THE EFFECT OF WEIGHT PERCEPTION, SATISFACTION, AND BEHAVIOR ON ANABOLIC STEROID USE AMONG COLLEGE STUDENTS

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Dedicated to my daughter, Riley Danielle.

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ABSTRACT

Few studies have examined predictors of anabolic steroid (AS) use among young adults not engaged in professional sports; especially at the college level. Therefore, the purpose of this study was to examine the relationship between gender, perceived AS use, perceived user weight, satisfaction with weight, healthy and unhealthy weight-control behaviors and self-reported AS use in college students.

This study utilized data from 27,774 students who participated in the 2011 National College Health Assessment Survey. Logistic regression models layered by self-perceived weight status, were run to examine the relationship between independent variables and the dependent variable (AS use). Results indicated that age, gender, unhealthy weight-control behaviors, and perceived peer steroid use significantly predict anabolic steroid use among college students. The three separate models explained 20.3%, 12.9%, and 3.7% of the variance in AS use.

Results from this study should be considered when designing interventions to address anabolic steroid use among college students.

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CHAPTER I

INTRODUCTION

The media often portrays the use of anabolic steroids (AS) to be solely related to participation in professional sports, such as weight lifting, body building, and, recently highlighted, endurance sports. The media coverage of AS use excludes the evidence indicating that the majority of AS users are recreational weight lifters and amateur athletes (Ip, Barnett, Tenerowicz, & Perry, 2011). AS use is growing among recreational young adult weight lifters (McCabe, Brower, West, Nelson, & Wechsler, 2007). Estimates are that over 3 million Americans are current users of AS and up to 3% of young adults have used AS in their lifetime (National Institute on Drug Abuse, 2000). Other surveys indicate that up to 30% of health club and gym patrons use AS (Parkinson & Evans, 2006).

AS use is unlike most recreational drug use due to the positive side effects (e.g. increases in strength, lean muscle mass and self-esteem) and the lack of an identified intoxication syndrome (Hildebrandt, Langenbucher, Carr, Sanjuan & Park, 2006). Approximately 90% of AS users report negative side effects yet they continue use (Hildebrandt et al., 2006; Ip et al., 2011). Without a seductive intoxication effect, AS users must consider the positive side effects to outweigh the adverse effects to continue use. The positive effects AS use has on the individual's physical and psychological state could be enticing to most young adults, yet most would not use steroids because of the potential adverse side effects (Monaghan, 2002; Wertz & Sayette, 2001).

During the young adult years and college, most people are searching for who they are and a part of that search can involve body image. Body image is not just internalizing how one looks in the mirror and appears to others, but is a mixture of positive and negative interpretations about their body (Philips & de Man, 2010). Body image begins to develop as children. A study of adolescent AS use concluded that AS users were more likely to have parents who were concerned about weight and report teasing by family members than non-users (Irving, Wall, Neumark-Sztainer, & Story, 2002). Dependence on steroids can be reinforced by the need to avoid negative reinforcement, like the aforementioned teasing, instead of being reinforced by the physical benefits (Brower, Blow, Young, & Hill, 1991).

Little research has been done to examine the predictors and psychological motives of young adult AS users in comparison to the vast amount of research on professional athletes or adolescent populations. Among recreational AS users, the subset population of college students has rarely been studied. The average starting age of AS use is 24.50 years of age, which is typically during or directly after the college years (Ip et al., 2011). Additional direct study of this population could produce more efficient and promising interventions and prevention strategies.

Purpose of the Study

The purpose of this study is to examine the relationship between self-reported anabolic steroid (AS) use and gender, perceived AS use on campus, perceived weight, satisfaction with weight, and weight-control behaviors.

Overarching Research Question

  This study's research question is: What is the relationship between gender, perceived anabolic steroid use on campus, perceived weight status, satisfaction with weight, healthy and unhealthy weight-control behaviors and self-reported anabolic steroid use in college students?

Specific Research Questions

  The study's specific research questions are: 1) What effect does perceived anabolic steroid use have on self-reported anabolic steroid use in college students, 2) What effect does perceived user weight have on self-reported anabolic steroid use in college students, 3) What effect does satisfaction with weight have on self-reported anabolic steroid use in college students, 4) What effect does healthy and unhealthy weight control behaviors have on self-reported anabolic steroid use in college students, and 5) What effect does gender have on self-reported anabolic steroid use in college students?

Hypotheses

  The hypotheses for this study are the following: 1) When controlling for gender, age, weight perception, satisfaction with weight, and weight-control behaviors, students who perceive no steroid use on their campus are less likely to use anabolic steroids than those who perceive that there is steroid use on their campus, 2) When controlling for gender, age, perceived steroid use, satisfaction with weight and weight control behaviors, students who perceive themselves as underweight are more likely to use anabolic steroids than those who

perceive themselves as a normal weight or overweight, 3)When controlling for gender, age, perceived steroid use, weight perception, and weight-control behaviors, students who are not trying to change their weight are less likely to use anabolic steroids than those who are trying to change their weight, 4) When controlling for gender, age, perceived steroid use, weight perception, and satisfaction with weight, students who participate in unhealthy weight-control behaviors are more likely to use anabolic steroids than those who do not participate in weight control behaviors, and 5) When controlling for age, perceived steroid use, weight perception, satisfaction with weight, and weight-control behavior, female students are less likely to use anabolic steroids than male students.

Theoretical Framework

Theory of Reasoned Action (TRA) is the theory most typically cited in relation to steroid use (Dunn et al., 2009; Schwerin & Corcoran, 1996). Dunn et al. (2009) claim that past behaviors are not relevant to predictive behavior models, and therefore, the exploration of underlying causes of AS use is necessary to understand how to design proper interventions.

TRA suggests that behavioral intentions are the direct precursors that determine behavior (Madden, Ellen, & Ajzen, 1992). In 1975, Fishbein & Ajzen developed TRA and separated behavioral intentions into two categories: normative and behavioral beliefs (Madden, Ellen, & Ajzen, 1992). In an introduction to health theories, Hayden (2009) describes social norms and attitudes. Hayden (2009) discusses that an individual's belief on how typical a behavior is and how pressured they feel to engage in it will build their

behavioral intentions. Also, Hayden (2009) discusses how attitudes toward a behavior are behavioral beliefs, for example believing AS use will bring about a positive outcome, such as higher self-esteem and positive body image, will increase the likelihood of an individual participating in that behavior. In Figure 1, the path model of TRA shows how beliefs affect intentions and intentions lead to behavior.

Theory of Reasoned Action guides this study because of the beliefs that go into anabolic steroid use. A user must first believe the illegal use of steroids is going to somehow benefit them and that there will be a positive outcome. This study utilizes the weight perception, satisfaction of weight, and weight-control behavior variables to assess behavioral beliefs. These variables assess behavioral beliefs by determining whether or not an individual is seeking a change in their weight, where AS use may benefit them. Normative beliefs are assessed by perceived AS use on campus variable. This variable most suitably determines the individual's perception of the social norms of AS use.
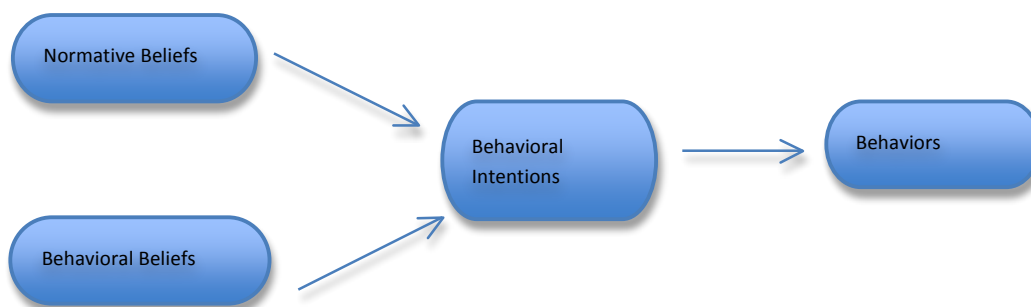
Figure 1 Path Model

Assumptions and Limitations

Assumptions of this study are that the students answered the survey to the best of their ability and honestly.

Limitations of this study are that the participant's satisfaction with weight is based upon a question asking if they are currently doing anything to change their weight. If a student is not currently trying to change their weight, then it is assumed they are satisfied with their weight. That assumption overlooks the possibility that a participant may not be currently doing anything about their weight because they have unsuccessfully tried several times to change their weight and have stopped attempting to change it.

Additionally, the self-reporting nature of the study presents limitations because researchers cannot determine whether a participant is answering honestly, perhaps due to social norms (i.e. weight control behaviors), or legality concerns (i.e. illegal steroid use). The study also does not assess whether the steroid use is illegal or not, and it could be possible that a small number of cases could be medically prescribed testosterone.

CHAPTER II

REVIEW OF LITERATURE

Anabolic steroid (AS) use is well documented among professional athletes in sports such as: bodybuilding, weightlifting, wrestling, baseball, football, track and field, rugby, cycling, swimming, soccer, boxing and basketball. Most existing studies tend to concentrate on the physical effects and motivations such as improving lean muscle mass and improving athletic performance (Hillenbrandt et al., 2006). Relatively recent numbers show that AS use is becoming more popular among adolescents engaged in recreational activities and young adult weight lifters (McCabe et al, 2007).

Although a number of studies have examined AS use among adult weight lifters and adolescents, AS use among college students and young adults in general is overlooked (Ip et al., 2011; Dunn, Mazanov, & Sitharthan, 2009; Miller, Hoffman, Barnes, Sabom, Melnick, &Farrell, 2005).

Anabolic Steroid Use among Adolescents

Kerr & Congeni (2007) found that adolescents who report wanting more defined muscles who were trying to replicate someone's physique, such as a famous actor, TV personality, or famous athlete, were three times more likely to use AS. Adolescents and young adults are often not deterred from AS use since the side effects are treatable and benefits such as increased self-esteem and improved concentration are positive reinforcements (Hildenbrandt, 2006). The positive reinforcements and negative reinforcements (avoiding teasing and low self-esteem) seem to outweigh the risk factors and

negative side effects on AS use, possibly due to the lack of physical, mental, and emotional maturity of the adolescent and young adult population (Brower et al., 1991).

Protective Factors

Studies suggest the usual protective factors against illicit drug use and behavioral issues, such as being older, having higher education and being married are potential risk factors for AS use (McCabe et al., 2007; Ip et al., 2011). In a study of trends of AS use in American college students, AS users were more likely to be married college students, as well as older students (McCabe et al, 2007). In a comparison study of 500 self-reported AS users and 700 non-users, it was also concluded that AS users were more likely to be married and that 43% of users had a bachelor's degree or higher (Ip et al., 2011). Social norms can also be discouraging and preventative measures of drug use (Monaghan, 2002; Wertz & Sayette, 2001). In the study of 500 AS users and 700 non-users, AS use was not a secretive practice; 72% of users informed a friend of their use, 53% informed spouse or family member, 29% informed a gym member or colleague, and less than 9% were completely secretive about their AS use (Ip et al., 2011).

Motivating Factors

Each specific population of AS users has different motives. A Norwegian study by Wichstrom et al. (2001) explored why adolescents use steroids. The categories of motives included using them to be rebellious, to look good, or to win at sports. The results indicate that adolescent AS users who used steroids in the preceding 12 months had better self-perceived romantic appeal than non-users, which indicates they were more concerned about

physical appearance than rebellion or sports performance. In a separate study, Miller et al. (2005) examined adolescent AS use by analyzing data from a national representative sample of high school students. Results from the latter study indicate AS use is associated with sexual risk-taking, binge drinking, cocaine use, and fighting. Similarly, Kerr et al. (2007) found that sexual promiscuity, history of sexually transmitted disease, and unprotected sex were also associated with AS use.

Side Effects of Anabolic Steroid Use

AS can be used to improve physical performance and appearance, but can have several adverse side effects (Tucci, Morgese, Colaianna, Zotti, Schiavone, Cuomo, & Trabace, 2012). Reported adverse side effects include increased acne, testicular atrophy, injection site pain, increased blood pressure, irritability, decreased impulse control, increased violence, insomnia, sexual dysfunction, abnormalities in lipid levels, hair loss, and bacterial or viral infections (Ip et al, 2011; Tucci et al, 2012; Casavant, Blake, Griffith, Yates, & Copley, 2007). Long-term consequences from AS abuse include testicular atrophy, decreased endogenous testosterone production, reduced fertility, baldness, altered libido, withdrawal symptoms, and feminizing effects on men such as development of breasts and increased voice pitch (Casavant et al., 2007).

Most AS users consider themselves educated and very confident about their actions. Ip et al. (2011) found that AS users spent a great deal of time researching AS before use and strategically planned the frequency and duration of use. Many AS users consider themselves to be just as or more knowledgeable than the medical community about AS and the use of

ancillary drugs for side effect management (Monaghan, 2002). Ip et al. (2011) also found that only 11% of users reported no side effects and 56% of users were concerned about long-term effects on their health. Though most AS users report side effects and are concerned about their health, they are undeterred often due to ancillary drug use. Ancillary drug use can be used to treat or prevent side effects like water retention, gynecomastia, difficulty sleeping, and testicular shrinkage (Hildenbrandt et al., 2006). Hildenbrandt (2006) conducted a study in which he found 99.8% of AS users used at least one ancillary drug.

Perceived Use, Norms, & Beliefs

In 2006, Martens et al. examined actual and perceived norms among college students relating unhealthy behaviors such as AS use. Results indicated that students perceived unhealthy behaviors were happening significantly more than these behaviors were actually reported. This illustrates normative beliefs, from the Theory of Reasoned Action, and how a student who is misperceiving drug use to be more typical than reality, is more likely to engage in that drug use (Hayden, 2009; Schwerin & Corcoran, 1996; Martens et al., 2006).

Behavioral beliefs about a behavior are determined by what outcomes an individual expects. If they expect a positive outcome from a known negative behavior, they still maintain a positive attitude about the behavior (Hayden, 2009; Schwerin & Corcoran, 1996). In a qualitative study of British bodybuilders, the motives and norms were analyzed to determine beliefs among AS users. Monaghan (2002) quotes respondents giving rationales about their AS use such as:

"It's a plus drug, you're trying to do something constructive."

"I don't class steroids as a drug […] whereas with other drugs they're just taking them to you know, get high."

"I know it's a drug when it boils down to it but the thing is, as I said, it's a conscious decision to improve yourself. I mean, if you get people who use heroin and people like that, they do it for a buzz …"

Weight Perception, Satisfaction with Weight & Weight-control Behaviors

Weight perception and satisfaction with weight are common discussions and feelings among college students. Students find themselves working out in groups, discussing the newest fad workout or diet, making plans on how to look good for spring break, pleading with their friends in front of the mirror that they "look fine," crash dieting, drinking low-fat, zero calorie, diet drinks, and self-depreciating themselves behind closed doors. Kerr and Congeni (2007) observed misperception of body image might contribute to AS use.

Low self-esteem, weight dissatisfaction, and weight misperception could all be related to steroid use. AS users may share many characteristics with anorexic or bulimic individuals, but typically view themselves as smaller than they actually are. Ip et al. (2011) states that although AS users already had higher BMIs and body weight, they were still classified as trying to "gain weight." The latter study suggests that "societal representation" of the body has become more muscular over the past few decades and may be contributing to the underlying body image issues related to AS use. To examine the effect of body image on AS use, Kanayama et al. (2003) studied 48 weight lifters using a scale to indicate degree of confidence in body appearance. Results of the latter study indicate negative relationship

between body image and AS use. A 10% increase in confidence in appearance equates to a 23% decrease in likelihood to use AS.

Recreational weight lifters do not seem to use AS for the same level of performance and results as professional athletes or body-builders. Parkinson et al. (2006) found that almost four out of five users are solely using AS for improved physical appearance. Dunn et al. (2009) found that 74% of users wanted to improve physical appearance and 80% wanted to increase muscle size. Current non-users report reasons for non-use as the side effects not out weighing the benefits (64%), and liked their appearance without the use of AS (49%), but only 4% claimed they did not believe that AS did not work, and 11% weren't using because AS are illegal (Dunn et al., 2009). In a study of 500 AS users, using a 5-point Likert scale to examine motivations to begin using AS, the top three motivations were to increase muscle mass, improve physical appearance, and increase strength (Ip et al., 2011).

Parkinson et al. (2006) found that almost four out of five users were solely using AS for improved physical appearance. This latter finding is consistent with Dunn et al. (2009) study in which 74% of AS users wanted to improve physical appearance and 80% wanted to increase muscle size. Non-users report reasons for non-use as the side effects not out weighing the benefits (64%), and liked their appearance without the use of AS (49%), but only 4% claimed they did not believe that AS did not work, and 11% weren't using because AS use is illegal (Dunn et al.,2009).

Miller et al. (2005) determined AS users engaged in more days of strength conditioning than non-users. AS users spend more time in the gym than non-users, which

potentially subjects themselves to a distorted view of their body image in comparison to other weight lifters. Dunn et al. (2009) stated that negative body image, knowing other AS users, greater time spent on weight lifting, and a greater awareness of AS effects are risk factors for AS use.

In the Irving et al. (2002) study in which AS users were more likely to report being teased by family members, male steroid users reported trying to lose weight at a 14.5% higher rate than non-users and were more likely to use unhealthy weight control behaviors versus non-users (Irving et al., 2002). Additionally, it was found that non-users were more likely to use healthy weight control behaviors than AS users.

This study utilized data from the Fall 2011 National College Health Assessment (NCHA) conducted by the American College Health Association. The NCHA is a representative sample of full-time college students in both private and public settings. Chapter III will discuss the NCHA questions and the methodology used to answer the study's research question: What is the relationship between perceived anabolic steroid use, gender, perceived user weight, satisfaction with weight, unhealthy weight-control behaviors and self-reported anabolic steroid use in college students?

CHAPTER III

METHODOLOGY

In this study, data from the Fall 2011 National College Health Assessment (NCHA) was examined to determine the relationship between anabolic steroid use (AS) and gender, perceived use of AS on campus, perceived weight, satisfaction with weight, and weight-control behaviors.

Data Source- National College Health Assessment

The NCHA is a survey administered by the American College Health Association (ACHA) designed to help campuses evaluate the health status, health behaviors, and perception of unhealthy behaviors on their campus. NCHA is the largest health related broad-spectrum data set for college students (American College Health Association, 2012). The survey consists of 66 questions addressing health education, alcohol, drugs, and tobacco use, and general health.

The surveys are conducted one of two ways. An institution can choose to conduct the survey by paper or by the web-based version. For the current data set, 2 institutions chose to collect surveys by paper (589 participants) and 42 institutions chose web-based collection (27,175 participants). The paper surveys had a mean response of 100% and the web-based surveys had a mean response of 21% (ACHA, 2012).

The data for this study is from Fall 2011. Relevant questions from the 2011 NCHA survey were utilized to examine the relationship between perception of AS use on campus,

gender, weight perception, satisfaction with weight, unhealthy weight-control behaviors and AS use.

Reliability & Validity

The ACHA-NCHA II survey has been assessed for reliability and validity using previous collection data from 2009 and 2010 instead of the original pilot data from 2000 (ACHA, 2011). The NCHA instrument is not externally valid. Schools are not randomly selected to participate. Rather, institutions self-select to participate. Selected schools randomly sample their student population for a representative sample (ACHA, 2012).

The ACHA (2011) reported reliability analyses demonstrated moderate to strong reliability on grouped and scaled items on the survey and there was a strong consistency over the two survey periods. The NCHA data consists of 65 questions, all of which were not analyzed, but most items went through a systematic evaluation. Principal Components Analysis (PCA) for the Alcohol, Tobacco and Drugs section, which includes anabolic steroid use, identified 2 components. The first component which was labeled "Infrequently Used Drugs" had an Egenvalue of 6.4 and explained 37.7% of the variance. The second component which was labeled "Moderately Used Drugs" had an Egenvalue of 2.1 and explained 12.5% of the variance. Reliability analysis indicate average inter-item correlation of .41 and .31 for the first and second components respectively. Standardized alphas were .91 and 74 for first and second component respectively. According to ACHA, the NCHA instrument has adequate construct validity (ACHA, 2011).

Participants

The 2011 American College Health Association- National College Health Assessment (NCHA) included 27,774 college students from 44 different college campuses across the United States. The decision to participate rested fully with individual institutions. Students in participating institutions were randomly selected to participate. Institutions in 44 different states participated in the survey. The campuses' sizes ranged from under 2,500 to over 20,000 (ACHA, 2012).

The participants' average age is 22.25 years and ranges from 18 to 32 years. The sample consists of 18,358 (67.14%) women and 8,998 (32.86%) men, 86.20% of whom are undergraduate students and 12.70% are graduate students, and 92.50% of who are full time students. The marital status of the sample is 85% are single. Also, 38.30% participate in organized collegiate sports (varsity, club, or intramurals). The overall return rate was 19% (ACHA, 2012).

Selected Variables for Analysis

The study design was a cross-sectional survey. The cross-sectional design only measures behavior at a specific one moment in time and allows for the examination between independent variables and the dependent variable. Causality or the direction of the relationship cannot be established with a cross-sectional design.

Dependent Variables

The dependent variable for this study was anabolic steroid use. Anabolic steroid use was assessed on the Fall 2001 NCHA survey by the question "Within the last 30 days, on

how many days did you use Anabolic steroids (Testosterone)?" Responses include: 1) "Never

used," 2) "Have used, but not in last 30 days," 3) "1-2 days," 4) "3-5-days," 5) "6-9 days,"

6) "10-19 days," 7) "20-29 days," and 8) "Used daily." This variable was recoded

dichotomously into "yes" and "no." This is because this study focused on any or no use

versus frequency of use.

The computation of the dependent variable, AS use, was based on responses to a

multiple-choice question on the survey. Students who answered they had never used any type

of AS were coded as "1 = no." Students who responded that they had used AS but not within

the last 30 days or used any type of AS in the past 30 days were coded as " 2 = yes."

Independent Variables

The independent variables for this study were perceived steroid use, weight

perception, satisfaction with weight, weight-control behaviors, and gender. Students were

asked questions pertaining to perceived steroid use on school campus, how they view their

weight, were they doing anything about their weight, and what actions have they taken to

lose weight.

The specific question on the Fall 2011 NCHA survey is; "Within the last 30 days, on

how often do you think the typical student at your school used: Anabolic steroids

(Testosterone)?" Responses include: 1) "Never used," 2) "Have used, but not in last 30

days," 3) "1-2 days," 4) "3-5-days," 5) "6-9 days," 6) "10-19 days," 7) "20-29 days," and 8)

"Used daily." This variable was recoded into two answers "yes" and "no." Again, like the

dependent variable, this study is not concerned with frequency, because it is an unhealthy behavior no matter how many times you use steroids.

AS use perception was also a multiple-choice question. Students who answered they thought the typical student on their campus had never used any type of AS were coded as "1 = no." Students who responded that they thought the typical student on their campus had used AS but not within the last 30 days or thought the typical student on their campus had used AS within the last 30 days were coded as "2 = yes."

Weight perception was assessed by the question "How do you describe your weight?" Responses include: 1) "Very underweight," 2) "Slightly underweight," 3) "About the right weight," 4) "Slightly overweight," and 5) "Very overweight." Students who responded as slightly or very underweight were recoded as "underweight." Those who responded as slightly or very overweight were recoded as "overweight." Overweight and underweight categories are combined because the degree to which they find themselves very over/underweight or slightly over/underweight will not further the study, so a basic perception about their weight was determined to be acceptable.

Weight perception was a categorical question. Students who described their weight as "very underweight" or "slightly underweight" were coded as "1 = underweight." Students who responded their weight as "about the right weight" were coded as "2 = correct weight." Students who depicted their weight as "slightly overweight" or "very overweight" were coded as "3 = overweight."

The satisfaction with weight variable was assessed by the question "Are you trying to do any of the following about your weight?" Responses included 1) "I am not trying to do anything about my weight," 2) "Stay the same weight," 3) "Lose weight," and 4) "Gain weight." Students who responded that they were doing nothing about their weight or were maintaining their weight are classified as "satisfied."

Satisfaction with weight was a categorical question. Students who answered that they were not currently trying control their weight or that they were trying to maintain the same weight were coded as "1= not trying to change weight." Students who reported that they were currently trying to "gain weight" or "lose weight" were coded "2 = trying to change weight."

The weight-control behavior variable was assessed by a dichotomous question. The question was "Within the last 30 days, did you do any of the following?" The subcategories included: A) "Exercise to lose weight," B) "Diet to lose weight," 3) "Vomit or take laxatives to lose weight," and D) "Take diet pills to lose weight." Responses included: 1) "No" and 2) "Yes." Students who responded, "yes" only to exercise and dieting to lose weight were recoded as using "1= healthy weight control." Students who responded "yes" to taking laxatives or diet pills were recoded as using "2= some unhealthy weight-control behaviors." Those who answered "no" to all were recoded as "3= no weight control behaviors."

Gender was also an independent variable. Research shows it is more likely for a man to be engaged in AS use than a woman (Ip et al., 2011; Miller et al., 2005; Hildebrandt et al., 2006; Irving et al., 2002). Gender was not recoded.

The control variable was age. Age was a control variable because previous research shows that age can be a predicting factor in AS use (McCabe et al., 2007). Age is a continuous variable and was not recoded.

Data Analysis

A logistic regression analysis was used to determine the relationship between the independent variables (gender; perceived anabolic steroid use on campus; weight perception; satisfaction with weight; weight-control behaviors) and the dependent variable (anabolic steroid use). Logistic regression was used because the dependent variable is a dichotomous categorical variable; using/used anabolic steroids versus never used anabolic steroids. Logistic regression allows for quantification of the relationship between the independent variables and the dependent variable. Odds ratios with 95% confidence intervals were calculated to further quantify the relationship.

Data analysis was done using SPSS®. Significance was set at p<.05

CHAPTER IV

RESULTS

This study utilized data from the Fall 2011 National College Health Assessment to explore the relationship between perceived anabolic steroid use on campus, gender, perceived weight status, satisfaction with weight, unhealthy weight-control behaviors and self-reported anabolic steroid use in college students. The following chapter explores the results of the data analysis to test the following hypotheses: 1) When controlling for gender, age, weight perception, satisfaction with weight, and weight-control behaviors, students who perceive no steroid use on their campus are less likely to use anabolic steroids than those who perceive that there is steroid use on their campus, 2) When controlling for gender, age, perceived steroid use, satisfaction with weight and weight control behaviors, students who perceive themselves as underweight are more likely to use anabolic steroids than those who perceive themselves as a normal weight or overweight, 3)When controlling for gender, age, perceived steroid use, weight perception, and weight-control behaviors, students who are not trying to change their weight are less likely to use anabolic steroids than those who are trying to change their weight, 4) When controlling for gender, age, perceived steroid use, weight perception, and satisfaction with weight, students who participate in unhealthy weight-control behaviors are more likely to use anabolic steroids than those who do not participate in weight control behaviors, and 5) When controlling for age, perceived steroid use, weight perception, satisfaction with weight, and weight-control behavior, female students are less likely to use anabolic steroids than male students.

Descriptive Statistics

The characteristics of study participants are presented in Table 1. A total of 27,774 students participated in the 2011 NCHA. The mean age was 22.25 years. The sample consisted of 67.14% female students and 32.86% male students. When asked if students had ever used anabolic steroids, 99.14% indicated they had never used steroids.

Students were asked about how they control their weight. They were asked if they use diet or exercise to control weight, which were each considered "healthy" behaviors. They were also asked if they vomit, use laxatives or take diet pills to control weight, which were each considered "unhealthy" behaviors. Students responded 52.70% that they were only using healthy weight-control behaviors, and 4.91% were using some unhealthy weight-control behaviors. Students responded that 58.13% were not trying to currently change their weight. Overall, 9.89% perceived themselves as "underweight," 54.33% perceived themselves "about the right weight," and 35.79% perceived themselves as "overweight." Concerning steroid use on campus, 50.07% of respondents thought students on their campus had used steroids.

Table 2 reflects prevalence estimates for anabolic steroid use and each independent variable. Among students who report anabolic steroid use, 67.42% were men, 14.84% were participating in some unhealthy weight-control behaviors, 57.76% were currently trying to change their weight, and 14.66% perceived themselves as underweight. The mean age is 24.27 ± 10.38 years.

Table 1

Participant Characteristics (N = 27774)

Characteristics	*n*	*%*
Steroid Use		
Have not used steroids	27337.00	99.14
Have used steroids	236.00	0.86
Weight-control Behaviors		
Healthy	14636.00	52.70
Unhealthy	1365.00	4.91
No WCB	11773.00	42.39
Self-Perceived Weight		
Underweight	2732.00	9.89
Normal weight	15015.00	54.33
Overweight	9890.00	35.79
Satisfaction with Weight		
Not trying to change weight	11569.00	41.87
Trying to change weight	16061.00	58.13
Perceived Peer Steroid Use		
Typical Student Has Not Used	13552.00	49.93
Typical Student Has Used	13592.00	50.07
Gender		
Women	18370.00	67.14
Men	8989.00	32.86

n = unweighted count

Table 2

Steroid User Characteristics (N = 236)

Characteristics	*n*	*%*
Weight-control Behaviors		
Healthy	95.00	40.25
Unhealthy	35.00	14.84
No WCB	106.00	44.92
Self-Perceived Weight		
Underweight	34.00	14.66
Normal weight	119.00	51.29
Overweight	79.00	34.05
Satisfaction with Weight		
Not trying to change weight	98.00	42.24
Trying to change weight	134.00	57.76
Perceived Peer Steroid Use		
Typical Student Has Not Used	64.00	28.32
Typical Student Has Used	162.00	71.68
Gender		
Women	72.00	32.58
Men	149.00	67.42

n = unweighted count

Model

Table 3 reflects the logistic regression analysis of the full model including the two significant interactions. The effect of self-perceived weight on steroid use is different for men and women. Additionally, the effect of self-perceived weight on steroid use depends on a student's age. The Nagelkerke R^2, which defines the strength of the relationship, was .103 for the full model.

Since there are two significant interactions in the full model and perceived weight was in both interactions, the population is divided by perceived weight for the logistic regression analysis. Tables 4, 5, and 6 contain the test of model effects by perceived weight.

Self-perceived Underweight

Table 4 reflects results of the logistic regression analysis examining the effect of the independent variables on anabolic steroid use among students who perceive themselves as underweight. The results indicate a significant relationship between four of the predictor variables and anabolic steroid use (X^2 Wald =90.37, df =1.00, p < .001). Gender (X^2 Wald = 18.64, df =1.00, p < .001), age (X^2 Wald = 8.93, df =1.00, p = .003), unhealthy weight loss behaviors (X^2 Wald = 26.27, df =1.00, p < .001), and perceived steroid use (X^2 Wald = 6.76, df =1.00, p = .009) are individually related to steroid use. Healthy weight loss behaviors (X^2 Wald = 1.17, df =1.00, p = .279) and satisfaction with weight (X^2 Wald = .53, df =1.00, p = .468) are not significant. The Nagelkerke R^2, which defines the strength of the relationship, was .203 for the underweight portion of the model.

Table 3

Summary of Logistic Regression Analysis Effects of Interactions

Variable	b	SE	Odds ratio	95% Confidence Interval Lower	95% Confidence Interval Upper	Wald statistic	df	p
Main Effects:								
Intercept	-3.75	0.49				59.73	1	.000
Age	-0.01	0.02	0.99	0.95	1.02	0.41	1	.520
Gender								
Women	-1.13	0.25	0.32	0.20	0.52	21.21	1	.000
Men	(reference)							
Satisfaction with Weight								
Not trying to change weight	0.03	0.17	1.03	0.74	1.43	0.03	1	.852
Trying to change weight	(reference)							
Perceived Steroid Use								
Typical Student Has Not Used	-1.15	0.16	0.32	0.23	0.43	51.84	1	.000
Typical Student Has Used	(reference)							
Weight-control Behaviors (WCB)								
Only healthy WCB	-0.04	0.18	0.96	0.68	1.35	0.06	1	.805
Some unhealthy WCB	1.51	0.24	4.53	2.83	7.23	39.83	1	.000
No WCB	(reference)							

Table 3 Continued

Summary of Logistic Regression Analysis Effects of Interactions

Variable	b	SE	Odds ratio	95% Confidence Interval Lower	Upper	Wald statistic	df	p
Self-perceived Weight								
Self-perceived Underweight	-1.15	0.66	0.32	0.09	1.14	3.08	1	.079
Self-perceived Normal Weight	-0.94	0.56	0.39	0.13	1.17	2.83	1	.092
Self-perceived Overweight	(reference)							
Interactions:								
Women*Self-perceived Underweight	-1.16	0.63	0.31	0.09	1.07	3.44	1	.064
Women*Self-perceived Normal Weight	-0.76	0.33	0.47	0.25	0.89	5.38	1	.020
Women*Self-perceived Overweight	(reference)							
Men*Self-perceived Underweight	(reference)							
Men*Self-perceived Normal Weight	(reference)							
Men*Self-perceived Overweight	(reference)							
Age								
Age*Self-perceived Underweight	0.08	0.02	1.08	1.03	1.13	9.70	1	.002
Age*Self-perceived Normal Weight	0.06	0.02	1.06	1.02	1.11	7.41	1	.006
Age*Self-perceived Overweight	(reference)							

Note: Model Chi Square = 240.37, *df* = 12, (*p* < .000); -2 Log Likelihood = 895.341, Nagelkerke R^2 = .103

Table 4

Summary of Logistic Regression Analysis for Predicting Anabolic Steroid Use in Self-Perceived Underweight Students

Variable	*b*	*SE*	Odds ratio	95% Confidence Interval Lower	Upper	Wald statistic	df	*p*
Main Effects:								
Intercept	-5.03	0.53				90.37	1	.000
Age	0.06	0.02	1.06	1.02	1.10	8.93	1	.003
Gender								
Women	-2.61	0.60	0.07	0.02	0.24	18.64	1	.000
Men	(reference)							
Satisfaction with Weight								
Not trying to change weight	0.28	0.39	1.33	0.62	2.86	0.53	1	.468
Trying to change weight	(reference)							
Perceived Steroid Use								
Typical Student Has Not Used	-1.14	0.44	0.32	0.13	0.76	6.76	1	.009
Typical Student Has Used	(reference)							
Weight-control Behaviors (WCB)								
Only healthy WCB	0.61	0.57	1.85	0.61	5.61	1.17	1	.279
Some unhealthy WCB	2.84	0.55	17.08	5.77	50.57	26.26	1	.000
No WCB	(reference)							

Note: Model Chi Square = 64.43, *df* = 6, (*p* < .000); -2 Log Likelihood = 136.74, Nagelkerke R^2 = .203

Table 4 also contains the odd ratios for each variable in the self-perceived underweight students. Among students who perceive themselves to be underweight, when controlling for age, weight-control behaviors, satisfaction with weight, and perceived steroid use, female students are less likely to report having used steroids compared to the reference group of male students. The odds ratio is .022, 95% CI [.02-.24].

Among self-perceived underweight students, when controlling for sex, age, satisfaction with weight, and perceived steroid use, students who reported using some unhealthy weight-control behaviors are more likely to report having used steroids than the reference group of students using no weight-control behaviors, OR 17.08, 95% CI [5.77-50.57]. There is no statistically significant difference in the likelihood of reporting steroid use when comparing students who used only healthy weight-control behaviors to the reference group of students who used no weight-control behaviors. Similarly, there is no statistically significant difference in the likelihood of reporting steroid use when comparing students not currently trying to do anything about their weight to the reference group of students who were trying to change their weight.

When controlling for age, gender, weight-control behaviors, and satisfaction with weight, students who perceived the typical student on their campus having not used anabolic steroids are less likely to report having used steroids themselves compared to the reference group of students who thought the typical student at their school had used steroids. OR .319, 95% CI [.14-.76].

Self-perceived Normal Weight

Table 5 reflects results of the logistic regression analysis examining the effect of the independent variables on anabolic steroid use among students who perceive themselves as normal weight. The results indicate significant relationship between four of the predictor variables and anabolic steroid use (X^2 Wald = 167.36, df =1.00, p < .001). Gender (X^2 Wald = 71.18, df =1.00, p < .001), age (X^2 Wald = 15.01, df =1.00, p < .001), unhealthy weight loss behaviors(X^2 Wald = 27.12, df =1.00, p < .001), and perceived steroid use (X^2 Wald = 37.03, df =1.00, p < .001) are individually related to steroid use. Healthy weight loss behaviors (X^2 Wald = 2.29, df =1.00, p = .130) and satisfaction with weight (X^2 Wald = .04, df =1.00, p = .847) are not significant predictors. The Nagelkerke R^2, which defines the strength of the relationship, is .129 for the normal weight portion of the model.

Table 5 also contains the odd ratios for each variable in the self-perceived normal weight students. Among students who perceive themselves to be normal weight, when controlling for age, weight-control behaviors, satisfaction with weight, and perceived steroid use, female students are less likely to report having used steroids than the reference group of male students. The odds ratio is .15, 95% CI [.10-.23].

Among self-perceived underweight students, when controlling for sex, age, satisfaction with weight, and perceived steroid use, students who reported using some unhealthy weight-control behaviors are more likely to report having used steroids than the reference group of students using no weight-control behaviors. The odds ratio is OR 5.53,

Table 5

Summary of Logistic Regression Analysis for Predicting Anabolic Steroid Use in Self-Perceived Normal Weight Students

Variable	b	SE	Odds ratio	95% Confidence Interval Lower	Upper	Wald statistic	df	p
Main Effects:								
Intercept	-4.52	0.35				167.36	1	.000
Age	0.05	0.01	1.05	1.02	1.08	15.01	1	.000
Gender								
Women	-1.91	0.23	0.15	0.09	0.23	71.18	1	.000
Men	(reference)							
Satisfaction with Weight								
Not trying to change weight	-0.04	0.21	0.96	0.63	1.46	0.04	1	.847
Trying to change weight	(reference)							
Perceived Steroid Use								
Typical Student Has Not Used	-1.38	0.23	0.25	0.16	0.39	37.02	1	.000
Typical Student Has Used	(reference)							
Weight-control Behaviors (WCB)								
Only healthy WCB	-0.35	0.23	0.71	0.45	1.11	2.29	1	.130
Some unhealthy WCB	1.71	0.33	5.52	2.90	10.51	27.12	1	.000
No WCB	(reference)							

Note: Model Chi Square = 159.71, *df* = 6, (*p* < .000); -2 Log Likelihood = 431.25, Nagelkerke R^2 = .129

95% CI [2.90-10.51]. There is no statistically significant difference in the likelihood of reporting steroid use when comparing students who used only healthy weight-control behaviors to the reference of no weight-control behaviors. Similarly, there is no statistically significant difference in the likelihood of reporting steroid use when comparing students not currently trying to do anything about their weight to the reference group of students who are trying to change their weight.

When controlling for age, weight-control behaviors, and satisfaction with weight, students who perceived the typical student on their campus having not used anabolic steroids are less likely to report having used steroids than the reference group of students who thought the typical student at their school had used steroids. The odds ratio is .25, 95% CI [.16-.39].

Self-perceived Overweight

Table 6 reflects results of the logistic regression analysis examining the effect of independent variables on anabolic steroid use among students who perceived themselves as overweight. The results indicate a significant relationship between three of the predictor variables and anabolic steroid use (X^2 Wald = 45.52, df =1.00, p < .001). Gender (X^2 Wald = 17.43, df =1.00, p < .001), unhealthy weight loss behaviors (X^2 Wald = 4.13, df =1.00, p = .042), and perceived steroid use (X^2 Wald = 8.72, df =1.00, p = .003) are individually related to steroid use. Age (X^2 Wald = .32, df =1.00, p = .572), healthy weight loss behaviors (X^2 Wald = .03, df =1.00, p = .874), and satisfaction with weight (X^2 Wald < .01, df =1.00, p < .958) are not significant. The Nagelkerke R^2, which defines the strength of the relationship, is .037 for the overweight portion of the model.

Table 6

Summary of Logistic Regression Analysis for Predicting Anabolic Steroid Use in Self-Perceived Overweight Students

Variable	b	SE	Odds ratio	95% Confidence Interval Lower	95% Confidence Interval Upper	Wald statistic	df	p
Main Effects:								
Intercept	-3.89	0.58				45.51	1	.000
Age	-0.01	0.02	0.99	0.96	1.02	0.32	1	.572
Gender								
Women	-1.03	0.25	0.36	0.22	0.58	17.43	1	.000
Men	(reference)							
Satisfaction with Weight								
Not trying to change weight	0.02	0.37	1.02	0.49	2.13	0.00	1	.958
Trying to change weight	(reference)							
Perceived Steroid Use								
Typical Student Has Not Used	-0.78	0.26	0.46	0.27	0.77	8.72	1	.003
Typical Student Has Used	(reference)							
Weight-control Behaviors (WCB)								
Only healthy WCB	0.06	0.35	1.06	0.53	2.12	0.03	1	.874
Some unhealthy WCB	0.93	0.46	2.54	1.03	6.25	4.13	1	.042
No WCB	(reference)							

Note: Model Chi Square = 29.00, *df* = 6, (*p* < .000); -2 Log Likelihood = 311.20, Nagelkerke R^2 = .037

Table 6 also contains the odd ratios for each variable in the self-perceived overweight students. Among students who perceived themselves to be underweight, when controlling for age, weight-control behaviors, satisfaction with weight, and perceived steroid use, female students are less likely to report having used steroids compared to the reference group of male students. The odds ratio is .36, 95% CI [.22-.58].

Among self-perceived overweight students, when controlling for sex, age, satisfaction with weight, and perceived steroid use, students who reported using some unhealthy weight-control behaviors are more likely to report having used steroids than the reference group of students using no weight-control behaviors. The odds ratio is 2.54, 95% CI [1.03-6.25]. There is no statistically significant difference in the likelihood of reporting steroid use when comparing students who used only healthy weight-control behaviors to the reference of no weight-control behaviors. Similarly, there is no statistically significant difference in the likelihood of reporting steroid use when comparing students not currently trying to do anything about their weight to the reference group of students who were trying to change their weight.

When controlling for age, weight-control behaviors, and satisfaction with weight, students who perceived the typical student on their campus having not used anabolic steroids are less likely to report having used steroids than the reference group of students who thought the typical student at their school had used steroids. The odds ratio is .46, 95% CI [.27-.77].

Discussion of the results is provided in chapter V.

CHAPTER V

DISCUSSION

Examining user motives is essential in the design of programs and interventions when addressing steroid use. This study explores possible predictors of anabolic steroid use among college students by examining the relationship between gender, perceived anabolic steroid use, perceived user weight, satisfaction with weight, unhealthy weight-control behaviors and self-reported anabolic steroid use in among college students. Included in this chapter is further discussion on individual variable outcomes, hypotheses, suggestions for further research, and concluding statements.

Steroid Use

In this study, the prevalence for steroid use is .86%, which was consistent with prevalence of use in similar studies; .06% prevalence for steroid use in adolescents (Drewnoski, Kurth, & Krahn, 1995) and 1% prevalence for steroid use among adults (McCabe et al., 2007). Among students who reported using steroids, 67.42% were men. The latter finding is consistent with results from a previous study in which 65.19% users were men (Iriving et al., 2002). For age, similar to IP et al., (2011) study of 500 steroid users where the mean age of users was 24.50 ± 7.20 years, the mean age of users in this study was 24.27 ± 10.38 years.

Self-perceived Weight

Overall, self-perception of weight was not a significant predictor of steroid use in the main effects model and the interaction model. Thus the hypothesis, when controlling for

gender, age, perceived steroid use, satisfaction with weight and weight control behaviors, students who perceive themselves as underweight are more likely to use anabolic steroids than those who perceive themselves as a normal weight or overweight, was not supported. These results are not directly comparable to previous research because there was no research examining the same relationship. Previous research does indicate that perceived weight could be related to steroid use and that steroid use is a risk among young adults who perceive themselves as underweight (Wang, Yesalis, Fitzhugh, Buckley, & Smicklas-Wright, 1994; McCreary & Sadava, 2001).

However when the logistic regression models are layered by categories of self-perceived weight, the effects of age and gender vary across models. The models for self-perceived underweight and normal weight students share the same significant predictor variables. Most of the predictors share a similar level of likelihood of using steroids, except for one. The odds of steroid use for students who participate in some unhealthy weight-control behaviors and perceived themselves as underweight is 17.08 while the odds for self-perceived normal weight students is 5.26. This large difference in odds ratio between weight perception could be attributed to those who perceive themselves as underweight since they are more likely to engage in more intense methods of unhealthy weight-control behaviors. This might translate into greater frequency of steroid use to manipulate their weight compared to students who perceive their weight to be normal. Because perception may not necessarily reflect reality, future research into anabolic steroid use layered by weight perception should include actual body mass as a control variable.

Age

Self-perceived overweight students report one less significant predictor for steroid use than self-perceived underweight and normal weight students. Age was an insignificant predictor among overweight students. However, age is significant in predicting steroid use in self-perceived underweight and normal weight students. The odds of steroid use increase by 1.06 per year among self-perceived underweight students and by 1.05 among self-perceived normal weight student. In an existing study on steroid use among college students, findings report that students age 23 were more likely to use steroids than students under 21, with an odds ratio of 3.28, 95% CI [1.68-6.92] (McCabe et al, 2007).

Perceived Steroid Use

Overall, the study results indicate that perceived peer steroid use is significant in predicting steroid use. Thus the hypothesis, when controlling for gender, age, weight perception, satisfaction with weight, and weight-control behaviors, students who perceive steroid no steroid use on their campus are less likely to use anabolic steroids than those who perceive no steroid use on their campus, is supported. This finding is consistent across all three self-perceived weight groups. The likelihood of steroid use among those who perceived the typical student had not used steroids are very similar in all three self-perceived weight categories. The odds ratios were; .32 for self-perceived underweight students; .25 for self-perceived normal weight students and, .46 for self-perceived overweight students. These results are not comparable or supported by existing studies because there are no previous studies that that author could find examining perceived steroid use and actual steroid use.

Interestingly, this study's results showed that 50.14% of students perceived the typical student had used steroids even though only 0.86% of students actually report having used steroids. The results are consistent with substance use patterns (perceived norms versus actual use) among college students. Martens et al. (2006) reported that students overestimate substance use consumption patterns of the typical college student. For example 62% of students reported not having used cigarettes in the last 30 days and 64% of students perceived the typical student smoked daily in the last 30 days. Students not honestly reporting steroid use, since it is an illegal activity could explain this phenomenon. Ip et al. (2011) report that the majority of steroid users tell someone close to them they are using steroids, which could explain a high perceived use by others, but underreport self use. Future research should examine the high perception of steroid use when only approximately 1% of college students, actually report using steroids themselves.

Weight-Control Behaviors

This study found that weight-control behaviors are significant in predicting steroid use. The hypothesis, when controlling for gender, age, perceived steroid use, weight perception, and satisfaction with weight, students who participate in unhealthy weight-control behaviors are more likely to use anabolic steroids than those who do not participate in weight control behaviors, is supported. An existing study of adolescent steroid use reported that male steroid users are more likely to report having used unhealthy weight-control behaviors than non-users in the year preceding the study (Irving et al., 2002).

As discussed earlier, there are variations in the likelihood of steroid use in those who participate in unhealthy weight-control behaviors when considering self-perceived weight. The OR for self-perceived underweight is 17. 08, self-perceived normal weight is 5.26, and self-perceived overweight is 2.54. This variation could be attributed to the idea that the smaller an individual perceives themselves to be then the greater the frequency and riskier unhealthy weight-control behaviors a person is willing to engage in.

Gender

In the current study, gender was significant in predicting steroid use. The hypothesis, when controlling for age, perceived steroid use, weight perception, satisfaction with weight, and weight-control behavior, female students are less likely to use anabolic steroids than male students, is supported. Across the three self-perceived weight categories, women were less likely than men to use steroids. The OR for AS use for the self-perceived underweight, normal and overweight were .07, .15 and .36 respectively. Similarly, in a study of adolescent steroid use, the likelihood of female adolescents was .44, 95% CI [.27-.71] (Miller et al.,2005). A study of college students, reports male students are more likely to report using steroids with an odds of 8.52, 95% CI [4.99-14.54] (McCabe et al.,2007).

Satisfaction with Weight

Satisfaction with weight is an insignificant variable in predicting anabolic steroid use. The hypothesis, when controlling for gender, age, perceived steroid use, weight perception, and weight-control behaviors, students who are not trying to change their weight are less likely to use anabolic steroids than those who are trying to change their weight, was not

supported. This result is consistent with a study of adolescent males. Body weight was found to be insignificant in predicting steroid use also (Drewnowski, Kurth, & Krahn, 1995).

Theory of Reasoned Action and Steroid Use

Theory of Reasoned Action (TRA) can help explain some the results from the study. The hypothesis, when controlling for gender, age, weight perception, satisfaction with weight, and weight-control behaviors, students who perceive no steroid use on their campus are less likely to use anabolic steroids than those who perceive that there is steroid use on their campus is significant and support by TRA. Students have a high-perceived normative belief of steroid use, which translates into behavioral intention and can result in the decision to use steroids.

The hypothesis, when controlling for gender, age, perceived steroid use, weight perception, and satisfaction with weight, students who participate in unhealthy weight-control behaviors are more likely to use anabolic steroids than those who do not participate in weight control behaviors, is significant and support by TRA. Students who want various degrees of control over their weight may believe that certain unhealthy and risky weight control behaviors will give them desired physical results. The students find the risk to be worth the desired result, and the severity of the action is varied by the severity of the desire for a specific result. Through behavioral beliefs they develop intentions, which could lead them to participate in steroid use.

Conclusion

The purpose of this study was to examine predictors of anabolic steroid use among college students. The results support three of the five stated hypothesis: students who perceive no steroid use on their campus are less likely to use anabolic steroids than those who perceive that there is steroid use on their campus, students who participate in unhealthy weight-control behaviors are more likely to use anabolic steroids than those who do not participate in weight control behaviors, and female students are less likely to use anabolic steroids than male students. There is no significant relationship between desire to change weight and steroid use. Also, there is no significant relationship between self-perceived weight and steroid use. A mixed methods approach combining quantitative and qualitative research could help explain the discrepancy between the relatively high rates of perceived AS use compared to actual AS use rates. Also the results involving perceived weight and age, the effect of self-perceived weight on steroid use depends on a student's age, which could be further explored.

Self-perception of weight and general body image would benefit from more specific and in-depth research in relation to steroids. Perception of weight was not significant in our study, but studies have implicated that it could be related and a motive to steroid use in those who perceive themselves as underweight (Wang et al., 1994; McCreary & Sadava, 2001).

Anabolic steroids are an underestimated problem in the general population. Adolescents and young adults are participating in a behavior that has only been associated with professional athletes until recently. Whether the current culture's body image, competitiveness, or sex appeal is a cause of growing steroid use is a valid question, but the

answer alone will not prevent steroid use. Continuing efforts to find and better understand predictors, risk factors, and motives behind steroid use will help to improve intervention designs for AS use among college students.

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APPENDICIES

APPENDIX A- Institutional Review Board Approval Letter

May 21, 2013

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Protocol Title: "The Effect of Weight Perception, Satisfaction, and Behavior on Anabolic Steroid Use Among College Students"

Protocol Number: 13-350

Dear Investigator(s),

The exemption is pursuant to 45 CFR 46.101(b) (4). This is because the research being conducted involves the collection and study of publically available data that is de-identified.

You will need to submit an end-of-project report to the Compliance Office upon completion of your research. Complete research means that you have finished collecting data and you are ready to submit your thesis and/or publish your findings. Should you not finish your research within the three (3) year period, you must submit a Progress Report and request a continuation prior to the expiration date. Please allow time for review and requested revisions. Your study expires on **May 21, 2016.**

Any change to the protocol must be submitted to the IRB before implementing this change. According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to provide a certificate of training to the Office of Compliance. **If you add researchers to an approved project, please forward an updated list of researchers and their certificates of training to the Office of Compliance before they begin to work on the project.** Once your research is completed, please send us a copy of the final report questionnaire to the Office of Compliance. This form can be located at www.mtsu.edu/irb on the forms page.

Also, all research materials must be retained by the PI or **faculty advisor (if the PI is a student)** for at least three (3) years after study completion. Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Andrew W. Jones

Compliance Office
615-494-8918
Compliance@mtsu.edu

APPENDIX B- American College Health Association Data Use Permission Letter

American College Health Association

1362 Mellon Road, Suite 180
Hanover, MD 21076
Tel: (410) 859-1500
Fax: (410) 859-1510
www.acha.org

June 7, 2013

Rachael K Brooker
1911 Saddlebrook Drive U167
Murfreesboro TN 37129

Dear Rachael,

Thank you for submitting a request to continue utilization of ACHA-NCHA data in your study, "The effect of weight perception, satisfaction, and behavior on anabolic steroid use among college students." Your request has been approved and enclosed you will find the ACHA-NCHA Fall 2011 Reference Group Dataset you requested and the corresponding survey codebook.

I have enclosed a copy of our data use guidelines and agreement for your information. Your signed copy is on file in my office.

As stated in the agreement, we would appreciate a copy of any final products that result from your research.

Please don't hesitate to contact me if you have any questions.

Best of luck in your efforts,

Mary Hoban, PhD, CHES
Director, ACHA-NCHA Program Office

Enclosure: ACHA-NCHA Data Use Guidelines and Agreement

APPENDIX C- National College Health Assessment Questions

Survey Questions

Variable	Description
Anabolic steroid use	**Within the last 30 days, on how many days did you use: (Please mark the appropriate column for each row)** … 3) Anabolic steroids (Testosterone) … (Never used; Have used but not in last 30 days; 1-2 days; 3-5 days; 6-9 days; 10-19 days; 20-29 days; Used daily)
Perceived steroid use	**Within the last 30 days, how often do you think the typical students at you school used: (State your best estimate; Please mark the appropriate column for each row)** … 3) Anabolic steroids (Testosterone) … (Never used; Have used but not in last 30 days; 1-2 days; 3-5 days; 6-9 days; 10-19 days; 20-29 days; Used daily)
Weight perception	**How do you describe your weight?** 1) Very Underweight 2) Slightly underweight 3) About the right weight 4) Slightly overweight 5) Very overweight
Satisfaction with weight	**Are you trying to do any of the following about your weight?** 1) I am not trying to do anything about my weight 2) Stay the same weight 3) Lose weight 4) Gain weight
Healthy weight-control behaviors	**Within the last 30 days, did you do any of the following? (Please appropriate column for each row)** A) Exercise to lose weight B) Diet to lose weight (No; Yes)
Unhealthy weight-control behaviors	**Within the last 30 days, did you do any of the following? (Please appropriate column for each row)** C) Vomit or take laxatives to lose weight D) Take diet pills to lose weight (No; Yes)