) contended that some steroid abusers may develop, what has not been previously recognized, "sex hormone-dependence disorder" (p. 3166). The authors suggested that anabolic steroids may be similar in psychoactive properties, "withdrawal symptoms, and underlying biologic mechanisms" (p. 3169) to other mood altering substances with complications accompanying abuse.

Presently it is not known whether psychological changes in male athletes can be attributed directly to steroid use or if steroids contribute to the uncovering of potential manifestations. "More likely, however, is that anabolic steroids tend to cause a shift in the entire psychological balance within the man athlete" (Taylor, 1985, p. 16).

As one anonymous pro bodybuilder explained (cited in...
Using this stuff [steroids] makes you neurotic. I entered four pro shows this year and I started with it, and haven't been off it for a long time because of the constant competition and shows...one after the other. I've been on it for a good part of the year. Anyone who goes on the stuff...your attitude changes, you get nasty...get real mad easy. I'm coming off now and I am very upset, depressed. My body feels lousy and my workouts are terrible. I lost a lot of drive. I lost my psych to work out hard and train. When you really clean up your system, you get really paranoid;...you feel like you're shrinking, you get very upset. This is what I am going through right now. It's a dramatic mental change. People notice and say, "you don't look so good." I don't want to go back on the stuff, I want to clean out my system. Some of those guys really go overboard. The kids are going nuts...young kids on junk. No one is putting a gun to my head, but I am being forced indirectly because everyone else is taking it. To tell you the truth, I'm gonna experiment without it in next year's pro shows....I really want to stop...bad. (p. 136-138)

To summarize, studies reporting the psychological side effects related to the use of anabolic steroids have been few in number. The side effects have been reported subjectively by relatively few athletes in proportion to the ever growing number of competitive and noncompetitive athletes using these drugs.

Perhaps the most evident psychological side effect has been an increase in aggression (Libstag, 1987; Olweus et al., 1980; Persky et al., 1971; Rozenek, 1986; Strauss et al., 1983; Taylor, 1987). Other subjectively reported psychological side effects include a state of euphoria which is motivational and enhances training (Dyment, 1987; Lamb, 1984); irritability (Stamford & Moffatt, 1974); an
increase in nervous tension (Johnson et al., 1972), and
depression upon cessation of the drugs (Goldman, 1984;
Taylor, 1987).

Pope and Katz (1990) discussed three male
weightlifters who committed violent crimes including
murder while using anabolic steroids. None of the
subjects had premorbid psychiatric histories nor evidence
of antisocial behavior. The same authors (1988) observed
some of the more serious psychiatric syndromes in males
who ingested anabolic steroids, including severe
depression, sleep disorder, anorexia, psychomotor retarda-
tion, manic episodes, feelings of guilt, paranoid delus-
ions, grandiose delusion, delusions of reference, and
visual and auditory hallucinations. They also reported
that another patient experienced depression, insomnia,
nightmares, chronic anxiety, and moderate agoraphobia.

Annitto and Laymen (1980) discussed one athlete who
experienced an acute schizophrenic episode with symptoms
including poor sleep, thought confusion, ruminations,
paranoid ideation, and audible thoughts. Freinhar and
Alvarez (1985) had a patient who experienced hypomania.

Littleton and Stillner (1990), Brower et al. (1989),
Rashkin and Kleber (1989), Tennant et al. (1988), Taylor
(1987), and Goldman (1984) discussed their thoughts on the
addictive nature associated with anabolic steroid
utilization.
The incidence of the more serious psychiatric syndromes as described above is very limited when the millions of competitive and noncompetitive athletes that are estimated to be using anabolic steroids is considered. Of the many athletes known to the researcher who have used these drugs, most doubt that the reported psychiatric syndromes can be directly attributed to steroid use. With reference to the studies above, it may be speculated that the drugs unmask psychiatric conditions that are present but not severe enough to require treatment prior to steroid use. Another possibility is that anabolic steroids exacerbate a genetic predisposition to the psychic manifestations observed. In fact O'Carroll (1987) reported no significant differences on various mood scales when testosterone treatment was compared to a placebo in hypogonadal men. Taylor (1982) stated, "The incidence of these disturbances is difficult to determine, and many athletes tend to deny that they may have been afflicted in this manner" (p. 68).

It is evident that anabolic steroid usage has become an increasingly preferred method for enhancing athletic performance and muscular development and the frequency of steroid use is on the rise. It is also evident that the physiological consequences of steroid usage have been examined in detail by a large number of researchers. Future studies should focus on the psychological
consequences. It is in this context that the present study was conducted.

Limitations

Sources of invalidity include the following:

1. Due to the limited number of subjects available, the number of statistical differences that may be found might be altered if the sample size were to be increased.

2. Due to the limited number of subjects available, it is questionable whether any statistical differences that may be found can be generalized to all weight trainers using anabolic steroids.

3. In the absence of randomization, the possibility always exists that some critical difference, not reflected in the first testing, is operating to contaminate the second testing (Isaac & Michael, 1987).

4. Since the majority of male weight trainers in this study are competitive athletes and are using anabolic steroids for contest preparation, it may be hypothesized that any psychological changes observed between the first and second test administrations may reflect their goal-directed behavior. The majority of male weight trainers who have never used anabolic steroids in this study are not competitive athletes.

5. Only through the male weight trainer's self report to the contact person will the researcher know whether an
athlete is, in fact, using anabolic steroids or is off anabolic steroids and whether the weight trainers who have never used anabolic steroids have always been drug-free. Actual verification is not possible.

6. There are current limitations of psychometric measuring instruments with respect to validity and reliability.
CHAPTER III

METHOD

Subject Selection

The increase in public awareness and negative media coverage mitigated against finding subjects for the present study. As would be anticipated, it was difficult to find weight trainers who would admit to using anabolic steroids as part of their training regimen and to agree to participate in this study. In order to overcome this barrier, the researcher utilized two personal contacts who were acquainted with male weight trainers who reportedly use anabolic steroids as part of their training regimen and who were willing to be part of this research. These same liaison individuals also had knowledge (by self report) of male weight trainers who have never used these drugs and who were also willing to be research subjects.

The researcher initially telephoned the personal contacts and explained the nature of the proposed project and the need for research subjects. These individuals responded favorably and said they would attempt to enlist the cooperation of both users and non-users in collecting data for the study. The two contact persons recruited 18 research subjects (nine who used steroids and nine who
have always trained drug-free) and 12 research subjects (six who used steroids and six who have always trained drug-free) respectively. As a result of their efforts a total of 30 subjects participated; 15 subjects who were using anabolic steroids and 15 who have never used the drugs. All the research subjects were members of various fitness centers or gyms in the upper midwestern United States.

The subjects in the experimental group utilized anabolic steroids for training enhancement. They provided demographic data (see Table 1) which included ranges in age (23-31 years old), bodyweight (190-244 lbs.), and number of years involved in weight training (5-12). Experimental subjects also reported, the number of weeks they had been using the drugs (13-25), their weekly dosage of steroids administered (100-1500 milligrams), and the number of previous steroid cycles experienced (2-11). All this information was provided at the time of the first testing with the MCMI-II. In addition at the time of the second testing with the MCMI-II, these subjects reported the number of weeks they were off anabolic steroids (7-14).

The subjects in the comparison group had never used anabolic steroids. They provided demographic data (see Table 1) which included ranges in age (21-44 years old), bodyweight (153-213 lbs.), and the number in years
involved in weight training (2-22). Eighty percent of the steroid users and about 27% of the non-users were training for a competition at the time of the first administration of the MCMI-II. At the second testing of the MCMI-II none of the test subjects was training for a competition.

Table 1

Group Mean Demographics of the Study Subjects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental group</th>
<th>Comparison group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 15</td>
<td>N = 15</td>
</tr>
<tr>
<td>Age</td>
<td>26.334 yrs.</td>
<td>30.4 yrs.</td>
</tr>
<tr>
<td>Bodyweight</td>
<td>210.33 lbs.</td>
<td>183.33 lbs.</td>
</tr>
<tr>
<td># years of weight training</td>
<td>8.6</td>
<td>7.067</td>
</tr>
<tr>
<td># weeks on steroids when test one of the MCMI-II was administered</td>
<td>18.533</td>
<td>N/A</td>
</tr>
<tr>
<td>Mgs. of steroids used during the week when test one of the MCMI-II was administered</td>
<td>59.5*</td>
<td>N/A</td>
</tr>
<tr>
<td># of steroid cycles experienced prior to the cycle when test one of the MCMI-II was administered</td>
<td>7.091**</td>
<td>N/A</td>
</tr>
<tr>
<td># weeks not using anabolic steroids when test two of the MCMI-II was administered</td>
<td>10.867</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note. # = number; yrs. = years; lbs. = pounds; N/A = not applicable; Mgs. = milligrams; * = 10 of 15 subjects responded; ** = 11 of 15 subjects responded.
Additionally, 40% of the users and about 27% of the drug free weight trainers were on a reduced calorie diet at the first MCMI-II administration. During the second test administration, none of the subjects was dieting. All demographic data provided were through subject self report and were not verified by the personal contacts or the researcher.

Instrumentation

The Millon Clinical Multiaxial Inventory-II ([MCMI-II], Millon, 1987) was the instrument used to examine the personality factors in this study. The inventory consists of 175 items to which the examinee responds true or false. "Each of the 22 clinical scales was constructed as an operational measure of a syndrome derived from a theory of personality and psychopathology" (p. 3). Constructed in line with the Diagnostic and Statistical Manual of Mental Disorders-Third Edition ([DSM-III], American Psychiatric Association, 1980), "profiles based on all 22 clinical scales illuminate the interplay between the long-standing characterological patterns and the distinctive clinical symptomology a patient manifests under psychic stress" (Millon, 1987, p. 4). The scales were also constructed to indicate levels of psychopathology. In addition, the MCMI-II contains three modifier and correction indices scales which addresses the "response
Because the inventory scales were normed on a clinical population, adjustments had to be made for the purpose of statistical analysis. "Normative data and transformation scores for the MCMI-II are based entirely on clinical samples and are applicable only to persons who evidence psychological symptoms or are engaged in a program of professional psychotherapy or psychodiagnostic evaluation" (Millon, 1987, p. 7). Since the research subjects involved in this study were considered a non-clinical population, only the raw scores of the various MCMI-II scales were used as the absolute measure of change. If any significant statistical differences were found, the raw score analyses served to identify trends and/or changes in the personality traits of the subjects (T. Millon, personal communication, April 3, 1989). It should be emphasized that the MCMI-II scales were not used for diagnostic or interpretive purposes (K. Anderson, personal communication, April 3, 1989).

The inventory provides three modifier indices scales: (X) Disclosure, (Y) Desirability, and (Z) Debasement. The 10 clinical personality pattern scales include: (1) Schizoid, (2) Avoidant, (3) Dependent, (4) Histrionic, (5) Narcissistic, (6A) Antisocial, (6B) Aggressive/Sadistic, (7) Compulsive, (8A) Passive-Aggressive, and (8B) Self-Defeating. Three severe personality pathology
scales include: (S) Schizotypal, (C) Borderline, and (P) Paranoid. Six clinical syndrome scales include: (A) Anxiety, (H) Somatoform, (N) Bipolar: Manic, (D) Dysthymia, (B) Alcohol Dependence, and (T) Drug Dependence. Three severe syndrome scales include: (SS) Thought Disorder, (CC) Major Depression, and (PP) Delusional Disorder. Retest reliabilities on non-clinical population samples range from .78 to .91.

A brief summary of the 25 MCMI-II scales and what they purport to measure appears in Appendix A.

Procedures

The proposed project was considered quasi-experimental (Isaac & Michael, 1981) research with the purpose: "to approximate the conditions of the true experiment in a setting which does not allow the control and/or manipulation of all relevant variables" (p. 54). Approval for this research was granted by the Human Subjects Institutional Review Board on March 17, 1989 (see Appendix B).

The independent variable was the use of anabolic steroids by male weight trainers. For ethical reasons the researcher could neither control the type or dosages of steroids individual weight trainers employed. The subjects were either self administering the anabolic steroids or receiving treatment from their personal physicians. The
dependent variables were the clinical personality pattern scales, the severe personality scales, the clinical syndrome scales, and the severe syndrome scales embodied in the Millon Clinical Multiaxial Inventory-II (Millon, 1987). Statistical analysis was used to test the null hypotheses.

Due to the lack of control over which subjects were using anabolic steroids and those who never used them, random assignment was not possible and static groups were formed. The "experimental" group consisted of those subjects who were using anabolic steroids as part of their training regimen. The "comparison" group consisted of those subjects who have never used the drugs.

A letter was sent to the two contact persons which described the procedures to be followed with regard to subject selection, the administration of the test, assurance of confidentiality, and a description of the contents of the test packets. A copy of the letter appears in Appendix C. Test packets were then sent to the personal contacts by mail and were distributed by them to the research subjects. Immediately prior to the first test administration, study participants were given an instruction sheet (see Appendix D) containing explicit directions for filling out the demographic data form (see Appendix E) and the MCMI-II (see Appendix F). The subjects were permitted to respond to the MCMI-II at home.
After completing the MCMI-II the subjects returned the inventory to the contact persons who then mailed them back to the researcher.

At the time of the first testing, each weight trainer in the experimental group had been administering anabolic steroids for a minimum of six weeks. The only criteria for the comparison group subjects were that they were and always have trained steroid-free. For the second test administration, the entire process was repeated and initiated at a time when each subject in the experimental group had been off anabolic steroids for at least six weeks. The control group subjects were also retested at this time.

**Statistical Hypotheses**

The following hypotheses stated in null form were tested:

**H01:** No statistically significant differences will be found in the scores between male weight trainers using anabolic steroids and when the same male weight trainers are not using the drugs on the following scales of the MCMI-II: (a) modifier indices scales, (b) clinical personality pattern scales, (c) severe personality pathology scales, (d) clinical syndrome scales, and (e) severe syndrome scales.

**H02:** No statistically significant differences will be
found in the scores between male weight trainers using anabolic steroids and male weight trainers who have never used the drugs on the following scales of the MCMI-II: (a) modifier indices scales, (b) clinical personality pattern scales, (c) severe personality pathology scales, (d) clinical syndrome scales, and (e) severe syndrome scales.

H03: No statistically significant differences will be found in the scores between male weight trainers not using anabolic steroids and male weight trainers who have never used the drugs on the following scales of the MCMI-II: (a) modifier indices scales, (b) clinical personality pattern scales, (c) severe personality pathology scales, (d) clinical syndrome scales, and (e) severe syndrome scales.

H04: No statistically significant differences will be found in the scores between the two test administrations completed by the male weight trainers who have never used anabolic steroids on the following scales of the MCMI-II: (a) modifier indices scales, (b) clinical personality pattern scales, (c) severe personality pathology scales, (d) clinical syndrome scales, and (e) severe syndrome scales.

Data Analysis

Because of the small sample and since the assumptions for parametric tests could not be met in the present study, non-parametric statistics were employed for the
purpose of statistical analyses. Assumptions that could not be met included normal distribution of the population, equal variances of the population, and random selection of the subjects. To meet these limitations, the MCMI-II scale scores were considered to be ordinal data. The Mann-Whitney U test was utilized to test all statistical hypotheses. Since this is an exploratory study, the .05 level of statistical significance was chosen as the rejection level for all null hypotheses to eliminate the possibility of Type II error.
CHAPTER IV

RESULTS

This study attempted to determine the effects anabolic steroids had on the personalities of male weight trainers. Three major comparisons which helped determine the effects of steroid use were conducted. A comparison of: (1) the personality characteristics of the same male weight trainers while administering anabolic steroids and when training without the drugs, (2) the personality characteristics of male weight trainers administering anabolic steroids and male weight trainers who have never used the drugs, and (3) the personality characteristics of male weight trainers who were not using anabolic steroids and male weight trainers who have never used the drugs, was undertaken. Additionally, for purposes of comparison the same male weight trainers who have never used the drugs were tested on two different occasions.

As stated in Chapter III the effects of the independent variable, anabolic steroids, on the personalities of male weight trainers were determined by examining the rank order of the scores by the experimental and comparison groups via the 25 scales measured by the Millon Clinical Multiaxial Inventory-II ([MCMI-II], Millon, 1987). Statistical treatment of the data, to determine
differences among the groups on the MCMI-II, was accomplished by the Mann-Whitney \( U \) test. The .05 level of significance was chosen for all statistical analyses and was used to accept or reject the null hypotheses investigated. At the time of the initial test administration of the MCMI-II, to be included in the experimental group, subjects had to be administering anabolic steroids for a minimum of six weeks. At the second test administration, six weeks was the minimum amount of time they had to be drug-free. Members of the comparison group (those who never used anabolic steroids) were tested at the same time.

Outcomes

In order to test Null Hypothesis 1, data from the experimental group were utilized. The Mann-Whitney \( U \) test was computed between the rank order of the 25 scale scores of the MCMI-II obtained by the male weight trainers when using anabolic steroids and when off the drugs. The results of the analyses are presented in Table 2. Significant differences were found on Modifier Indices Scales: (X) Disclosure, (Z) Debasement; Clinical Personality Scales: (8A) Passive Aggressive, (8B) Self-Defeating; Severe Personality Pathology Scales: (C) Borderline; Clinical Syndrome Scales: (H) Somatoform, (D) Dysthymia, (B) Alcohol Dependence, (T) Drug Dependence;
and Severe Syndrome Scale: (CC) Major Depression.

Table 2

Mann-Whitney U Test for Differences Between Male Weight Trainers Using Anabolic Steroids and When They Were Not Using the Drugs on the MCMI-II Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>U</th>
<th>W</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modifier Indices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(X) Disclosure</td>
<td>57</td>
<td>288</td>
<td>-2.3023</td>
<td>.0213*</td>
</tr>
<tr>
<td>(Y) Desirability</td>
<td>110.5</td>
<td>230.5</td>
<td>- .0839</td>
<td>.9331</td>
</tr>
<tr>
<td>(Z) Debasement</td>
<td>55.5</td>
<td>289.5</td>
<td>-2.3748</td>
<td>.0176*</td>
</tr>
<tr>
<td>Clinical Personality Pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Schizoid</td>
<td>93.5</td>
<td>251.5</td>
<td>- .7890</td>
<td>.4301</td>
</tr>
<tr>
<td>(2) Avoidant</td>
<td>88</td>
<td>257</td>
<td>-1.0183</td>
<td>.3086</td>
</tr>
<tr>
<td>(3) Dependent</td>
<td>100.5</td>
<td>244.5</td>
<td>- .4990</td>
<td>.6178</td>
</tr>
<tr>
<td>(4) Histrionic</td>
<td>111</td>
<td>234</td>
<td>- .0823</td>
<td>.9503</td>
</tr>
<tr>
<td>(5) Narcissistic</td>
<td>96</td>
<td>249</td>
<td>- .6851</td>
<td>.4933</td>
</tr>
<tr>
<td>(6A) Anti-Social</td>
<td>69</td>
<td>276</td>
<td>-1.8061</td>
<td>.0709</td>
</tr>
<tr>
<td>(6B) Aggressive/Sadistic</td>
<td>77.5</td>
<td>267.5</td>
<td>-1.4535</td>
<td>.1461</td>
</tr>
<tr>
<td>(7) Compulsive</td>
<td>89.5</td>
<td>209.5</td>
<td>- .9557</td>
<td>.3392</td>
</tr>
<tr>
<td>(8A) Passive Aggressive</td>
<td>44.5</td>
<td>300.5</td>
<td>-2.8230</td>
<td>.0048*</td>
</tr>
<tr>
<td>(8B) Self-Defeating</td>
<td>61.5</td>
<td>283.5</td>
<td>-2.1218</td>
<td>.0339*</td>
</tr>
<tr>
<td>Severe Personality Pathology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S) Schizotypal</td>
<td>87</td>
<td>258</td>
<td>-1.0616</td>
<td>.2884</td>
</tr>
<tr>
<td>(C) Borderline</td>
<td>30.5</td>
<td>314.5</td>
<td>-3.4031</td>
<td>.0007*</td>
</tr>
<tr>
<td>(P) Paranoid</td>
<td>106.0</td>
<td>239</td>
<td>- .2701</td>
<td>.7871</td>
</tr>
</tbody>
</table>

Clinical Syndrome

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Table 2--Continued

<table>
<thead>
<tr>
<th>Scale</th>
<th>U</th>
<th>W</th>
<th>Z</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Anxiety</td>
<td>77</td>
<td>268</td>
<td>-1.4774</td>
<td>.1396</td>
</tr>
<tr>
<td>(H) Somatoform</td>
<td>50.5</td>
<td>294.5</td>
<td>-2.5788</td>
<td>.0099*</td>
</tr>
<tr>
<td>(N) Bipolar:Manic</td>
<td>79.5</td>
<td>265.5</td>
<td>-1.3711</td>
<td>.1704</td>
</tr>
<tr>
<td>(D) Dysthymia</td>
<td>46.5</td>
<td>298.5</td>
<td>-2.7458</td>
<td>.0060*</td>
</tr>
<tr>
<td>(B) Alcohol Dependence</td>
<td>41</td>
<td>304</td>
<td>-2.9776</td>
<td>.0029*</td>
</tr>
<tr>
<td>(T) Drug Dependence</td>
<td>56.5</td>
<td>288.5</td>
<td>-2.3248</td>
<td>.0201*</td>
</tr>
<tr>
<td>Severe Syndrome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS) Thought Disorder</td>
<td>66</td>
<td>279</td>
<td>-1.9354</td>
<td>.0529</td>
</tr>
<tr>
<td>(CC) Major Depression</td>
<td>60.5</td>
<td>284.5</td>
<td>-2.1651</td>
<td>.0304*</td>
</tr>
<tr>
<td>(PP) Delusional Disorder</td>
<td>96</td>
<td>216</td>
<td>- .6879</td>
<td>.4915</td>
</tr>
</tbody>
</table>

*p < .05

The inspection of Table 2 indicates that Null Hypothesis 1 was rejected on 10 scales of the MCMI-II. This would indicate that male weight trainers, on some personality dimensions, differ when using and not using anabolic steroids (p < .05). Null Hypothesis 1 of no differences in measured personality traits was retained on the remaining 15 scales at the .05 level of significance.

In order to test Null Hypothesis 2, data from the experimental and comparison groups were utilized. The Mann-Whitney U test was computed between the rank order of the 25 scale scores of the MCMI-II obtained by the male
weight trainers using anabolic steroids and male weight trainers who never used the drugs. The results of the analyses are presented in Table 3. Significant differences were found on Modifier Indices Scales: (X) Disclosure, (Z) Debasement; Clinical Personality Scales: (1) Schizoid, (2) Avoidant, (4) Histrionic, (5) Narcissistic, (6A) Anti-Social, (6B) Aggressive/Sadistic, (8A) Passive Aggressive, (8B) Self-Defeating; Severe Personality Pathology Scales: (S) Schizotypal, (C) Borderline, (P) Paranoid; Clinical Syndrome Scales: (A) Anxiety, (H) Somatoform, (N) Bipolar:Manic, (D) Dysthymia, (B) Alcohol Dependence, (T) Drug Dependence; and Severe Syndrome Scales:

Table 3

Mann-Whitney U Test for Differences Between Male Weight Trainers Using Anabolic Steroids and Male Weight Trainers Who Have Never Used the Drugs on the MCMI-II Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>U</th>
<th>W</th>
<th>z</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modifier Indices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(X) Disclosure</td>
<td>17.5</td>
<td>327.5</td>
<td>-3.9413</td>
<td>.0001*</td>
</tr>
<tr>
<td>(Y) Desirability</td>
<td>88</td>
<td>257</td>
<td>-1.0249</td>
<td>.3054</td>
</tr>
<tr>
<td>(Z) Debasement</td>
<td>30.5</td>
<td>314.5</td>
<td>-3.4444</td>
<td>.0006*</td>
</tr>
<tr>
<td>Clinical Personality Pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Schizoid</td>
<td>51.5</td>
<td>291.5</td>
<td>-2.5401</td>
<td>.0111*</td>
</tr>
<tr>
<td>(2) Avoidant</td>
<td>30.5</td>
<td>314.5</td>
<td>-3.4180</td>
<td>.0006*</td>
</tr>
<tr>
<td>(3) Dependent</td>
<td>109.5</td>
<td>235.5</td>
<td>- .1248</td>
<td>.9007</td>
</tr>
<tr>
<td>Scale</td>
<td>U</td>
<td>W</td>
<td>z</td>
<td>p</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------</td>
<td>------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>(4) Histrionic</td>
<td>58.5</td>
<td>286.5</td>
<td>-2.2458</td>
<td>.0247*</td>
</tr>
<tr>
<td>(5) Narcissistic</td>
<td>29.5</td>
<td>315.5</td>
<td>-3.4488</td>
<td>.0006*</td>
</tr>
<tr>
<td>(6A) Anti-Social</td>
<td>28</td>
<td>317</td>
<td>-3.5088</td>
<td>.0005*</td>
</tr>
<tr>
<td>(6B) Aggressive/Sadistic</td>
<td>23.5</td>
<td>321.5</td>
<td>-3.6973</td>
<td>.0002*</td>
</tr>
<tr>
<td>(7) Compulsive</td>
<td>28</td>
<td>317</td>
<td>-3.5086</td>
<td>.0005*</td>
</tr>
<tr>
<td>(8A) Passive Aggressive</td>
<td>28</td>
<td>317</td>
<td>-3.4758</td>
<td>.0005*</td>
</tr>
<tr>
<td>(8B) Self-Defeating</td>
<td>29</td>
<td>316</td>
<td>-3.4758</td>
<td>.0005*</td>
</tr>
<tr>
<td>Severe Personality Pathology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S) Schizotypal</td>
<td>21</td>
<td>324</td>
<td>-3.8161</td>
<td>.0001*</td>
</tr>
<tr>
<td>(C) Borderline</td>
<td>13</td>
<td>332</td>
<td>-4.1298</td>
<td>.0000*</td>
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<tr>
<td>(P) Paranoid</td>
<td>41</td>
<td>304</td>
<td>-2.9170</td>
<td>.0030*</td>
</tr>
<tr>
<td>Clinical Syndrome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Anxiety</td>
<td>56</td>
<td>289</td>
<td>-2.3689</td>
<td>.0178*</td>
</tr>
<tr>
<td>(H) Somatoform</td>
<td>29.5</td>
<td>315.5</td>
<td>-3.4504</td>
<td>.0006*</td>
</tr>
<tr>
<td>(N) Bipolar:Manic</td>
<td>24.5</td>
<td>320.5</td>
<td>-3.6550</td>
<td>.0003*</td>
</tr>
<tr>
<td>(D) Dysthymia</td>
<td>48.5</td>
<td>296.5</td>
<td>-2.6641</td>
<td>.0077*</td>
</tr>
<tr>
<td>(B) Alcohol Dependence</td>
<td>15.5</td>
<td>329.5</td>
<td>-4.0337</td>
<td>.0001*</td>
</tr>
<tr>
<td>(T) Drug Dependence</td>
<td>14</td>
<td>331</td>
<td>-4.0892</td>
<td>.0000*</td>
</tr>
<tr>
<td>Severe Syndrome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS) Thought Disorder</td>
<td>22</td>
<td>323</td>
<td>-3.7855</td>
<td>.0002*</td>
</tr>
<tr>
<td>(CC) Major Depression</td>
<td>31</td>
<td>314</td>
<td>-3.4175</td>
<td>.0006*</td>
</tr>
<tr>
<td>(PP) Delusional Disorder</td>
<td>41.5</td>
<td>303.5</td>
<td>-2.9568</td>
<td>.0031*</td>
</tr>
</tbody>
</table>

*p < .05

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(SS) Thought Disorder, (CC) Major Depression, (PP) Delusional Disorder.

The inspection of Table 3 indicates that Null Hypothesis 2 was rejected on 22 scales of the MCMI-II. This would indicate that male weight trainers using anabolic steroids, on almost all personality dimensions, differ when compared to the male weight trainers who have never used anabolic steroids ($p < .05$). Null Hypothesis 2 of no differences in measured personality traits was retained on the remaining three scales at the .05 level of significance.

In order to test Null Hypothesis 3, data from the experimental and comparison groups were utilized. The Mann-Whitney $U$ test was computed between the rank order of the 25 scale scores of the MCMI-II obtained by the male weight trainers who were off anabolic steroids and male weight trainers who have never used the drugs. The results of the analyses are presented in Table 4. Significant differences were found on Modifier Indices Scales: (X) Disclosure, (Z) Debasement; Clinical Personality Scales: (2) Avoidant, (5) Narcissistic, (5B) Aggressive/Sadistic, (8A) Passive Aggressive, (8B) Self-Defeating; Severe Personality Pathology Scales: (S) Schizotypal, (C) Borderline, (P) Paranoid; Clinical Syndrome Scales: (A) Anxiety, (H) Somatoform, (N) Bipolar:Manic, (T) Drugs; and
Severe Syndrome Scales: (SS) Thought Disorder, (CC) Major Depression, (PP) Delusional Disorder.

Table 4

Mann-Whitney U Test for Differences Between Male Weight Trainers Who Were Not Using Anabolic Steroids and Male Weight Trainers Who Have Never Used the Drugs on the MCMI-II Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>U</th>
<th>W</th>
<th>Z</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modifier Indices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(X) Disclosure</td>
<td>46.5</td>
<td>298.5</td>
<td>-2.7382</td>
<td>.0062*</td>
</tr>
<tr>
<td>(Y) Desirability</td>
<td>92.5</td>
<td>252.5</td>
<td>- .8350</td>
<td>.4037</td>
</tr>
<tr>
<td>(Z) Debasement</td>
<td>42.5</td>
<td>302.5</td>
<td>-2.9867</td>
<td>.0028*</td>
</tr>
<tr>
<td>Clinical Personality Pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Schizoid</td>
<td>103</td>
<td>242</td>
<td>- .3951</td>
<td>.7082</td>
</tr>
<tr>
<td>(2) Avoidant</td>
<td>57.5</td>
<td>287.5</td>
<td>-2.2884</td>
<td>.0221*</td>
</tr>
<tr>
<td>(3) Dependent</td>
<td>106.5</td>
<td>226.5</td>
<td>- .2497</td>
<td>.8028</td>
</tr>
<tr>
<td>(4) Histrionic</td>
<td>80</td>
<td>265</td>
<td>-1.3506</td>
<td>.1768</td>
</tr>
<tr>
<td>(5) Narcissistic</td>
<td>64.5</td>
<td>280.5</td>
<td>-1.9932</td>
<td>.0462*</td>
</tr>
<tr>
<td>(6A) Anti-Social</td>
<td>68</td>
<td>277</td>
<td>-1.8478</td>
<td>.0646</td>
</tr>
<tr>
<td>(6B) Aggressive/Sadistic</td>
<td>62</td>
<td>283</td>
<td>-2.0972</td>
<td>.0360*</td>
</tr>
<tr>
<td>(7) Compulsive</td>
<td>87</td>
<td>258</td>
<td>-1.0597</td>
<td>.2893</td>
</tr>
<tr>
<td>(8A) Passive Aggressive</td>
<td>63.5</td>
<td>281.5</td>
<td>-2.0347</td>
<td>.0419*</td>
</tr>
<tr>
<td>(8B) Self-Defeating</td>
<td>39</td>
<td>306</td>
<td>-3.0589</td>
<td>.0022*</td>
</tr>
<tr>
<td>Severe Personality Pathology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(S) Schizotypal</td>
<td>37.5</td>
<td>307.5</td>
<td>-3.1192</td>
<td>.0018*</td>
</tr>
<tr>
<td>(C) Borderline</td>
<td>54.5</td>
<td>290.5</td>
<td>-2.4103</td>
<td>.0159*</td>
</tr>
</tbody>
</table>

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Table 4--Continued

<table>
<thead>
<tr>
<th>Scale</th>
<th>U</th>
<th>W</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P) Paranoid</td>
<td>53</td>
<td>292</td>
<td>-2.4732</td>
<td>.0134*</td>
</tr>
<tr>
<td>Clinical Syndrome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Anxiety</td>
<td>55</td>
<td>290</td>
<td>-2.4183</td>
<td>.0156*</td>
</tr>
<tr>
<td>(H) Somatoform</td>
<td>48</td>
<td>297</td>
<td>-2.6952</td>
<td>.0070*</td>
</tr>
<tr>
<td>(N) Bipolar:Manic</td>
<td>56.5</td>
<td>288.5</td>
<td>--2.3277</td>
<td>.0199*</td>
</tr>
<tr>
<td>(D) Dysthymia</td>
<td>76.5</td>
<td>268.5</td>
<td>--1.5029</td>
<td>.1329</td>
</tr>
<tr>
<td>(B) Alcohol Dependence</td>
<td>70.5</td>
<td>274.5</td>
<td>--1.7485</td>
<td>.0804</td>
</tr>
<tr>
<td>(T) Drug Dependence</td>
<td>53.5</td>
<td>291.5</td>
<td>--2.4491</td>
<td>.0143*</td>
</tr>
<tr>
<td>Severe Syndrome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS) Thought Disorder</td>
<td>33</td>
<td>312</td>
<td>--3.3257</td>
<td>.0009*</td>
</tr>
<tr>
<td>(CC) Major Depression</td>
<td>54</td>
<td>291</td>
<td>--2.4931</td>
<td>.0127*</td>
</tr>
<tr>
<td>(PP) Delusional Disorder</td>
<td>24.5</td>
<td>320.5</td>
<td>--3.6611</td>
<td>.0003*</td>
</tr>
</tbody>
</table>

*p < .05

The inspection of Table 4 indicates that Null Hypothesis 3 was rejected on 17 scales of the MCMI-II. This would indicate that male weight trainers off anabolic steroids, on most personality dimensions, differ when compared to the male weight trainers who have never used anabolic steroids (p < .05). Null Hypothesis 3 of no differences in measured personality traits was retained on the remaining eight scales at the .05 level of significance.
In order to test Null Hypothesis 4, data from the comparison group were utilized. The Mann-Whitney \( U \) test was computed between the rank order of the 25 scale scores of the MCMI-II obtained on two test administrations by the male weight trainers who have never used anabolic steroids. The results of the analyses are presented in Table 5. No significant differences were found.

**Table 5**

*Mann-Whitney \( U \) Test for Differences Between Two Test Administrations Completed by Male Weight Trainers Who Have Never Used Anabolic Steroids on the MCMI-II Scales*

<table>
<thead>
<tr>
<th>Scale</th>
<th>( U )</th>
<th>( W )</th>
<th>( Z )</th>
<th>( D )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modifier Indices</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(X) Disclosure</td>
<td>102</td>
<td>222</td>
<td>-.4356</td>
<td>.6631</td>
</tr>
<tr>
<td>(Y) Desirability</td>
<td>101</td>
<td>221</td>
<td>-.4906</td>
<td>.6237</td>
</tr>
<tr>
<td>(Z) Debasement</td>
<td>96</td>
<td>249</td>
<td>-.7749</td>
<td>.4384</td>
</tr>
<tr>
<td><strong>Clinical Personality Pattern</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Schizoid</td>
<td>93.5</td>
<td>213.5</td>
<td>-.7920</td>
<td>.4284</td>
</tr>
<tr>
<td>(2) Avoidant</td>
<td>111.5</td>
<td>231.5</td>
<td>-.0419</td>
<td>.9665</td>
</tr>
<tr>
<td>(3) Dependent</td>
<td>87</td>
<td>207</td>
<td>-1.0601</td>
<td>.2891</td>
</tr>
<tr>
<td>(4) Histrionic</td>
<td>96.5</td>
<td>216.5</td>
<td>-.6651</td>
<td>.5060</td>
</tr>
<tr>
<td>(5) Narcissistic</td>
<td>109</td>
<td>229</td>
<td>-.1451</td>
<td>.8842</td>
</tr>
<tr>
<td>(6A) Anti-Social</td>
<td>110.5</td>
<td>230.5</td>
<td>-.0844</td>
<td>.9328</td>
</tr>
<tr>
<td>(6B) Aggressive/Sadistic</td>
<td>103.5</td>
<td>223.5</td>
<td>-.3784</td>
<td>.7051</td>
</tr>
<tr>
<td>(7) Compulsive</td>
<td>103</td>
<td>242</td>
<td>-.3954</td>
<td>.6926</td>
</tr>
</tbody>
</table>
The inspection of Table 5 indicates that Null Hypothesis 4 was retained on all 25 scales of the MCMI-II at the .05 level of significance.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The research was undertaken to determine if the use of anabolic steroids by male weight trainers has any effects on measured personality traits. More specifically, it was directed at determining the differences in personality of these subjects as measured by the Millon Clinical Multiaxial Inventory-II ([MCMI-II], Millon, 1987). A review of the literature indicated a lack of research examining weight trainers when using and not using steroids. Evidence pointing towards effects on personality and behavior was anecdotal. Isolated case reports of individuals experiencing psychiatric symptoms have been published in the professional journals; but as Pope and Katz (1988) stated, the psychiatric effects resulting from steroid use has rarely been empirically investigated. O'Carroll (1987) called for further research to help determine the psychological effects related to exogenous androgen use. With the use of anabolic steroids steadily increasing, a goal of this study was to use an objective instrument to identify and describe the psychological consequences of anabolic steroid usage.

The objectives of this study were:

1. To compare the measured personality traits of male
weight trainers during cycles when they were and were not using anabolic steroids.

2. To compare the measured personality traits of male weight trainers when they were using anabolic steroids with male weight trainers who never used the drugs.

3. To compare the measured personality traits of male weight trainers while off anabolic steroids with male weight trainers who have never used the drugs.

4. To provide additional information to psychologists, psychiatrists, physicians, athletes, and to the general public about the psychological effects of anabolic steroid use.

The difficulty in finding male weight trainers who would admit to anabolic steroid use and in persuading them to agree to participate in research studies has been a factor in the paucity of research on the topic. The researcher, having been a former weight lifting competitor, had personal contacts who overcame the selection problem by recruiting voluntary research subjects from the athletes they knew to be using anabolic steroids. These subjects were all members of various fitness centers and gyms in the upper midwestern United States.

With regard to design, this study was considered quasi-experimental since all of the relevant independent variables were not controlled. Random assignment was not possible and static groups were formed. Specifically, the
research design utilized two test administrations of the MCMI-II—one when the male weight trainers were using anabolic steroids and again when they were temporarily off the drugs.

In review, the mean length of time the 15 experimental group subjects were using anabolic steroids when the initial MCMI-II was administered was 18.533 weeks (range = 13-25). The subjects had ceased from steroid use for a mean time of 10.867 weeks (range = 7-14) when the second administration of the MCMI-II was undertaken. A comparison group of 15 male weight trainers who never used anabolic steroids took the MCMI-II concurrently with the experimental group. Comparisons were investigated (a) between the male weight trainers when using and not using the drugs, (b) between male weight trainers using anabolic steroids and male weight trainers who had never used the drugs, (c) between male weight trainers not using anabolic steroids and male weight trainers who never used the drugs, and (d) between male weight trainers who never used anabolic steroids on two separate occasions. The 25 scale scores obtained on the MCMI-II were compared by rank ordering the subjects' scores on the two test administrations and applying the Mann-Whitney U test of significance.

The underlying assumption of this study was that anabolic steroids would affect personality traits in male
weight trainers using these drugs. If these comparisons mentioned above resulted in statistically significant differences, then the basic assumption of the study would be confirmed. Furthermore the specific personality traits which were altered by the drug use would be identified.

Conclusions

In discussing the conclusions inferred from the data analyses, it is essential to understand that since normative data and transformation scores of the MCMI-II are based entirely on clinical samples (Millon, 1987) and the research subjects were not considered a clinical population, analyses of the raw scores served only to identify trends and/or changes in the personality traits of the subjects (T. Millon, personal communication, April 3, 1989). Thus, significant differences in scores are not necessarily indicative of pathology but of a trend in the indicated direction.

All hypotheses were tested by computing z scores for ordinal means on the 25 MCMI-II scales. It should be noted by the reader that the descriptions used to describe the results were extracted from Millon's (1987) MCMI-II manual.

The first major hypothesis was concerned with statistically significant different personality traits when steroid users were on and off the drugs. On 10
scales the resulting z scores reflected statistically significant differences and the null hypotheses were rejected. The rejection of the null hypotheses on the 10 scales indicated the following trends and/or changes in male weight trainers when using anabolic steroids.

As seen in the results section, significant differences were found on the Modifier Indices Scales, (X) Disclosure and (Z) Debasement. Addressing subject response style to the test administrations as measured by the MCMI-II, these scales indicate a tendency for athletes using the drugs to be unreserved, free-spoken, and to play up their emotional vulnerabilities. On the Clinical Personality Scales, significant differences were found on scales (8A) Passive Aggressive and (8B) Self-Defeating. Athletes using anabolic steroids may exhibit trends towards vacillation between obedience and defiance and may relate to others in a self-sacrificing manner. A significant difference was found on the Severe Personality Pathology Scale (C) Borderline which indicated that changes in male weight trainers using the drugs could include intense moods with spells of anger. The Clinical Syndrome Scales analyses yielded significant differences on scales (H) Somatoform, (D) Dysthymia, (B) Alcohol Dependence, and (T) Drug Dependence. According to these results it would appear that the use of anabolic steroids may increase the tendency of male weight trainers to focus
on bodily complaints to gain attention, experience feelings of discouragement or guilt, have difficulty with alcohol, and may experience themselves as drug dependent. One Severe Syndrome Scale indicated a significant difference, (CC) Major Depression. While using anabolic steroids athletes may show changes in sex drive, appetite, body weight, and sleep patterns.

The second major hypothesis examined the personality traits of the weight trainers using anabolic steroids and weight trainers who have never used the drugs. On 22 scales the resulting z scores reflected statistically significant differences and the null hypotheses were rejected. The rejection of the null hypotheses on the 22 scales indicated the following differences between male weight trainers using anabolic steroids compared to male weight trainers who have never used the drugs.

As seen in the results section, on the Modifier Indices Scales, significant differences were found on scales (X) Disclosure and (Z) Debasement. Addressing subject response style to the test administration as measured by the MCMI-II, these scales indicate a tendency for athletes using the drugs to be unreserved, free-spoken, and to play up their emotional vulnerabilities. On the Clinical Personality Scales significant differences were found on scales (1) Schizoid, (2) Avoidant, (4) Histrionic, (5) Narcissistic, (6A) Anti-Social, (6B)
Aggressive/Sadistic, (8A) Passive Aggressive, and (8B) Self-Defeating. As compared to their non-drug using counterparts, when using anabolic steroids, athletes may appear more detached from human relationships, be perennially on guard, give an appearance of inner confidence, and experience pleasure by focusing on themselves. They possibly engage in behaviors that exploit the environment for self gain, act in ways that humiliate others, and may be seen as hostile and antagonistic. At times they may vacillate between obedience and defiance and may relate to others in a self-sacrificing manner. Significant differences were found on Severe Personality Pathology Scales (S) Schizotypal, (C) Borderline, and (P) Paranoid. When compared to athletes who do not use steroids, using athletes may be seen as interpersonally detached and self-absorbed, experiencing intense moods with spells of anger, and be mistrustful of others. The Clinical Syndrome Scales analyses resulted in significant differences being found on scales (A) Anxiety, (H) Somatoform, (N) Bipolar:Manic, (D) Dysthymic, (B) Alcohol Dependence, and (T) Drug Dependence. Compared to male weight trainers who always train drug-free, male weight trainers using anabolic steroids may tend to feel more tense and restless, focus on bodily complaints to gain attention, experience mood shifts, and act impulsively. In addition they may have inflated self esteem, at times
experience discouragement and guilt, have difficulty with alcohol, and may experience themselves as drug dependent. Severe Syndrome Scales (SS) Thought Disorder, (CC) Major Depression, and (PP) Delusional Disorder were also significantly different. When compared to those who have never used steroids, athletes while using the drugs may exhibit disorganized, regressive behavior, show changes in appetite, body weight, sex drive, and sleep patterns, and show signs of disorganized thinking.

The third major hypothesis examined the personality traits of the steroid using male weight trainers when they were temporarily off the drugs with male weight trainers who have never used the drugs. On 17 scales the resulting z scores reflected statistically significant differences and the null hypotheses were rejected. The rejection of the null hypotheses on the 17 scales indicated the following differences between male weight trainers when not using anabolic steroids compared to male weight trainers who have never used the drugs.

As seen in the results section, significant differences were found on the Modifier Indices Scales (X) Disclosure and (Z) Debasement. Addressing subject response style to the test administration as measured by the MCMI-II, these scales indicate a tendency for athletes who are off anabolic steroids to be unreserved, free-spoken, and to play up their emotional vulnerabilities. On the
Clinical Personality Pattern Scales significant differences were found on scales (2) Avoidant, (5) Narcissistic, (6B) Aggressive/Sadistic, and (8B) Self-Defeating. As compared to their counterparts who have never used the drugs, users when temporarily cessating from steroids could be described as being perennially on guard, experiencing pleasure by focusing on themselves, act in ways that humiliate others, and may be seen as hostile and antagonistic. At times they may relate to others in a self-sacrificing manner. Significant differences between the two groups were also found on three Severe Personality Pathology Scales: (S) Schizotypal, (C) Borderline, and (P) Paranoid. These differences indicated that when compared to those who have never used the drugs, athletes cessating from the drugs may be seen as interpersonally detached and self-absorbed, experiencing intense moods with spells of anger, and be mistrustful of others. The Clinical Syndrome Scales analyses yielded significant differences on scales (A) Anxiety, (H) Somatoform, (N) Bipolar:Manic, and (T) Drug Dependence. Compared to male weight trainers who always train drug-free, male weight trainers off anabolic steroids may tend to feel tense and restless, focus on bodily complaints to gain attention, at times may experience discouragement and guilt, and may experience themselves as drug dependent. Severe Syndrome Scales (SS) Thought Disorder, (CC) Major Depression, (PP)
Delusional Disorder were also significantly different. When compared to non-users, steroid using athletes while off the drugs may exhibit disorganized, regressive behavior, show changes in appetite, body weight, sex drive, and sleep patterns, and show signs of disorganized thinking.

The fourth major hypothesis investigated changes in personality traits of male weight trainers who have never used anabolic steroids. These athletes comprised the comparison group. On two different occasions these subjects responded to the MCMI-II concurrently with the experimental group (once while the experimental group subjects were administering anabolic steroids and once when the experimental group subjects were not using the drugs). On all 25 scales the resulting z scores reflected no statistically significant differences and the null hypotheses were retained. Retaining the null hypotheses on all 25 scales indicated persistence of personality traits of male weight trainers who have never used anabolic steroids across time and that the MCMI-II was statistically reliable.

As stated earlier, although significant differences have been found among the MCMI-II scales under major Null Hypotheses 1, 2, and 3, this is not necessarily indicative of pathological conditions related to anabolic steroid use. Viewing normalcy vs. pathology on a continuum, the results suggest that male weight trainers using anabolic
steroids seem to exhibit behavior in a pathological direction. The absolute measure of change within each individual subject is probably as varied as the individuals themselves. Although the main objective of this study was to determine the effects of anabolic steroid use on the personality traits of male weight trainers, the results also suggest that male weight trainers who use the drugs are quite different in personality traits than those who always train drug-free as measured by the MCMII-II, whether they are using the drugs or not (see Table 6). The extent to which the periodic drug use accounts for this difference cannot accurately be estimated in the context of the present data.

Table 6
Comparing the MCMII-II Scales That Were Significantly Different (p < .05) Under the Four Null Hypotheses

<table>
<thead>
<tr>
<th>Ho1</th>
<th>Ho2</th>
<th>Ho3</th>
<th>Ho4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(X) Disclosure</td>
<td>Disclosure</td>
<td>Disclosure</td>
<td></td>
</tr>
<tr>
<td>(Z) Debasement</td>
<td>Debasement</td>
<td>Debasement</td>
<td></td>
</tr>
<tr>
<td>(1) Schizoid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Avoidant</td>
<td>Avoidant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Histrionic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Narcissistic</td>
<td>Narcissistic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6A) Anti-Social</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6B) Aggr./Sad.</td>
<td>Aggr./Sad.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6—Continued

<table>
<thead>
<tr>
<th>Ho1</th>
<th>Ho2</th>
<th>Ho3</th>
<th>Ho4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(8B) Self-Def.</td>
<td>Self-Def.</td>
<td>Self-Def.</td>
<td></td>
</tr>
<tr>
<td>(S) Schizotypal</td>
<td>Schizotypal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C) Borderline</td>
<td>Borderline</td>
<td>Borderline</td>
<td></td>
</tr>
<tr>
<td>(P) Paranoid</td>
<td>Paranoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Anxiety</td>
<td>Anxiety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(H) Somatoform</td>
<td>Somatoform</td>
<td>Somatoform</td>
<td></td>
</tr>
<tr>
<td>(N) Bipolar:Manic</td>
<td>Bipolar:Manic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D) Dysthymia</td>
<td>Dysthymia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B) Alcohol Dep.</td>
<td>Alcohol Dep.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SS) Thought Dis.</td>
<td>Thought Dis.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** Ho1 = experimental group using steroids/experimental group off steroids; Ho2 = experimental group using steroids/comparison group; Ho3 = experimental group off steroids/comparison group; Ho4 = comparison group/comparison group; Aggr./Sad. = Aggressive/Sadistic; Pass. Aggr. = Passive Aggressive; Self-Def. = Self-Defeating; Dep. = Dependent; Dis. = Disorder; Maj. Depress. = Major Depression; Delus. Dis. = Delusional Disorder.
In Table 6 the outcomes of the study are summarized. Examination of the results of the statistical analyses (Chapter IV) and the information in Table 6, as suggested in the first research hypothesis, implies that male weight trainers using anabolic steroids differ in various personality traits in accordance with their cycling on and off of these drugs. Further examination of the results indicates, as suggested in the second research hypothesis, that male weight trainers using anabolic steroids differ in a majority of personality traits, as measured by the MCMI-II, when compared to male weight trainers who have never used the drugs. The third research hypothesis is also confirmed. Steroid using male weight trainers, even while off the drugs, differ in personality traits than their non-drug using counterparts.

Additionally, information in Table 6 indicates that significant statistical differences were found on the vast majority of MCMI-II scales under more than one null hypothesis. On scales (X) Disclosure, (Z) Debasement, (8A) Passive Aggressive, (8B) Self-Defeating, (C) Borderline, (H) Somatoform, (T) Drug Dependent, and (CC) Major Depression, the athletes' scores when using anabolic steroids were significantly different when compared to themselves while off the drugs (Ho1) and when compared to athletes who have never used the drugs (Ho2). Even when not using anabolic steroids these same weight trainers
still obtained significantly different scores on these scales when compared to weight trainers who have never used the drugs (Ho3).

On scales (2) Avoidant, (5) Narcissistic, (6B) Aggressive/Sadistic, (S) Schizotypal, (P) Paranoid, (A) Anxiety, (N) Bipolar:Manic, (SS) Thought Disorder, and (PP) Delusional Disorder, steroid using athletes' scores were significantly different when compared to athletes who have never used the drugs (Ho2). Even when not using the drugs these same athletes still obtained significantly different scores on these scales when compared to athletes who have never used the drugs (Ho3).

On scales (D) Dysthymia and (B) Alcohol Dependent, the male weight trainers' scores when using anabolic steroids were significantly different when compared to themselves while off the drugs (Ho1) and compared to male weight trainers who have never used the drugs (Ho2).

On scales (1) Schizoid, (4) Histrionic, and (6A) Anti-Social, male weight trainers' scores when using anabolic steroids were significantly different than male weight trainers who have never used the drugs (Ho2).

In conclusion, the effects of anabolic steroids on personality traits of male weight trainers, as measured by the MCMI-II, indicates the following:

1. Various measured personality dimensions of steroid using athletes appear to be affected by the use of the

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drugs and seems to result in behavioral changes that trends toward the pathological direction.

2. Anabolic steroid usage may result in the exacerbation of pre-disposed or pre-existing psychological conditions.

3. Cumulative effects of steroid use over time may result in altered personalities that may or may not be permanent.

4. Cessating from anabolic steroids does not necessarily ensure that any or all psychological changes experienced while using the drugs will abate.

5. Male weight trainers who decide to employ anabolic steroids as part of their training regimen may be significantly different psychologically, prior to their initial experience with steroids, than their counterparts who have never used the drugs. Perhaps it is their constitutional personality traits that lead them to drug use.

Recommendations

The present research was exploratory in nature. It attempted to identify the effects of anabolic steroids on the personality traits of male weight trainers and to initiate interest in further research in this understudied area. Random selection of a larger sample size would lead to the assumptions that there was normal distribution of the population with equal variances. The question of
homogeneity is an important one to address. Future research might involve a pre-selection process based on assessing personality traits prior to steroid use.

An important question that remains is why after cessating from the drugs the experimental group subjects were still significantly different from the athletes who always trained drug-free on the majority of measured personality scales. A longitudinal study seems appropriate in answering this question. Although ethical considerations would seem to prohibit such a study, ideally subjects could be recruited from a population pool of those who indicate an intention to use anabolic steroids for the first time. Pretest personality assessments could be undertaken and then the steroids would be utilized with post-test personality assessments administered after some predetermined number of weeks. The personality inventories would then be administered again after a predetermined period of cessation and repeated perhaps six months to a year from the time the drugs were initially employed.

To ensure greater control of relevant variables in this type of research, future studies will require: (a) the regulation of the types, dosages, and length of time of steroid utilization, (b) use of competitive or non-competitive weight trainers, and (c) control of dietary regimens.
It is also suggested that in future studies the researcher be given the opportunity to personally interview the test subjects to ascertain their subjective experiences under the various research conditions. This could provide greater clarification and insight with regard to the results obtained on personality inventories.
Appendix A

Summary of the MCMI-II Scales
Summary of the MCMI-II Scales

Modifier Indices Scales

(X) Disclosure: Focuses on the ability of test subjects to be open and frank; "relecting at one extreme, a tendency to be unreserved, guileless, or free-spoken and, at the other end, reticent, equivocal, or secretive" (Millon, 1987, p. 117).

(Y) Desirability: Looks at the attempt by the test subject to appear "psychologically healthy and socially virtuous, denying unattractive or problematic characteristics" (Millon, 1987, p. 119).

(Z) Debasement: Examined the tendency of the test subjects "to demean or denigrate themselves, to accentuate their psychological anguish, and to play up their emotional vulnerabilities" (Millon, 1987, p. 120).

Clinical Personality Pattern Scales

(1) Schizoid: Identifies a "lack of desire and ...[an] incapacity to experience depth in either pleasure or pain...[These individuals] tend to be apathetic, listless, distant, and asocial. Affectionate needs and emotional feelings are minimal...[They are] detached from the rewards and affections of human relationships" (Millon, 1987, p. 19-20).

(2) Avoidant: Identifies characteristics which may be
described as experiencing "few positive reinforcers from self and others, are vigilant, perennially on guard, and are ever ready to distance themselves from anxious anticipation of life's painful or negatively reinforcing experiences. Only by active withdrawal can they protect themselves" (Millon, 1987, p. 20).

(3) Dependent: These individuals "are characterized by a search for relationships in which they can lean upon others for affection, security, and guidance...willingly submitting to the wishes of others to maintain their affection" (Millon, 1987, p. 28).

(4) Histrionic: Characteristics of histrionic individuals may be described as "an insatiable...search for stimulation and affection. Artful social behaviors give the appearance of an inner confidence...beneath...lies a fear of genuine autonomy and a need for repeated signs of acceptance and approval. Tribute and affection must be constantly replenished" (Millon, 1987, p. 28).

(5) Narcissistic: "These individuals are noted by their egotistic self-involvement, experiencing primary pleasure simply by...focusing on themselves....They blithely assume that others will recognize their specialness...with little incentive to engage in the reciprocal give-and-take of social life" (Millon, 1987, p. 28).

(6A) Antisocial: Antisocial individuals may be identified as acting "to counter the expectation of pain
and deprecation at the hands of others...by engaging in...behaviors designed to exploit the environment for self-gain...[with] a wish for revenge and recompense for what they feel have been past injustices" (Millon, 1987, p. 28-29).

(6B) Aggressive/Sadistic: Identifies characteristics which may be described as those "who are not judged antisocial, but whose actions signify personal pleasure and satisfaction in behaviors that humiliate others and violate their rights and feelings....They are generally hostile...and give themselves away in dominating, antagonistic, and frequent persecutory actions" (Millon, 1987, p. 29).

(7) Compulsive: Compulsive individuals may be described as having "perfectionistic ways [which] derive from a conflict between hostility toward others and a fear of social disapproval. They resolve this ambivalence not only by suppressing resentment, but by overconforming and by placing high demands on themselves and others" (Millon, 1987, p. 29).

(8A) Passive-Aggressive: These individuals may be described as being in a "struggle between following the reinforcements offered by others and those derived by themselves....They vacillate between deference and obedience one time, and defiance and aggressive negativism the next" (Millon, 1987, p. 29).
(8B) Self-Defeating: Characteristics of the self-defeating individuals may be described as those who "relate to others in an obsequious and self-sacrificing manner, these persons allow, and perhaps encourage, others to exploit or take advantage of them. Focusing on their very worst features, many assert that they deserve being shamed and humbled" (Millon, 1987, p. 30).

Severe Personality Pathology Scales

(S) Schizotypal: Identifies characteristics which may be represented as a "cognitively dysfunctional and interpersonally detached orientation. These persons prefer social isolation with minimal personal attachments and obligations....They think tangentially and often appear self-absorbed and ruminative....Perceived by others as strange...they display anxious wariness...or an emotional flattening" (Millon, 1987, p. 30).

(C) Borderline: Individuals described as borderline "have structural defects, experience intense endogenous moods, with recurring periods of dejection and apathy, often interspersed with spells of anger....Many reveal recurring self mutilating and suicidal thoughts...[and] have difficulty maintaining a clear sense of identity" (Millon, 1987, p. 30).

(P) Paranoid: Paranoid individuals "display a vigil­lant mistrust of others and an edgy defensiveness against
anticipated criticism and deception....Expressed often is a fear of losing independence, leading...to vigorously resist external influence and control" (Millon, 1987, p. 31).

Clinical Syndrome Scales

(A) Anxiety: Anxious individuals "often report feeling either vaguely apprehensive or specifically phobic, are typically tense, indecisive, and restless, and tend to complain of a variety of physical discomforts....[There is] an apprehensive sense that problems are imminent" (Millon, 1987, p. 31-32).

(H) Somatoform: Identifies characteristics where "psychological difficulties [are] expressed through somatic channels, [with] persistent periods of fatigue and weakness, and a preoccupation with ill health...often presented in a dramatic, vague, or exaggerated way. Typically, somatic complaints are employed to gain attention" (Millon, 1987, p. 32).

(N) Bipolar: Manic: These individuals experience "periods of superficial elation, inflated self-esteem, restless overactivity and distractibility, pressured speech, and impulsiveness and irritability. Also evident is...an intrusive...demanding quality to interpersonal relations; decreased need for sleep; flights of ideas; and rapid...shifts in moods" (Millon, 1987, p. 32).
(D) Dysthymia: Dysthymic individuals "remain involved in everyday life but have been preoccupied over a period of two or more years with feelings of discouragement or guilt, a lack of initiative and behavioral apathy, low self-esteem, and frequently voiced futility and self-deprecatory remarks" (Millon, 1987, p. 32).

(B) Alcohol Dependence: Characteristically these individuals probably have "a history of alcoholism...made efforts to overcome the difficulty with minimal success, and, as a consequence, experience considerable discomfort in both family and work settings" (Millon, 1987, p. 32).

(T) Drug Dependence: Characteristically these individuals likely "have had a recurrent or recent history of drug abuse, tends to have difficulty in restraining impulses or keeping them within conventional social limits, and displays an inability to manage the personal consequences of these behaviors" (Millon, 1987, p. 33).

Severe Syndrome Scales

(SS) Thought Disorder: Individuals with thought disorders "depending on length and course...are usually classified as 'schizophrenic,' 'schizophreniform,' or 'brief reactive psychosis.' They may periodically exhibit incongruous, disorganized, or regressive behavior, often appearing confused and disorganized and occasionally displaying inappropriate affect, scattered hallucinations,
and unsystematic delusions" (Millon, 1987, p.33).

(CC) Major Depression: Severely depressed individuals are "usually incapable of functioning in a normal environment...[and] express a dread of the future, suicidal ideation, and a sense of hopeless resignation. Some exhibit a marked motor retardation...others display an agitated quality, incessantly pacing about and bemoaning their fate" (Millon, 1987, p. 33). Disruptions in sleep patterns, appetite, bodyweight changes, and sex drive are often experienced.

(PP) Delusional Disorder: Characteristics of a delusional disorder include being "frequently considered acutely paranoid, [these individuals] may become periodically belligerent, voicing irrational but interconnected sets of delusions of a jealous, persecutory, or grandiose nature....There may be...signs of disturbed thinking and ideas of reference...suspiciousness, vigilance, and alertness to possible betrayal" (Millon, 1987, p. 33).
Appendix B

Human Subjects Institutional Review Board Approval
TO: Kraig Libstag
FROM: Ellen Page-Robin, Chair
RE: Research Protocol
DATE: March 17, 1989

This letter will serve as confirmation that your research protocol, "The Effects of Anabolic Steroids on Personality Factors of Male Weight Trainers" is now complete and has been signed off by the HSIRB.

If you have any further questions, please contact me at 387-2647.
Appendix C

Letter to Personal Contacts
Dear XXXX,

Thanks so much for helping with my research. Here are the implementation instructions.

1. I will need the same number (or as close as possible) of subjects who use steroids that will make up the "experimental group" and those weight trainers who have never used the drugs who will make up the "comparison" group.

2. Inform each subject that their identity will only be known to you. Inform each subject in the experimental group that they will be asked to complete the MCMI-II twice; once when they have been on the drugs for a minimum of six weeks and after they have been off all steroids for a minimum of six weeks.

   Inform each subject in the comparison group that they will be asked to complete the MCMI-II twice during the same time frame as the experimental group (now; and then retested approximately six-eight weeks after the state meet)

Each testing will take approximately 30-45 minutes.

3. My doctoral committee informed me that they want the subjects to remain anonymous from me. Please assign each subject a # and you keep a sheet with the names and numbers so that the pre and post tests can be coordinated.

4. After I send you the test packets, hand them to each subject. The packets will contain a) instruction sheet, b) demographic data sheet, and c) test question booklet. Have them select a subject ID# to be filled in on the demographic sheet and the answer sheet. The same number will be used for the second testing.

5. The subjects can respond to the test at home but please tell them to follow the test instructions explicitly.

6. Please request that the subjects return the completed test and information sheets back to you as soon as possible.

I will call you in a couple days to make sure you have received this information and discuss any questions you may have. Thanks so much again for your help.

Sincerely,

[Signature]

Kraig Libstag
5058 Beckley Rd. #3C
Kalamazoo, MI 49009
616-372 2182
Appendix D

Instruction Sheet
INSTRUCTIONS
Thank you to for taking part in this research. The study will help find out if steroids affect personality traits. Any person who wishes to have a report of his MCMI-II may do so by informing the coordinator of your desire (your ID# will be used for this report). YOU WILL REMAIN ANONYMOUS TO THE RESEARCHER. ONLY ID#'S WILL BE USED. Thanks again.

1. **Demographic Data:** Please fill out this form.

   (A) Those weight trainers who have never used anabolic steroids please complete section A. Simply put a check after the statement reflecting this. Proceed no further on this sheet.

   (B) Those weight trainers who use anabolic steroids, please complete section B.

   Answer questions 1, 2, 3, 4, & 5 if you are currently using anabolic steroids.

   Answer questions 6 & 7 if you are not currently using anabolic steroids.

2. **MCMI-II: DIRECTIONS FOR TEST TAKER**

   A) Use a SOFT, BLACK LEAD PENCIL ONLY and make a heavy, dark mark when filling in the circles.

   B) If you make a mistake or change your mind, please erase the mark fully and then fill in the correct circle.

   C) Try to be as honest and serious as you can in marking the statements.

   D) Do not be concerned that a few of the statements will seem unusual to you. When you agree with a statement or decide that it describes you, fill in the true (T) circle. If you disagree with the statement or decide that it does not describe you, fill in the false (F) circle. Try to mark every statement even if you are not sure of your choice. Please do not discuss any test statement with anybody. Input from others would invalidate the results. If you have tried your best and still cannot decide, fill in the false (F) circle.

   E) There is no time limit for completing the inventory, but it is best to work as rapidly as is comfortable for you.

   F) If this is the second testing, the environmental conditions should be as similar as possible to the initial testing.

   G) Please open the test booklet and begin at question #1.
Appendix E

Demographic Data Forms
Demographic Data

Subject ID#: Today's date:
Age: # Years of Weight Training:
Bodyweight: Are you training for a competition?
Are you on a reduced calorie diet?

SECTION A
FOR WEIGHT TRAINERS WHO HAVE NEVER USED ANABOLIC STEROIDS

If you have never used anabolic steroids please check here and turn in this sheet with your completed answer sheet.
GO NO FURTHER ON THIS SHEET. Return to the instruction sheet for guidelines in filling out the MCMI-II test booklet.

SECTION B
FOR WEIGHT TRAINERS WHO ARE CURRENTLY USING OR HAVE USED ANABOLIC STEROIDS

**Please answer questions 1, 2, 3, 4, & 5 if you are currently using anabolic steroids.

1) Number of Steroid Cycles completed prior to this current cycle:

2) Length of time (number of weeks) of Current Steroid Cycle as of today's date:

3) Type and Dosage (mgs./week injectables; mgs./day orals) of anabolic steroids being administered as of this week in the current steroid cycle:

4) Date when planning to discontinue this cycle of all anabolic steroids:

5) Date when planning to begin the next cycle of any anabolic steroids:

Return to the instruction sheet for guidelines in completing the the MCMI-II test booklet.

**Please answer questions 6 & 7 if you are not currently using anabolic steroids.

6) Length of time (number of weeks) off all anabolic steroids since the last cycle as of today's date:

7) Date when planning to begin the next cycle of any anabolic steroids:

Return to the instruction sheet for guidelines in filling out the MCMI-II test booklet.
APPENDIX F

Millon Clinical Multiaxial Inventory-II

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